SYLLABUS

This report presents the results of a feasibility study to provide flood protection for the Fisher School Basin, located in the town of Jean Lafitte, Louisiana. The study was conducted as part of the Continuing Authorities Program (CAP), under the authority of Section 205 of the 1948 Flood Control Act, as amended.

Officials of the town of Jean Lafitte, the West Jefferson Levee District, and Jefferson Parish desire a Federal project to provide increased levels of flood protection for the study area. The desire for improvement in the study area stems from the natural growth and development occurring on the west bank of the Mississippi River, particularly within the proximity of the Fisher High School. This growth has resulted in the development of lands more vulnerable to flooding from storm tides and local rainfall. The area has experienced a recent surge in land and property values as a result of the enormous growth occurring and is likely to continue to develop given the lack of available land on the east bank of the Mississippi River in Orleans and Jefferson parishes, the presence of an existing interior drainage system, the close proximity to metropolitan New Orleans, and plans for continued improvement in the sewer and interior drainage systems by the local government.

The New Orleans District completed a reconnaissance study of the Fisher School Basin and submitted that report to higher authority in November 1994, recommending further analysis through a cost-shared feasibility study. Due to funding constraints, the study did not proceed beyond reconnaissance for approximately two years. Then on June 25, 1996 a Feasibility Cost Sharing Agreement (FCSA) was signed with the West Jefferson Levee District and the Fisher Basin feasibility study was initiated.

The study area encompasses approximately 45 acres of urbanized land located in southeastern Louisiana in the vicinity of New Orleans. Jean Lafitte is located on the eastern bank of Bayou Barataria in Jefferson Parish and is protected from Mississippi River overflow by the mainline Mississippi River and Tributaries levee system. A local levee system was constructed by the West Jefferson Levee District in response to emergency flooding and provides minimal protection due to its varying height and gaps in the alignment. Land elevations slope gently from an average elevation of about 4 feet NGVD along the natural banks of Bayou Barataria to –1 foot NGVD in portions of the leveed area. Waters emanating in the Gulf of Mexico and nearby Lakes Salvador and Cataouatche travel across the marsh and through the many natural and manmade channels to flood the study area from the south.

The reconnaissance report recommended a structural solution that involves raising the existing earthen levees to elevation +7.0 National Geodetic Vertical Datum (NGVD). In feasibility, the study team identified and analyzed both non-structural and structural alternatives for providing flood protection in addition to the alternative of "no action". The study team identified two economically justified non-structural alternatives. However, the net benefit provided by both alternatives were significantly less than that provided by the proposed levee.

The existing levee alignment was followed as closely as possible in order to minimize adverse impacts to the natural environment and social well being. During plan formulation it was deemed necessary that we maintain the hurricane evacuation route during construction. Louisiana Highway 45 (LA 45) is the primary transportation and hurricane evacuation route for the area south of and including Jean Lafitte. The plan recommended for construction would require raising LA 45 to tie into the levee alignment. To accomplish this task however, special measures will be taken to ensure that detours are available to provide continuous service along LA 45 throughout construction.

The recommended plan consists of hauling in approximately 130,000 cubic yards of earthen material to raise the existing levee to elevation 7.0 feet NGVD. Approximately 7,600 linear feet of concrete capped, steel sheetpile floodwall will be installed in three segments along Bayou Barataria due to the limited right of way available. The plan also contains eleven (11) floodgates to maintain pedestrian and vehicular access to Bayou Barataria. Any changes in the existing levee alignment were based on social, environmental, or cost related concerns.

The incremental total project first cost is estimated to be $9,600,000. The plan would provide flood protection to approximately 309 residential and commercial structures. Annual operation and maintenance costs, which are included in the previous totals, are approximately $19,000. The costs are based on 1997 price levels at an interest rate of 7-1/8 percent with a project life of 50 years. The benefit-to-cost (B/C) ratio is 1.5 to 1. The annual net benefits, the difference in equivalent annual benefits and annual costs, are $386,769. The maximum Federal contribution for Section 205 is $5,000,000. The non-Federal sponsor is required to provide all Lands, Easements, Rights-of-Way, Relocations, and Disposals (LERRD's) for construction. The total project first costs of approximately $9,600,000 includes an estimated $3,800,000 in LERRD's. The project costs for the recommended plan would be apportioned $4,689,000 Federal (maximizes Federal limit) and $4,911,000 non-Federal.

The primary environmental impact of the recommended plan would be the loss of 10.4 acres of fresh swamp and bottomland hardwood habitat. All direct losses of habitat value would be mitigated through the implementation of a mitigation plan consisting of the acquisition of forested lands located in nearby Terrebonne Parish. The estimated cost of the mitigation plan is $17,500. Implementing this mitigation feature would compensate in-kind, all direct project-induced habitat losses to the fullest extent possible. Full compliance with a variety of statues would be achieved after Clean Water Act public notice, review and revision of the environmental assessment are complete, and a finding of no significant impact is issued, if appropriate.

FISHER SCHOOL BASIN FLOOD PROTECTION PROJECT

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

PLAN FORMULATION

RECOMMENDED PLAN DESCRIPTION

TABLE OF CONTENTS (continued)

PLAN IMPLEMENTATION

SUMMARY OF COORDINATION, PUBLIC VIEWS AND COMMENTS

RECOMMENDATIONS

APPENDICES

TABLE OF CONTENTS (continued)

EXHIBITS

LIST OF TABLES

STUDY AUTHORITY

The Fisher School Basin feasibility study was conducted under the authority of Section 205 of the 1948 Flood Control Act, as amended, in response to requests for Federal assistance from officials of the town of Jean Lafitte by letter dated February 2, 1993. The feasibility study is based on recommendations made by the New Orleans District in the Fisher Basin reconnaissance report, submitted to higher authority in November 1994.

SCOPE OF STUDY

A reconnaissance study of the Fisher Basin was initiated in 1993 as the first phase of a two-phase process. The Corps typically conducts a reconnaissance study using existing data wherever possible to determine the nature and extent of the problems and to determine if a feasibility study is appropriate. In the Fisher Basin, the reconnaissance study concentrated on areas that experienced the greatest amount of damage due to flooding. The feasibility study is the second phase of the two-phase study process and is used to identify the National Economic Development (NED) plan. In feasibility, detailed engineering, economic, and environmental investigations are performed to identify economically feasible, environmentally acceptable alternatives. The NED plan is the plan that reasonably maximizes net benefits and minimizes adverse impacts to the environment and social well being.

The Fisher Basin feasibility study was not initiated until June 1996 due to funding constraints in the Continuing Authorities Program. On July 21, 1997, the scope of work was amended to include an area adjacent to the Fisher School Basin, known as the Fleming Curve. As a result, the total study area was enlarged, to encompass approximately 45 acres, and studied as a single hydraulic basin. The Fisher School Basin and Fisher Basin are used interchangeably in this document to refer to the same study area. A vicinity map and description of the study area are enclosed as Plate 1.

Interior drainage for the Fisher Basin was determined to be adequate for a 10-year rainfall event, however, exterior tidal stages frequently overtop the current levee system and cause widespread flooding. Approximately 232 of the 309 structures (roughly 75%) within the study area are inundated below the 5-year design storm event. In feasibility, both non-structural and structural alternatives were considered in addition to the “no action” alternative. Engineering, environmental and economic investigations were used to develop a structural alternative similar to the plan recommended in the reconnaissance report.

STUDY PARTICIPANTS AND COORDINATION

The U.S. Army Corps of Engineers, Mississippi Valley Division, New Orleans District is responsible for the overall study management and report preparation. The West Jefferson Levee District is the non-federal (local) sponsor for the study. The levee district provided input to the feasibility report by completing the Environmental Assessment in coordination with members of the New Orleans District. The study was coordinated with interested Federal, state, and local agencies, and the public.

OTHER STUDIES AND REPORTS

A number of studies and reports on water resources development in the vicinity of the study area have been prepared by the U.S. Army Corps of Engineers, other Federal, state, and local agencies, research institutes, and individuals. Previous Federal and non-Federal studies have established an extensive amount of data for this study. FEMA Flood Insurance studies were conducted in the study area for the unincorporated areas of Jefferson Parish, and Public Works Department drainage plans were provided to the study team for information purposes. The West Jefferson Levee District maintains a comprehensive regional evacuation plan for a wide range of storms. The Corps of Engineers, in conjunction with the Federal Emergency Management Agency (FEMA) and the National Weather Service (NWS), completed a hurricane preparedness study for southeast Louisiana in August 1994 to provide hurricane evacuation plans. The more relevant studies, reports, and projects are described in the following paragraphs.

a. Studies conducted in the vicinity of the Fisher School Basin

(1) A reconnaissance report entitled Fisher School Basin, Jean Lafitte, Louisiana was published by the U.S. Army Corps of Engineers in November 1994. The report recommended further analysis of a structural alternative that involved raising the existing levee to provide protection from tidal and rainfall events.

(2) The U.S. Army Corps of Engineers published a feasibility report entitled West Bank of the Mississippi River in the Vicinity of New Orleans, Louisiana, in December 1986. The report investigated the feasibility of providing hurricane surge protection to that portion of the West Bank of the Mississippi River in Jefferson Parish between the Harvey Canal and Westwego and down to the vicinity of Crown Point, Louisiana. The report recommended implementing a plan that would provide hurricane protection to an area on the West Bank between Westwego and the Harvey Canal north of the Fisher Basin. The project was authorized by the Water Resources Development Act of 1986, Public Law 99 - 662. Project construction was initiated in early 1991, with the West Jefferson Levee District as the non-Federal sponsor. Overall construction of the Westbank hurricane protection projects is scheduled for completion in 2011.

(3) The U.S. Army Corps of Engineers completed a feasibility report entitled West Bank of the Mississippi River in the Vicinity of New Orleans, Louisiana (East of the Harvey Canal), in August 1994. The study investigated the feasibility of providing hurricane surge protection to that portion of the West Bank of metropolitan New Orleans from the Harvey Canal eastward to the Mississippi River. The final report recommended that the existing West Bank Hurricane Protection Project, authorized by the Water Resources Development Act of 1986, Public Law 99-662, approved November 17, 1986, be modified to provide additional hurricane protection east of the Harvey Canal. The report also recommended the level of protection for the area east of the Algiers Canal deviate from the NED level of protection and provides protection for the Standard Project Hurricane (SPH). The Division Engineer's Notice was issued on September 1, 1994. The Chief of Engineer's report was issued on May

1, 1995. The project was authorized by the Water Resources Development Act of 1996. Overall construction of the Westbank hurricane protection projects is scheduled for completion in 2011.

(4) A Post Authorization Change report entitled Westwego to Harvey Canal, Louisiana Hurricane Protection Project Lake Cataouatche Area was published by the U.S. Army Corps of Engineers in December 1996. The report investigated the feasibility of providing hurricane surge protection to several communities on the west bank of the Mississippi River bounded by Bayou Segnette to the east, Lake Cataouatche to the south, the Mississippi River to the north, and the St. Charles Parish line to the west. The recommended plan would provide for the construction of levees and floodwalls extending from Bayou Segnette State Park to the St. Charles Parish line. The protection would tie into the authorized Westwego to Harvey Canal project that was authorized by the Water Resources Development Act of 1986 and construction of the project began in early 1991. Overall construction of the Westbank hurricane protection projects is scheduled for completion in 2011.

(5) The U.S. Army Corps of Engineers completed a reconnaissance report, Jefferson and Orleans Parishes Louisiana Urban Flood Control and Water Quality Management in July 1992. The study was authorized by Senate and House resolutions to investigate rainfall flooding and water quality problems associated with storm water runoff in Jefferson and Orleans Parishes. Both Orleans and Jefferson parishes agreed to participate in four-year urban flood control feasibility studies beginning in 1994. Due to a catastrophic rainfall event on May 8-9, 1995, Section 108 of the Energy and Water Development Appropriations Act of 1996, directed the Corps to proceed with engineering, design and construction of economically justified alternatives identified by the reconnaissance study in Orleans, Jefferson and St. Tammany parishes. The individual flood control features in the three parishes are a part of a single project known as the Southeast Louisiana (SELA) Project. Pre-construction engineering and design (PED) and construction are underway for several project features in Orleans and Jefferson parishes.

b. Other studies and reports

(1) The Mississippi River and Tributaries project, the comprehensive flood control project for the lower Mississippi Valley below Cairo, Illinois, has had a significant impact on the water and land resources in the study area. The Flood Control Act of 1928, and subsequent amendments authorized this project. Features of the project pertinent to the study are listed below.

a) The Mississippi River levees extend from Baton Rouge, Louisiana, to Bohemia, Louisiana, on the west bank. They provide protection from the standard project flood on the Mississippi River and Tributaries system. These levees are essentially complete in the study area.

b) The Bonnet Carre Spillway is located upstream of New Orleans, Louisiana, on the east bank of the Mississippi River in the vicinity of Norco, Louisiana. The purpose of the spillway is to divert Mississippi River flows into Lake Pontchartrain to lower flood stages on the Mississippi River in the New Orleans area. The spillway was completed in 1932.

c) Revetments and foreshore protection were constructed along the Mississippi River in the study area. Revetments are constructed where levees or development is threatened by bank caving or where unsatisfactory alignment and channel conditions are developing. Foreshore protection is constructed where the erosion of the batture threatens levees. Construction of these features is continuing as needed.

(2) The Louisiana Department of Natural Resources published a report entitled Louisiana's Eroding Coastline: Recommendations for Protection in June 1982. The report recognizes that future losses of coastal wetlands are unavoidable and will require either retreat of development from the coastal zone or increasingly greater levels of protection. The report recommends development and implementation of a shoreline protection plan and proposes a number of pilot projects using water and sediment diversions, dredged material placement,

and planting vegetation as a means to reduce erosion. A study to determine future coastal conditions, including changes in shoreline configuration and impacts on developed areas, is also recommended.

(3) The U.S. Army Corps of Engineers prepared a final feasibility report, Louisiana Coastal Area - Freshwater Diversion to Barataria and Breton Sound Basins in September 1984. The report recommends diverting Mississippi River water near Caernarvon into the Breton Sound Basin and near Davis Pond into Barataria Basin to enhance habitat conditions and improve fish and wildlife resources. The report also recommends implementation of the plan under the authorized Mississippi Delta Region Project, which is identical in purpose. The diversions would reduce land loss and save about 99,200 acres of marsh. The construction of the Caernarvon structure was completed in early 1991. Construction is underway for the Davis Pond project.

(4) The Barataria-Terrebonne National Estuary Program, nominated by Governor Roemer in October 1989, received funding under Section 320 of the 1987 Water Quality Act on April 20, 1990, to enhance, protect and maintain the water quality, habitat integrity and natural resources of the Estuarine Complex. The Act authorized the EPA to develop a Comprehensive Conservation and Management Plan which recommends priority corrective actions and compliance schedules addressing point and non-point sources of pollution to restore and maintain the chemical, physical and biological integrity of the estuary: including restoration and maintenance of water quality, a balanced indigenous population of shellfish, fish, and wildlife, and recreational activities, and assuring that the designated uses of the estuary are protected.

(5) The Louisiana Coastal Wetlands Restoration Plan, a comprehensive plan for restoring and conserving the coastal wetlands of Louisiana, was mandated by the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA). The final report was submitted to higher authority in December 1993 and the Record of Decision on the Programmatic Environmental Impact Statement was signed in March 1994. The report details the process by which wetlands restoration plans were developed for the nine hydrologic basins in the coastal zone. The projects presented in the report far exceed the CWPPRA's funding capacity (approximately $40 million per year from 1991 to 1997, including 25 percent cost sharing by the state of Louisiana). The task force established by CWPPRA is initiating feasibility studies with a view toward securing authorization and funding for a number of large-scale projects.

THE STUDY PROCESS

The reconnaissance report concluded that structural improvements to provide flood protection from tidal and rainfall events were economically feasible. The report recommended detailed studies to quantify the magnitude of the costs and benefits associated with several types of improvements.

This feasibility study follows the recommendations of the Fisher School Basin Reconnaissance Report. It includes detailed analyses of a range of improvements and their effectiveness at providing adequate flood protection to the residents of Jean Lafitte. The feasibility study also provides detailed assessments of environmental, social, and local economic effects of those improvements determined to be most viable from a national economic perspective. Results of this study form the basis for a decision on project implementation.

The study process provided for a systematic preparation and evaluation of alternate plans that address study area problems and opportunities. The process involved all of the four functional planning steps:

PROBLEM IDENTIFICATION
FORMULATION OF ALTERNATIVES
IMPACT ASSESSMENT
EVALUATION

The reconnaissance phase emphasized problem identification and formulation of alternatives. Emphasis in this feasibility phase is on evaluation of alternatives, assessment of impacts, and selection of a recommended plan.

PROBLEM IDENTIFICATION

This section of the report shall address the National Objectives; Existing Conditions; Future Conditions without project; Problems, Needs, and Opportunities; and Planning Objectives

NATIONAL OBJECTIVES

The fundamental national objective of Federal participation in water resource development projects is to insure that an optimum contribution is made to the welfare of all people. This requires contributing to the national economic development consistent with protecting the Nation's environment, while at the same time protecting national environmental statues, applicable executive orders, and other national planning requirements.

The plan that reasonably maximizes net national economic development benefits, consistent with the national objective is to be identified as the national economic development (NED) plan. National objectives are designed to ensure systematic interdisciplinary planning, assessment and evaluation of plans addressing environmental concerns that will be responsive to Federal law and regulations.

PLANNING CONSTRAINTS

This study was conducted within the constraints described by the Economic and Environmental Principles and Guidelines for Water and Related Land Implementation Studies, and by applicable Department of the Army regulations and other documents which provide guidance pertaining to the implementation of these principles and guidelines. Plans were developed with due regard to the benefits and costs, both tangible and intangible, as well as associated effects on the ecological, social and economic well-being of the region. Federal participation in developments should also ensure that any plan is complete in itself, efficient and safe, economically feasible in terms of current prices, environmentally acceptable, and consistent and acceptable in accordance with local, regional, and state plans and policies. As far as practical, plans should be formulated to maximize the beneficial effects and minimize the adverse impacts.

PLANNING OBJECTIVES

The following planning objectives were established in response to the identified problems, needs, and opportunities:

- Provide improved flood protection for the Fisher Basin in the town of Jean Lafitte, Louisiana

- Structural alternatives should follow the existing levee alignment to minimize project costs and adverse impacts to residents

- Ensure that Louisiana Highway 45 remains operable throughout construction to maintain the hurricane evacuation route and minimize impacts on the communities south of Jean Lafitte

- Minimize adverse environmental impacts associated with the implementation of flood control measures

- Minimize to the extent possible the destruction of archaeological and historical resources

- Minimize particularly the loss of bottomland hardwood forests or if not possible, mitigate those losses “in-kind” to the extent practicable

- Mitigate for all unavoidable impacts to significant fish and wildlife resources

PROBLEMS, NEEDS, AND OPPORTUNITIES

The problems, needs, and opportunities identified in this study relate to the need for improving flood protection in the Fisher Basin.

General

The study area is located in southeastern Louisiana and is bounded on the north and west by Bayou Barataria and the Gulf Intracoastal Waterway (G.I.W.W.), in the south and east by numerous oil field canals and wetlands (see Plate 1). The Fisher Basin is located approximately 30 miles north of the Gulf of Mexico.

Early developments within the study area occurred primarily along the banks of Bayou Barataria and consist of wood frame and brick structures constructed on slab and pier foundations. As development expanded away from the bayou and into lower, more vulnerable areas, it became necessary to construct interior drainage canals with pumping stations. Over 85 percent of the residential and commercial structures in the study area were constructed before participation in the National Flood Insurance Program was required. The high rates of ground consolidation and subsidence further compound the problem by decreasing efficiency of interior drainage systems and lowering structure elevations below sea level in some areas. As a result, most of the structures located within the study area, experience considerable and repetitive flooding damages.

If no Federal action is taken to provide increased levels of flood protection to the Fisher Basin, the study area will continue to experience flooding because the local governments do not possess the financial resources to construct the recommended plan without Federal assistance. The West Jefferson Levee District constructed several small earthen levee sections along the eastern and southern project limit, in immediate response to hurricane induced flooding. Currently, there are no federally authorized hurricane or tidal flood protection projects for the Fisher Basin study area. Hurricane protection within the study area is not economically feasible at this time given the limited amount of existing development and right-of-way along Bayou

Barataria. The communities along Bayou Barataria, in the vicinity of the study area, could not support a project to provide protection against a 100-year event.

Floods and storms of record

Most of the flooding in the Fisher Basin results from high tides caused by hurricanes and tropical storms tracking in the Gulf of Mexico. The most recent flooding in Jean Lafitte occurred during Tropical Storm Frances from 11-13 September 1998, where Bayou Barataria was 2-to-4 feet above normal for approximately five days. In Jean Lafitte, residents battled tidal flooding under a mandatory evacuation order that was issued Friday, September 11, 1998. Mayor Kerner of Jean Lafitte indicated that during the storm the small levee along the eastern project limit, failed at Tasha Lane and caused flash flooding that damaged several homes and left many residents stranded in those areas. The levee district was able to repair the levee fairly quickly. Federal and State agencies provided portable drainage pumps to relieve some low-lying areas that flooded, but as late as Wednesday, September 16, 1998 several streets had up to one-foot of water still remaining and several homes could not be reached.

Hurricane season extends from June through November with the greatest number of storms expected during the first two weeks of September. Hurricane force winds exceed 74 mph and may extend 100 miles from the center. Extreme gusts may exceed 200 mph at a distance of 20 to 30 miles from the eye. Most hurricanes approach the Louisiana coast from the south or southeast and cross the shoreline at a high angle before moving inland. Occasionally, however, a storm will parallel the shoreline, lingering for days and causing unexpected damages. Such was the case in 1985 when Hurricane Juan looped twice south of Morgan City before paralleling the shoreline and crossing the mouth of the Mississippi River and continuing to the east.

Surveys estimated that 271 of the 275 residential structures and approximately 34 commercial structures in Jean Lafitte, experienced damage during recent hurricane and flooding events, including damage from Tropical Storm Frances in 1998 and Hurricane Juan in 1985. And in 1992, Hurricane Andrew raised water levels at Barataria and Lafitte to 3.5 and 4.2 feet NGVD, respectively, causing widespread flooding of residential and commercial structures. In addition to these storms, the following hurricanes also affected the study area and caused significant flooding: Carmen (August-September 1974), Babe (September 1977), Bob (July 1979), and Danny (August 1985). Statistical data concerning these hurricanes is presented in Appendix A.

Existing protection

The study area is protected from Mississippi River overflow by the mainline Mississippi River and Tributaries levee system. The West Jefferson Levee District has constructed several earthen segments in response to Hurricanes Juan and Andrew to form segmented local levees. The levees vary in elevation from 2 to 6 feet NGVD along Bayou Barataria and from approximately 2.5 feet to 4 feet NGVD along the eastern and southern alignment. The integrity of this series of levees is questionable in view of failures that occurred during Hurricane Juan and Tropical Storm Frances. Overflow frequently occurs across low spots in the line of protection and interior drainage problems are exacerbated when rainfall is accompanied by high tides.

Socio-economic impacts

Most of the residential structures in Jean Lafitte are single-family units. Surveys of estimated damage to residential property from recent flood and hurricane events indicate that approximately 822 of the 1,500 residents in Jean Lafitte have experienced losses from these events. This estimate is based on the general pattern of single-family dwelling units in the community, the number (275) of residential structures and mobile homes impacted by recent events, and the 1990 census estimate of the size of an average household in the town of Jean Lafitte (275 x 2.99 persons/ household = 822 persons).

The needs of the study area related to tidal flood protection can be demonstrated by the fact that of the 309 residential and commercial structures located within the study area, 232 are vulnerable to the 5-year design storm event. The equivalent annual damages for the without project conditions are estimated to be $1,225,407. Flood damage to new development should be moderated by participation in the National Flood Insurance Program, which requires the construction of new structures above the 100-year base flood elevation.

EXISTING CONDITIONS

Physical setting

(1) Physiography. The dominant physiographic features of the study area typically include abandoned distributaries of the Mississippi River, natural levees, inland lakes and bayous, low lying swamps and marshes, and small interconnected lakes, bayous, and man-made canals. The Fisher Basin is located on the deltaic alluvial plain of the Mississippi River and is generally characterized by low relief and gentle slope. Elevations of natural ground typically range from a maximum of approximately 4.0 feet NGVD along the levee ridges of Bayou Barataria to a minimum of approximately –1.0 foot NGVD within protected areas along the eastern part of the study area.

At present, the threat of Mississippi River flooding has been alleviated by levees constructed as part of the Mississippi River and Tributaries Flood Control Project. Storm surges, however, are a continuing threat to the study area. The storm surges, usually related to tropical storm systems originating in the Gulf of Mexico, can easily travel across the broken marsh and through Bayou Barataria and numerous other natural and man-made channels thereby threatening the study area with inundation.

(2) Geology. The geologic history of primary significance to the study area is that which has occurred since the end of the Pleistocene Epoch. A shift of the Mississippi River brought the flow into its present course forming the Plaquemine Delta just south of New Orleans, and the present Balize Delta below the Plaquemine Delta. During the last 1,000 years the Plaquemine-Modern Delta Complex continued to supply minor amounts of sediments into the study area until that supply was interrupted by construction of the artificial levee systems along the Mississippi River resulting in the gradual degradation of the study area through subsidence and shoreline retreat.

(3) Subsidence. Subsidence, which generally refers to the loss of surface elevation, is an ongoing occurrence within the deltaic alluvial plain of the Mississippi River and consequently, within the study area. Subsidence in the study area is estimated to occur at a rate of 0.50 feet per century within a levee system and from 0.6 to 1.2 feet per century in unleveed areas. This rate of subsidence is and will continue to be exacerbated by eustatic/global sea level rise that has been estimated to be 0.5 feet per century. As a result of subsidence and sea level rise, the study area will become increasingly vulnerable to flooding, particularly in unleveed areas.

(4) Mineral Resources. Extensive oil and gas exploration and production has occurred in the vicinity of the study area. While the majority of producing facilities are presently suffering limited production, geophysical exploration activities are reportedly being undertaken by Shell Oil Company. No active exploration or producing wells were identified within the study area, although some facilities related to the production of adjacent wells are known to exist. Continued exploration and production of mineral resources in the vicinity of the study area will not be adversely affected by the project, nor will the project be adversely affected by the oil and gas operations.

(5) Soils. At the project site, the subsurface consists of Holocene deposits approximately 90 feet thick. These deposits consist of natural levee clays and silts approximately 10 feet thick adjacent to Bayou Barataria. Moving east from Bayou Barataria, the flanks of these natural levees have subsided and approximately 5 feet of swamp and marsh clays and peats have been deposited on top of the natural levee. Natural levee, swamp, and marsh deposits overlie interdistributary clays and silts that can be found to elevation -60.0 feet NGVD.

The United State Department of Agriculture - Soil Conservation Service has surveyed and classified the soils within the study area. According to this survey, the study area is comprised of five soil series, which include Barbary Muck; Sharkey Clay; Sharkey Silty Clay Loam; Commerce Silt Loam; and Lafitte-Clovely Association. Most of the soil types in the study area will settle upon loading, will shrink and oxidize upon dewatering, and have low shear strengths. Therefore, settlement sensitive structures should be pile supported.

Climatology

(1) Climate. The study area has a subtropical marine climate. Located in subtropical latitude, its climate is influenced by the many water surfaces of lakes, streams, and the Gulf of Mexico. Throughout the year, these water bodies modify the relative humidity and temperature conditions decreasing the range between the extremes. When southern winds prevail, these effects are increased, imparting the characteristics of a marine climate.

Climatic conditions in the area from April through September are influenced by tropical air masses from the Gulf of Mexico and, from October through March, by cold air masses from the northern continental United States. The result is a humid, subtropical climate with mild winters and long, hot summers. During the summer, prevailing southerly winds produce conditions favorable for afternoon thundershowers. In the colder seasons, the area is subjected to frontal movements that produce squalls and sudden temperature drops. River fogs are prevalent in the winter and spring when the temperature of the Mississippi River is somewhat colder than the air temperature.

(2) Precipitation. Precipitation in Louisiana results from storms commonly associated with polar fronts, squall lines, tropical fronts, tropical weather systems, and showers and thunderstorms. Summer showers last from mid-June to mid-September, and heavy winter rains generally occur from mid-December to mid-March. Extreme monthly rainfalls exceeding 12 inches are not uncommon within the study area, and as much as 20 inches have been recorded in a single month. The heaviest rainfall typically occurs in the summer. Precipitation in the form of snow, sleet, or hail seldom occurs.

Precipitation data pertinent to the study area has been collected from the National Climatic Center for the LSU Citrus Research Station. The station location is situated 20 miles southeast of the study area. The monthly and annual norms for the station are listed on Table 1. The maximum monthly rainfall and the maximum daily rainfall totals recorded between 1984 and 1992 are listed on Table 2.

TABLE 1
MONTHLY PRECIPITATION (Inches)
30 Year Average (1961-1990)

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
LSU CITRUS	5.05	5.83	4.99	4.06	5.08	5.59	6.82	6.67	5.89	3.40	4.26	5.21	62.85

Source: National Climatic Center

TABLE 2
MAXIMUM PRECIPITATION TOTALS (Inches)
(1984-1992)

STATION	MONTHLY	MAXIMUM DATE	1 DAY	GREATEST DATE
LSU CITRUS	20.00	APR 91	8.73	2 AUG 84

Source: National Climatic Center

The annual normal precipitation at the LSU Citrus Research Station over the 30-year period from 1961 to 1990 is 62.85 inches. July is the wettest month with an average monthly normal of 6.82 inches. October is the driest month, averaging 3.40 inches. The maximum monthly rainfall at the station between 1984 and 1992 occurred in April 1991 when a total of 20.00 inches was recorded. The maximum daily rainfall at the station during the referenced period occurred on August 2, 1984 when a total of 8.73 inches was recorded.

(3) Temperature. Records of temperatures are available from "Climatological Data" for Louisiana, published by the National Climatic Center. Mean temperatures within the study area can be described using data observations from the LSU Citrus Research Station. The annual normal temperature at this station during the period from 1961 to 1990 is 60.1 degrees Fahrenheit (EF) with monthly mean temperature norms varying from 42.5 EF in January to 73.7 EF in July. Temperature extremes occurring at the station between 1984 and 1992 were

97EF for a high and 12 EF for a low on December 23, 1989. Average temperatures are shown in Table 3 and extremes at this station since 1984 are shown in Table 4.

TABLE 3
MEAN MONTHLY and ANNUAL TEMPERATURES (EF)
30 Year Average (1961-1990)

STATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
LSU CITRUS	42.5	45.1	51.9	60.2	67.0	72.5	73.7	73.6	71.6	62.4	54.1	46.4	60.1

Source: National Climatic Center

TABLE 4
TEMPERATURE EXTREMES (EF)
(1984-1992)

STATION	MAXIMUM	DATE	MINIMUM	GREATEST DATE
LSU CITRUS	97	Occurring on Several Days	12	23 DEC 89

Source: National Climatic Center

(4) Wind. Wind data taken at New Orleans is used to describe the study area. The average wind velocity is 8.0 miles per hour (mph) over the period 1973-1992. Southeast winds predominate in the spring and summer. The prevailing winds of the fall and winter are from the northeast. The strongest winds are associated with the high-pressure systems that penetrate the Gulf of Mexico area in winter and with hurricanes in summer. The winter storms have produced wind speeds up to 47 mph, and hurricanes have generated winds in excess of 190 mph in the area. Since 1893, a total of 75 tropical storms and hurricanes have struck the coast while another 103 passed offshore but affected the area. The maximum wind speed observed (highest one-minute speed) since 1963 was 69 mph at New Orleans and was the result of Hurricane Betsy in September 1965.

(5) Stages, Frequencies and Duration. Stage data is recorded at two gage stations within the vicinity of the study area. One station, identified as "Bayou Barataria at Barataria", is located near the confluence of Bayou Barataria and the Gulf Intracoastal Waterway. The second station, identified as "Bayou Barataria at Lafitte", and is located near the confluence of Bayou Barataria and Bayou Rigolettes. Stream gage data for these stations, including period of record and maximum and minimum stages, is presented in Table 5.

TABLE 5
STREAM GAGING DATA

MAP NO.	STATION	PERIOD OF RECORD	MAXIMUM STAGE FEET NGVD	MAXIMUM STAGE DATE	MINIMUM STAGE FEET NGVD	MINIMUM STAGE DATE
1	Bayou Barataria at Barataria	1950-92	4.25[1]	October 29, 1985	-0.58[1]	September 10, 1965
2	Bayou Barataria at Lafitte	1963-92	5.05[1]	October 29, 1985	-0.95[2]	December 23, 1989

[1] Caused by Hurricane Juan in 1985
[2] From Incomplete Record
Source: U.S. Army Engineers District, New Orleans

Tides in the study area can be diurnal or semi-diurnal depending on astronomical conditions. The tidal range at Barataria is 0.25 feet NGVD with the mean high water being approximately 1.47 feet NGVD, and the mean low water approximately 1.22 feet NGVD. The average high stage at Barataria is 3.34 feet NGVD, and the average low stage is 0.72 feet NGVD. At Lafitte, the tidal range is 0.35 feet NGVD with the mean high water measuring approximately 1.49 feet NGVD, and the mean low water approximately 1.14 feet NGVD. The average high stage is 2.87 feet NGVD, and the average low stage is -0.13 feet NGVD.

Within the study area, wind effects can mask the daily ebb and flow variations, and during periods of sustained southerly winds, tides rise in direct response to the duration and intensity of the wind stress. Intense hurricanes such as Betsy have caused high stages along the coastal area of Louisiana (10.5 feet NGVD at Grand Isle) and moderately high stages inland

(3.2 feet NGVD at the Harvey Lock). Although a relatively weak storm in terms of maximum sustained windspeed, Hurricane Juan caused higher stages in the study area than the more intense Hurricane Betsy. This is directly attributable to the hurricane's erratic, almost stationary, path across southern Louisiana. Gale force winds over a period of five days caused tides 3 to 6 feet above normal across the entire coastal area of southern Louisiana. Examination of gage records at the gaging stations for the study area reveals that Hurricane Juan caused the highest stage of record on October 29, 1985, along Bayou Barataria at both Barataria (4.25 feet NGVD) and Lafitte (5.05 feet NGVD).

Biological resources

Wetlands. Forested wetlands of the project area are under extreme developmental pressures, primarily being cleared for single family dwellings. Much of the southern half of the project area has been enclosed by a levee constructed by local interests and has been under pump for some time. Although currently unleveed, forested wetlands within the northern half of the project area are experiencing identical developmental pressures.

Along the extreme southern end of the project area, 17.5 acres of fresh swamp are currently enclosed by an existing levee. This habitant is characterized by the occurrence of a few remaining baldcypress and tupelogum trees; however, the area primarily consists of a dense growth of young woody vegetation having an average height of less than 25 feet. Because of the denseness of the canopy, the area is virtually devoid of ground cover.

Within the mid- to northern reach of the project area, 7.96 acres of early successional bottomland hardwood habitat will be enclosed by the proposed levee. The areas that have become reforested had formerly been cleared for the cultivation of sugarcane. The predominant species within this habitat include sugar-berry, Chinese tallow-tree, red maple, black willow, American elder, eastern false-willow, and blackberry. This habitat resembles a scrub-shrub community, having tree species with a diameter breast height (dbh) of generally less than 5 inches.

Wildlife. Because the remaining forested wetlands in the project area are of relatively low quality and have been adversely affected by forced drainage and developmental disturbances, they are considered of low value as wildlife habitat. Wildlife which may be evidenced in the project area include various species of reptiles and amphibians, resident and migratory passerine birds, rabbits, squirrels, various rodents, and the nine-banded armadillo.

Fisheries. Bayou Barataria supports a variety of fish species including blue and channel catfish, freshwater drum, buffalo, largemouth bass, and spotted, long nose and alligator gar. Saltwater species such as anchovies and striped mullet also inhabit the bayou indicating that a transition of salinity conditions occurs in the general area. Open water in the project area is limited to borrow canals/ditches that are of extremely low value to fishery resources because of their poor water quality and shallow depth. The only fish species that is likely to occur with some regularity within the project area is the mosquitofish.

Threatened and Endangered Species. The only species of concern near the project area is the bald eagle, an endangered species. A nest is located in the vicinity, over a mile from the project area. The U.S. Fish and Wildlife Service does not consider this nest to be within the proposed project area.

Water Quality

Water Use Support Classification. LDEQ classifies water use support based upon either an evaluation of land use, citizen complaints, etc., or upon actual monitored data. Only an evaluated assessment is available for the study area, and the results of this evaluated assessment are summarized below and discussed in more detail in Appendix D.

Existing Water Quality Data. No active water quality monitoring stations were identified in the study area. Prior to 1994, there were three stations located near the study area as part of Jefferson Parish's storm water drainage canal sampling program. The data for these stations are listed in Appendix A.

Results of Water and Sediment Quality Testing. As part of this water quality assessment, water samples were taken at three sites. These sites were the forebay of the Gloria Drive pumping station, the tailbay of the Verret Street pumping station, and on the unprotected side of the existing levee near the Town Auditorium. Sediment samples were taken in the forebay of the Verret Street pumping station, just downstream of the Louisiana Highway 45 bridge. Both the water and the sediment samples were tested for priority pollutants.

The results of the water testing were compared to the water quality standards and criteria of the Louisiana Department of Environmental Quality. Very few contaminants were detected in any of the water samples. Trace amounts of D-BHC were detected at both the Gloria Street and the Verret Street pumping station sites. A trace amount of B-Endosulfan was detected at the site near the Town Auditorium. Arsenic was detected in very small quantities at all three sites tested, as was copper and nickel. Zinc was detected at the Town Auditorium site. None of these parameters exceeded the state water quality criteria. No testing for fecal coliform was performed at these sites.

Cultural Resources

The lower Barataria region was used by humans in both prehistoric and historic times. Archaeological records concerning prehistoric sites in the region indicate that extensive colonization sites are known to exist within the immediate vicinity of the project area.
Two cultural resources surveys of the project area have been completed by Earth Search, Inc. through primary source document research, intensive pedestrian survey, and fieldwork consisting of a program of shovel testing and auguring. One of the surveys addresses the originally proposed alignment for the Fisher School Basin. The second addresses the Fleming Curve, which was later included in the proposed alignment. Through these efforts, data detailing the environmental setting, prehistoric occupations, historic occupations, previous investigations, and existing archaeological sites and conditions has been collected. A report of these findings is on file at the New Orleans District.

An examination of the cultural resources survey reports indicate that there are two reported sites: the Oyster Road Site (16JE84) - located within the project area at its' southwest corner; and the Fleming /Berthoud Cemetery (16JE36) - located within the project area near the shoreline of Bayou Barataria at the intersection of Bayou Villars. The Oyster Road Site was recorded in 1977 by Richard Weinstein of Coastal Environments, Inc. and at that time was listed in the Louisiana State Files as a prehistoric (Marksville period) Indian shell midden which occupied 32.5 meters along the bank of Bayou Barataria. A subsequent visit, by archaeologists from R. Christopher Goodwin & Associates, Inc., in 1984 found the site to be severely eroded and completely wave washed. While no subsurface testing was conducted, surface probing did not reveal evidence of cultural remains. Due to the extensive damages, the site was deemed ineligible for nomination to the National Register of Historic Places (NRHP). A recent visual and subsurface examination of the site in July 1995, by archaeologists from Earth Search, Inc., revealed no evidence of shell or cultural materials. It has been concluded that the site is destroyed and no longer eligible or potentially eligible for nomination to the NRHP. Consequently, the proposed project will not impact any significant cultural resources at this site.

The second reported site, the Fleming/Berthoud Cemetery (16JE36), contains the remains of both prehistoric and historic components. The prehistoric component includes a Marksville through Mississippi period shell midden deposit and a large Indian mound. The historic component includes a cemetery dug into the Indian mound and the remains of the Mavis Grove/Fleming Plantation which consists of the main house, the yard area, and ruins of the sugar house. The plantation, which dates to the early 19th Century, was a large sugar plantation with numerous outbuildings including a hospital, storehouses, stables, Negro cabins, and a sugar house. The prehistoric components of (16JE36) were reported as eligible for nomination to the NRHP in 1975 and 1986, however these sites are not currently listed in the NRHP. The Mavis Grove/Fleming Plantation main house is presently listed in the NRHP. Both the prehistoric and historic components of the Fleming/Berthoud site have been archaeologically investigated. No intact cultural deposits associated with either the historic or prehistoric components at 16JE36 were found within the project corridor. Planned construction will therefore have no adverse effect on this significant site. The New Orleans District is currently preparing Plans and Specifications for a bank stabilization project at the Fleming Cemetery site. This work is being done in connection with maintenance operations on the Gulf Intercoastal Waterway (GIWW). The proposed project would protect the cemetery from erosion with a sheetpile wall by following the existing shoreline and tying into the Fisher Basin flood protection levee. The proposed improvements to the levee system would likely benefit the cemetery by stabilizing the eroding shoreline.

Recreation

Urban type facilities, found both within and north of the study area, include: National and State Parks; local parks, playgrounds, and swimming pools; and ball parks and tennis courts. Natural resource related facilities, found within and surrounding the study area, include: picnic areas, camp sites, and hiking trails; wildlife refuges, management areas, and numerous waterbodies; and private and public fishing piers and boat launches.

Predominant recreational activities are freshwater and saltwater fishing, including finfishing, crawfishing, crabbing, and shrimping. Other recreational activities include big game, small game and migratory bird hunting, boating, swimming, and camping. The three major recreational areas of significance adjacent to the area are the Lake Cataouatche - Lake Salvador complex (which includes the Salvador Wildlife Management Area), the Jean Lafitte National Historical Park and Preserve, and the Bayou Segnette State Park. A listing of the recreation sites located within the vicinity of the project area, as condensed from an outdoor recreation printout provided by the Louisiana Department of Culture, Recreation and Tourism, is presented in Tables 7 and 8 of the attached Environmental Assessment. The tables provide an overall summary of the recreational facilities available in the vicinity of the proposed project.

Hazardous, toxic, and radioactive wastes

A land use history evaluation, regulatory agency coordination, and site inspections have been accomplished to assess the potential for hazardous, toxic, and radioactive wastes (HTRW) within the project area. A full report of the Preliminary HTRW Site Assessment is contained in the Environmental Assessment.

The EPA National Priorities List (NPL - Superfund Sites) of the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) was investigated through personal contacts with Mr. Don Markham of EPA Region 6 on March 7, 1997. No sites from the project area were identified on the NPL at that time. The EPA Resource Conservation and Recovery Information System (RCRIS) list for Jean Lafitte was obtained on March 7, 1997. The list indicated that no hazardous waste treatment, storage, disposal, or transportation facilities are located within the project vicinity; however, the list did reveal that five hazardous waste generators are reporting in the project vicinity. Several generators are no longer active. Of the active generators, none were located within two miles of the project area. The Louisiana Department of Environmental Quality, Louisiana Site Remediation Information System (LASRIS) list, which shows inactive and abandoned sites, lists one location (Watts Construction Company) in Jean Lafitte. The site is located over three miles northeast of the project area.

Inspections of the proposed project alignment and adjacent areas were accomplished on November 11, 1996, April 3, 1997, and July 28, 1997. The inspections were completed on foot and included all accessible portions of the alignment. Based upon these inspections, the risk of encountering an HTRW site during construction is minimal throughout most of the project. Areas identified to be of moderate to high risk include: a small dump site north of the Gloria Drive Pump Station; a boat building or repair business at the southwest corner of the alignment; and an underground storage tank (UST) located at a vacant grocery store along Bayou Barataria. Construction of the proposed levee will not impact these three sites. Areas identified to be of minimal HTRW risk, but likely requiring removal to accommodate construction included: a residential storage area at the LA Highway 45 bend; pipe penetrations in the levee near Tasha Lane; a dump site at the dead end canal; and a dump site south of the Gloria Drive Pump Station. These four areas will likely be removed during construction. Other areas identified were either outside of the alignment, or were not a significant HTRW concern.

Economic resources

(1) Population and Land Use. The town of Jean Lafitte, Louisiana, is located in Jefferson Parish, which is one of eight parishes making up the New Orleans Metropolitan Statistical Area (MSA). Jean Lafitte was incorporated, and portions of it annexed, between 1970 and 1980. The population of Jean Lafitte increased from 936 to 1,496 between 1980 and 1990 while the total population of both Jefferson Parish and the New Orleans metro area slightly declined. The population increase in Jean Lafitte, as in other suburban communities is due in part to the lower cost of single-family housing and other properties such as: the appeal of lower population densities, new construction of or improvements to rapid transportation systems, and increasing crime rates in large metropolitan areas. Construction of an additional Mississippi River bridge near the New Orleans central business district is believed to have a positive impact on residential developments in Jean Lafitte.

In spite of frequent storms making up part of the semi-tropical climate of the area, the mild climate and availability of abundant natural resources have generated economic development and population growth along the Louisiana Gulf Coast, the New Orleans metropolitan area, and the town of Jean Lafitte. Since the population of Jean Lafitte is still relatively small, the availability of published data on land use and other socio-economic conditions is limited. The 1990 census reported that the political boundaries of Jean Lafitte covered approximately 6.3 square miles, including 6.0 square miles of land area.

A 1980 summary of total land use for the parish prepared by the Louisiana Office of State Planning estimated the total land area of the parish at about 319.57 square miles. This preliminary estimate showed that 72 percent of the total land area in Jefferson Parish was wetland and beaches. About 15 percent was residential land (including a significant amount of the urbanized portion of the New Orleans metropolitan area); another 7 percent was commercial and industrial land; 4 percent was used for transportation, communication, and related services; and the remaining 2 percent was either agricultural land, forest land, strip mines and quarries, sandy areas other than beaches, and land in transition.

(2) Businesses and Employment. The businesses and related employment within the incorporated limits of Jean Lafitte include the markets and services traditionally required maintaining a small suburban community in close proximity to a much larger urban center. Businesses include such things as retail stores that sell food, clothing, medical supplies, home furnishings, automobiles, trucks, and boats; and various service establishments providing health care, sanitation, legal services, and automobile and boat maintenance. Other business activities more unique to the local area include the operation and maintenance of the commercial fishing vessels docked along the bayou and activities in support of oil and gas production Table 6 compares employment, and unemployment rates, and the median family income in Jean Lafitte and Jefferson Parish and has not been adjusted to reflect the unusual pattern of inflation, which occurred nationally between 1979 and 1989.

The 1990 census appears to be the first published information providing employment and median family income data for communities with populations of less than 2,500. The 1980 census indicated that Jefferson Parish ranked first among all Louisiana parishes in median family income. In 1990, it ranked slightly behind three other parishes in the New Orleans MSA, St. Charles Parish with $35,355 and St. Tammany Parishes with $35,033 and East Baton Rouge Parish with $34,198.

(3) Structure Inventory and Contents Valuation. A comprehensive field survey (100% inventory of all of the structures within the alignment) was conducted for the Fisher Basin to identify every structure at risk in the study area. Contained in the survey is an estimate of the number, value, and elevation of all structures. First floor elevations above natural ground were estimated using a hand level to insure accuracy and ground elevations were determined using 1-foot contours from GIS maps provided by Jefferson Parish's contractor, Vernon F. Meyer and Associates.

TABLE 6

Civilian Labor Force, Employment, Unemployment and Income

AREA	1980/a	1990/b	1994/c (April)
Jean Lafitte:			
Civilian Labor Force	*	571	*
Employed	*	531	*
Unemployed	*	40	*
Unemployment Rate	*	7.0	*
Median Family Income	*	$22,125	*
Jefferson Parish:			
Civilian Labor Force	214,909	222,939	226,700
Employed	205,987	207,556	212,600
Unemployed	8,922	15,383	14,100
Unemployment Rate	4.2	6.9	6.2
Median Family Income	$21,920	$32,446	*

* Not available

a/ U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, "General Social and Economic Characteristics, Louisiana". Income data are for the entire previous (1979) year, and unadjusted for changing price levels.

b/ U.S. Department of Commerce, Bureau of the Census, 1990 Census of Population and Housing, "Summary Social, Economic, and Housing Characteristics, Louisiana". Income data are for the entire previous (1989) year and unadjusted for changing price levels.

c/ Louisiana, Department of Labor, unpublished data.

Structure and content values are major elements impacting depth-damage relationships and the magnitude of flood damage to urban structures. For the purposes of estimating urban flood damages, a structure is defined as a building and any attached components, such as built-in appliances, shelves, carpeting, etc. Contents represent furnishings and equipment, or all items within the structure that are not permanently attached. The value of land is excluded in the determination of urban structure values.

Residential structure values were calculated using the Marshall and Swift Residential Estimator Program. This continually price-adjusted computer program uses cost per square foot, geographically localized by zip code, to calculate a depreciated replacement value for each structure. Mobile homes within the area were assessed using an average value per structure based on size. A summary of the major structure types and structure values, is depicted in Table 7.

TABLE 7

STRUCTURE INVENTORY

CATEGORY	NUMBER	VALUE
Residential (1-sty)	168	$ 6,762,663
Residential (2-sty)	18	905,434
Mobile Homes	89	612,000
Commercial	34	$ 3,763,487

(4) Damage evaluation. In determining the number of structures flooded and resulting impact, the Urban Flood Damage Program was utilized to correlate existing structural and hydrologic data. Within the program, nine different types of urban structures were evaluated using hydrologic profile data, structure locations, first floor elevations, depth-damage relationships, and structure and contents values to compute the depth of flooding and resulting damages for each structure for selected frequency flood events. Table 8 displays the number of structures damaged by flood frequency for the study area.

TABLE 8

TOTAL NUMBER OF STRUCTURES FLOODED BY FREQUENCY*

DESIGN STORM FREQUENCY	# OF STRUCTURES FLOODED
1	4
2	91
5	232
10	243
25	279
50	295
100	304
200	305
500	305

* Total numbers are cumulative. Damages begin with yard and slab damage 0.5 foot below first-flood elevation.

(5) Automobile Damages and Valuation. Damage to other property in the flood plain, such as automobiles, are directly related to the structural flood damages. The elevation of each automobile is determined by its corresponding structure elevation. Automobile damage estimates are then calculated by correlating depth of flooding, depth-damage per automobile, and damage per automobile. The 1990 census indicated that there were 1.8 vehicles per household in Jefferson Parish. It was assumed that each residence had one automobile that was susceptible to damage. The current average damage per automobile was estimated to be $9,400, based on the replacement value of a depreciated used automobile according to the Louisiana Motor Vehicle Division and Census Data.

(6) Expected Flood Damages. The results of the flood damage analysis for existing conditions are presented in Table 9 for structures and automobiles.

TABLE 9

EXPECTED ANNUAL FLOOD DAMAGES

DAMAGE CATEGORY	EXPECTED ANNUAL DAMAGE
Residential	$527,757
Commercial	260,922
Automobiles	436,728
TOTAL	$1,225,407

FUTURE CONDITIONS WITHOUT PROJECT

Having explored the past and present condition of Jean Lafitte, the next step is to forecast future conditions if no improvements are made. This forecast of conditions under the no-action scenario will provide the basis for analysis of project improvements.

Flood Protection

Historical evidence of sea level rise and subsidence indicates the need for a projection of storm surge stages and their effect on this project's effectiveness. Sea level rise of 0.5 feet per century along the Gulf Coast is recommended by the latest Corps' guidance. COE geologists from radio carbon dating of buried marsh deposits developed estimates of subsidence in coastal Louisiana. This data was compiled on quadrangle maps for coastal Louisiana. Using the projected sea level rise of 0.2 feet in the next 50 years and the appropriate subsidence rate in the coastal zones bordering the project area, the WIFM model was employed to compute the hurricane surge heights which could be expected in the year 2040. Stages for pertinent locations in the area that would accompany the SPH, 100-year and 10-year hurricanes are shown in Table 10.

TABLE 10

2040 HURRICANE SURGE HEIGHTS

Location	SPH	100-year	10-year
	STAGES IN FEET NGVD		
Bayou Barataria	9.6	7.7	4.2

Levee heights for future conditions were determined by adding runup from the appropriate wave condition to the design stillwater level. Where protective structures will be sheltered against significant wave runup, wave runup from the small locally generated wave climate was used to determine levee height. On the eastern side of the study area wave berms should be added to maintain the same level of protection as the original project due to the loss of the woods and marsh on the flood side of the levee. In these areas where significant hurricane wave action will occur because of an available fetch, levee heights were designed using wave height determined from methodologies described in the Coastal Engineering Center's Shore Protection Manual. Design elevations of protective structures in each reach are given in Table 11.

TABLE 11

2040 DESIGN ELEVATION OF PROTECTIVE STRUCTURES

Location		SWL (ft)	WAVE RUNUP	10-year*
Bayou Barataria		4.25	2.0	6.5
Eastside Levee	(w/berm)	4.25	2.5	7.0

* Ground surface elevation is 0.2 ft lower.

Biological Resources

Wetlands. After a thorough review of color infrared photography beginning at year 1974, through year 1995, combined with a field reconnaissance of the project area (including the proposed levee alignment), biologists from the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the local sponsor (West Jefferson Levee District) concluded that within the next 15 years (by the year 2012) all of the forested wetlands (94.7 acres) that would be enclosed within the proposed levee alignment would be lost to development in the future without - project condition. In other words, even if the levee were not constructed, those wetlands would be lost to ongoing developments (i.e., primarily single family dwellings). These developments are and will continue to expand via construction on pilings or on hauled-in fill material, to the FEMA - approved elevation.

It is unlikely, however, that forested wetlands (i.e., fresh swamp) on the unprotected side of the existing levee along the southeastern perimeter of the project area will be cleared for development. Levee systems such as that currently being proposed have historically become the line of demarcation precluding future developments on the unprotected side. As such, they serve to protect adjacent, functionally valuable wetlands. The currently existing levee provides such a benefit to adjacent wetlands. Unfortunately, increased saltwater intrusion and subsidence in the future are likely to convert wetlands outside the existing future levee system from swamp to marsh and, to some extent, open water within the next 50 years.

Wildlife**.** Wildlife habitat within the levee system, albeit very limited and of low value, is expected to be virtually eliminated within the next 15 years. Habitat outside of the levee system would support different species assemblages as it transitions from swamp to marsh to open water.

Fisheries. Fishery conditions in Bayou Barataria may become more saltwater oriented during the next 50 years unless the anticipated freshwater introduction benefits from diversions at Davis Pond and other areas are realized.

Threatened and Endangered Species. The bald eagle nest would continue to be used for the foreseeable future unless encroaching development stresses cause the eagle to relocate. Unless abated, continued saltwater encroachment could cause the death of the baldcypress-nesting tree.

Water Quality

For the without project condition, projected water quality for the study area is expected to remain similar to current conditions. The study area is partially protected by an existing non-Federal levee, and would continue to be pumped in the absence of the proposed project. Minor industrial point sources, package plants, petroleum activities, channelization, spills, contaminated sediments, siltation, salinity, total dissolved solids, chlorides, and oil and grease are the major factors which currently affect water quality in the study area. These are expected to continue to be the major factors affecting water quality in the study area. Recent increased regulation and legislation as well as an increase in public awareness of environmental issues may result in slight reductions in the amount of pollutants released into the study area, which would result in slight improvements in its water quality.

Cultural Resources

The Oyster Road site (16JE84) mentioned previously has eroded into Bayou Barataria and is totally destroyed. Whatever remnants of the site remain will continue to be eroded by the bayou. A prehistoric shell midden component of the Fleming/Berthoud site (16JE36) has experienced some erosion along Bayou Barataria. Riprap placed along the bankline is protecting the midden at this time; however, without continued intervention, the midden will likely be impacted again in the future. The prehistoric Indian mound component of the Fleming/Berthoud site has been used for interments in historic and modern times. This usage is expected to continue. The historic plantation component of the Fleming/Berthoud site is suffering from neglect. This component will continue to deteriorate without intervention.

It is probable that both the known and unknown cultural resources in the project vicinity will eventually be impacted by urban growth, since residential development is proceeding rapidly in the area. Other adverse impacts resulting from indiscriminate human actions would most likely increase with the corresponding increase in population. In addition to potential vandalism of cultural properties, both recorded and unrecorded sites could be unknowingly destroyed.

Recreation

Future recreational use of the study area should increase due to: the proximity of natural areas such as Lake Cataouatche-Lake Salvador (including the Salvador Wildlife Management Area), Jean Lafitte Natural Historical Park, and Bayou Segnette State park; the availability of numerous access points to the areas natural resources; and the rapid rate of development presently occurring in the vicinity. These anticipated increases in recreational use would not significantly affect any of the Federal and State parks or management areas in the vicinity; however, public facilities at the Parish and local levels could eventually be strained by increasing usage demands. Continued flooding, experienced without the proposed project, would adversely affect existing and future recreation opportunities by limiting accessibility during and immediately following such events. Expenditures related to flood recovery could also limit the feasibility of providing viable recreation opportunities at the local and commercial level.

Hazardous, toxic, and radioactive waste

Hazardous, toxic, and radioactive waste (HTRW) problems are unlikely along most of the proposed alignment with the exception of three (3) sites which were determined to be of moderate to high risk. No change in the likelihood of occurrence or location of toxic materials would be expected without this project.

PLAN FORMULATION

This section describes the process of developing plans to address the flood protection needs of the study area.

POLICY REGARDING EXISTING LEVEES

The U.S. Army Corps of Engineers, Policy Guidance Letter No. 26, Benefit Determination Involving Existing Levees (dated December 23, 1991) provides guidance for determining without-project conditions and with project flood damage reduction benefits for feasibility studies involving existing non-Federal levees that do not meet Army Corps of Engineers criteria. Problems have arisen in the benefit evaluation of flood damage reduction studies when there are existing levees of uncertain reliability. Specifically, the problem is one of engineering judgement on the ability of the levees to contain flows with water surface elevations of given height. Following a careful evaluation of the segmented levees in the Fisher Basin, the New Orleans District has determined the following:

- existing levees do not form a closed system to protect against tidal flooding
- level of protection provided by the levees is estimated to be below the 5-year event

Integrity of the local levee system is questionable in view of failures that occurred during recent hurricanes and tropical storms. The close proximity of many residences to Bayou Barataria prevents construction of a significant earthen levee in many areas, therefore, a true levee does not exist along the bayou, but the high bank elevation varies from +2.0 to +6.0 feet NGVD. Along the eastern and southern project limits, the levee constructed by West Jefferson Levee District stops approximately 300 feet south of Highway 45 providing a fairly large gap that will allow flood waters to inundate the study area.

Based on the minimal level of protection provided by the existing levee and the nature of the flooding experienced in the study area, PGL No. 26 guidelines were not applied to the engineering calculations for this study.

INITIAL PLAN DEVELOPMENT

The Guidance for Conducting Civil Works Planning Studies (ER 1105-2-100) requires the systematic development of alternative plans that contribute to the Federal objective. The objective of this study is the development of an economically feasible and environmentally acceptable flood protection plan that will enable the area to adequately withstand a 10-year design storm event, as a minimum, without substantial residual flooding.

In the development of plans for addressing the problems and needs of the study area both structural and non-structural alternatives were considered. Structural measures considered for the study area included levees, floodwalls, floodgates, and pumping stations and other available means to reduce flooding from storm driven tides and rainfall. Non-structural measures, such as flood-forecasting, combined with evacuation procedures and participation in the national flood insurance program, are currently being employed in the study area and will continue to be employed, with or without further Federal action. Additional non-structural measures were considered during feasibility, and are summarized in the following sections.

Development of a structural alternative was based on the recommendations made in the November 1994 reconnaissance report for the study area. The recommended plan was designed to maximize the use of the high bank along Bayou Barataria and existing levees. The levee alignment described by that report provided protection to the developed areas of Jean Lafitte primarily located south of the Fleming Canal, from Touchard Lane to Canal Street. In feasibility, the non-Federal sponsor requested that the levee alignment be enlarged to provide protection to an adjacent area that includes the developed portions of Jean Lafitte bounded by Canal E1 to the east, Bayou Barataria in the north and west and Canal Street to the south.

Economic Benefit

The National Economic Development Procedures Manual for Urban Flood Damage recognizes four (4) primary categories of benefits for urban flood control plans: inundation reduction, intensification, location and employment benefits. Inundation reduction is the only category of NED benefits for urban areas considered in this analysis. In addition to the reduction in damages caused by inundation, this category also includes the reduction of emergency costs, evacuation and subsistence costs, reoccupation costs, and Federal Insurance Administration costs saved. The evaluation process involved the formulation and assessment of the flood control improvements, the identification of categories of possible flood control benefits, the determination of without- and with-project damages and costs incurred, and standard benefit-cost comparisons.

The values estimated for benefits and costs at the time of accrual were made comparable by conversion to an equivalent time basis using a designated interest rate. The interest rate used in this analysis is 7-1/8 percent. The period of analysis, or project life, utilized in the analysis is 50 years. The benefits and costs are expressed as the average annual value of the present worth of all expenditures and all plan outputs. These expenditures and outputs are measured at a specific point in time (base year). The base year for this project is 2002, which represents the year in which the project becomes operational or when significant benefits start to accrue.

Plan Assessment and Evaluation

The final phase of the plan formulation process is refinement. A broad range of preliminary plans were formulated, but some key points remain to be determined. Among these are: the level of protection to be provided by improvements, interior drainage capacity, and impacts to residential and commercial structures and occupants. Detailed procedures for cost and benefit evaluations are summarized in Appendix B. A summary of plan assessment and evaluation follows:

No Action. The Corps would not participate in any protective measures to protect the Fisher Basin. As stated earlier in this report under future conditions without project, the study area would continue to be inundated by rainfall events and tidal stages. The West Jefferson Levee District’s efforts to implement flood control improvements are restricted due to funding limitations and the magnitude of the flooding problems.

Non-structural Alternatives. Non-structural measures either reduce or avoid flood damages without significantly altering the nature or the extent of flooding. Such measures reduce flood losses by either (1) changing the use of floodplains (e.g., from residential to recreational use), or (2) retaining existing flood plain use with some accommodation of the flood hazard (e.g., elevating a structure). Non-structural measures include, but are not limit to, such actions as floodproofing of structures, regulation of floodplain use, temporary evacuation of hazard areas, relocation of activities to non-floodplain sites, acquisition of land or easements, redevelopment in a manner compatible with the flood hazard, and flood forecasting and warning.

Basically, two types of non-structural measures for flood protection exist – those that reduce existing damages and those that reimburse for existing damages and reduce future damage potential. Only those non-structural measures that reduce damages were investigated to varying degrees in this study and include the following:

a. Floodproofing by waterproofing of walls and openings in structures.
b. Raising structures in place.
c. Constructing small walls or levees around structures.

The analysis of non-structural alternatives shown in Table 12, revealed that flood proofing and small walls are economically justified.

TABLE 12

NON-STRUCTURAL ANALYSIS

Description	First Costs	Avg. Ann. Cost	Avg. Ann. Benefit	B/C Ratio	Net Benefits
Flood Proofing	$4,474,700	$329,500	$430,400	1.3	$100,900
Small Walls	$3,286,600	$242,000	$240,800	1.0	($1,200)
Raise Structures	$6,039,800	$444,700	$203,000	.7	($151,700)

Structural Alternatives. The proposed plan consists of earthen levee, floodwalls, and floodgates. The design target of the plan was to protect the Fisher Basin against damage from a 10-year rainfall and tidal event. The basin's interior drainage system consists of several drainage canals, five pump stations, and an extensive pipe network that is adequate for a 10-year rainfall event if the study area were protected from tidal inundation. During reconnaissance, a levee constructed to elevation 7.0 NGVD was determined to be sufficient to provide protection from the 10-year event described. In order to identify the NED plan, the study team evaluated the level of protection provided by constructing levees at various elevations. The results of this analysis using the fully funded cost estimates are shown in Table 13.

ENVIRONMENTAL EFFECTS

The study team assumed that a levee constructed to elevation 8.0 feet NGVD would cause similar adverse environmental impacts as a levee at a lower elevation, but the magnitude of those effects would differ. Extensive analyses were performed to assess the likely environmental effects of the plans. These analyses are described in detail in the Environmental Assessment (EA) and Appendix D. A brief summary of the significant environmental concerns is provided in this section.

Wetlands. Forested wetlands of the project area are under extreme developmental pressure, primarily being cleared for single family dwellings. Within the extreme southern end of the project 17.5 acres of fresh swamp are currently enclosed by an existing levee. Within the mid- to northern reach of the project area are 79.6 acres of early successional bottomland hardwood habitat.

No Action: After a thorough review of color infrared photographs beginning in 1974 through 1995, combined with a field reconnaissance of the project area, biologists representing the Corps, the U.S. Fish and Wildlife Service, and the local sponsor concluded that within the next 15 years (by 2012), all of the forested wetlands (94.7 acres) that would be enclosed by the proposed levee alignment would be lost to development in the future without-project condition.

TABLE 13
BENEFIT-COST SUMMARY

Levee Elevation (NGVD)	**+6.0-ft**	**+7.0-ft**	**+8.0-ft.**
Construction Costs	$4,534,000	$4,845,000	$5,536,500
Real Estate	3,196,000	3,196,000	3,711,000
Relocations	693,000	693,000	767,000
Mitigation	19,000	19,000	22,500
Engineering & Design	412,100	412,100	412,100
Supervision & Administration	803,000	803,000	803,000
Interest During Construction	1,055,769	1,070,019	1,209,719
Total First Costs	$10,713,069	$11,038,319	$12,461,819
Average Annual Costs	$ 788,589	$ 812,531	$ 917,314
Operation and Maintenance	19,000	19,000	19,000
Total Average Annual Costs	$ 807,589	$ 831,531	$ 936,314
Average Annual Benefits			
Inundation Reduction	$ 712,400	$ 857,900	$ 906,100
Emergency Costs Saved	137,300	143,700	145,300
Evacuation & Subsistence Costs Saved	28,000	29,300	29,600
Reoccupation Costs Saved	169,300	177,000	178,900
FIA Costs Saved	9,900	10,400	10,500
Total Average Annual Benefits	$ 1,056,900	$1,218,300	$1,270,400
Benefit-Cost Ratio	1.3	1.5	1.4
Net Benefits	$ 249,311	$ 386,769	$ 334,086

Levee and Floodwall: Within the extreme southern end of the project area, enlargement of the existing levee to elevation 7.0 feet NGVD would result in the direct loss of 2.4 acres of the 17.5 acre fresh swamp. Within the mid to northern reach of the project area, levee construction would cause the direct loss of 8.0 acres of the 79.6 acre early successional BLH habitat.

In August 1997, the previously referenced biologists quantified the loss in habitat values associated with the direct project-induced loss of 2.4 acres of fresh swamp and 8 acres of early successional bottomland hardwood habitat. The value of the 10.4 acres of habitat loss will be mitigated through purchase of the needed acreage. The cost of this purchase is directly attributable to project costs. The project induced effects on wildlife, fisheries, threatened and endangered species, cultural resources, water quality, air quality, recreational resources and hazardous, toxic, and radioactive, wastes (HTRW) are summarized in detail in the EA and Appendix D of this document.

DETERMINATION OF THE RECOMMENDED PLAN

This section evaluates the NED results for each plan developed separately in relation to the no-action plan. It draws on the results obtained for the three benefit types and costs developed in other sections and appendices.

A traditional analysis was performed using annualized benefit and cost estimates, an assessment of environmental acceptability, and impact to local residents and businesses. Therefore, these costs are sufficiently accurate to allow elimination of plans that are infeasible. Upon review of the non-structural alternatives, raising structures is not economically justified and floodproofing is superior to the small walls option. However, the structural alternative provides superior net benefits compared to any of the non-structural alternatives. Therefore, the non-structural alternatives were dropped from further consideration.

With respect to the structural plan, the levee design contains similar floodwall, floodgate, and earthen levee features for each level of protection. While all appear economically justified, a levee constructed to elevation +7.0 feet NGVD maximizes net benefit.

RECOMMENDED PLAN DESCRIPTION

The recommended alternative consists of earthen levee enlargement, levee creation, and floodwall and floodgate construction to enhance flood protection. The plan involves hauling to the site approximately 135,000 cubic yards of earthen fill material from an offsite commercial source for elevating 3.0 miles of an existing earthen levee. The final elevation of the protection levee is 7.0 feet NGVD with 1-on-4 side slopes. The remaining levee alignment, approximately 1.7-miles, will consist of eleven (11) floodgates and three sheetpile floodwall sections that will tie into the earthen levee to form a closed alignment. Earthen fill material will be transported to the construction site via Louisiana Highway 45 (LA 45). From LA 45, the dump trucks would access the levee construction site via Gloria Drive, Canal Street, Radio Tower Road, and Dardar Street located in the town of Jean Lafitte.

CONSTRUCTION COSTS

The proposed levee will be constructed in one lift with a total duration of approximately 2 to 2.5 years, but will be limited to a maximum of six months in any one location based upon prior construction projects of this nature. A five-foot wide temporary construction easement is required for a period of three years to accomplish the described work. Based on the types of construction involved it is recommended that it be accomplished using three separate contracts. Cross-sectional diagrams of the proposed earthen levees, floodwalls, and floodgates are presented in Plates 11 thru 19. A detailed estimate of construction costs is presented in Table 14.

Levee construction will require the use of approximately 60 trucks per day, hauling material during daytime hours. Typical construction of earthen levees is accomplished at the rate of 1200 cubic yards per day. The levee requires approximately 100,000 cubic yards of material, however additional time must be added to account for the special right-of-way circumstances. A number of private residences are within 20 feet of the construction site, thus minimizing impacts to the residents will require implementing techniques to reduce noise and avoid damage to private property.

Table 14

Construction Cost Estimate

Code	Item	Qty	Unit	Unit Price	Amount	Contingency	Project Cost
1	**Mob/Demob**		LS	$115,000	$115,000	$28,750	$143,750
2	**Reinforced Concrete**						
	Bulkhead Floodwall: Walls	310	CUYD	$400	$124,000	$31,000	$155,000
	Landside Floodwall:						
	Walls and Columns	2050	CUYD	$400	$820,000	$246,000	$1,066,000
	Base Slabs	200	CUYD	$200	$40,000	$12,000	$52,000
	Stab. Slabs	150	CUYD	$100	$15,000	$4,500	$19,500
	Stairs	75	CUYD	$400	$30,000	$9,000	$39,000
3	**Steel Sheetpiling**						
	CZ-101 (Landside F/W)	69,100	SQFT	$12.5	$863,750	$259,125	$1,22,875
	CZ-114 (Bulkhead F/W)	40,300	SQFT	$14.0	$564,200	$141,050	$705,250
4	**Piling, Timber (12” dia.)**	6,000	LNFT	$12	$72,000	$21,600	$93,600
5	**Excavation (Floodwall)**	3,000	CUYD	$6	$18,000	$5,400	$23,400
6	**Backfill (Floodwall)**						
	Backfill (Landside F/W)	2,000	CUYD	$8	$16,000	$4,800	$20,800
	Backfill (Bulkhead F/W)	700	CUYD	$8	$5,600	$1,400	$7,000
7	**Fertilizing, Seeding & Mulching**	.7	ACRE	$2,000	$1,400	$420	$1,820
8	**Steel Swing Gates**	21,400	LBS	$2.5	$53,500	$16,050	$69,550
9	**Clearing & Grubbing**	25	ACRE	$1,000	$25,000	$5,000	$30,000
10	**Embankment Semicompacted Fill**	100,000	CUYD	$8	$800,000	$160,000	$960,000
11	**Fertilizing and Seeding Embankment**		LS	$15,000	$15,000	$3,000	$18,000
				TOTALS	$3,578,450	$949,095	$4,527,545

Concrete-capped steel sheetpile floodwalls will be constructed primarily along Bayou Barataria, where construction right-of-way is extremely limited. The total length of the floodwalls is approximately 7,600 feet. Included in the floodwall design are eleven (11) swing-type floodgates to maintain vehicular and pedestrian access to Bayou Barataria. At each residence along Bayou Barataria, reinforced concrete stairs will be installed to maintain pedestrian access to the water.

REAL ESTATE REQUIREMENTS

There are no existing Federal interests associated with this project. The estates required for this project include a Perpetual Flood Protection Levee Easement consisting of approximately 17.7 acres and a Temporary Work Area Easement consisting of approximately 3.4 acres for 3 years. Bayou Barataria is an inland water course that is presently used in interstate or foreign commerce. All of the work along Bayou Barataria will be accomplished within an area where the Federal Government can assert its superior right to aid commerce. Therefore, the Government needs no further real estate interests to perform said work. A summary of the Real Estate costs using December 17, 1997 valuation date is shown in Table 15. A detailed description of these requirements is presented in Appendix C.

Approximately 120 individual landowners will be affected by construction and will require 5 residences to be demolished and removed. It is understood at this time that the residences are occupied rental units. The landowner is entitled to compensation for the value of the structures and the renters entitled to relocation benefits as displaced persons under Public Law 91-646, as amended. These costs have been incorporated into the real estate estimates. Along Bayou Barataria construction may require removal of several bulkheads, piers and boathouses affecting approximately 60 landowners. The landowner is entitled to compensation for the value of the structures removed. These costs have also been incorporated into the real estate estimate.

TABLE 15

Real Estate Cost Estimate

(A) LANDS AND DAMAGES (TITLE III)			
Perpetual Flood Protection Levee Easement	Acres	Unit Value	Total Value
Residential (Waterfront West of LA 45)	5.7	$219,150	$1,249,155
Residential (East of LA 45)	5.4	$ 28,227	$152,424
Recreation	6.6	$270	1,782
Temporary Work Area Easement (3 years)			
Residential (Waterfront West of LA 45)	.9	$69,626	$62,663
Residential (East of LA 45)	1.3	$ 8,970	$11,661
Recreational (East of LA 45)	.9	$ 86	$ 77
Road Access	.3	N/A	$1,500
(B) Improvements			$12,000
(C) Severence Damage (Cost to Cure)			$165,000
		TOTAL LANDS & DAMAGES	$1,656,000
(D) Contingencies 25%			$414,000
		TOTAL LANDS, EASEMENTS AND RIGHTS-OF-WAY	$2,070,000
(E) Acquisition Costs			$1,089,120
(F) PL 91-646 (URA), Title II payments			$37,500
		TOTAL ESTIMATED REAL ESTATE COST	$3,195,930

RELOCATIONS OF AFFECTED FACILITIES

The total cost for relocation of Louisiana Highway 45, several oil and gas pipelines, power and communication lines, and drainage pump station discharge pipes for the proposed project is currently estimated to be $693,200.00. This total includes 5% for the owners engineering and design and 10% for the owners contract administration. Twenty-five percent (25%) for contingencies is added to the total for all relocation items except the highway ramps and detours. Contingencies for the ramps and detours are 30% and 35% respectively. Future Government expenditures in the areas of engineering, design, and contract administration have not been included in these estimates. A detailed description of the facilities to be relocated is provided in Appendix A.

MITIGATION

Mitigation as a result of project construction is required for 10.4 acres of direct forested wetland loss, which is approximately equivalent to 3 Average Annual Habitat Units. The habitat value of wetland loss could be fully mitigated via acquisition of an appropriate amount of forested wetland mitigation credits from an approved mitigation area in coastal Louisiana. The West Jefferson Levee District has contacted the Bayou LaCache wetland mitigation area that complies with the Coastal Management Division of the Department of Natural Resources and the U.S. Army Corps of Engineers. This mitigation area is located in Terrebonne Parish and consists of approximately 655 acres of available forested wetland habitat with an estimated habitat unit value per acre equal to .6. Thus, mitigation for construction of the Fisher Basin project would require approximately 5 acres from Bayou LaCache at a cost of approximately $3,500 per acre. The total mitigation cost for the proposed project is estimated to be $17,500.

OPERATION AND MAINTENANCE

The estimated annual operation and maintenance (O&M) costs of the recommended plan for the Fisher Basin are as follows.

TABLE 16
OPERATION AND MAINTENANCE ESTIMATE

MAINTENANCE ITEM	COST ESTIMATE
Levee Maintenance	$ 7,500
Floodwall Maintenance	$ 2,000
Floodgate Maintenance	$ 7,000
Subtotal	$16,500
15% contingencies	2,475
TOTAL	$18,975

Operation and maintenance of this project involves mowing approximately 56 acres of earthen levee, mowing or spraying grass adjacent to 7,600 linear feet of floodwall, removing graffiti from floodwalls, cleaning floodgate sills, and greasing and spot painting the floodgates periodically.

ENGINEERING AND DESIGN

Engineering and Design (E&D) for this project consists of preparing detailed design plates for construction. Pending approval of this DPR, additional funding will be provided to develop plans and specifications. E&D cost estimates are as follows:

Geotechnical Br.	$56,000.00
Structures Br.	$81,250.00
General Engineering Br.	$3,350.00
Cost Engineering Br.	$18,000.00
Hydraulics Br.	$2,500.00
Civil Br.	$80,000.00
Design Services Branch	$16,000.00
Surveys	$90,000.00
Engr Div Total	$347,100.00

Construction Div.	$25,000.00
Project Mgmt. Div.	$40,000.00
E&D TOTAL	**$412,100.00**

SUPERVISION AND ADMINISTRATION

Supervision and Administration (S&A) of construction contracts for this project is the responsibility of the U.S. Army Corps of Engineers. S&A cost estimates are as follows:

Construction Div.	$720,000.00
Project Mgmt. Div.	$30,000.00
S&A TOTAL	**$750,000.00**

PLAN IMPLEMENTATION

The purpose of this section is to present pertinent information concerning the Federal and non-Federal responsibilities regarding cost apportionment and the division of responsibilities for construction and subsequent operation, maintenance, and rehabilitation of the project. Such costs apportionment is based on Federal guidelines.

DIVISION OF PLAN RESPONSIBILITIES

FEDERAL RESPONSIBILITIES

The Federal government will be responsible for planning, engineering, design, and construction of the project in accordance with the applicable provisions of Public Law 99-662 (WRDA of 1986). The Government, subject to the availability of funds and using those funds provided by the Non-Federal Sponsor, shall expeditiously construct the Project, applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

NON-FEDERAL RESPONSIBILITIES

In accordance with Federal policy, non-Federal interests must, at the appropriate time, assure the Secretary of the Army that they will, without cost to the United States:

A. Furnish all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas necessary for construction, operation, and maintenance of the Project, and shall perform or ensure performance of all relocations necessary for the construction, operation, and maintenance of the Project.

B. The Non-Federal Sponsor shall contribute a minimum of 35 percent, but not to exceed 50 percent, of total project costs in accordance with the Federal regulations

C. The Non-Federal Sponsor shall provide a cash contribution equal to 5 percent of total project costs.

D. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the Project, except for damages due to the fault or negligence of the United States or its contractors.

E. Operate, maintain, repair, replace, and rehabilitate, as necessary, all features of the project, at no cost to the Government, in accordance with regulations prescribed by the Secretary of the Army, including levees, floodwalls, floodgates and approach channels, drainage structures, drainage ditches or canals, and all mitigation features.

F. Provide for the adjudication of all water right's claims resulting from construction, operation, maintenance, repair, replacement, and rehabilitation of the project, and hold and save the United States free from damages due to such claims.

G. Publicize flood plain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the Project.

H. Within one year after the date of signing a project cooperation agreement, prepare a floodplain management plan designed to reduce the impact of future flood events in the project area. This plan shall be prepared in accordance with guidelines developed by the Government. The plan must be implemented no later than one year after completion of construction of the project.

I. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder operation and maintenance of the project.

J. Assure that construction, operation, maintenance, repair, replacement, and rehabilitation of any non-Federally constructed flood features do not diminish the flood protection provided by or jeopardize the structural integrity of the project.

K. Assure compliance with applicable Federal floodplain management and flood insurance programs.

L. The Non-Federal Sponsor may request the Government to accomplish betterments. Such requests shall be in writing and shall describe the betterments requested to be accomplished. If the Government elects to accomplish the requested betterments or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions. The Non-Federal Sponsor shall be solely responsible for all costs due to the requested betterments and shall pay all such costs.

M. Not less than once each year the Non-Federal Sponsor shall inform affected interests of the extent of protection afforded by the Project.

N. Comply with the applicable provisions of the Uniform Relocations and Real Property Acquisition Policies Act of 1970 (PL 91-646), as amended by Title IV of the Surface Transportation and Uniform Relocations Assistance Act of 1987 (PL 100-17)

O. Comply with Section 221 of Public Law 91-661, flood Control Act of 1970, approved December 31, 1970, which provides that the construction of any water resources project by the Corps of Engineers shall not be started until each non-federal interest has entered into a written agreement to furnish its required cooperation for the project.

P. Comply with Section 601 of Title IV of the Civil Rights Act of 1964 (PL 88-352) that no person shall be excluded from participation in, denied the benefits of, or subject to discrimination in connection with the project on the grounds of race, creed, or national origin.

VIEWS OF LOCAL SPONSOR

The West Jefferson Levee District is the local agency responsible for providing flood protection to residents living on the westbank of the Mississippi River in Jefferson Parish. Mr. Gerald Spohrer, Executive Director of the levee district and his project management team at Coastal Engineers and Environmental Consultants were members of the Interdisciplinary Planning Team (IPT). Approximately twenty-two (22) IPT coordination meetings were conducted throughout the course of this feasibility study. The West Jefferson Levee District has expressed their support of the recommended plan and their intent to provide the non-Federal share of the project costs (see Exhibit 1).

STATEMENT OF FINANCIAL CAPABILITY

The New Orleans District has reviewed the West Jefferson Levee District's financing plan and determined that the local sponsor is financially capable of satisfying the project cost-share requirements. The West Jefferson Levee District received revenue from several sources including, but not limited to, ad valorem taxes on property, state revenue sharing, interest income on fund balances, and other fees. In addition to these revenue sources, funds for the Fisher Basin Project are being requested in the State of Louisiana capital outlay budget and Statewide Flood Control Program.

SUMMARY OF COORDINATION, PUBLIC VIEWS AND COMMENTS

STUDY MANAGEMENT

The U.S. Army Corps of Engineers, New Orleans District, had the responsibility of conducting and coordinating the feasibility study, consolidating information from other agencies and interested parties, preparing the report, and formulating the alternative plans in conjunction with the non-Federal sponsor. During the course of this study, coordination was initiated and maintained with the U.S. Fish and Wildlife Service, Louisiana Department of Wildlife and Fisheries, Louisiana Department of Transportation and Development, Louisiana Office of State Parks, West Jefferson Levee District, Jefferson Parish Department of Drainage, Town of Jean Lafitte, and other Federal, state, and local agencies.

TECHNICAL REVIEW

The Mississippi Valley Division office is concerned with providing Quality Assurance in the preparation, review, and approval of decision and implementation documents. Quality Assurance guidance for technical products developed by both Planning and Engineering division is the focus of this section. An interdisciplinary planning team at the district accomplished the independent technical review. The technical review was completed on November 6, 1998 and the significant issues are summarized in Appendix F.

PUBLIC INVOLVEMENT

Through the combined efforts of the New Orleans District and the West Jefferson Levee District, a public involvement strategy was developed to ensure that agencies, groups, and individuals most likely to be interested in the study are identified and contacted, and that their views and concerns relative to the study process and plan formulation are identified and addressed in the design.

PUBLIC INFORMATION MEETING

On January 20, 1998, the New Orleans District and the West Jefferson Levee District hosted a public information meeting in the Jean Lafitte Town Hall to describe the proposed project to all affected individuals and interested groups and agencies. The participants in this meeting included landowners, representatives from local interest groups, business owners, and many of the local and state officials. Approximately 35 people were in attendance.

Many landowners expressed concern on the topic of: access to Bayou Barataria, adverse impacts to oak trees along the existing alignment, and impacts to existing private bulkheads, boat docks, and boat sheds. The floodwall design provides several public use floodgates for vehicular and pedestrian access. In addition, each residence along Bayou Barataria affected by the floodwall will be provided a set of concrete stairs. In areas along the bayou where an earthen levee is proposed, pedestrian access is not inhibited by the final levee height.

The enclosed Environmental Assessment addresses the issue of oak trees situated along Bayou Barataria, specifically at the Fleming/Berthoud site along the bayou. Most of the live oak trees in the area would continue to survive in a stressed condition provided that no disturbances occur on the ground below or around them. However, the erosion along Bayou Barataria would likely result in the demise of the oaks along its bank in 15 to 20 years. Unfortunately, efforts to stabilize the bank could kill the stressed trees rather than save them. If the floodwall is moved several feet out from the bank, no fill is placed behind the floodwall above the bayou water level, and no activity occurs on the land under or within several feet of the crowns of the trees, they may live the full 15-20 years that we estimate. The earthen levee section on the landside of the trees located at the Fleming/Berthoud site is estimated to cost $72,000, while a concrete-capped sheetpile floodwall placed in the bayou, outside the tree crown, is estimated to cost $800,000. A floodwall is not an economically viable alternative since available right-of-way for an earthen levee does exist on the landside of the live oaks (see Exhibit B). The final levee alignment will minimize impacts to the live oak trees and shall be determined in the preconstruction engineering and design (PED) phase.

With respect to the existing bulkheads, docks, boat sheds, etc. along Bayou Barataria, the method of construction currently involves the use of a barge to drive sheetpile. This method may require the removal of approximately 60 boat docks and boat sheds along the bayou. However, the federal government will make every attempt to minimize the number of private structures affected during construction.

The participants in the public information meeting expressed satisfaction with the attempts being made to accommodate their interest and seemed optimistic about the project. The Times-Picayune summarized the proposed project and the public meeting in an article that appeared in the January 21, 1998 issue. A copy of the newspaper article is provided as Exhibit C.

COORDINATION WITH INDIVIDUAL LANDOWNERS

Following the public meeting, several landowners contacted the New Orleans District to discuss the proposed levee alignment. The owners of the Fleming/Berthoud tract mentioned above, expressed great interest in the live oak trees. As discussed earlier, a floodwall placed several feet out into the bayou would be to cost prohibitive, therefore we recommend relocating the earthen levee away from the bank, where most of the live oaks are situated.

Adjacent to the Fleming/Berthoud site along Bayou Barataria is the Fleming Canal Store. The business consists of a marina with fuel pumps and a large store. The site was originally excluded due to right-of-way concerns and the impact of construction on their business. However, after a closer look at the site, the number of floodgates required in both cases is identical and the construction costs involved in excluding the business versus including the business are also nearly identical. The owner is willing to allow construction to inconvenience them temporarily in exchange for a revised floodwall alignment that will protect many of the existing structures and maintain their access to the waterfront. They also request that the construction be scheduled during winter months and that every effort be made to affect only half of the property at any one time.

In the northeastern section of the Fisher Basin, several changes to the proposed levee were discussed to accommodate three individual landowners and their future development plans. Cost estimates were prepared for each of the proposed changes, which would result in more land, not structures, being protected. In each case, the landowners' proposed alignment is more expensive than the Corps' proposal. The additional construction costs are estimated to be $75,000, additional facility relocation costs are estimated to be $155,000, and additional mitigation is estimated to be $45,000. The proposed changes are not economically feasible due to the increased cost and adverse impacts to approximately 10-acres of scrub-shrub wetland habitat. Therefore the West Jefferson Levee District would be responsible for funding these changes. The levee district is expected to respond to these requests prior to initiation of PED.

RECOMMENDATIONS

FINAL ENVIRONMENTAL ASSESSMENT

FISHER SCHOOL BASIN
JEAN LAFITTE, LOUISIANA

January 1999

EA# 271

INTRODUCTION

This Environmental Assessment has been prepared to evaluate the potential impacts associated with flood control protection measures for Fisher School Basin in Jean Lafitte, Louisiana. The proposed action would involve the improvement of existing levees, the construction of a levee, and the construction of floodwall segments to enable the area to adequately withstand an exterior tidal event and to experience a 10-year rainfall event without substantial residual flooding. This document is prepared in accordance with the National Environmental Policy Act of 1969, as reflected by the U.S. Army Corps of Engineers (USACE) Regulation ER 200-2-2. The following sections include a discussion of the need for the proposed action, alternatives to the proposed action, significant resources affected, and the impacts of the proposed action.

AUTHORITY

The New Orleans District conducted this study under the authority of Section 205 of the 1948 Flood Control Act, as amended, in response to requests for Federal flood control assistance from officials of the Town of Jean Lafitte and West Jefferson Levee District.

PURPOSE AND NEED

The existing levee system was constructed by the West Jefferson Levee District in response to hurricane damages and, therefore, the level of protection was not evaluated at that time. The existing protection has since been deemed insufficient due to its varying heights and gaps in the alignment. As such, extreme high tides accompanied by heavy rainfall or storms have caused residual flooding in the study area. Extended duration weak hurricanes, such as Juan, have produced storm surges of sufficient height to overtop existing protective embankments and flood the area inhabited by some 2,000 people. The purpose of the proposed action is to adequately withstand an exterior tidal event and to experience a 10-year rainfall event without substantial residual flooding.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action would be located within the Town of Jean Lafitte in Jefferson Parish, Louisiana (Plates 1 and 2). The protection would include features consisting of earthen levee enlargement, levee creation, and floodwall and floodgate construction to enhance flood protection. The proposed alignment of the flood protection initiates on the east bank of Bayou Barataria at a location 1,800 feet south of the Louisiana Highway 302 Bridge. From this point, the alignment proceeds north along the natural ridge of Bayou Barataria; thence east along the bankline of the Intracoastal Waterway to intersect with Canal E1. From this point, the alignment commences south; parallel to Canal E1; thence west to tie into an existing levee at the North Canal. From this point; the alignment commences south to the Gloria Drive Pump Station; thence east and south around the rear of Oak Drive; thence west to intersect with the natural ridge of Bayou Barataria at the point of origin. The protection system would follow existing levee alignments as closely as possible to minimize adverse impacts to the natural environment and private landholdings (Plates 3, 4, and 5).

The proposed action would involve hauling to the site, approximately 133,000 cubic yards of earthen fill material from an offsite commercial source for elevating about 3.0 miles of levee. The final elevation of the proposed levee would be 7.0 feet National Geodetic Vertical Datum (NGVD) with 1 on 4 side slopes. The import of fill material to the project area would occur, by truck, via LA Highway 45. From the highway, the trucks would access the levee construction site via Gloria Drive, Canal St., Radio Tower Road, and Dardar St.

Levee construction could require up to several dozen truckloads of fill per day. Material hauling would occur during daytime hours. All project construction would occur in 2-2.5

years, but not at any given location for more than six months. In addition to the levees, at least 3 segments of concrete-capped, sheetpile floodwall would be constructed along Bayou Barataria with 11 swing-type floodgates. The total length of the floodwalls would be approximately 7,300 feet and the elevation would be 7.0 feet NGVD. The exact combination of floodgates, floodwalls, and levees along Bayou Barataria would be determined during detailed design. Environmental impacts would not change, but floodgates and floodwalls which are more expensive may be needed rather than levees to satisfy requests of some landowners. Cross-sections of the proposed levees, floodwalls, and floodgates are presented in Plates 6, 7, and 8.

PRIOR REPORTS

A flood protection reconnaissance study and report entitled "Jean Lafitte, Louisiana, Fisher School Basin" was prepared in November 1994. The document established existing conditions, determined the extent and magnitude of the problem, and developed an alternative solution to flooding problems in Fisher School Basin.

ALTERNATIVES CONSIDERED

Alternatives to the proposed action were considered. These alternatives were: (1) No-Action, and (2) Non-structural flood protection, and (3) Structural levee design.

No-Action Alternative

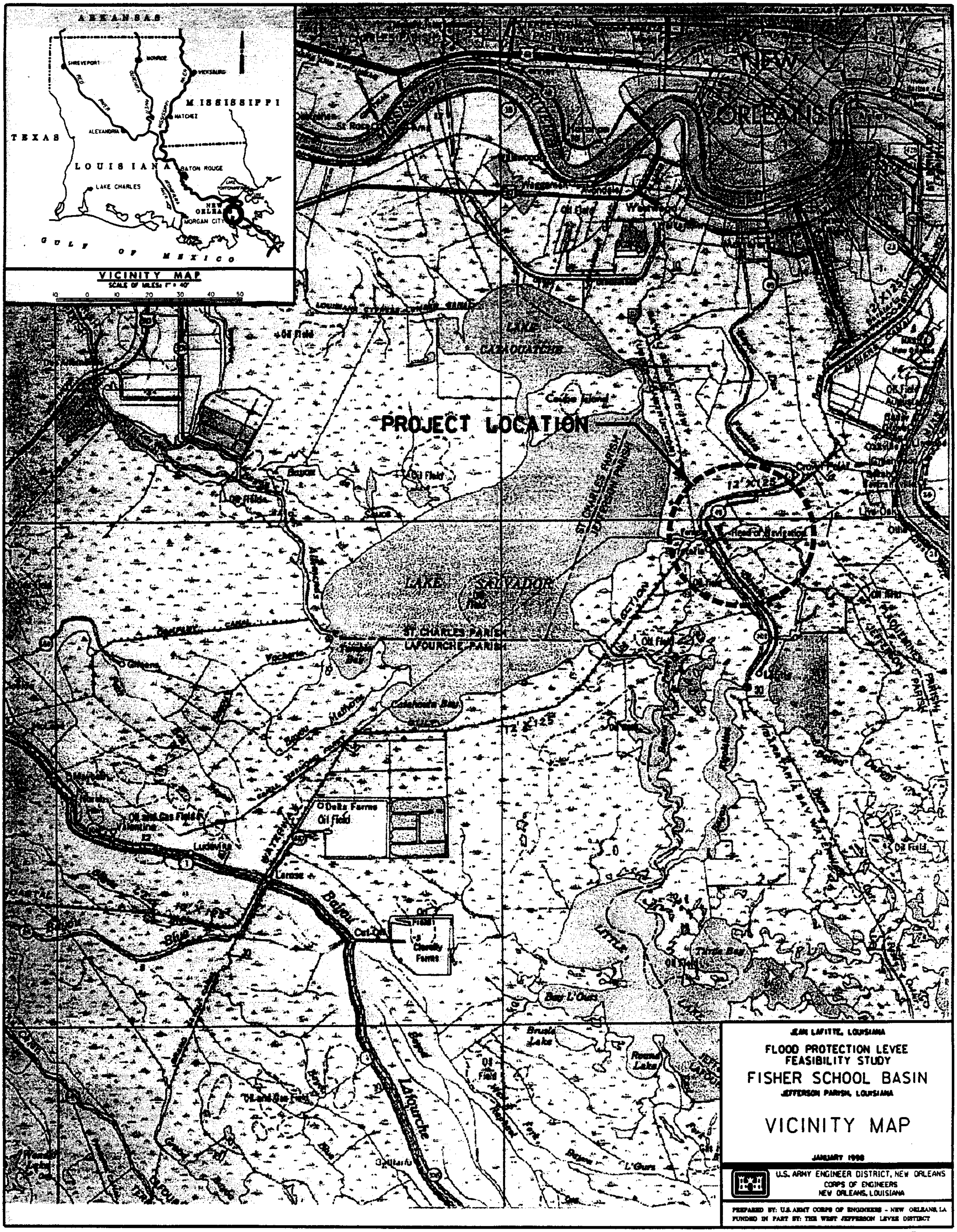
Under the no-action alternative, the proposed action would not be performed by the USACE. The study area would continue to experience flooding under this alternative. Flood damage to new developments would be moderated by participation in the National Flood Insurance Program. The West Jefferson Levee District's efforts to implement flood control improvements would be restricted based on funding limitations. Some work would be accomplished, but the extent would be limited.

Non-structural Alternatives

Non-structural alternatives such as flood proofing, raising structures, and flood warning systems were considered during the feasibility phase. Flood proofing and raising structures were economically justifiable alternatives; however, the net benefits provided are significantly less than the structural alternative. Flood warning systems were not an acceptable solution without additional structural improvements to the existing levee.

Levee and Floodwall (Proposed Action)

A levee design was developed based on the November 1994 reconnaissance report. The levee is designed to protect the Fisher Basin against damage due to flooding caused by a 10-year storm event. The recommended plan involves raising approximately 4.6 miles of an existing earthen levee to elevation 7.0' NGVD. Roughly 3.0 miles of the levee would be composed of earthen fill from an offsite location. The remaining 1.6 miles of the levee alignment would consist of three concrete-capped sheetpile floodwalls with 11 roller-type floodgates.



JEAN LAFITTE, LOUISIANA

FLOOD PROTECTION LEVEE
FEASIBILITY STUDY

FISHER SCHOOL BASIN

JEFFERSON PARISH, LOUISIANA

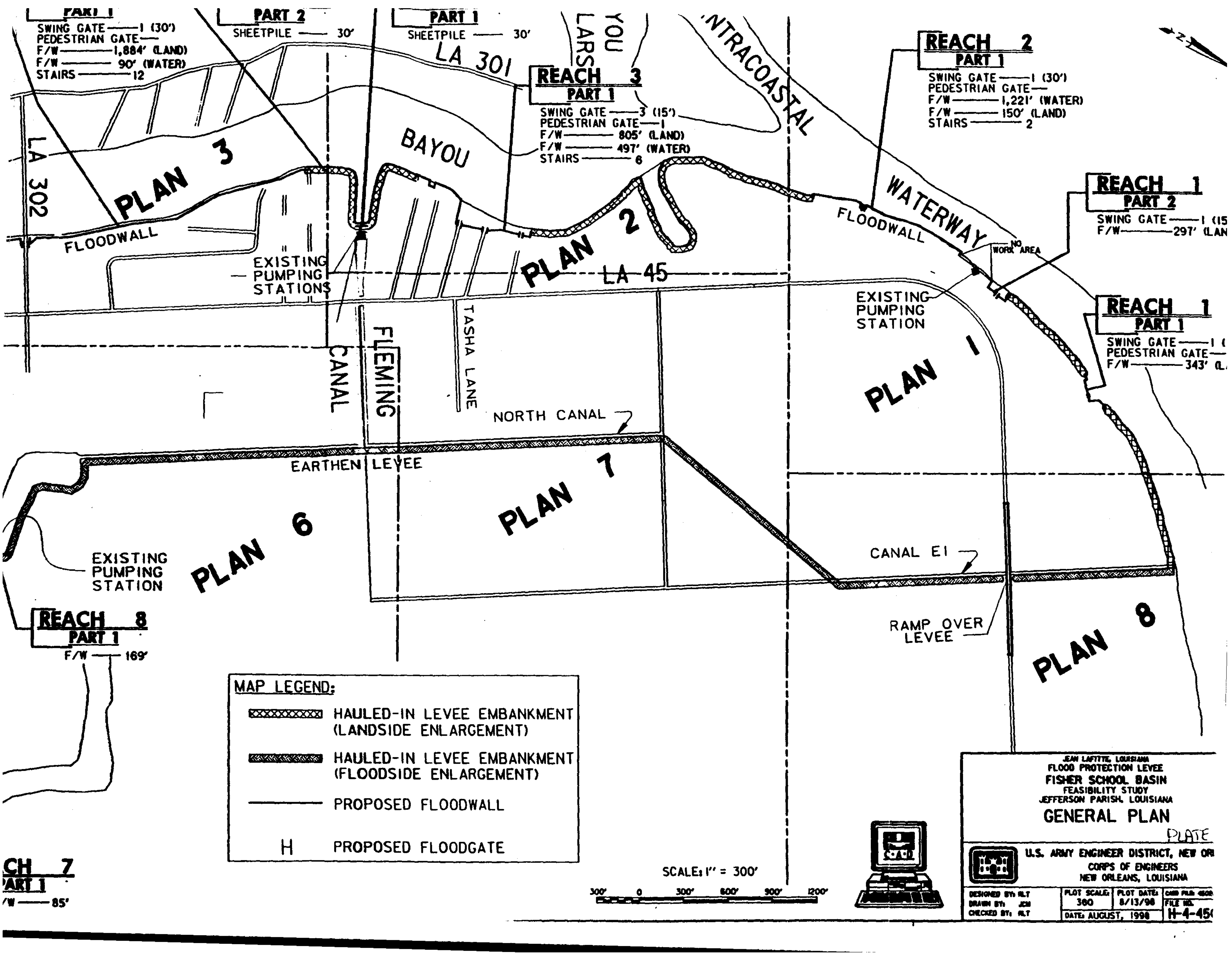
VICINITY MAP

JANUARY 1998

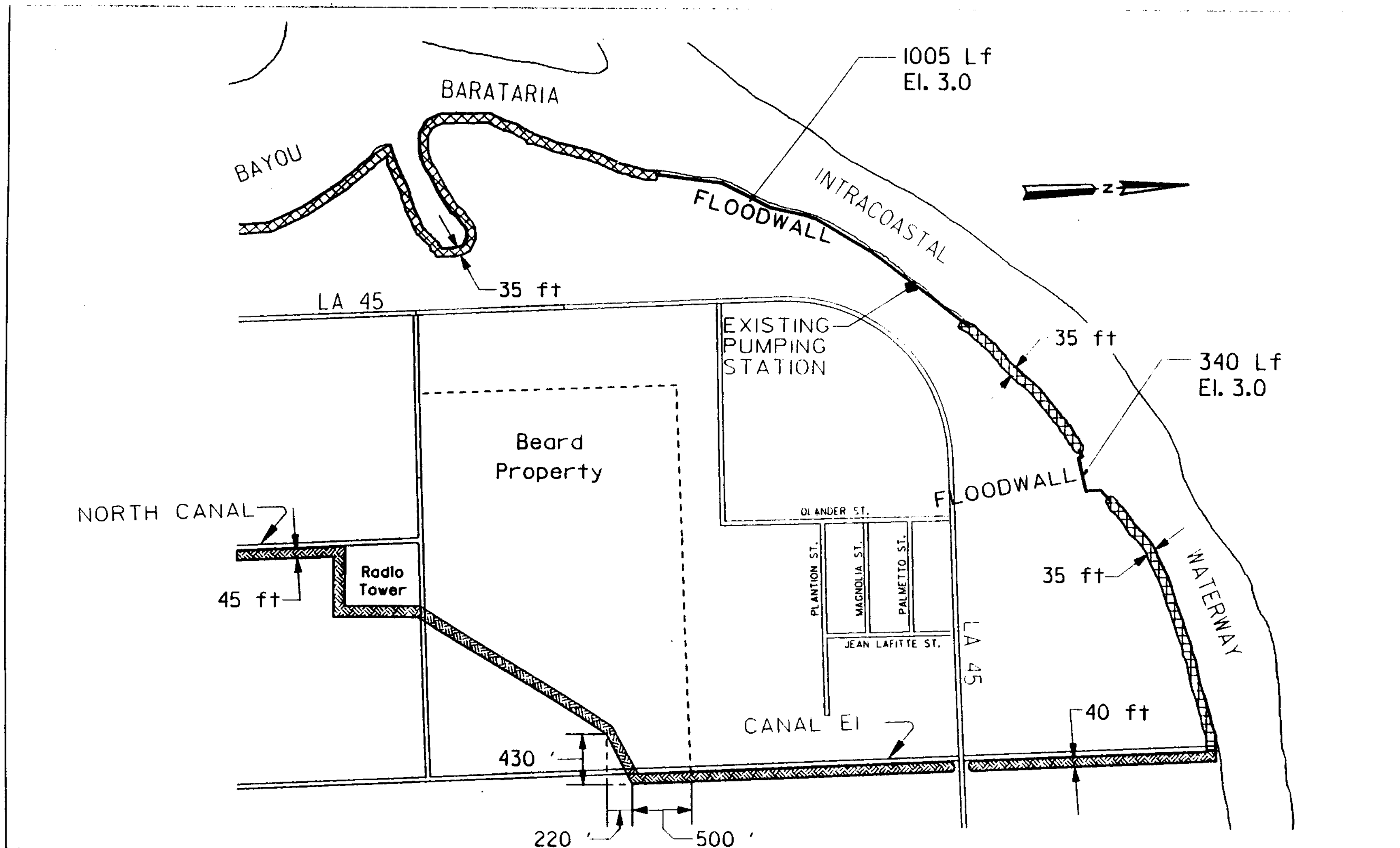
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT

PLATE 1



PART 1
SWING GATE —— 1 (30')
PEDESTRIAN GATE ——
F/W —— 1,884' (LAND)
F/W —— 90' (WATER)
STAIRS —— 12
PART 2
SHEETPILE —— 30'
PART 1
SHEETPILE —— 30'
LA 301
REACH 3
PART 1
SWING GATE —— 3 (15')
PEDESTRIAN GATE —— 1
F/W —— 805' (LAND)
F/W —— 497' (WATER)
STAIRS —— 6
REACH 2
PART 1
SWING GATE —— 1 (30')
PEDESTRIAN GATE ——
F/W —— 1,221' (WATER)
F/W —— 150' (LAND)
STAIRS —— 2
INTRACOASTAL WATERWAY
BAYOU
PLAN 3
LA 302
FLOODWALL
EXISTING PUMPING STATIONS
PLAN 2
LA 45
FLOODWALL
NO WORK AREA
REACH 1
PART 2
SWING GATE —— 1 (15
F/W —— 297' (LAN
REACH 1
PART 1
SWING GATE —— 1 (
PEDESTRIAN GATE ——
F/W —— 343' (L
EXISTING PUMPING STATION
CANAL
FLEMING
TASHA LANE
PLAN 1
NORTH CANAL
EARTHEN LEVEE
PLAN 7
PLAN 6
EXISTING PUMPING STATION
CANAL E1
RAMP OVER LEVEE
PLAN 8
REACH 8
PART 1
F/W —— 169'
MAP LEGEND:
HAULED-IN LEVEE EMBANKMENT (LANDSIDE ENLARGEMENT)
HAULED-IN LEVEE EMBANKMENT (FLOODSIDE ENLARGEMENT)
PROPOSED FLOODWALL
H PROPOSED FLOODGATE
CH 7
PART 1
/W —— 85'
SCALE: 1" = 300'
300' 0 300' 600' 900' 1200'
JEAN LAFITTE, LOUISIANA
FLOOD PROTECTION LEVEE
FISHER SCHOOL BASIN
FEASIBILITY STUDY
JEFFERSON PARISH, LOUISIANA
GENERAL PLAN
PLATE
U.S. ARMY ENGINEER DISTRICT, NEW ORL
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: RLT
DRAWN BY: JCM
CHECKED BY: RLT
PLOT SCALE: 300
PLOT DATE: 8/13/98
DATE: AUGUST, 1998
H-4-45



MAP LEGEND:

- HAULED-IN LEVEE EMBANKMENT (LANDSIDE ENLARGEMENT)
- HAULED-IN LEVEE EMBANKMENT (FLOODSIDE ENLARGEMENT)
- PROPOSED FLOODWALL
- H PROPOSED FLOODGATE

FISHER SCHOOL BASIN PLAN VIEW

NOT TO SCALE

JEAN LAFITTE, LOUISIANA

FLOOD PROTECTION LEVEE FEASIBILITY STUDY

FISHER SCHOOL BASIN

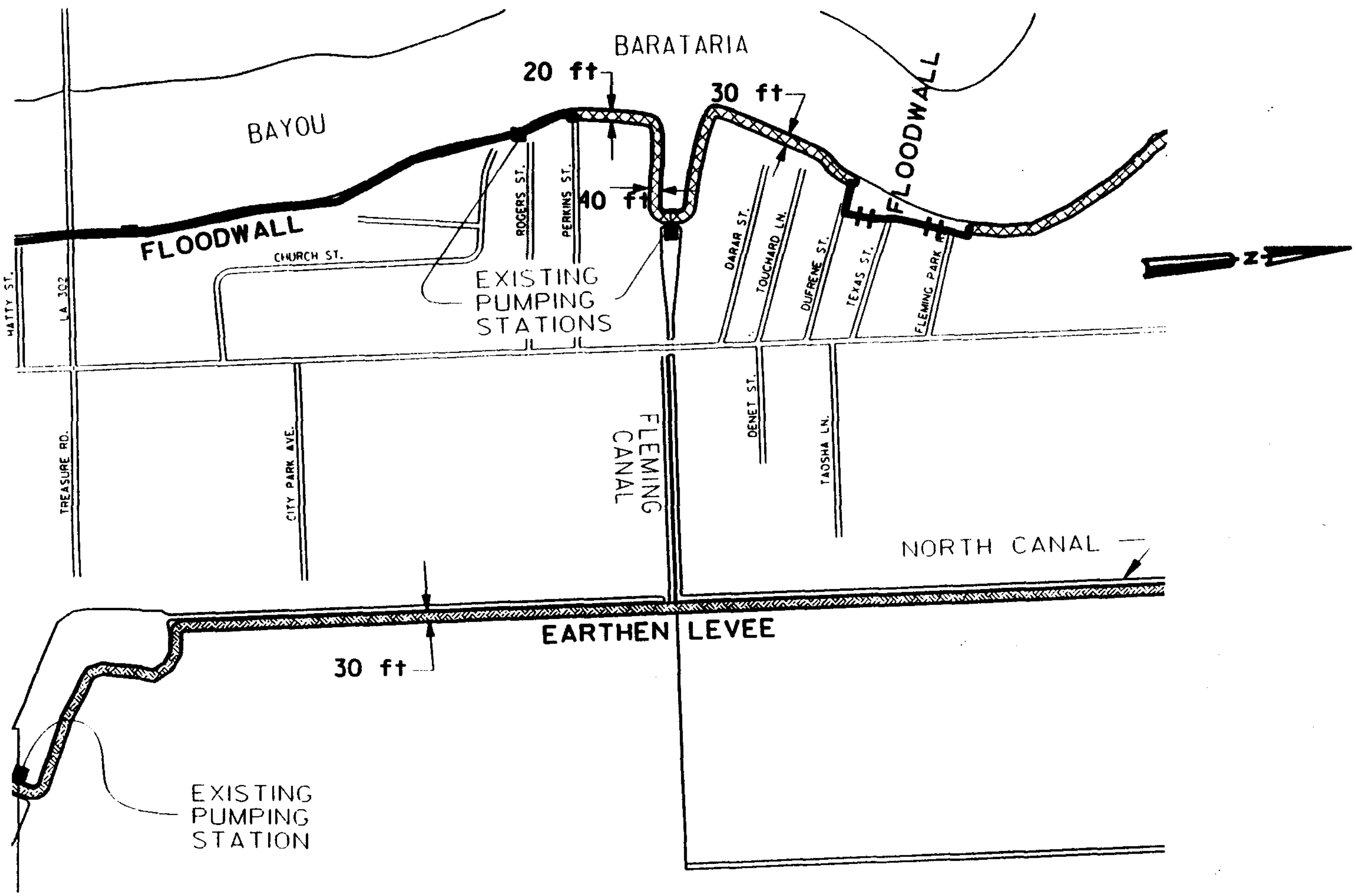
JEFFERSON PARISH, LOUISIANA

ALIGNMENT DETAILS

APRIL 199[illegible]

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT



MAP LEGEND:

	HAULED-IN LEVEE EMBANKMENT (LANDSIDE ENLARGEMENT)
	HAULED-IN LEVEE EMBANKMENT (FLOODSIDE ENLARGEMENT)
	PROPOSED FLOODWALL
H	PROPOSED FLOODGATE

FISHER SCHOOL BASIN
PLAN VIEW

NOT TO SCALE

JEAN LAFITTE, LOUISIANA

FLOOD PROTECTION LEVEE
FEASIBILITY STUDY

FISHER SCHOOL BASIN

JEFFERSON PARISH, LOUISIANA

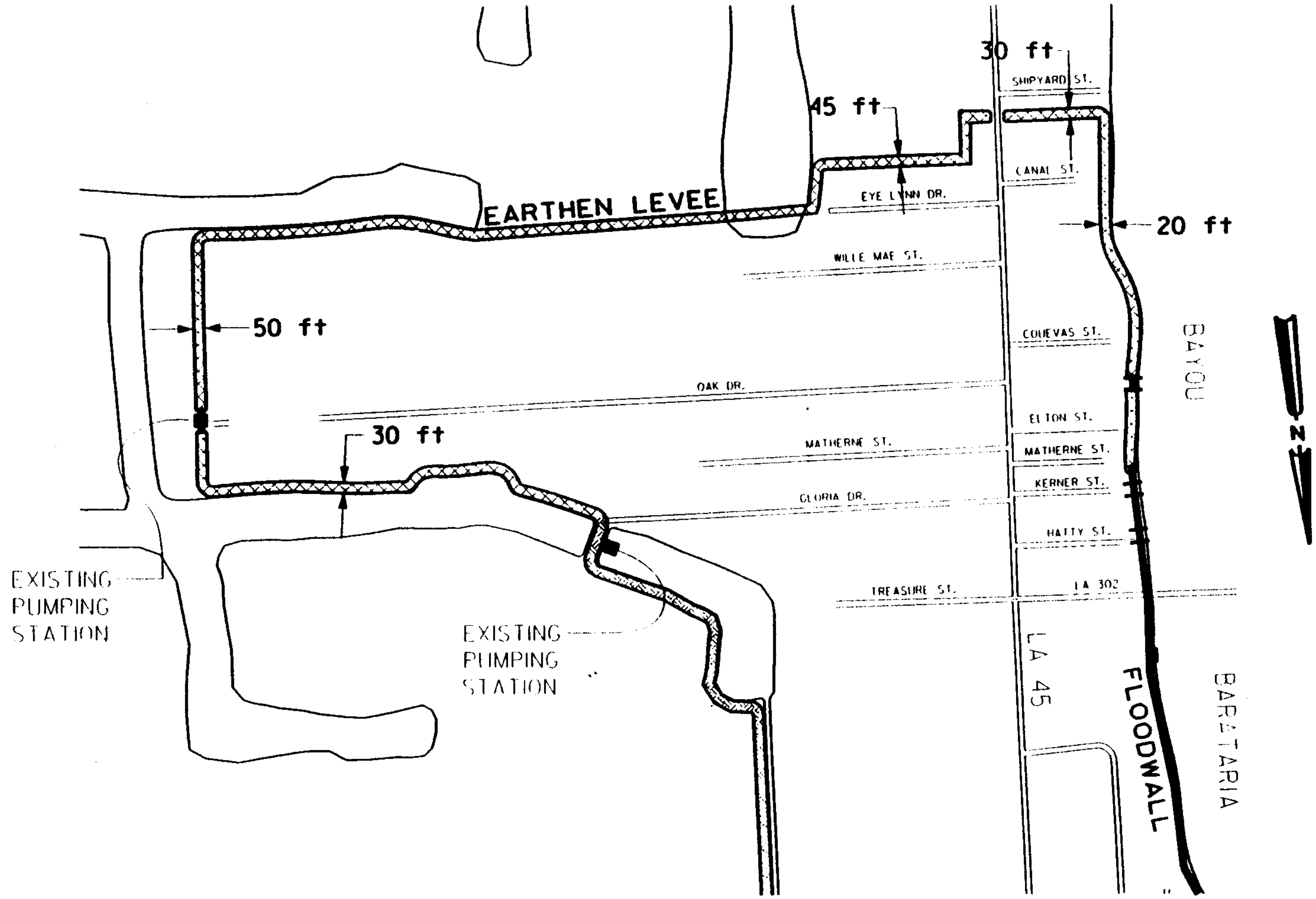
ALIGNMNET DETAILS

[illegible]

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT

PLATE 4



MAP LEGEND:

- HAULED-IN LEVEE EMBANKMENT (LANDSIDE ENLARGEMENT)
- HAULED-IN LEVEE EMBANKMENT (FLOODSIDE ENLARGEMENT)
- PROPOSED FLOODWALL
- H PROPOSED FLOODGATE

FISHER SCHOOL BASIN
PLAN VIEW

NOT TO SCALE

JEAN LAFITTE, LOUISIANA

FLOOD PROTECTION LEVEE FEASIBILITY STUDY

FISHER SCHOOL BASIN

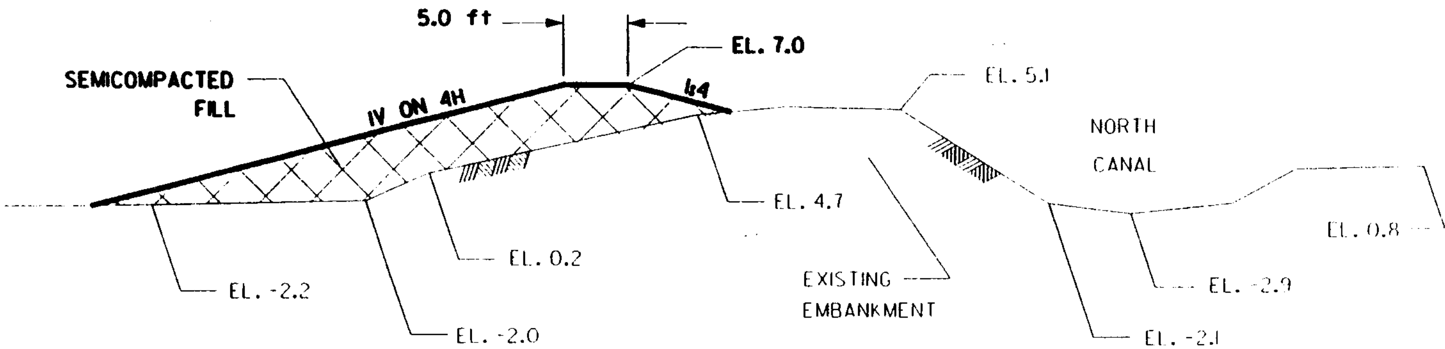
JEFFERSON PARISH, LOUISIANA

ALIGNMENT DETAILS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

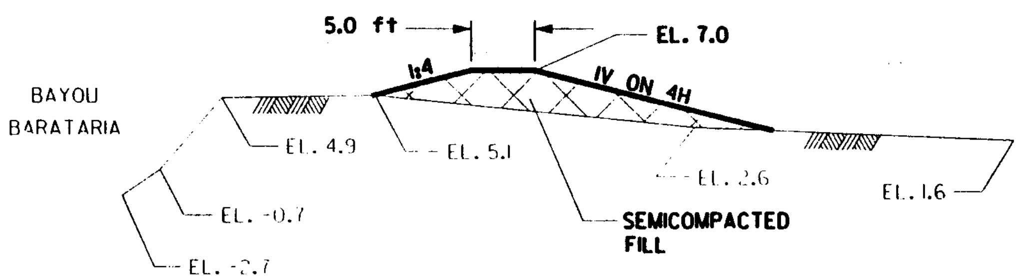
PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT

PLATE 5



TYPICAL SECTION
FLOODSIDE ENLARGEMENT
(LOOKING SOUTH)

NOT TO SCALE



TYPICAL SECTION
LANDSIDE ENLARGEMENT
(LOOKING NORTH)

NOT TO SCALE

JEAN LAFITTE, LOUISIANA

FLOOD PROTECTION LEVEE FEASIBILITY STUDY

FISHER SCHOOL BASIN

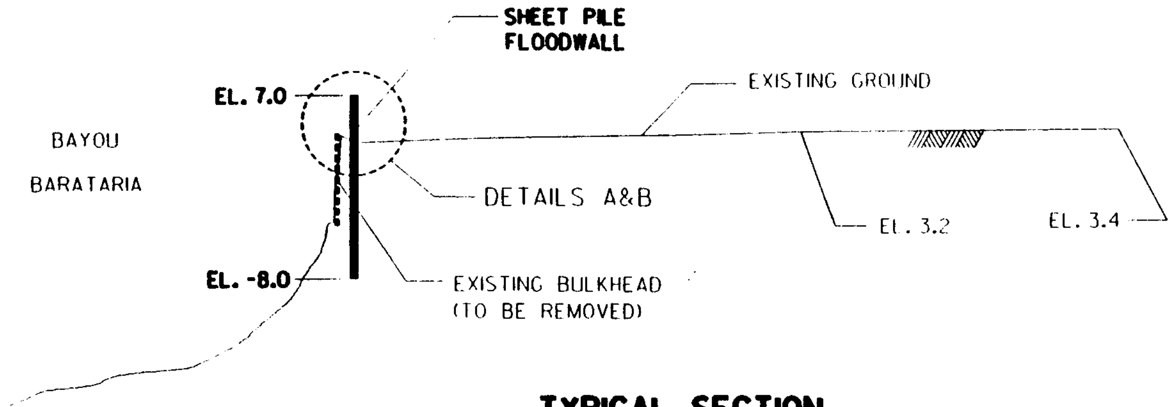
JEFFERSON PARISH, LOUISIANA

TYPICAL LEVEE SECTIONS

JANUARY 199[illegible]

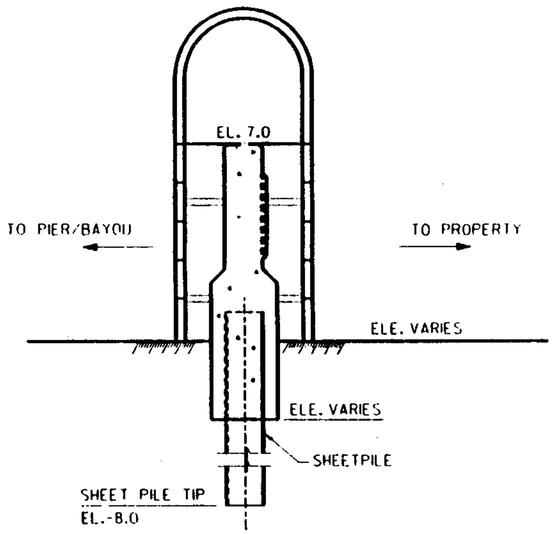
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT

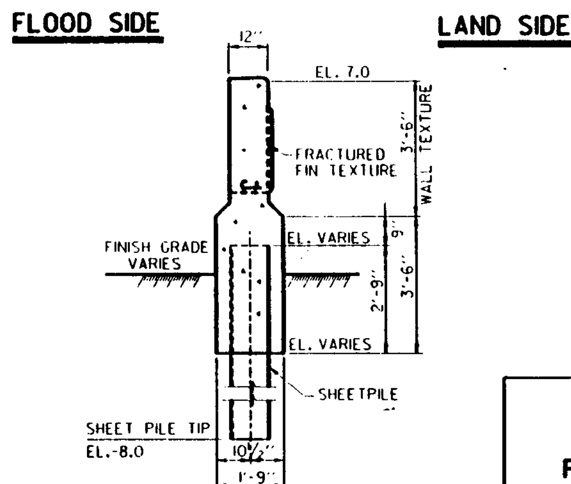


TYPICAL SECTION
SHEETPILE FLOODWALL
(LOOKING NORTH)

NOT TO SCALE



SECTION Ⓐ
NOT TO SCALE
TYPICAL STAIR DETAIL

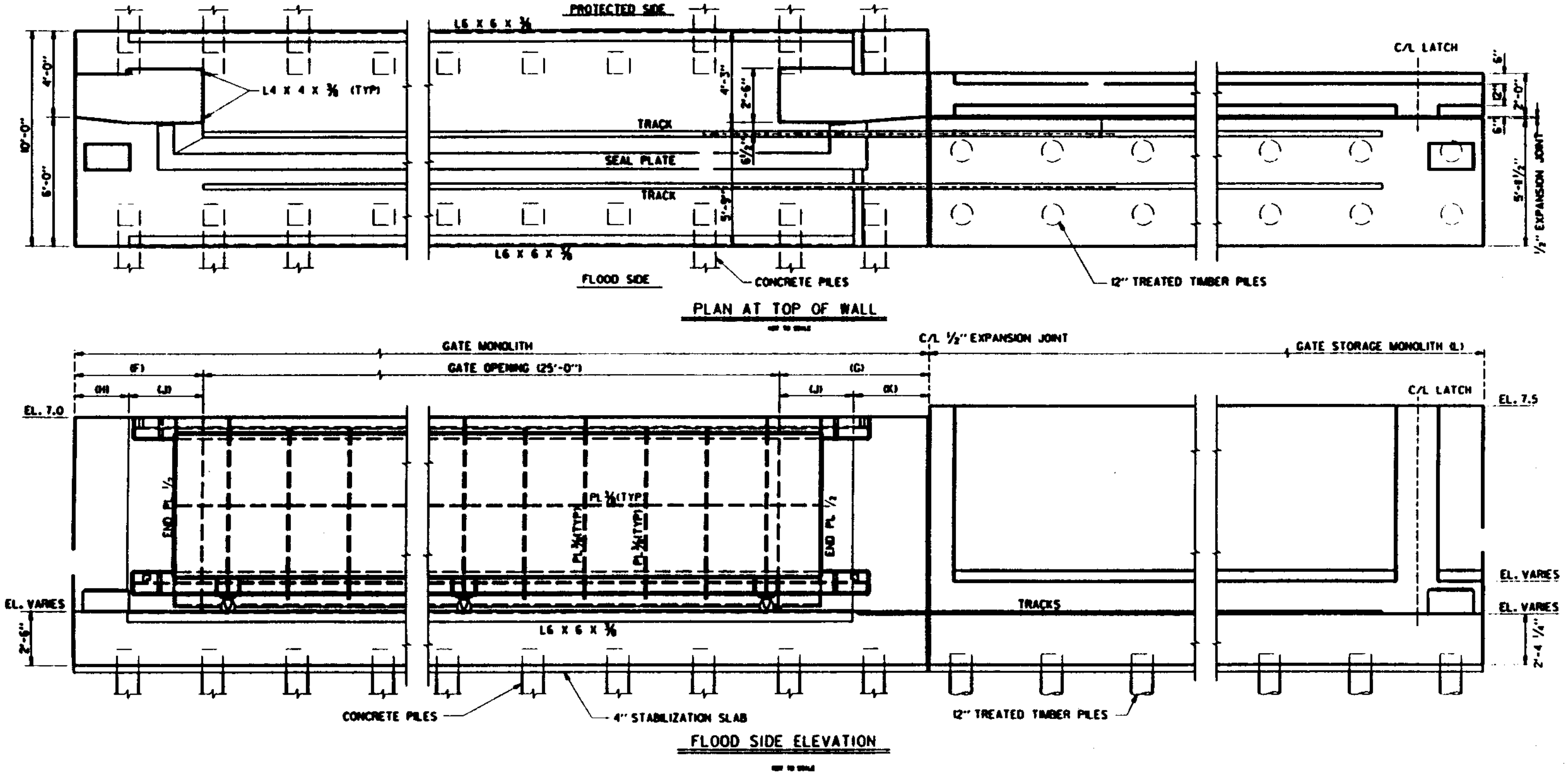


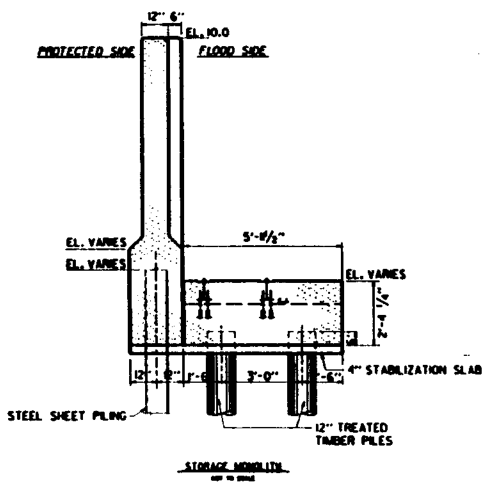
SECTION Ⓑ
NOT TO SCALE
TYPICAL CONCETE CAP DETAIL

JEAN LAFITTE, LOUISIANA
FLOOD PROTECTION LEVEE FEASIBILITY STUDY
FISHER SCHOOL BASIN
JEFFERSON PARISH, LOUISIANA
FLOODWALL DETAILS
[illegible]

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT





JEAN LAFITTE, LOUISIANA

FLOOD PROTECTION LEVEE
FEASIBILITY STUDY

FISHER SCHOOL BASIN

JEFFERSON PARISH, LOUISIANA

FLOODGATE DETAILS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY: U.S. ARMY CORPS OF ENGINEERS - NEW ORLEANS, LA
FUNDED IN PART BY: THE WEST JEFFERSON LEVEE DISTRICT

PLATE 8

ENVIRONMENTAL SETTING

GENERAL

The project area, situated on the Westbank of the Mississippi River in southern Jefferson Parish, is more specifically located on the eastern bank of Bayou Barataria, east of the confluence of Bayou Barataria, Bayou Villars, and the Gulf Intracoastal Waterway. The dominant physiographic features in the project vicinity typically include abandoned distributaries of the Mississippi River, natural levees, inland lakes and bayous, low lying swamps and marshes, and small interconnected lakes, bayous, and man-made canals. The project area, which encompasses approximately 425 acres, is located on the deltaic alluvial plain of the Mississippi River and is generally characterized by low relief and gentle slope. Elevations of natural ground typically range from a maximum of approximately 4 feet NGVD along the levee ridges of Bayou Barataria to a minimum of approximately -1.0 foot NGVD within leveed areas of the eastern part of the study area. Marshes in the unleveed eastern portions of the study area typically exhibit natural ground elevations which average between 0.5 and 1.0 foot NGVD.

The physiographic and topographic features of the study area create an environment which has been extremely prone to flooding from elevated Mississippi River stages and storm-induced tidal surges. At present, the threat of Mississippi River flooding has been alleviated by levees constructed as part of the Mississippi River and Tributaries Flood Control Project. Storm surges, however, are a continuing threat to the study area. The storm surges, usually related to tropical storm systems originating in the Gulf of Mexico, can easily travel across the broken marsh and through Bayou Barataria and numerous other natural and man-made channels thereby threatening the study area with inundation.

CLIMATE

The study area has a subtropical marine climate. Located in a subtropical latitude, its climate is influenced by the many water surfaces of lakes, streams, and the Gulf of Mexico. Throughout the year, these water bodies modify the relative humidity and temperature conditions decreasing the range between the extremes. When southerly winds prevail, these effects are increased, imparting the characteristics of a marine climate. The annual normal temperature recorded at the LSU Citrus Research

Station during the period from 1961 to 1990 is 60.1 degrees Fahrenheit (/F) with monthly mean temperature normals varying from 42.5 /F in January to 73.7 /F in July. Temperature extremes between 1984 and 1992 were 97 /F for a high and 12 /F for a low. The total average annual precipitation recorded at the LSU Citrus Research Station is 62.85 inches. Of this, 34.11 inches, or 54.3 percent usually falls between April and September. The heaviest 1-day rainfall recorded was 8.73 inches on August 2, 1984.

Climatic conditions in the area from April through September are influenced by tropical air masses from the Gulf of Mexico and, from October through March, by cold air masses from the northern continental United States. The result is a humid, subtropical climate with mild winters and long, hot summers. During the summer, prevailing southerly winds produce conditions favorable for afternoon thunderstorms. Thunderstorms occur on about 70 days each year. Hurricanes are dominant low-pressure weather systems that can affect coastal and inland portions of Louisiana and the Gulf Coast between June 1 and November 30. Tornadic activity generally parallels the summer hurricane season in Louisiana. In the colder seasons, the area is subjected to frontal movements that produce squalls and sudden temperature drops. River fogs are prevalent in the winter and spring when the temperature of the Mississippi River is somewhat colder than the air temperature.

SOILS

The United States Department of Agriculture - Natural Resources Conservation Service has surveyed and classified the soils within the study area. According to this survey, the study area is comprised of five soil series which include: Barbary Muck; Sharkey Clay; Sharkey Silty Clay Loam; Commerce Silt Loam; and Lafitte-Clovely Association. These soils are described as follows:

> **Barbary Muck** - Barbary Muck is a poorly drained soil at low elevations between the natural levee of the streams and marshes. The water level is at or above the surface most of the year. Surface runoff is almost nonexistent and permeability is very slow.

Sharkey Clay - Sharkey Clay is a level, poorly drained clay soil on the low natural levees of the Mississippi River and its distributaries. Surface water runoff occurs at a slow rate. The seasonally high water table fluctuates between a depth of 1.0 and 2.0 feet during rainy seasons.

Sharkey Silty Clay Loam - Sharkey Silty Clay Loam is a firm soil on the low natural levees of the Mississippi River and its distributaries. The water table is within 15 inches of the surface during rainy seasons. Permeability and surface water runoff are very slow.

Commerce Silt Loam - Commerce Silt Loam is a level, somewhat poorly drained soil at high elevations on natural levees of the Mississippi River and its distributaries. This soil occupies some of the highest elevations in the project area. Surface water runoff occurs at a slow rate. The seasonally high water table fluctuates between a depth of 1.5 and 4 feet.

Lafitte-Clovelly Association- Lafitte-Clovelly Association is a level, very poorly drained soil which occurs at low elevations on subsided natural levees and interlevee basins. This soil is frequently flooded. The water table, under normal conditions, ranges from a low of 0.5 foot below the surface to a high of 1.0 foot above the surface. Soil permeability is high in organic layers and very low in clayey layers.

Most of the soil types in the study area would settle upon loading, would shrink and oxidize upon dewatering, and have low shear strengths. Therefore, settlement sensitive structures should be pile supported.

SIGNIFICANT RESOURCES

This section contains a description of significant resources and the impacts of the proposed action on these resources. The significant resources described in this section are those recognized by laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations. Criteria used to evaluate these resources are displayed in Tables 1 and 2.

Table 1. ATTRIBUTES OF SIGNIFICANT RESOURCES IN JEAN LAFITTE

Resource	Ecological Attributes	Cultural Attributes	Aesthetic Attributes
WETLANDS	Provide diverse habitat for fish and wildlife. Source of detritus for the aquatic food web.	Supports the traditional extractive economy of the Barataria Basin.	Sounds, sights, and smells provide a pleasing alternative to farms and towns in the area. Provides an escape from urbanization.
WILDLIFE	Numerous species utilize the study area.	Supports traditional commercial and recreational activities. Provided resources to historic and prehistoric settlers.	Viewing and hearing animals in their natural setting is pleasing to inhabitants and visitors.
FISHERIES	Fish and shellfish provide a food source to wildlife.	Fish and shellfish gathering are a traditional part of the local heritage and economy.	Pleasing to view fish swimming in natural habitat.
CULTURAL RESOURCES	Sites often indicate the nature of prehistoric and historic ecological attributes.	Indicators of history and previous inhabitants of the area	Many cultural resources have high aesthetic value to inhabitants and visitors.
THREATENED AND ENDANGERED SPECIES	These species indicate stress on the ecological system.	The bald eagle is a national symbol; and others have been important commercial and recreational interests.	Enjoyment comes to many while viewing a rare species.
RECREATION	The harvest of fish and wildlife can be an important ecological factor. Sportsmen appreciate and respect plant and animal life for their unique ecological characteristics.	Association with the outdoors is part of the area's heritage. Jean Lafitte National Historical Park; Bayou Segnette State Park; and Salvador WMA are nearby.	Recreation flourishes in outdoor, natural settings.
AIR QUALITY	Poor air quality can negatively affect plant and animal life.	Poor air quality affects traditional outdoor activities, recreation, and commerce.	Good air quality enhances the scenic value of the area.
NOISE	Excessive noise levels could cause the relocation of less tolerant species.	Excessive noise deteriorates the traditional outdoors association of the area.	The sounds of nature are valued in this suburban setting.

FARMLANDS	Plant life associated with farms provides air quality benefits.	Farming has been a historical part of the local heritage.	Sights and sounds are a pleasing alternative to urban sprawl.

Table 2. RECOGNITION OF SIGNIFICANT RESOURCES

Resource	Institutional Recognition	Technical Recognition	Public Recognition
WETLANDS	Clean Water Act of 1977, Coastal Zone Management Act of 1972, Louisiana State and Local Coastal Resources Management Act of 1978, Fish and Wildlife Coordination Act, EO 11990, EO 11988.	Habitat for 14 species of special emphasis (USFWS). Louisiana losing 30 mi^2 marsh per year.	Environmental organization and many individuals support preservation of wetlands.
WILDLIFE	Fish and Wildlife Coordination Act, Clean Water Act, Louisiana Water Control Act.	Fourteen species of special emphasis in project area. USFWS, NMFS, LDWF, LDNR, and USACE recognize value of wildlife.	Resource is of importance to consumptive and to non-consumptive users. Environmental groups and many individuals support preservation of wildlife needed habitat.
FISHERIES	Clean Water Act, Fish and Wildlife Coordination Act, Louisiana Water Control Act, EO 11988, EO 11990.	USFWS, NMFS, LDWF, and USACE recognize value of fisheries and necessary water quality.	Environmental organizations and many individuals support water quality and fisheries resources.
THREATENED AND ENDANGERED SPECIES	Endangered Species Act, Bald Eagle Act.	Bald eagle nest located over one mile from project. USFWS, NMFS, LDWF, and USACE cooperate to protect. Audubon Blue List recognizes rare species.	Environmental organizations and many individuals support preservation and enhancement of rare species. High degree of interest in resource.
RECREATION	Land and Water Conservation Fund Act of 1965.	Many fishing and hunting person-days are logged. Various facilities exist which currently satisfy numerous user-days of recreation annually.	Public makes high demands on recreation areas.
CULTURAL RESOURCES	National Historic Preservation Act, Archaeological Resource Protection Act.	Sites are present in the vicinity of the proposed action.	The public and preservation groups support protection and enhancement of historical resources.
HTRW	RCRA, CERCLA, E.O. Order 12088, State of La. Safety and health regulations (40 CFR 1920), OSHA standard 29 CFR 1910.120	Contaminants (not at HTRW levels) have been found in the area of the proposed action.	Public expects protection from hazardous materials.

Table 2 Continued. RECOGNITION OF SIGNIFICANT RESOURCES

AIR QUALITY	Clean Air Act of 1990, Louisiana Air Control Act	Jefferson Parish and the project area have been designated as complying with ozone standards.	The public values clean air and expects protection from air pollutants.
NOISE	Noise Control Act of 1972, National Environmental Policy Act of 1969	Day-Night Noise Level Standards have been established based on land use types.	The public values a noise free environment for the pursuit of home and outdoor activities.
FARMLANDS	Farmland Protection Policy Act, P.L. 97-98	USDA recognizes the value of unique and prime farmlands	The public recognizes the need for farmland as a means to supply consumptive demands.

WETLANDS

EXISTING CONDITIONS: Forested wetlands of the project area are under extreme developmental pressures, primarily being cleared for single family dwellings. Much of the southern half of the project area has been enclosed by a levee constructed by local interests and has been under pump for some time. Although currently unleveed, forested wetlands within the northern portion of the project area are experiencing identical developmental pressures.

Within the extreme southern end of the project area, 17.5 acres of fresh swamp are currently enclosed by an existing levee. This habitat is characterized by the occurrence of a few remaining baldcypress and tupelogum trees; however, the area primarily consists of a dense growth of young woody vegetation having an average height of less than 25 feet. Because of the denseness of the canopy, the area is virtually devoid of ground cover.

Within the mid to northern reach of the project area are 79.6 acres of early successional bottomland hardwood (BLH) habitat. The predominant species within this habitat include sugarberry, Chinese tallow-tree, red maple, black wouldow, American elder, eastern false-willow, and blackberry. This habitat resembles a scrub-shrub community, having tree species with a diameter at breast height of generally less than 5 inches.

There are several many live oak trees on the Fleming property that are of concern, including several in particular along Bayou Barataria. Generally, live oaks in this area of Louisiana are under stress from a high water table and are in a very fragile state. The banks along the bayou have eroded to the point where many of the tree roots are now exposed. These trees are under stress from a combination of the erosion and the high water table and can withstand no additional impacts and survive for long.

NO ACTION: After a thorough review of color infrared photographs beginning in 1974 through 1995, combined with a field reconnaissance of the project area (including the proposed levee alignment), biologists representing the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the local sponsor (West Jefferson Levee District) concluded that within the next 15 years (by the year 2012), all of the forested wetlands (94.7 acres) that would be enclosed within the proposed levee alignment would be lost to development in the future without-project condition. In other words, even if the levee were not constructed, those wetlands would be lost to ongoing developments (i.e., primarily single family dwellings). These developments would continue to expand via construction on pilings or on hauled-in fill material, to the FEMA - approved elevation. It is unlikely, however, that forested wetlands (i.e., fresh swamp) on the unprotected side of the existing levee along the southeastern perimeter of the project area would be cleared for development.

Most of the live oak trees in the area would continue to survive in a stressed condition for several decades provided that no disturbances occur on the ground below or around them. However, the erosion along Bayou Barataria would likely result in the demise of the oaks along its bank in 15 to 20 years. Unfortunately, efforts to stabilize the bank could kill the stressed trees rather than save them if the roots are smothered or the ground compressed.

LEVEE AND FLOODWALL: Within the extreme southern end of the project area, enlargement of the existing levee would result in the direct loss of 2.4 acres of the 17.5 acre fresh swamp. Within the mid to northern reach of the project area, levee construction would cause the direct loss of 8.0 acres of the 79.6 acre early successional BLH habitat.

Levee systems such as that currently being proposed have historically become the line of demarcation, discouraging future developments on the unprotected side. As such, they serve to protect adjacent, functionally valuable wetlands. The currently existing levee provides such a benefit to adjacent wetlands. Unfortunately, continued subsidence in the future is likely to convert wetlands outside the existing/future levee system from swamp to marsh and, to some extent, open water within the next 50 years.

In August 1997, the previously referenced biologists quantified the loss in habitat value associated with the direct, project-induced loss of 2.4 acres of fresh swamp and 8 acres of early successional bottomland hardwood habitat. The Wetland Value Assessment (WVA) methodology used to evaluate restoration projects, developed under Section 303 of the Federal Coastal Wetlands Planning, Protection and Restoration Act, was used to quantify that loss in habitat value. Using the WVA, habitat quality and quantity are assessed for baseline conditions and are predicted for future without-project and future with-project conditions.

Using various parameters, the WVA evaluates entire communities (e.g., bottomland hardwoods and fresh swamp). The 7 parameters assessed for bottomland hardwoods are tree species association, stand maturity, understory/midstory percentage, hydrology, forest size, surrounding land use, and disturbance. The 6 parameters assessed for fresh swamp are stand structure (percent cover), stand maturity (either known age or diameter at breast height), hydrology, forest size, surrounding land use, and disturbance.

The habitat unit is the basic unit of the WVA, which quantifies the effects on fish and wildlife habitat. Habitat units are the product of a habitat suitability index (HSI) and the acreage of affected habitat at a given target year. The HSI, which is a relative measure of the quality of a particular habitat type, is determined by assessing the parameters identified in the previous paragraph. An HSI of 0.0 represents no habitat value; an HSI of 1.0 represents optimum habitat value.

Habitat units fluctuate in response to changes in the HSI (habitat quality) and/or acres (habitat quantity). Those changes in quality and quantity are predicted for various target years over the anticipated life of a project, for future without-project and future with-project scenarios.

Target years selected for this project were 0 (baseline), 1, 15, and 50. HSI values were established from site visits to the area and from a review of aerial photographs and reports documenting fish and wildlife habitat conditions in the study area and similar habitats.

The products of the resultant HSI values and the habitat acreage were summed and annualized to determine the Average Annual Habitat Units (AAHU's) available for each habitat type. Comparison of the AAHU's available under the future with-project and future without-project conditions indicated that implementation of the proposed project would cause the permanent loss of 0.74 AAHU's of fresh swamp and 2.34 AAHU's of early successional bottomland hardwoods. Attachment A contains copies of the detailed WVA data analysis.

Construction of a floodwall or levee along Bayou Barataria would likely kill the large live oak trees on the Fleming property much sooner than the estimated 20 years they would survive with no disturbance. If the floodwall is moved several feet out from the bank, no fill is be placed behind the floodwall above the bayou water level, and no activity occurs on the land under or within several feet of the crowns of the trees, the trees may survive longer than 20 years because the bank would be stabilized. The trees are not likely to live the full 20 years that we estimate they have remaining if construction activity occurs around them.

WILDLIFE

EXISTING CONDITIONS: Because the remaining forested wetlands in the project area are of relatively low quality and have been adversely affected by forced drainage and developmental disturbances, they are considered of low value as wildlife habitat. Wildlife which may be evidenced in the project area include various species of reptiles and amphibians, resident and migratory passerine birds, rabbits, squirrels, various rodents, and the nine-banded armadillo.

NO-ACTION: Wildlife habitat within the levee system, albeit very limited and of low value, is expected to be virtually eliminated within the next 15 years due to residential development. Habitat outside of the levee system would support different species assemblages as it transitions from swamp to marsh to open water.

LEVEE AND FLOODWALL: Construction of the proposed levee would permanently eliminate 2.4 acres of fresh swamp and 8 acres of early successional bottomland hardwood habitat. These areas currently serve as moderate value habitat for rabbits, squirrels and a variety of passerine birds.

FISHERIES

EXISTING CONDITIONS: Bayou Barataria supports a variety of fish species including blue and channel catfish, freshwater drum, buffalo, largemouth bass, and spotted, long nose and alligator gar. Saltwater species such as anchovies and striped mullet also inhabit the bayou (USACE, 1976) indicating that a transition of salinity conditions occurs in the general area. Open water in the project area is limited to borrow canals/ditches that are of extremely low value to fishery resources because of their poor water quality and shallow depth. The only fish species that is likely to occur with some regularity within the project area is the mosquitofish.

NO ACTION: Fishery conditions in Bayou Barataria may become more saltwater oriented during the next 50 years unless the anticipated freshwater introduction benefits from diversions at Davis Pond and other areas are realized.

LEVEE AND FLOODWALL: Fishery habitat within the project area is currently limited to interior ditches and depressions. Levee construction, in conjunction with pumping by the local sponsor, would totally eliminate fishery habitat from within the project area.

THREATENED AND ENDANGERED SPECIES

EXISTING CONDITIONS: The only species of concern near the project area is the bald eagle, an endangered species. A nest is located in the vicinity, over a mile from the project area.

NO-ACTION: The bald eagle nest would continue to be used for the foreseeable future unless encroaching development stresses cause the eagle to relocate. Unless abated, continued saltwater encroachment could cause the death of the baldcypress nesting tree.

LEVEE AND FLOODWALL: In its September 13, 1994, Planning Aid Report, the U.S. Fish and Wildlife Service indicated that no Federally listed threatened or endangered species presently occurs within the proposed project area. However, the U.S. Fish and Wildlife Service noted that, if project construction had not been initiated within one year, follow-up consultation should be accomplished prior to making expenditures for construction.

On December 20, 1996, CEEC (representative of the local sponsor) consulted with personnel of the U.S. Fish and Wildlife Service regarding the potential for the proposed project to impact threatened or endangered species. Ms. Terry Rabot of the U.S. Fish and Wildlife Service confirmed at that time that an active eagle nest still occurred in the area but was located in excess of one mile from the project area. Accordingly, she did not believe that the proposed project would adversely affect the eagles. The U.S. Fish and Wildlife Service did request, however, that it be consulted again immediately prior to executing a contract for construction to ensure that no adverse impacts to endangered species would occur.

CULTURAL RESOURCES

EXISTING CONDITIONS: The lower Barataria region has been used by man in both prehistoric and historic times. Archaeological records concerning prehistoric sites in the region indicate that extensive colonization was initiated during the Marksville period (200-400 A.D.) and continued throughout much of the prehistoric period. Historical records concerning the region indicate that European settlement in the region began in the early 1700's. Both prehistoric and historic sites are known to exist within the immediate vicinity of the project area.

One site, identified as the Oyster Road Site (16JE84), is located within the project area at its southwest corner. The site is a prehistoric Indian shell midden which in 1977 occupied 32.5 meters along the bank of Bayou Barataria. In 1984, the site was examined and found to be severely eroded and completely wave washed. Due to the damages found at that time, the site was deemed ineligible for nomination to the National Register of Historic Places (NRHP). A recent examination, conducted in July 1995, revealed no evidence of shell or cultural remains.

A second reported site, the Fleming/Berthoud Cemetery (16JE36), is located within the project area near the shoreline of Bayou Barataria at the intersection of Bayou Villars. This site contains the remains of both prehistoric and historic components. The prehistoric component includes a Marksville through Mississippi period shell midden deposit and a large Indian mound. The historic component includes a cemetery dug into the Indian mound and the remains of the Mavis Grove/Fleming Plantation. The prehistoric components of (16JE36) were reported as eligible for nomination to the NRHP in 1975 and 1986, however these sites are not currently listed in the NRHP. The Mavis Grove/Fleming Plantation main house is presently not listed in the NRHP.

NO-ACTION: The Oyster Road site (16JE84) has eroded into Bayou Barataria and is totally destroyed. Remnants of the site that remain would continue to be washed away by erosional forces.

The prehistoric shell midden component of the Fleming/Berthoud site (16JE36) has experienced some erosion along Bayou Bartaria. Rip-rap placed along the bankline is protecting the midden at this time; however, without continued intervention, the midden would likely be impacted again in the future. The prehistoric Indian mound component of the Fleming/Berthoud site has been used for interments in historic and modern times. This usage is expected to continue. The historic plantation component of the Fleming/Berthoud site is suffering from neglect. This component would continue to deteriorate without intervention.

LEVEE AND FLOODWALL: A visual and subsurface examination of the Oyster Road (16JE84) site in July 1995, by archaeologist from Earth Search, Inc., revealed no evidence of shell or cultural materials. It has been concluded that the site is destroyed and no longer eligible or potentially eligible for nomination to the NRHP. Consequently, the proposed project would not impact any significant cultural resources at this site.

Both the prehistoric and historic components of the Fleming/Berthoud (16JE36) site have been archaeologically investigated. No intact cultural deposits associated with either the historic or prehistoric components were found within the project corridor. Planned construction would therefore have no adverse effect on this significant site. The improvements to the levee system would likely benefit the cemetery by stabilizing the eroding shoreline.

The proposed has been coordinated with the Louisiana State Historic Preservation Officer (SHPO) and is in compliance with Section 106 of the National Historic Preservation Act. A letter of no-objection from the Louisiana SHPO is presented in Attachment B.

RECREATIONAL RESOURCES

EXISTING CONDITIONS: Urban type recreation facilities, found within and north of the study area, include: National and State Parks; local parks, playgrounds, and swimming pools; and ballparks and tennis courts. Natural resource related facilities, found within and surrounding the study area, include: picnic areas, camp sites, and hiking trails; wildlife refuges and management areas, and numerous water bodies; and private and public fishing piers and boat launches. The primary users of these facilities are the residents of southeast Louisiana; however, residents of Louisiana and the nation also frequent the area. Predominant recreational activities are freshwater and saltwater fishing, including fin-fishing, crawfishing, and crabbing and shrimping. Other recreational activities include big game, small game and migratory bird hunting, boating, swimming, and camping. The three major recreational areas of significance adjacent to the area are the Lake Cataouatche-Lake Salvador complex (which includes the Salvador Wildlife Management Area), the Jean Lafitte National Historical Park and Preserve, and the Bayou Segnette State Park. It is estimated that 75,000-150,000 recreational users visit the Jean Lafitte National Historical park and Preserve, Barataria Preserve Unit each year according to the National Park Service statistics.

NO-ACTION: Future recreational use of the study area should increase due to: the proximity of natural areas such as Lake Cataouatche-Lake Salvador (including the Salvador Wildlife Management Area), Jean Lafitte Natural Historical Park, and Bayou Segnette State Park; the availability of numerous access points to the areas natural resources; and the rapid rate of development presently occurring in the vicinity. These anticipated increases in recreational use would not significantly affect any of the Federal and State parks or management areas in the vicinity; however, public facilities at the Parish and local levels could eventually be strained by increasing usage demands. Commercial facilities would likely adapt, on the basis of supply and demand, to meet future recreational access demands. Continue flooding, experienced without the proposed project, would adversely affect existing and future recreation opportunities by limiting accessibility during and immediately following such events. Expenditures related to flood recovery could also limit the feasibility of providing viable recreation opportunities at the local and commercial level.

LEVEE AND FLOODWALL: Implementation of the proposed project would not cause any significant impact to recreation areas or activities within the project vicinity. Minor impacts to the shoreline of Bayou Barataria, during construction, would likely result in a localized disturbance of aquatic wildlife and a diminished level of accessibility for adjacent landowners and the public. Minimal impacts would also be imposed on existing recreational activities occurring on the levees, such as walking, jogging, birdwatching, and nature study. Any such impacts would be localized and limited to the construction period and would be minimized by the application of construction controls such as silt curtains. The proposed project would yield positive immediate and long-term effects to recreation areas by providing enhanced flood protection to existing sites and stimulating potential development of new sites.

Coordination with Federal, State, and local agencies has been accomplished with respect to recreational impacts of the proposed project. No comments have been received as a result of the coordination solicitations.

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

EXISTING CONDITIONS: The results of historic land use research indicates that the study area was undeveloped prior to the mid to late twentieth century. In the nineteenth century it was part of the Mavis Grove Plantation. Sugar was grown in the region and the lumber industry boomed in the late nineteenth century. Jean Lafitte can be labeled a line settlement, having expanded down the high land along the natural levee of Bayou Barataria. Development has been both residential and commercial.

Industry in the area is associated with fishing or with oil and gas support services. Industrial development appears to have been somewhat concentrated in the lower portion of the town. Map and historical photograph analysis provides insufficient evidence to determine the purpose of structures in the lower reach of the study area.

The EPA National Priorities List (NPL - Superfund Sites) of the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) was investigated through personal contacts with Mr. Don Markham of EPA Region 6 on March 7, 1997. No sites from the project area were identified on the NPL at that time. The EPA Resource Conservation and Recovery Information System (RCRIS) list for Lafitte was obtained on March 7, 1997. The list indicated that no hazardous waste treatment, storage, disposal, or transportation facilities are located within the project vicinity; however, the list did reveal that five hazardous waste generators are reporting in the project vicinity. Several generators are no longer active. Of the active generators, none were located within two miles of the project area. The Louisiana Department of Environmental Quality, Louisiana Site Remediation Information System (LASRIS) list, which shows inactive and abandoned sites, lists one location

(Watts Construction Company) in Jean Lafitte. The site is located over three miles northeast of the project area.

NO-ACTION: Hazardous, toxic, and radioactive waste (HTRW) problems are unlikely along the majority of the proposed alignment with the exception of 3 sites which were determined to be of moderate to high risk. No change in the likelihood of occurrence or location of toxic materials would be expected without this project.

LEVEE AND FLOODWALL: Implementation of the proposed action would LIKELY result in the testing and clean-up of 3 sites of potential concern. Several other waste sites, which were not deemed to be significant, would also require removal to allow for construction. The proposed action would, therefore, provide for the improvement of the overall environmental condition of the project area.

Inspections of the proposed project alignment and adjacent areas were accomplished on November 11, 1996, April 3, 1997, and July 28, 1997. The inspections were completed on foot and included all accessible portions of the alignment. Based upon these inspections, the risk of encountering an HTRW site during construction is minimal throughout most of the project. Areas identified to be of moderate to high risk include: a dump site north of the Gloria Drive Pump Station; a boat building or repair business at the southwest corner of the alignment; and an underground storage tank (UST) site at a vacant grocery store at Bayou Barataria. Areas identified to be of minimal HTRW risk, but likely requiring removal to accommodate construction included: a residential storage area at the LA Highway 45 bend; pipe penetrations in the levee near Tasha Lane; a dump site at the dead end canal; and a dump site south of the Gloria Drive Pump Station. Other areas identified were either outside of the alignment or were not a significant HTRW concern.

AIR QUALITY

EXISTING CONDITIONS: Based upon a review of ambient air quality 5-year trend analyzes (1992-1996), collected by the Louisiana Department of Environmental Quality (LDEQ-AQD), there were no violations of state air quality standards at the monitoring stations nearest the project area. The LDEQ-AQD also indicated that there are no non-attainment areas or deviations from National Ambient Air Quality Standards in the vicinity.

These findings indicate that the air quality in the study area is generally good.

NO ACTION: Air quality within the project area would be expected to worsen slightly as development continues, but violations of state air quality standards are not expected to occur.

LEVEE AND FLOODWALL: There would be temporary, minor adverse impacts to air quality near construction areas. Exhausts from construction equipment and dust from moving equipment would occur during construction. No violations of state air quality standards are expected to occur because of the relatively small extent of the project. It was calculated that the massive New Lock and Connecting Channels Project would produce 50.9 tons of volatile organic compounds per year (COE 1997). The current project would produce a small fraction of that amount.

NOISE

EXISTING CONDITIONS: Ambient noise in the study area is generated by residential activities, vehicular traffic, and interspersed industrial enterprises. Boat traffic on Bayou Barataria and the Intracoastal Waterway is an additional source of noise for areas adjacent to these canals. The noise levels present in the study area probably vary between 50-80 decibels, with the lower levels occurring in the less developed northern and eastern reaches, and the higher levels occurring in the more developed southern and western reaches.

NO-ACTION: With the anticipated residential and business growth that would occur in the project area, noise levels would increase slightly.

LEVEE AND FLOODWALL: Noise levels would increase temporarily over the without-project conditions in the areas of construction. Since construction would take place during daylight hours, sleep interference would be minimal; however, the noise could be annoying to workers and inhabitants in adjacent structures. The EPA has a limit of 85 dBA for eight hours of continuous exposure to protect against permanent hearing loss. Noise above this level would not occur for periods longer than eight hours. Construction workers would have hearing protection devices.

FARMLANDS

EXISTING CONDITIONS: The farmland Protection Policy Act, recognizes and encourages the responsible use of lands which are classified as prime or unique farmland. The classification of a property is generally based upon factors that include: the soil type; existing land usage; and conditions of flooding. According to the Natural Resources Conservation Service, Soil Survey of Jefferson Parish (1983), the soil units which comprise prime farmland in the project area include: Sharkey clay; Sharkey silty clay loam; and Commerce silt loam. It is estimated that the project area contains 355 acres of prime farmland soils, based solely upon an evaluation of surveyed map units. The actual acreage of prime farmland in the project area would be less than the specified figure, since areas having existing development and flooded conditions would be eliminated from the acreage estimate.

NO-ACTION: Land use trends in Jefferson Parish and in the project area are toward the conversion of prime farmland to urban uses. As a result, prime farmland in the project area would likely be converted to developed uses within the foreseeable future. This development would occur with or without the proposed action.

LEVEE AND FLOODWALL: Construction of the proposed levee would result in the loss of approximately 16 acres (4.5%) of prime farmland in the project area by virtue of the expanded levee footprint. Since prime farmland is presently being lost to development, the losses associated with the proposed action would temporarily accelerate the rate of loss. The total acreage of prime farmland ultimately lost to long term development would not be affected.

CUMULATIVE IMPACTS

The direct loss of 10.4 acres of fresh swamp and BLH habitat would be added to other wetland losses, both man induced and natural, in the Barataria Bay ecosystem. Between 1956 and 1989 approximately 6,000 acres of bottomland hardwoods and over 2,000 acres of marsh were lost in the plan area. Most of these acres have become developed, resulting in the loss of all wetland values and functions associated with these areas. Wetland losses resulting from development would be expected to continue at the same rate under the no action plan condition compared to the proposed project scenario because the demand for land to develop in this area is so great. The development demand has resulted and would continue to result in an influx of residents from outside the Lafitte area.

MITIGATION

The habitat value (3 Average Annual Habitat Units) of the 10.4 acres of direct forested wetland loss could be fully mitigated via one of the following options:

! As recommended by the U.S. Fish and Wildlife Service in its September 1997 Fish and Wildlife Coordination Act Report, acquisition and management of a yet to be determined acreage of forested wetlands located in the outfall area of the Davis Pond Freshwater Diversion Structure; or - 4 acres available at .45 AAHU

! As recommended by the U.S. Fish and Wildlife Service in its September 1997 Fish and Wildlife Coordination Act Report, acquisition or deed-restriction and management of an approximately 12.75 acre tract of early successional bottomland hardwoods immediately adjacent to, but on the unprotected side of the new levee to be constructed, through the mid to northern half of the project area; or

÷ .45 = 2.5
1 ÷ .35 = 3.2 acres

! Acquisition of an appropriate amount of forested wetland mitigation credits from an approved mitigation area in coastal Louisiana.

The COE has elected to purchase the needed acreage in the Bayou Lacache mitigation area in Terrebonne Parish. The Bayou Lacache area has been designated to provide 0.6 AAHU/acre. Because 3.0 AAHU would be lost with project implementation, five acres would need to be purchased in the mitigation area.

The areas under and around all live oak trees must be avoided during construction to avoid damage to the fragile trees. It is questionable that anything can be done to avoid damage to the live oaks on the Fleming property that grow along Bayou Barataria, unless construction in the area is avoided entirely. If the trees are removed and replaced, the replacement trees should be species that are more tolerant of the high water table (e.g cypress or overcup and nuttall oak, if oaks are selected) and be at least 15 feet tall. Live oaks should not be planted on the property as replacements. They are not likely to be vigorous

3 ÷ .45 = 6.67

4 x .45 = 1.8 available

1.2 ÷ .35 = 3.4 acres

and may not survive because of their sensitivity to the high water table. Twice as many trees should be planted to offset those removed or killed by project implementation because the replacement trees would be smaller initially and would always have a more vertical growth form.

COORDINATION

The New Orleans District representatives have met with Jefferson Parish representatives and interested citizens concerning the design and details of the proposed action. All persons contacted support the proposed action.

This document has been coordinated with appropriate Congressional, Federal, State, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, received copies of this Environmental Assessment:

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

A draft EA was circulated for review and comment for 30 days starting on November 24, 1998. Five letters of comment were received. Three of the letters were from private landowners concerned about their land and structures on their property. The project manager has contacted all the landowners and will continue to coordinate with them. A letter from the National Marine Fisheries Service recommended no revisions to the EA. The letter from the State Historic Preservation Officer concurred with our finding of no effect on significant cultural resources and recommended one minor modification of the EA.

Recommendations of the U.S. Fish and Wildlife Service

Recommendation 1. Concurrent with project implementation, 6.4 acres of bottomland hardwoods and 6.35 acres of swamp shall be reforested at Mitigation Site 1; or, funding would be made available to develop and dedicate 3 AAHU's on the West Bank Mitigation Area to compensate for the unavoidable, project-related loss of forested wetlands.

Response 1. We checked with the superintendent of the Jean Lafitte National Historical Park and Preserve to determine if they would accept the small triangular area outside the levee system to manage. They are not interested in it and we can find no other acceptable entity to manage such a small area. The mitigation credits for the Davis Pond mitigation area have yet to be worked out; therefore, we plan to purchase five acres in the approved Bayou Lacache mitigation area where we gain 0.6 AAHU's/acre. However, appropriate acreage in the Davis Pond area or lands closer to the Jean Lafitte National Historical Park would be acceptable.

Recommendation 2. The Service shall be provided an opportunity to review and submit recommendations on the draft plans and specifications for all levee work addressed in this report, and shall be consulted throughout the development of the mitigation alternative ultimately selected for implementation.

Response 2. We would coordinate future planning with the U.S. Fish and Wildlife Service.

COMPLIANCE WITH STATUTES

Environmental compliance of the proposed action with a variety of statutes is required. The status of compliance with applicable Federal and State statutes, at this stage of the review process, is displayed in Table 3. Full compliance would be achieved a finding of no significant impact is issued, if appropriate. A state water quality certificate was issued on October 9, 1997 and approval of the coastal zone consistency determination was given on July 30, 1998.

Table 3. ENVIRONMENTAL COMPLIANCE

Statute	Compliance
FEDERAL	
Abandoned Shipwreck Act of 1988	Full
Archeological and Historic Preservation Act of 1974	Full
Bald Eagle Act	Full
Clean Air Act, As Amended	Full
Clean Water Act of 1977, As Amended	Full
Coastal Zone Management Act of 1972, As Amended	Full
Coastal Barrier Resources Act (PL 97-348; 1982)	Full
Endangered Species Act of 1973, As Amended	Full
Estuary Protection Act	Full
Farmland Protection Policy Act	Full
Federal Water Project Recreation Act, As Amended	Full
Fish and Wildlife Coordination Act, As Amended	Full
Floodplain Management (E.O. 11988)	Full
Flood Security Act of 1985	Full
Land and Water Conservation Fund Act of 1965	Full
Marine Protection, Research, and Sanctuary Act of	Full
1972	Full
National Environmental Policy Act of 1969, As	Full
Amended	Full
National Historical Preserve Act of 1966, As Amended	Full
Prime and Unique Farmlands, 1980 CEQ Memorandum	Full
Protection and Enhancement of the Cultural	Full
Environment, 1971 (E.O. 11593)	Full
Protection of Wetlands (Executive Order 11990)	Full
River and Harbor and Flood Control Act of 1970	Full
Water Resources Dev. Acts of 1976, 1986, and 1990	Full
Wild and Scenic River Act, As Amended	Full
STATE	
Air control Act	Full
Archeological Treasury Act of 1974, As Revised	Full
Louisiana State and Local Coastal Resource	Full
Management Act of 1978	Full
Louisiana Natural and Scenic Rivers System Act	Full
Protection of Cypress Trees	Full
Louisiana Water Control Act	Full

PUBLIC CONCERNS

The flooding of streets, homes, and businesses is a concern to all residents of the State of Louisiana. The residents of the Fisher School Basin in Jean Lafitte are particularly interested in eliminating the flooding that results from storm induced tides and precipitation. Loss of wetlands, forests, and fish and wildlife habitat are concerns related to any project in south Louisiana. Residents along the bayou are concerned about aesthetic qualities and replacement of structures (e.g. piers) that they have placed along the bayou. Affected residents would be compensated for lands, structures, and relocations. Also of concern to citizens are their property values and adequate compensation for land and structures taken to construct a levee/floodwall.

SUMMARY

The proposed action would reduce tidal and storm induced flooding within the Fisher School Basin by: elevating existing levee systems; constructing a new levee segment; and placing floodwalls at several strategic locations. The protection system would follow existing levee alignments as closely as possible to minimize adverse impacts and would be designed to protect against the existing 10-year exterior, or tidal, event. The proposed action would cause the loss of 10.4 acres of wetland habitat. The affected wetlands are almost totally enclosed, under pump, and exhibit low functional values; however, the direct wetland losses would be mitigated by one of the methods previously described. Minor impacts to wildlife or fisheries would occur as a result of the proposed action. Slight and temporary impacts to the water quality of Bayou Barataria or canals and wetlands adjacent to the project area would result from the proposed action. This office has assessed the environmental impacts of the proposed action and has determined that the improvements of the Fisher School Basin Flood Protection System would have no adverse impact upon endangered species, cultural resources, or recreational resources.

LITERATURE CITED

U.S. Army Corps of Engineers. 1997. Mississippi River-Gulf Outlet New Lock and Connecting Channels Evaluation Report, Volume 6, Appendix D. U.S. Army Corps of Engineers. New Orleans, LA.

LIST OF PREPARERS

This environmental assessment was prepared by Mr. David Soileau, Biologist, and Mr. Brian Hava, Senior Environmental Specialist, Coastal Engineering and Environmental Consultants, Inc., in coorperation with Mr. Bob Martinson, Biologist at the U.S. Army Corps of Engineers, New Orleans District. Engineering information was provided by Mr. Rodney Greenup, Study Manager and Rich Varuso, Civil Engineer U.S. Army Corps of Engineers, New Orleans District. Ms. Joan Exnicios coordinated cultural resources investigations.

Attachment A

Wetland Valuation Assessment Results

COMMUNITY HABITAT SUITABILITY MODEL
Fresh Swamp

Project...... south swamp Acres: 1.2

Condition: Future With Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 15 Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory	70	0.60	0			
	Scrub shrub	70		0			
	Herbaceous	10		0			
V2	Maturity	Age		Age		Age	
	(input age			1	0.00	1	0.00
	or	Cypress %		Cypress %		Cypress %	
		35					
	species	Cypress dbh		Cypress dbh		Cypress dbh	
	composition	12					
	and	Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
	dbh)	65					
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		6	0.44				
		Class		Class		Class	
V3	Hydrology	2	0.40	1	0.10	1	0.10
		Class		Class		Class	
V4	Forest Size	2	0.40	1		1	
	Surrounding	Values %		Values %		Values %	
V5	Land Use						
	Forest / marsh	60	0.60	60	0.60	50	0.50
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	40		40		50	
	Disturbance						
V6		Class		Class		Class	
	Type	1	0.01				
		Class		Class		Class	
	Distance	1					
		HSI =	0.34	HSI =	0.00	HSI =	0.00

Project...... south swamp
FWP

Variable		TY 50 Class/Value	SI	TY Class/Value		TY Class/Value	
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory						
	Scrub shrub						
	Herbaceous						
V2	Maturity	Age		Age		Age	
	(input age	1	0.00				
	or	Cypress %		Cypress %		Cypress %	
	species	Cypress dbh		Cypress dbh		Cypress dbh	
	composition						
	and	Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
	dbh)						
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		Class		Class		Class	
V3	Hydrology	1	0.10				
		Class		Class		Class	
V4	Forest Size	1					
	Surrounding	Values %		Values %		Values %	
V5	Land Use						
	Forest / marsh	50	0.50				
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	50					
	Disturbance						
V6		Class		Class		Class	
	Type						
		Class		Class		Class	
	Distance						
		HSI =	0.00	HSI =		HSI =	

COMMUNITY HABITAT SUITABILITY MODEL

Fresh Swamp

Project...... south swamp　　　　Acres: 1.2

Condition: Future Without Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 15 Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory	70	0.60	70	0.60		
	Scrub shrub	70		70			
	Herbaceous	10		10			
V2	Maturity	Age		Age		Age	
	(input age					1	0.00
	or	Cypress %		Cypress %		Cypress %	
		35		35			
	species	Cypress dbh		Cypress dbh		Cypress dbh	
	composition	12		12			
	and	Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
	dbh)	65		65			
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		6	0.44	6	0.44		
		Class		Class		Class	
V3	Hydrology	2	0.40	2	0.40	2	0.40
		Class		Class		Class	
V4	Forest Size	2	0.40	2	0.40	2	
	Surrounding	Values %		Values %		Values %	
V5	Land Use						
	Forest / marsh	60	0.60	60	0.60	50	0.50
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	40		40		50	
	Disturbance						
V6		Class		Class		Class	
	Type	1	0.01	1	0.01		
		Class		Class		Class	
	Distance	1		1			
		HSI =	0.36	HSI =	0.36	HSI =	0.00

Project...... south swamp
FWOP

Variable		TY 50 Class/Value	SI	TY Class/Value	SI	TY Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory						
	Scrub shrub						
	Herbaceous						
V2	Maturity	Age		Age		Age	
	(input age	1	0.00	1	0.00		
	, or	Cypress %		Cypress %		Cypress %	
	species	Cypress dbh		Cypress dbh		Cypress dbh	
	composition						
	and	Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
	dbh)						
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		Class		Class		Class	
V3	Hydrology	2	0.40	2	0.40		
		Class		Class		Class	
V4	Forest Size	2		2			
	Surrounding	Values %		Values %		Values %	
V5	Land Use						
	Forest / marsh	50	0.50	50	0.50		
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	50		50			
	Disturbance						
V6		Class		Class		Class	
	Type						
		Class		Class		Class	
	Distance						
		HSI =	0.00	HSI =	0.00	HSI =	

AAHU CALCULATION, Fresh Swamp

Project: south swamp

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	1.2	0.36	0.43	
1	1.2	0.00	0.00	0.22
15	1.2	0.00	0.00	0.00
50	1.2	0.00	0.00	0.00

Total CHUs =	0.22
AAHUs =	0.00

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	1.2	0.36	0.43	
1	1.2	0.36	0.43	0.43
15	1.2	0.00	0.00	3.04
50	1.2	0.00	0.00	0.00
		0.00		

Total CHUs =	3.48
AAHUs =	0.07

NET CHANGE IN CHUs DUE TO PROJECT	
A. Future With Project CHUs =	0.22
B. Future Without Project CHUs =	3.48
Net Change (FWP - FWOP) =	-3.26

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHUs =	0.00
B. Future Without Project AAHUs =	0.07
Net Change (FWP - FWOP) =	-0.07

AAHU CALCULATION, Bottomland Hardwoods

Project: hwy 45

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	3.8	0.77	2.94	
1	0	0.04	0.00	1.01
16	0	0.04	0.00	0.00
50	0	0.04	0.00	0.00
			Total CHUs =	1.01
			AAHUs =	0.02

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	3.8	0.77	2.94	
1	3.8	0.78	2.96	2.95
16	0	0.04	0.00	14.18
50	0	0.04	0.00	0.00
			Total CHUs =	17.12
			AAHUs =	0.34

NET CHANGE IN CHUs DUE TO PROJECT	
A. Future With Project CHUs =	1.01
B. Future Without Project CHUs =	17.12
Net Change (FWP - FWOP) =	-16.11

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project AAHUs =	0.02
B. Future Without Project AAHUs =	0.34
Net Change (FWP - FWOP) =	-0.32

08/11/97

COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project...... hwy 45 Acres: 3.8

Condition: Future Without Project

Variable		TY 0 Class/Value	TY 0 SI	TY 1 Class/Value	TY 1 SI	TY 15 Class/Value	TY 15 SI
V1	Species Assoc.	Class 5	1.00	Class 5	1.00	Class 1	
V2	Maturity (input age or dbh, not both)	Age 40 dbh	0.80	Age 41 dbh	0.82	Age 1 dbh	0.00
V3	Understory / Midstory	Understory % 10 Midstory % 30	0.70	Understory % 10 Midstory % 30	0.70	Understory % 10 Midstory % 30	
V4	Hyrology	Class 3	1.00	Class 3	1.00	Class 3	1.00
V5	Forest Size	Class 5	1.00	Class 5	1.00	Class 5	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	40	0.40	40	0.40	40	0.40
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	60		60		60	
V7	Disturbance						
	Type	Class 2	0.26	Class 2	0.26	Class 2	0.26
	Distance	Class 1		Class 1		Class 1	
		HSI =	0.77	HSI =	0.78	HSI =	0.04

Project...... hwy 45
FWP

Variable		TY 50 Class/Value	TY 50 SI	TY Class/Value	TY SI	TY Class/Value	TY SI
V1	Species Assoc.	Class 1		Class		Class	
V2	Maturity (input age or dbh, not both)	Age 1 dbh	0.00	Age dbh		Age dbh	
V3	Understory / Midstory	Understory % 10 Midstory % 30		Understory % Midstory %		Understory % Midstory %	
V4	Hyrology	Class 3	1.00	Class		Class	
V5	Forest Size	Class 5		Class		Class	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	40	0.40				
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	60					
V7	Disturbance						
	Type	Class 2	0.26	Class		Class	
	Distance	Class 1		Class		Class	
		HSI =	0.04	HSI =		HSI =	

COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project...... hwy 45 Acres: 3.8

Condition: Future With Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 15 Class/Value	SI
V1	Species Assoc.	Class 5	1.00	Class 1		Class 1	
V2	Maturity (input age or dbh, not both)	Age 40 dbh	0.80	Age 1 dbh	0.00	Age 1 dbh	0.00
V3	Understory / Midstory	Understory % 10 Midstory % 30	0.70	Understory % 1 Midstory % 1		Understory % 1 Midstory % 1	
V4	Hyrology	Class 3	1.00	Class 3	1.00	Class 3	1.00
V5	Forest Size	Class 5	1.00	Class 5		Class 5	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	40	0.40	50	0.50	50	0.50
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	60		50		50	
V7	Disturbance Type	Class 2	0.26	Class 2	0.26	Class 2	0.26
	Distance	Class 1		Class 1		Class 1	
		HSI =	0.77	HSI =	0.04	HSI =	0.04

Project...... hwy 45
FWP

Variable		TY 50 Class/Value	SI	TY Class/Value	SI	TY Class/Value	SI
V1	Species Assoc.	Class 1		Class		Class	
V2	Maturity (input age or dbh, not both)	Age 1 dbh	0.00	Age dbh		Age dbh	
V3	Understory / Midstory	Understory % 1 Midstory % 1		Understory % Midstory %		Understory % Midstory %	
V4	Hyrology	Class 3	1.00	Class		Class	
V5	Forest Size	Class 5		Class		Class	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	40	0.40				
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	60					
V7	Disturbance Type	Class 2	0.26	Class		Class	
	Distance	Class 1		Class		Class	
		HSI =	0.04	HSI =		HSI =	

08/11/97

AAHU CALCULATION, Bottomland Hardwoods

Project: Fisher North diagonal

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	4.2	0.17	0.71	
1	0	0.05	0.00	0.27
50	0	0.05	0.00	0.00
			Total CHUs =	0.27
			AAHUs =	0.01

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	4.2	0.17	0.71	
1	4.2	0.17	0.71	0.71
50	4.2	0.81	3.39	100.35
			Total CHUs =	101.06
			AAHUs =	2.02

NET CHANGE IN CHUs DUE TO PROJECT	
A. Future With Project CHUs =	0.27
B. Future Without Project CHUs =	101.06
Net Change (FWP - FWOP) =	-100.79

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project AAHUs =	0.01
B. Future Without Project AAHUs =	2.02
Net Change (FWP - FWOP) =	-2.02

COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project...... Fisher North diagonal   Acres: 4.2

Condition: Future Without Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 50 Class/Value	SI
V1	Species Assoc.	Class 2		Class 2		Class 4	0.80
V2	Maturity (input age or dbh, not both)	Age 6 dbh	0.04	Age 6 dbh	0.04	Age 56 dbh	1.00
V3	Understory / Midstory	Understory % 10 Midstory % 90		Understory % 10 Midstory % 90		Understory % 10 Midstory % 30	0.70
V4	Hyrology	Class 3	1.00	Class 3	1.00	Class 3	1.00
V5	Forest Size	Class 5		Class 5		Class 5	1.00
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	50	0.50	50	0.50	40	0.40
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	50		50		60	
V7	Disturbance Type	Class 2	0.50	Class 2	0.50	Class 2	0.50
	Distance	Class 2		Class 2		Class 2	
		HSI =	0.17	HSI =	0.17	HSI =	0.81

Project...... Fisher North diagonal
FWP

Variable		TY Class/Value	SI	TY Class/Value	SI	TY Class/Value	SI
V1	Species Assoc.	Class		Class		Class	
V2	Maturity (input age or dbh, not both)	Age dbh		Age dbh		Age dbh	
V3	Understory / Midstory	Understory % Midstory %		Understory % Midstory %		Understory % Midstory %	
V4	Hyrology	Class		Class		Class	
V5	Forest Size	Class		Class		Class	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh						
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development						
V7	Disturbance Type	Class		Class		Class	
	Distance	Class		Class		Class	
		HSI =		HSI =		HSI =	

COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project...... Fisher North diagonal   Acres: 4.2

Condition: Future With Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 50 Class/Value	SI
V1	Species Assoc.	Class 2		Class 1		Class 1	
V2	Maturity (input age or dbh, not both)	Age 6 dbh	0.04	Age 1 dbh	0.00	Age 1 dbh	0.00
V3	Understory / Midstory	Understory % 10 Midstory % 90		Understory % 1 Midstory % 1		Understory % 1 Midstory % 1	
V4	Hyrology	Class 3	1.00	Class 3	1.00	Class 3	1.00
V5	Forest Size	Class 5		Class 5		Class 5	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	50	0.50	50	0.50	50	0.50
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	50		50		50	
V7	Disturbance Type	Class 2	0.50	Class 2	0.50	Class 2	0.50
	Distance	Class 2		Class 2		Class 2	
		HSI =	0.17	HSI =	0.05	HSI =	0.05

Project...... Fisher North diagonal
FWP

Variable		TY Class/Value	SI	TY Class/Value	SI	TY Class/Value	SI
V1	Species Assoc.	Class		Class		Class	
V2	Maturity (input age or dbh, not both)	Age dbh		Age dbh		Age dbh	
V3	Understory / Midstory	Understory % Midstory %		Understory % Midstory %		Understory % Midstory %	
V4	Hyrology	Class		Class		Class	
V5	Forest Size	Class		Class		Class	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh						
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development						
V7	Disturbance Type	Class		Class		Class	
	Distance	Class		Class		Class	
		HSI =		HSI =		HSI =	

AAHU CALCULATION, Fresh Swamp

Project: behind school

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	1.2	0.51	0.61	
1	0	0.00	0.00	0.20
50	0	0.00	0.00	0.00
			Total CHUs =	0.20
			AAHUs =	0.00

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	1.2	0.51	0.61	
1	1.2	0.51	0.61	0.61
50	1.2	0.62	0.74	33.22
			Total CHUs =	33.83
			AAHUs =	0.68

NET CHANGE IN CHUs DUE TO PROJECT	
A. Future With Project CHUs =	0.20
B. Future Without Project CHUs =	33.83
Net Change (FWP - FWOP) =	-33.63

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHUs =	0.00
B. Future Without Project AAHUs =	0.68
Net Change (FWP - FWOP) =	-0.67

COMMUNITY HABITAT SUITABILITY MODEL
Fresh Swamp

Project...... behind school　　　　Acres: 1.2

Condition: Future Without Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 50 Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory	33	0.50	33	0.50	33	0.50
	Scrub shrub	25		25		25	
	Herbaceous	65		65		65	
V2	Maturity (input age or species composition and dbh)	Age		Age		Age	
		Cypress %		Cypress %		Cypress %	
		100		100		100	
		Cypress dbh		Cypress dbh		Cypress dbh	
		10		10		15	
		Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
			0.45		0.45		0.93
V3	Hydrology	Class 2	0.40	Class 2	0.40	Class 2	0.40
V4	Forest Size	Class 5	1.00	Class 5	1.00	Class 5	1.00
V5	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	60	0.60	60	0.60	40	0.40
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	40		40		60	
V6	Disturbance						
	Type	Class 3	0.65	Class 3	0.65	Class 3	0.65
	Distance	Class 2		Class 2		Class 2	
		HSI =	0.51	HSI =	0.51	HSI =	0.62

Project...... behind school
FWOP

Variable		TY Class/Value	SI	TY Class/Value	SI	TY Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory						
	Scrub shrub						
	Herbaceous						
V2	Maturity (input age or species composition and dbh)	Age		Age		Age	
		Cypress %		Cypress %		Cypress %	
		Cypress dbh		Cypress dbh		Cypress dbh	
		Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
V3	Hydrology	Class		Class		Class	
V4	Forest Size	Class		Class		Class	
V5	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh						
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development						
V6	Disturbance						
	Type	Class		Class		Class	
	Distance	Class		Class		Class	
		HSI =		HSI =		HSI =	

COMMUNITY HABITAT SUITABILITY MODEL
Fresh Swamp

Project...... behind school Acres: 1.2

Condition: Future With Project

Variable		TY 0 Class/Value	SI	TY 1 Class/Value	SI	TY 50 Class/Value	SI
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory	33	0.50	0			
	Scrub shrub	25		0			
	Herbaceous	65		0			
V2	Maturity	Age		Age		Age	
	(input age			1	0.00	1	0.00
	or	Cypress %		Cypress %		Cypress %	
		100					
	species	Cypress dbh		Cypress dbh		Cypress dbh	
	composition	10					
	and	Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
	dbh)	0					
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		0	0.45				
		Class		Class		Class	
V3	Hydrology	2	0.40	1	0.10	1	0.10
		Class		Class		Class	
V4	Forest Size	5	1.00	5		1	
	Surrounding	Values %		Values %		Values %	
V5	Land Use						
	Forest / marsh	60	0.60	60	0.60	40	0.40
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development	40		40		60	
	Disturbance						
V6		Class		Class		Class	
	Type	3	0.65				
		Class		Class		Class	
	Distance	2					
		HSI =	0.51	HSI =	0.00	HSI =	0.00

Project...... behind school
FWP

Variable		TY Class/Value	SI	TY Class/Value		TY Class/Value	
V1	Stand Structure	% Cover		% Cover		% Cover	
	Overstory						
	Scrub shrub						
	Herbaceous						
V2	Maturity	Age		Age		Age	
	(input age						
	or	Cypress %		Cypress %		Cypress %	
	species	Cypress dbh		Cypress dbh		Cypress dbh	
	composition						
	and	Tupelo et al. %		Tupelo et al. %		Tupelo et al. %	
	dbh)						
		Tupelo et al dbh		Tupelo et al dbh		Tupelo et al dbh	
		Class		Class		Class	
V3	Hydrology						
		Class		Class		Class	
V4	Forest Size						
	Surrounding	Values %		Values %		Values %	
V5	Land Use						
	Forest / marsh						
	Abandoned Ag						
	Pasture / Hay						
	Active Ag						
	Development						
	Disturbance						
V6		Class		Class		Class	
	Type						
		Class		Class		Class	
	Distance						
		HSI =		HSI =		HSI =	

Attachment B

State Historic Preservation Officer Coordination Letter

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

KATHLEEN BABINEAUX BLANCO
LIEUTENANT GOVERNOR

PHILLIP J. JONES
SECRETARY

GERRI HOBDY
ASSISTANT SECRETARY

August 7, 1997

Mr. Brian S. Hava
Coastal Engineering and
Environmental Consultants, Inc.
615 Fourth Street
Westwego, Louisiana 70094

Re: Draft Phase I CRM Report
Cultural Resources Survey,
Fisher School Basin,
Jefferson Parish, Louisiana
Earth Search, Inc.

Dear Mr. Hava:

Receipt is acknowledged of your letter dated July 15, 1997, transmitting two copies of the referenced report. We have completed our review of the document and have the following comments to offer.

The report meets the report writing standards of the Louisiana Archaeological Code and we have only a few technical comments, which are attached to this letter. Concerning the Phase I survey results, we concur with the findings of the archaeological contractor that significant cultural resources should not be affected by construction of the proposed flood protection project. Consequently, we have no objections to its implementation.

Upon finalization of the report, please transmit two copies of the document for our CRM library. Thank you for your cooperation in addressing project effect on cultural resources.

Sincerely,

Gerri Hobdy

Gerri Hobdy
State Historic Preservation Officer

c: Dr. Jill-Karen Yakubik
Earth Search, Inc.

TABLE OF CONTENTS

HYDRAULICS AND HYDROLOGY

A.1. GENERAL

This appendix presents detailed descriptions of the climatology and hydrologic regimen of the area and detailed descriptions of hydraulic analysis methods and procedures used in the design of the protection features of the plan. These descriptions include essential data, assumptions, and criteria used in the study that provides the basis for determining surges, routings, wind tides, wave runup and overtopping, and stage frequencies. Designs for protective structures at elevation +6.0 feet, +7.0 feet, and +8.0 feet National Geodetic Vertical Datum (N.G.V.D.) were developed. Parameters for various frequency storms were derived from the Standard Project Hurricane (SPH) using methodology furnished by the National Weather Service and differ from the SPH only in central pressure index and windspeed.

The study area is located in Jefferson Parish, west of the Mississippi River within the area known as the Barataria Basin. The Bayou Lafourche ridge bound the Barataria Basin to the west, the Mississippi River to the north and east and the Gulf of Mexico to the south. Lakes Salvador and Cataouatche are estuary areas to the west, which connect to the Gulf of Mexico through Barataria Bay. Tidal waters are carried into the study area through these lakes and Bayou Barataria into the Harvey, Algiers and Hero Canals. Freshwater is introduced into the study area from the Mississippi River via the Harvey and Algiers Locks, direct rainfall and pumped discharges from leveed areas.

A.2. TERRAIN

The Fisher School Basin, located in southeastern Louisiana, is of mostly low relief and characteristic of an alluvial plain. Situated on the eastern bank of Bayou Barataria near New Orleans, land elevations slope gently from an average elevation of about 4 feet NGVD along the natural banks of Bayou Barataria to approximately one foot below sea level in portions of the study area. Natural ground elevations in the unprotected marsh areas in the eastern part of the study area average 0.5 to 1.0 feet NGVD. Although leveed marshland will subside when pumped, unleveed areas are subject to natural subsidence and in the future will become increasingly vulnerable to flooding from the combined effects of this subsidence and eustatic/global sea level rise. Within the study area 0.5 feet of subsidence was assumed throughout most of the area during a 100-year period; along the eastern part of the study area from 0.6 to 1.2 feet of subsidence is expected. Sea level rise is assumed to be 0.5 feet in 100 years.

All of the area is protected from Mississippi River overflows by the mainline levee system. Flooding originating in the Gulf of Mexico and Lakes Salvador and Cataouatche can travel across the marsh and through the many natural and man-made channels to inundate the Fisher School Basin from the south. To protect the area from this tidal and storm surge flooding, local interests have constructed a partial levee. The levee begins at the south-eastern end of the basin at Louisiana Highway 45 (LA 45) and proceeds along several man-made canals along the eastern end of the alignment and gradually declines in elevation to the existing ground approximately 2500 feet from LA 45 in the north, near Fleming Curve. The naturally high-ridge along Bayou Barataria varies in elevation from +4.0 ft to +1.0 ft NGVD and provides marginal protection from high tidal stages along the northern and western sections of the study area. The existing levee and natural ridges do not form a closed flood protection system for the Fisher Basin.

Rainfall amounts used to estimate interior flooding elevations and design drainage structures were taken from the National Weather Service Technical Paper (TP) 40, which gives rainfall totals for various durations and frequencies across the United States. In the design studies, rainfall amounts for the design rainfall included lesser duration rainfalls. For instance, imbedded in the 100-year, 24-hour rainfall distribution are the 100-year, 1-hour, 2-hour, 3-hour, 6-hour, and 12-hour rainfall amounts, as given in TP 40. This methodology is used to determine each area's sensitivity to the various durations of more intense rainfalls. Similar distributions of duration can be applied to any frequency of rainfall, as depicted by TP 40.

A.3. CLIMATOLOGY

a. Climate. The Fisher School Basin has a subtropical marine climate. Located in subtropical latitude, its climate is influenced by the many water surfaces of the lakes, streams, and the Gulf of Mexico. Throughout the year, these water bodies modify the relative humidity and temperature conditions decreasing the range between the extremes. When southern winds prevail, these effects are increased, imparting the characteristics of a marine climate.

The area has mild winters and hot, humid summers. During the summer, prevailing southerly winds produce conditions favorable for afternoon thundershowers. In the colder seasons, the area is subjected to frontal movements that produce squalls and sudden temperature drops.

b. Temperature. Records of temperature are available from "Climatological Data" for Louisiana, published by the National Climatic Center. The study area can be described by using temperature data observed at LSU Citrus Research Station in Plaquemine Parish. The annual normal temperature of this station based on the period 1961-1990 is 60.1 degrees Fahrenheit (°F) with monthly mean temperature normals varying from 42.5 °F in January to 73.7° F in July. Temperature normals are shown in Table A-1 and the extremes of this station since 1984 are shown in Table A-2.

TABLE A-1

MEAN MONTHLY and ANNUAL TEMPERATURE (°F)

30 Year Normals (1961-1990)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
LSU CITRUS	42.5	45.1	51.9	60.2	67.0	72.5	73.7	73.6	71.6	62.4	54.1	46.4	60.1

Source: National Climatic Center

TABLE A-2

TEMPERATURE EXTREMES (°F) 1984-1992

STATION	MAXIMUM	DATE	MINIMUM	DATE
LSU CITRUS	97	*	12	23 DEC 89

* Occurring on several days.

Source: National Climatic Center

c. Precipitation. The annual normal precipitation for the study area based on National Climatic Center records at LSU Citrus Research Station over the period 1961-1990 is 62.85 inches. Table A-3 lists the monthly and annual normals. The maximum monthly rainfall and greatest day of this station since 1984 is shown in Table A-4. There have been some months that recorded no precipitation. The heaviest rainfall usually occurs during the summer with July being the wettest month with an average monthly normal of 6.82 inches. October is the driest month, averaging 3.40 inches.

TABLE A-3
MONTHLY PRECIPITATION (inches)
30 Year Normals (1961-1990)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
LSU CITRUS	5.05	5.83	4.99	4.06	5.08	5.59	6.82	6.67	5.89	3.40	4.26	5.21	62.85

Source: National Climatic Center

TABLE A-4
MAXIMUM PRECIPITATION TOTALS
(inches)(1984-1992)

	Maximum		Greatest	
Station	Monthly	Date	1 Day	Date
LSU CITRUS	20.00	APR 91	8.73	2 AUG 84

Source: National Climatic Center

d. Wind. Wind data taken at New Orleans is used to describe the study area. The average wind velocity is 8.0 miles per hour (mph) over the period 1973-1992. Southeast winds predominate in the spring and summer. The prevailing winds of the fall and winter are from the northeast. Winter storms in the area have produced wind speeds of up to 47 mph. The summer is often disturbed by tropical storms and hurricanes that produce the highest winds in the area. The maximum wind speeds observed (highest one-minute speed) since 1963 was 69 mph at New Orleans and the result of Hurricane Betsy in September 1965.

e. Stream Gaging Data. Records of stage data are available at two stations within the study area. Discharge measurements are not available due to tidal influence. Stream gaging data such as period of record, maximum and minimum extremes are presented below in Table A-5.

TABLE A-5

STREAM GAGING DATA

MAP STATION NO.	PERIOD OF RECORD	MAXIMUM STAGE		MINIMUM STAGE	
		FT NGVD	DATE	FT NGVD	DATE
1 BAYOU BARATARIA @BARATARIA	1950-92	4.25*	29 OCT 85	-0.58*	10 SEP 65
2 BAYOU BARATARIA @ LAFITTE	1963-92	5.05*	29 OCT 85	-0.95a	23 DEC 89

* Caused by Hurricane/Storm

a From incomplete record

Source: U.S. Army Engineers District, New Orleans

f. Floods and Storms of Record. Most of the flooding in the study area is from high tides caused by hurricanes and tropical storms tracking in the Gulf of Mexico. Some of the major storms that have passed through or near the study area are shown below in Table A-6.

TABLE A-6
EXPERIENCED HURRICANES

STORM	DATE	MAXIMUM CENTRAL PRESSURE (Inches Mercury)	MAXIMUM FORWARD SPEED(Knots)	MAXIMUM RECORDED WINDSPEED (M.P.H.)
1915	22 Sep-2 Oct 1915	27.87	10	94
1947	4-21 Sep 1947	28.57	16	98
FLOSSY	21-30 Sep 1956	28.76	20	90
HILDA	28 Sep – 5 Oct 1964	28.4	7	98
BETSY	27 Aug-10 Sep 1965	28.0	20	105
CARMEN	29 Aug–10 Sep 1974	27.84	9	86
BABE	3-8 sep 1977	29.85	-	75
BOB	9-16 Jul 1979	29.58	15	75
DANNY	12-20 Aug 1985	29.61	13	85
JUAN	26-31 Oct 1985	29.13	13*	74
ANDREW	16-28 Aug 1992	27.66	15	150

* Maximum reported forward speed. Several times during its traversal, the storm stalled while changing direction.

Hurricane Flossy brought torrential rains and tidal flooding to the study area. Golden Meadow, which is below the study area, received 16.7 inches of rain in a 24-hour period. Hurricane Hilda raised water levels at Barataria and Lafitte to 3.6 and 4.0 feet, NGVD, respectively. Hurricanes Betsy and Carmen also caused flooding to some parts of the study area. Hurricane Juan broke high water records at both gages in the study area (see Table A-5). Flooding was from tidal inundation and high stages caused by Juan's prolonged stay. Total storm precipitation for Juan ranged from 8-12 inches over the area. Hurricane Andrew, which was the last storm to hit the Louisiana coast raised water levels at Barataria and Lafitte to 3.5 and 4.2 feet NGVD, respectively.

Other flooding in the area is from a combination of high gulf tides and runoff from heavy rainfall. An example of this flooding occurred in the spring (Apr-May) of 1991 when Bayou Barataria at Barataria recorded a peak stage of 3.4 feet NGVD and Bayou Barataria at Lafitte recorded a peak stage of 3.32 feet NGVD, both on 29 April 1991.

g. Tides. Tides in the study area can be diurnal or semi-diurnal depending on astronomical conditions. The tidal range at Barataria is 0.25 feet, NGVD, with the mean high water being approximately 1.47 feet, NGVD, and the mean low water approximately 1.22 feet, NGVD. The highest observed stage at Barataria was 4.25 feet, NGVD (29 Oct 85), and the lowest observed stage was -0.58 feet, NGVD (9 Sep 65). At Lafitte, the tidal range is 0.35 feet, NGVD, with the mean high water measuring approximately 1.49 feet, NGVD, and the mean low water approximately 1.14 feet, NGVD. The highest observed stage was 5.05 feet, NGVD (29 Oct 85), and the lowest observed stage was -0.68 feet, NGVD (25 Dec 85).

A.4. DESIGN STORM.

Protective structures at elevation +6.0 ft, +7.0 ft, and +8.0 ft NGVD were analyzed by running storm events that range in frequency from 1 year to 500 years. The SPH (Standard Project Hurricane) represents the most severe combination of hurricane parameters that is reasonably characteristic of the area, excluding extremely rare combinations. The hurricane would approach each individual site at such a rate of movement as to produce the maximum hurricane surge at each location of interest. The SPH has a central pressure index of 27.4 inches of mercury, a maximum 5 minute average wind velocity offshore (in the Gulf of Mexico) of 100 knots 30 feet above the surface at a radius of 30 nautical miles, and a forward speed of 11 knots along a path critical to each location of interest. The 100- and 10-year frequency storms were derived from the SPH parameters using experienced stage frequencies and data provided by the National Weather Service. Hurricane parameters for other frequency storms differ from the SPH only in central pressure index and windspeed.

A.5. DESCRIPTION AND VERIFICATION OF PROCEDURES.

a. Hurricane Memorandums. The Hydrometeorological Section (HMS) of the National Weather Service has cooperated in the development of hurricane criteria for experienced and potential hurricanes in the study area. The HMS memorandums provided isovel patterns, hurricane paths, pressure profiles, rainfall estimates, frequency data, and various other parameters required for the hydraulic computations. A reevaluation of historic meteorlogic and hydrologic data was the basis for memorandums relative to experienced hurricanes. Those relative to potential hurricanes were developed through the use of generalized estimates of hurricane parameters based on recent research and concepts of hurricane theory. Memorandums applicable to the study area are listed in the attached bibliography.

b. Surges. Maximum hurricane surge heights along the gulf shores were determined from computations made for ranges extending from the shores out to the continental shelf by use of a general wind tide formula based on the steady state conception of water superelevation (1)(2)(3)*. The average windspeed and average depth in each range were determined from isovel and hydrographic charts for each computation. The National Weather

Service furnished the storm isovel patterns. In order to reach agreement between the computed maximum surge heights and the observed high water marks, it was necessary to introduce a surge adjustment factor or calibration coefficient into the general equation, which in its modified form, was as follows:

$$S = 1.165 \times 10^{-3} \frac{V^2 FNZ}{D} \cos 0$$

Where, S = wind setup in feet

V = windspeed in m.p.h.

F = fetch length in statute miles

D = average depth of fetch in feet

N = planform factor, assumed equal to unity

Z = surge adjustment factor

0 = angle between direction of wind and the fetch

* Numbers in parenthesis indicate reference in bibliography

Hurricane surges at the shore were determined by summation of incremental wind setups along a range above the water surface elevation at the gulf end of the range. A combination of the setup due to atmospheric pressure anomaly and the predicted normal tide was used to determine the initial elevation at the gulf end of the range. Due to the variation in pressure setup between the shoreward end and gulfward end of the range, an adjustment was made at the former to compensate for the difference. This procedure for determining surge heights at the coastline was developed for the Mississippi Gulf Coast, where reliable data was available at several locations for more than one severe hurricane, and is used for the entire coastal Louisiana region. Due to dissimilar shoreline configurations, different factors were required at different locations, but identical factors were used at each location for every hurricane. The value of the factor is apparently a function of the distance from the shoreline to deep water and varies inversely with this distance. Comparative computed surge heights and observed high water marks for the 1915 and 1947 hurricanes at the locations used to verify the respective procedures are shown in Table A-7. All elevations in this appendix are in feet and are referred to National Geodetic Vertical Datum of 1929 (NGVD).

In those areas where a coastal bay separated from the gulf by an offshore barrier island such as Grand Isle characterizes the coastline or by a shoal, it is necessary to inject an additional step in the normal procedure to verify experienced hurricane tides. The incremental step computation was completed to the gulf shore of the island and the water surface elevation transposed to the inland bay side of the island from whence the incremental computations were continued using a new surge adjustment factor that was considered representative of the shallower depths within the bay. This procedure resulted in a satisfactory verification of hurricane tides along other portions of the Louisiana coast.

The incremental step computation was used to check elevations experienced during the hurricane of 22 September - 2 October 1915 and Hurricane Flossy, 21-30 September 1956. Verification of surge heights and surge adjustment factors for these hurricanes are shown in Table A-8. Surge adjustment factors of 0.80 in open water and 0.48 in Barataria Bay were used for the Manila Village area.

TABLE A-7

HURRICANE SURGE HEIGHTS

Location	Surge Adjustment Factor (Z)	1915		1947	
		Observed	Computed	Observed	Computed
		(feet NGVD)		(feet NGVD)	
Long Point, La.	.21	9.8	9.6	10.0	10.1
Bay St. Louis, Ms.	.46	11.8	11.8	15.2	15.1
Gulfport, Ms.	.60	10.2*	9.9	14.1	14.3
Biloxi, Ms.	.65	10.1*	9.8	12.1*	12.6

* Average of several high water marks.

TABLE A-8

VERIFICATION OF HURRICANE SURGE HEIGHTS

Location	Surge Adjustment Factor (Z)	Sep 1915		Sep 1947 (Flossy)	
		Observed	Computed	Observed	Computed
		(feet NGVD)		(feet NGVD)	
Grand Isle					
Flooding from front	0.80(a)	9.0	8.8	3.9	4.1
Flooding from rear	0.80(a)	-	-	8.0	7.8
Manila Village	0.48(b)	8.0	8.5	-	5.1

(a) In Gulf of Mexico

(b) In Barataria Bay

c. Routing. Since the major hurricane damage in the study area would result from storm induced effects on Lake Salvador, it was necessary to establish a method to determine the stage in the lake at any time during the hurricane occurrence. This procedure involves the construction of a stage hydrograph for Barataria Bay by calculating the hourly flows and rainfall simultaneously through Lake Salvador's natural inlet channels (assumed in this case to be one large channel).

Prerequisite to any routing is the choice of an actual or hypothetical hurricane of known or designated characteristics.

It is then possible to develop surge heights for any point in Barataria Bay for the selected hurricane. For routing purposes, Manila Village, which is about 20 miles southeast of Lake Salvador was selected as the critical point for a hydrograph. It would reflect stages at the mouth of the schematized inlet channel. Such a hydrograph of hourly stages was constructed by computing the incremental setup for each hour and using the maximum surge elevation as the peak of the hydrograph for the critical period. Storm surge hydrographs at Manila Village for other frequencies were determined by identical procedures.

A stage area curve was made for the schematized conveyance channel between Manila Village and the entrance to the Lake Salvador Basin, which consists of Lake Salvador, Lake Cataouatche, and the adjacent marsh area. Since the width of the channel is very large, the depth of water was used as the hydraulic radius.

The cumulative amount of rainfall coincident with the storm significantly affects the lake elevation and, therefore, the routing procedure. The amount of this rainfall was calculated by the methods described in U.S. Weather Service memorandums (4)(5), using a moderate rainfall that would be coincident with a tropical storm. For routing purposes, a moderate rainfall of 8.50 inches in 24 hours was considered as additional inflow into the Lake Salvador Basin. The effect of cumulative rainfall is to raise the average lake level.

With the above mentioned items resolved, the routing procedure was reduced to the successive approximation type problem in which the variable factors were manipulated until a correlation between flows from the gulf through the inlet channel and the rise in the mean elevation of the Lake Salvador Basin was obtained for the incremental time intervals. The use of this method was illustrated by Bretschneider and Collins (6). For verification of the method, the surge caused by Hurricane Betsy, September 1965 was routed by this procedure. The routed stage for Bayou Barataria at Lafitte (assumed to be the representative stage of the Lake Salvador Basin) was found to be in reasonable agreement with the observed stage for the hurricane. The observed and computed peak stages for Hurricane Betsy are 3.35 and 3.05 feet, respectively. If the average stage between the Lafitte and Barataria, Louisiana were used as the representative stage, the computed and observed stages would be in very close agreement.

d. Wind Tides. When strong hurricane winds blow over enclosed bodies of shallow water, they tend to drive large quantities of water ahead of them. Therefore, wind tide levels (WTL's) in Lakes Salvador and Cataouatche, respectively, are needed to determine stage damage curves and to design protective levee heights.

Lakes Salvador and Cataouatche are located in a marsh west of the study area and are so situated that the volume of incoming flow from the gulf cannot be measured because the water flows over broad areas of ungaged marshland. Therefore, the extensive marshlands that surround both lakes results in an almost unlimited storage area when lake waters overflow their banks. Hourly lake elevations for the various frequencies used in computing wind tide levels for Lakes Salvador and Cataouatche were obtained from the routed hydrographs that reflect the average lake level.

To compute wind tide, the lake is divided into three zones roughly parallel to wind directions. A nodal line is designated perpendicular to the zones and setup is calculated for the leeward segment and setdown for the windward segment. The average windspeed and average depth in each segment were determined from isovel and hydrographic charts for each computation. The storm isovel patterns were furnished by the U.S. Weather Service (ESSA)(7). The computation of setup or setdown along each segment was based on the segmental integration method (3) and was calculated by the use of the step method formulas (8) that were modified as follows:

$$Setup = d_t\left(\sqrt{\frac{0.00266u^2FN}{d_t^2}+1}-1\right)$$

$$Setdown = d_t\left(1-\sqrt{1-\frac{0.00266\,u^2FN}{d_t^2}}\right)$$

Where: setup or setdown in feet is measured above or below mean water level (mwl) of the surge in the lake.

d = average depth of fetch in feet below m.w.l.
u = windspeed in m.p.h. over fetch.
F = fetch length in miles, node to shoreline.
N = planform factor, equal generally to unity.

Graphs were constructed from the above formulas to determine setup and setdown quickly about the nodal elevation for storms of varied frequencies. Volumes of water along the zones, represented by the setup and setdown with respect to a nodal elevation, were determined and the water surface profiles adjusted until setup and setdown volumes for the lake balanced within 5 percent. Then setup elevations were added to the still water level to yield the WTL. The time dependent SPH and Design Hurricane wind tide hydrographs were computed for the eastern and northern shore of Lakes Salvador and Cataouatche.

Observed wind tide elevations at the shorelines of Lakes Salvador and Cataouatche are not available. Therefore, the method of wind tide level computation could not be verified by comparing observed and computed data. However, the above-described method has been used successfully for the south shore of Lake Pontchartrain at New Orleans, Louisiana. Observed data were available for this lake and the method verified.

In order to obtain wind tide levels along Louisiana Highway 45, it was necessary to use the relationship between the maximum wind tide level and the distance inland from the shoreline.

Marshlands that fringe the shoreline in certain locations are inundated for considerable distances inland by hurricane wind tides that approach the shores. The limit of overland surge penetration depends upon the height of the wind tides and the duration of high stages at the lakeshore. The study of available observed high water marks at the coastline and inland indicates a fairly consistent simple relationship between the maximum surge height and the distance inland from the coast. This relationship exists independently of the speed of hurricane translation, wind speeds, or directions. The data indicates that the weighted mean decrease in surge heights inland is at the rate of 1.0 foot per 2.75 miles. This relationship remains true even in the western portion of Louisiana where relatively high chenieres, or wooded ridges, parallel the coast. Efforts to establish time lags between peak wind tide heights at the shoreline and at inland locations were unsuccessful because of inadequate basic data.

For the purpose of surge routing procedures, the shoreline is defined as the locus of points where the maximum WTL's would be observed along fetches normal to the general shore. This synthetic shoreline is assumed to be along the southern portion of the Lake Cataouatche levee and near the extreme western side of the Bayou Des Familles ridge. In order to determine the maximum water surface elevations at inland locations, it was necessary to compute maximum WTL's at the designated points mentioned above. These computed wind tide levels were then adjusted by application of the average slope of maximum surge height inland (1 foot/2.75 miles) to the location of interest. Hurricane stages were not available for positive verification of the procedure within the area. However, the procedure has given satisfactory results in this area and has verified the observed data in other areas of study with similar topography and bathymetry.

A.6. LEVEES.

The mainline Mississippi River and Tributaries levee system protect the study area from river overflow. A partial levee along the eastern end of the study area provides some protection from tidal stages. The levee was constructed by local interests as expanding development-demanded protection following severe storm events. The levee varies in elevation from +2.5 to +4.0 feet NGVD. Along the western and northern sections of the study area, the Bayou Barataria bankline varies in elevation from approximately +1.0 feet to +4.0 feet NGVD.

The existing levee ties into LA 45 at the southeastern end of the Fisher School Basin, however it gradually slopes to the natural ground elevation of +2.5 ft NGVD in the northeastern end of the study area. The levee does not tie into the streambank, therefore the Fisher Basin is not protected by a closed system. The integrity of the local levees is questionable in view of failures that occurred to similar levees west of the Harvey Canal during Hurricane Juan. Variations in elevation cause frequent overtopping of the existing protection.

For with-project conditions, a closed levee system at elevation 6.0 ft, 7.0 ft, and 8.0 ft NGVD was considered for this area. Waves larger than the significant wave may overtop the protective structures, but, due to the limited number of waves larger than the significant wave, such overtopping will not endanger the security of the structure. Where levees or floodwalls are sheltered from storm-generated wave runup, wave runup from small locally generated waves, which cannot be predicted from our standard methodology, can overtop the levee. For this study 1-foot waves with small periods, 2.7 seconds, were used to compute runup from these small unpredictable waves. Methods used for computing wave runup are explained in the Shore Protection Manual, published by the Coastal Engineering Research Center in 1984. Wave runup of 2 feet was determined for the sheltered reaches of levee. Design elevations for the protective structures in each reach for the alternatives studied are shown in Table A-9.

TABLE A-9

DESIGN ELEVATION OF PROTECTIVE STRUCTURES

Location	SWL ft	WAVE RUNUP	10-Year
Bayou Barataria Floodwall	3.8	2.0	6.0
Eastside Levee	3.8	2.0	6.0

A.7. STAGES AND DURATIONS.

Extreme astronomical high tides accompanied by heavy rainfall and/or storms can cause flooding in the study area. Extended duration weak hurricanes, such as Hurricane Juan, can produce a storm surge of sufficient height to overtop existing protective embankments and flood the heavily populated developed areas.

In 1973, floodwaters resulting from excessive rainfall and abnormally high tides in Lakes Cataouatche and Salvador and Bayou Barataria prevented adequate drainage and caused damage to residential areas.

Drainage problems are exacerbated when rainfall is accompanied by high tides. During May 1978 and April 1980, short duration, large accumulation rainfalls occurred in this area. During the rainstorm of 3 May 1978, the stage was 2.3 feet NGVD at Barataria on Bayou Barataria and 2.7 feet NGVD at the Harvey Lock on the Intracoastal Waterway because of strong onshore winds that accompanied the rainstorm. At the city of Algiers, 9.8 inches of rainfall were measured. On 13 April 1980, the rainfall measured at Algiers was 9.7 inches and the accompanying stage at Barataria was 3.8 feet NGVD. At the

Harvey Lock, the maximum stage was 3.2 feet NGVD. Pump stations that discharge into the marsh were forced to operate against higher than optimum outside stages during these events, reducing the capacity of these stations.

Continuous records of stages are available at several locations in and near the study area. On the westbank of Jefferson Parish, several continuous gages were operated: Bayou Barataria at Barataria from 1950 to 1992, Bayou Barataria at Lafitte from 1963 to 1992, and Bayou Rigaud at Grand Isle from August 1947 to the present. A recording gage for hurricane stages is located on Grand Isle at the mayor's office. A wire-weight type gage, located in the Intracoastal Waterway at the Harvey Lock, is read daily, usually at 8 a.m. Records for this gage are available from January 1925. Another wire-weight gage is located, along with a continuous gage, in the Intracoastal Waterway at Algiers Lock; it is read daily at 8 a.m. Records are available at this location from 1956. In the Mississippi River, the continuous gage located nearest Jefferson Parish is the Carrolton Gage located in Orleans Parish at River Mile 102.8; it has been in operation since January 1872. All of these gage records are published annually in "Stages and Discharges of the Mississippi River and Tributaries." In addition, gage information and stillwater elevations for hurricanes of relatively recent history affecting the area are available in various other publications of the U. S. Army Corps of Engineers and other agencies.

Intense hurricanes such as Betsy have caused high stages along the coastal area of Louisiana (10.5 Feet NGVD at Grand Isle) and moderately high stages inland (3.2 feet NGVD at the Harvey Lock). High stages resulting from several hurricanes are summarized in the section on "Hurricanes and Tropical Storms" in this report. Detailed data is presented in a Corps publication entitled, "History of Hurricane Occurrences along Coastal Louisiana." Examination of gage records at the inland gaging stations reveals that Hurricane Juan caused the highest stage of record on 29 October 1985, along Bayou Barataria at both Barataria (4.25 feet NGVD) and Lafitte (5.05 feet NGVD) and at the Algiers (4.45 feet NGVD) and Harvey (4.74 feet NGVD) Locks.

The normal tide in the study area is diurnal. However wind effects can mask the daily ebb and flow variations and during periods of sustained southerly winds, tides rise in direct response to the duration and intensity of the wind stress. Hurricane Juan demonstrated this in 1985. Although a relatively weak storm in terms of maximum sustained windspeed, Hurricane Juan caused higher stages in much of the study area than the more intense Hurricane Betsy. This is directly attributable to the hurricane's erratic, almost stationary, path across southern Louisiana. Gale force winds over a period of 5 days caused tides 3 to 6 feet above normal across the entire coastal area of southern Louisiana.

A.8. FREQUENCIES.

To determine the design stages for the study area, frequency estimates were developed for experienced hurricane stages and analysis of theoretical hurricane stages. Using stages measured at the gaging stations in the study area, an experienced stage frequency curve was drawn for each station for the combined effects of hurricane induced storm surge and high stages caused by other events, using procedures outlined in EC 1110-2-249, Hydrologic Frequency Analysis.

To develop characteristics for the design hurricanes, information on hurricanes published by the National Weather Service was used. The National Weather Services made a generalized study of hurricane frequencies and parameters and presented the res0ults in NOAA Technical Report NWS23, "Meteorological Criteria for Standard Project Hurricane and Probable Maximum Hurricane Windfields, Gulf and East Coasts of the United States, September 1979"(9). In a 400 mile zone along the central gulf coast from Cameron, Louisiana, to Pensacola, Florida (Zone B), frequencies for hurricane central pressure indexes (CPI) presented in the report reflect the probability of hurricane recurrence in the mid-gulf coastal area. Hurricane characteristics with critical tracks and CPI's representative of the SPH were developed in cooperation with the National Weather Service. The CPI used was 27.45 inches for this hurricane. The SPH described in NHRP Report No. 33, and NWS Report 23 was the basis of development of the Design Hurricane used in the study.

The Standard Project Hurricane is a large storm of moderate forward speed and high wind speed. Relatively weak storms, such as Hurricane Juan, have weak steering currents and historically are the storms that will stall. An intense hurricane, such as Betsy or Camille, has strong steering currents and moves at a moderate to fast forward speed, making landfall with few changes in course. For these reasons, the SPH was assumed to travel at a moderate forward speed without stalling.

Hurricane Wind Tide Levels (WTL'S) were computed for the theoretical hurricanes in accordance with prescribed procedures for determining setup and setdown in an enclosed lake. Isovels were rotated and the path transposed within allowable limits as necessary to produce maximum surge elevations at the proposed levee.

A synthetic stage frequency curve was developed by correlating stages and frequencies for corresponding CPI's, using a procedure developed for the Lake Pontchartrain study area. Experienced stage frequency curve developed at the gaging station in Bayou Barataria was used to adjust synthetic stages in these canals. Stages for study area that would accompany the SPH, 100-year and 10-year storms are shown in Table A-10.

TABLE A-10
COMPARATIVE SURGE HEIGHTS

	Stages in feet NGVD		
Location	SPH	100-year	10-year
Bayou Barataria	9.0	7.0	3.8

A one-dimensional model was used to develop the frequency curves for this project. The project has not been redesigned using a two-dimensional model. However, the two-dimensional numerical model, WIFM, was used to compute water surface elevations in the Barataria Basin. The WIFM model, developed by the Waterways Experiment Station (WES), was calibrated by them for the Louisiana coastal area and used extensively for computing hurricane surges in the coastal region and areas adjacent to Lake Pontchartrain. The results from the WIFM model, using the design SPH as the forcing function, verify the mean stages computed with the calibrated one-dimensional model for Lakes Cataouatche and Salvador as well as open coast surge heights at Grand Isle and Venice. Therefore, no further studies using this two-dimensional model were undertaken for this area.

The probability value used for a given CPI represents frequency of occurrence from any direction in a 400-mile zone along the central gulf coast. In order to establish frequencies for the locality under study, it was assumed that hurricanes critical to the locality would pass through a 50-mile subzone along the coast. Thus, the number of occurrences in a 50-mile subzone would be 12.5 percent of the number of occurrences in a 400-mile zone, provided that all hurricanes traveled in a direction normal to the coast. A hurricane whose track is perpendicular to the coast ordinarily will cause extremely high tides and inundation for a distance of about 50 miles along the coast. However, the usual hurricane track is oblique to the shoreline. The average projection along the coast of this 50 mile swath for the azimuth of 48 Zone B hurricanes is 80 miles. Since this is 1.6 times the width of the normal 50-mile strip affected by a hurricane, the probability of occurrence of any hurricane in the 50-mile subzone would be 1.6 times the 12.5 percent of the probabilities for the entire mid-gulf Zone B. Therefore, 20 percent of the frequencies of hurricanes for Zone B, mid-gulf, was used to represent the frequencies of hurricanes in the critical 50-mile subzone for each study locality.

Since tracks having major components from the southeast create the most critical stages in the Grand Isle area, maximum hurricane surge heights were computed for synthetic hurricanes approaching the area on a track from that direction. Four-fifths of all tracks that approached the Grand Isle area were from the southeast. Therefore, a stage frequency curve was derived using 4/5 of the 50-mile subzone probability for all tracks. Frequencies for observed hurricane stages were then computed on the same basis as the CPI frequencies (10), and a curve plotted. The synthetic frequency curve was then adjusted and plotted to the Grand Isle observed data. A frequency curve for Manila Village was then obtained by adding the additional wind tide setup across Barataria Bay to the appropriate stage frequency value on the adjusted Grand Isle curve.

There is a direct relationship between the stage frequency at Manila Village and the average stage frequency in Lakes Salvador. However, the critical stage frequency at the shoreline is considerably diminished because the hurricane track required to cause critical stages at the eastern shore of Lake Salvador is unique. Only 6.4 percent of all hurricane tracks observed have followed a track similar to the unique hypothetical track used in this study. Stage frequencies were also developed based on the remaining 93.6 percent-observed hurricane tracks.

The azimuths of tracks observed in the vicinity of the study area were divided into quadrants corresponding to the four cardinal points. Since 1900, 73 storms have affected the Louisiana coast; 46 had tracks from the south, 18 from the east, 8 from the west, and 1 from the north. Hurricanes with tracks having major components from the south and east generate WTL's that are near critical relative to the study area, while those tracks from the west generate WTL's most critical to the study area. The average azimuth of tracks from the south is 180 degrees. Tracks from the east had an average azimuth of 117 degrees. These azimuths, along with the critical track from the west, were used in computing WTL's for Lake Salvador. Of all experienced tracks since 1900 affecting the Louisiana Coast, approximately 63 percent have come from a southerly direction, 24.6 percent from the east, and 11 percent have come from the west. The probabilities of equal stages for the three groups of tracks were then added arithmetically to develop a curve representing a synthetic probability of recurrence of maximum wind tide levels for hurricanes from all directions. Table A-11 illustrates the synthetic frequency computation for WTL's at the east shore of Lake Salvador. Using these procedures, stage frequency relationships were established under existing conditions for flooding by surges from Lakes Salvador for the area along Highway 45 between Crown Point and Lafitte, Louisiana. See Plate A-1 for stage-frequency curves for Bayou Barataria at Lafitte, without project conditions for Fisher School-Fleming Curve Basins, and with project conditions for Fisher School-Fleming Curve Basins.

A.9. FUTURE CONDITIONS.

Historical evidence of sea level rise and subsidence indicates the need for a projection of storm surge stages and their effect on this project's effectiveness. Sea level rise of 0.5 feet per century along the Gulf Coast is recommended by the latest Corps' guidance. COE geologists from radio carbon dating of buried marsh deposits developed estimates of subsidence in coastal Louisiana. This data was compiled on quadrangle maps for coastal Louisiana. Using the projected sea level rise of 0.2 feet in the next 50 years and the appropriate subsidence rate in the coastal zones bordering the project area, the WIFM model was employed to compute the hurricane surge heights which could be expected in the year 2040. Stages for pertinent locations in the area that would accompany the SPH, 100-year and 10-year hurricanes are shown in Table A-12.

Table A-11

Plate A-1

TABLE A-12

2040 HURRICANE SURGE HEIGHTS

	Stages in feet NGVD		
Location	SPH	100-year	10-year
Bayou Barataria	9.6	7.7	4.2

Levee heights for future conditions were determined by adding runup from the appropriate wave condition to the design stillwater level. Where protective structures will be sheltered against significant wave runup, wave runup from the small locally generated wave climate was used to determine levee height. On the eastern side of the study area wave berms will have to be added to maintain the same level of protection as the original project due to the loss of the woods and marsh on the flood side of the levee. In these areas where significant hurricane wave action will occur because of an available fetch, levee heights were designed using wave height determined from methodologies described in the Coastal Engineering Center's Shore Protection Manual. Design elevations of protective structures in each reach are given in Table A-13.

TABLE A-13

2040 DESIGN ELEVATION OF PROTECTIVE STRUCTURES

Location	SWL ft	WAVE RUNUP	10-year
Bayou Barataria	4.25	2.0	6.5
Eastside Levee (w/berm)	4.25	2.5	7.0

* Ground surface elevation is 0.2 ft lower.

A.10. RISK ANALYSIS.

a. Introduction. The Fisher Basin, Jean Lafitte, La., Feasibility Study's risk analysis procedures were the same as the Harvey Canal to Westwego Hurricane Protection Project Post-

Authorization Change Study (Lake Cataouatche). The Harvey Canal to Westwego Hurricane Protection Project Post-Authorization Change Study (Lake Cataouatche) was the first coastal study to undergo risk-based analysis as outlined in EC 1105-2-205. The lack of guidance on risk-based analysis for projects in the coastal zone was a main concern at that time. In a meeting held in early February 1994, officials from HEC, IWR, OCE, LMVD, and NED decided that the study was similar to a flood control study and should generally follow a riverine risk-analysis approach. It was determined that the primary effort of H&H Branch was to establish the confidence limits for the exterior stage-frequency curve. Representatives of HEC and IWR stressed that the analyses remain simple. Thus, the stage-damage function for an interior ponding area is fixed relative to the exterior stage and its confidence limits for that particular frequency. A program for non-analytical frequency curves developed by HEC extrapolated the stage-frequency curve to the far extremities and computed the standard error of the curve based on the equivalent record of the primary gage used in the basin. The output from this program was supplied to Economics Branch to use in their analysis.

b. General. Stage frequency curves cannot be described by an analytic distribution. Analysis of these curves is usually performed graphically or non-analytically. The uncertainty in a non-analytical frequency curve that is estimated from a graphical fit of ordered observations (e.g. peak annual stages) may be calculated from order statistics. No assumption has to be made concerning the analytic form of the frequency curve. The statistic derived to estimate uncertainty is termed "non-parametric" or "distribution free".

The order statistic approach is limited to calculating uncertainty in the estimated frequency curve for the range of observed data or, alternatively, the equivalent length of record. Extrapolating the estimates beyond the range of data is performed by using asymptotic approximations of uncertainty distributions. The order statistic and asymptotic estimates of uncertainty are matched at the limits of the observed data. The estimates of uncertainty are computed using the asymptotic approximation beyond the range of data.

c. Computer Program. The FORTRAN program "LIMIT", developed by HEC, was used in the computation of confidence limits. The program can be used when a frequency curve has been developed based on 1) systematic observations, 2) hypothetical events or 3) both. Input data consists of systematic observations, equivalent years of record, and the systematic and equivalent record. Output consists of 1) computation results, 2) an ASCII data file containing results that are used by the @RISK program, and 3) an HEC-DSS file that can be used to plot the frequency curve and computed confidence limits.

d. Application. The Bayou Barataria at Lafitte gage was used most extensively for this study. The lower end of the stage-frequency curve reflects the historical record and the upper end of the stage frequency curve is based on WIFM results that were calibrated to the Lafitte gage.

The equivalent record length was determined by using the guidelines as set forth in ETL 1110-2-205, dated November 1993, with the analysis setting being a long-period gage within the watershed and the model calibrated to the gage-based curve. This suggests the use of 50% to 90% of the record length. The 100-year, 200-year, and 500-year stages are hypothetical stages developed from WIFM runs.

e. Results. Confidence is high in the lower end of the stage-frequency curve. The computed error is very small between the 99.9% chance exceedence and the 50% chance exceedence. At the 50% chance exceedence and continuing to the .01% chance exceedence the confidence limits start to diverge significantly. The computed error increases from 0.063 feet at the 50% chance exceedence to over 3 feet at the .01% chance exceedence. This is expected because the less frequent events are based on hypothetical results and not experienced events.

A.11. <u>INTERIOR DRAINAGE</u>.

The Fisher School Basin is a subbasin of the Barataria Basin and is located on the west bank of the Mississippi River in Jefferson Parish. It is an elongated area along Bayou Barataria bounded by a local levee along the east and south, and Bayou Barataria to the west and north. High ground along Bayou Barataria directs runoff eastward. The Fisher School Basin study area encompasses approximately 45 acres. The low-lying areas in this region are prone to flooding from frequent rainfall events.

The HECIFH Interior Flood Hydrology Package (1991) computer program developed by the Corp's Hydraulic Engineering Center was used in the interior drainage analysis. The IFH program was designed to simplify the analysis of areas protected by levees and/or floodwalls. Rainfall, topography, pumping, exterior stages, and inflow from wave overtopping are all inputs into the program. The output consists of a stage-frequency curve in a tabular format. For the analysis of the interior drainage the study area acted as one ponding area. Once the outside stage reached the top of the protection, the interior stage was assumed equal to the exterior stage.

The general steps of the IFH program for hypothetical events started with entering the hypothetical rainfall storm depth-duration-frequency data (from TP-40) for multiple hypothetical events. Then the rainfall excess values for the interior basin were computed using the Initial-Uniform method. Next the rainfall excess was transformed into runoff hydrographs for the interior basin. The unit hydrographs were computed by the Clark unit hydrograph method. The flow into the interior basin from wave overtopping was then added for each event analyzed. The interior inflow was routed through the interior ponding area and discharged through the line of protection by way of pumping stations. Existing drainage canals will convey rainfall runoff to a new collector canal that will connects North Canal and Canal E1. The new canal will run parallel to the proposed diagonal levee alignment along the eastern project limit. Pump station efficiencies varied with the exterior stage. The program then determined the interior stage-frequency curve for each of the hypothetical events.

LITERATURE CITED

(1) Beach Erosion Board, "Shore Protection Planning and Design," Technical Report No. 4, June 1954.

(2) Saville, Thorndike, Jr., "Wind Setup and Waves in Shallow Water," Beach Erosion Board, Technical Memorandum No. 27, June 1952.

(3) U.S. Army Engineer District, Jacksonville, "Design Memorandum, Wind Tide Produced by Hurricanes: Partial Definite Project Report, Central and Southern Florida Project, for Flood Control and Other Purposes. Part IV, Supplement 2, Section 3, July 26, 1956.

(4) U.S. Weather Bureau, "Hurricane Rainfall Estimates Applicable to Middle Gulf Standard Project Hurricanes, Tracks A, C, F, D, and B, New Orleans Study, Zone B," Memorandum HUR 3-5, November 30, 1959.

(5) U.S. Weather Bureau, "Estimates of Moderate Hurricane Rainfall Applicable to Middle Gulf Standard Project Hurricanes," Memorandum HUR 3-5A, December 11, 1959.

(6) Bretschneider, C. L. and J. I. Collins: "Prediction of Hurricane Surge, An Investigation for Corpus Christi, Texas, and Vicinity," NESCO Technical Report SN-120 to U.S. Army Engineer District, Galveston, National Engineering Science Co., Washington, D.C., 1963.

(7) Environmental Science Services Administration, U.S. Weather Bureau, "Standard Project Hurricane Wind Field Patterns (revised) to Replace Existing Patterns in NHRP Report No. 33 for Zones B and C," Memorandum HUR 7-84, August 17, 1965.

(8) Bretschneider, C. L., "Prediction of Wind Waves and Setup in Shallow Water, with Special Application to Lake Okeechobee, Florida," Unpublished Paper, Texas A&M College, August 1954.

(9) National Weather Service, "Meteorological Criteria for Standard Project Hurricane and Probable Maximum Hurricane Windfields, Gulf and East Coasts of the United States, NOAA Technical Report NWS 23, September 1979.

(10) U.S. Weather Bureau, "Hurricane Frequency and Correlation of Hurricane Characteristics for the Gulf of Mexico Area, P.L. 71," Memorandum HUR Z-4, August 30, 1957.

RELOCATIONS

B.1. SUMMARY.

a. Scope. Relocation data was developed using the “1990 Louisiana Parish Pipeline and Industrial Atlas”, various oil and gas maps, United States Geological Surveys (USGS) quadrangle maps, aerial photographs, and site visits. Preliminary relocation plans were developed in-house based on current project requirements. Pending approval of the Detailed Project Report, the owner of each facility will be allowed to review and comment on the preliminary relocation plans and cost estimates during preparation of detailed plans and specifications.

b. Estimated Relocation Cost. The estimated total cost for relocation of highways, pipelines, power and communication lines, and pumping stations for the proposed project is approximately $693,200.00. This total includes 5% for the owners engineering and design and 10% for the owners contract administration. Twenty-five percent (25%) for contingencies is added to the total for all relocation items except the highway ramps and detours. Contingencies for the ramps and detours are 30% and 35% respectively. Future Government expenditures in the areas of engineering, design, and contract administration have not been included in these estimates.

c. Authority for Accomplishing Relocations. Lands, easements, rights-of-way, relocations and disposal areas (LERRD’s) are the responsibility of the local sponsor. The cost of acquiring the required LERRD’s is included in the total project cost and is creditable toward the sponsor’s share of the implementation costs. The local cost sharing responsibilities for project implementation vary based on the extent of the LERRD’s. The minimum non-Federal contribution is 25 percent of the total project cost and the maximum is 50 percent. A minimum cash contribution of 5 percent of the overall project cost is also required.

B.2. FACILITIES UNAFFECTED BY THE PROJECT.

Several facilities parallel Louisiana State Highway 45 (LA 45) in the proposed levee alignment at the northern and southern edges of the project. Among those unaffected facilities are aerial power and telephone lines, and television cables belonging to Entergy, Bell South Telephone Company, and Cox Cable Company respectively. These lines appear to have enough clearance from the ground surface to accommodate the proposed levee. In addition, a Jefferson Parish 8-inch gravity (assumed) sewer line parallels LA 45. Rerouting a gravity line over the levee would render the line ineffective. Leaving the line in the levee section does not jeopardize the protection. Therefore, it is cost effective not to relocate the sewer line.

Sheetpile is proposed in the vicinity of Louisiana Highway 302 Bridge (LA Hwy 302) in order to avoid disturbing congested facilities. The facilities include a generator building and power pole at approximate station 154+35 belonging to Louisiana Department of Transportation and Development (LADOTD) and a power pole with power lines belonging to Entergy. Between approximate station 154+50 to 157+00 is an asphalt recreational walking track belonging to the Town of Jean Lafitte. At approximate station 155+85 along the edge of bank is an Entergy power pole where a power cable goes underground and crosses Bayou Barataria.

Four power poles, located at approximate stations 147+95, 148+40, 148+70 and 167+58, are not impacted by the current levee alignment.

There are six existing pumping stations within the proposed levee alignment that are maintained by Jefferson Parish. Three of the six pump stations discharge pipes have invert elevation above the required flowline elevation of 5.0 ft. NGVD at the point where they cross the proposed levee crown. Since these discharge pipes meet this requirement, they are unaffected. The unaffected pumps are located at approximate stations 0+00 by Fleming Canal, 92+32 by end of Oak Drive, and 159+65 by south end of Church Street.

B.3. DESCRIPTION OF IMPACTED FACILITIES, PROPOSED RELOCATIONS, AND COSTS. The estimated relocation costs given in the following description do not include contingencies, owners engineering and design, and owners contract administration. Refer to section B.1.b. for those cost estimates.

a. Highways. The estimated total relocation cost for highways are $372,120.00. The following highways cross the proposed levee alignment, and require relocation:

Louisiana State Highway 45 (LA 45). Louisiana State Highway 45 (LA 45) traverses the proposed levee alignment at the northern and southern edges of the project, and will require relocation. This is a two-lane, asphaltic concrete, through traffic primary highway. Ramps will be constructed to raise the two reaches to the project flood protection level of +7.0 feet NGVD. The approximate length of the proposed ramps will be approximately 1200 feet each.

Temporary detours will be constructed to allow continuation of traffic during construction. Due to the limited area available for a detour road at this location, we anticipate a phased construction of the ramp with a single lane detour will be necessary. Flagmen will be required during construction to direct traffic. Each day, following construction, the contractor will be required to restore the work area to a driveable condition that will allow two-lane highway traffic. The cost estimates for the two new LA 45 ramps is $236,290.00, and the two detours is $135,830.00.

b. Pipelines. The estimated total cost for the relocation of affected pipelines is $47,120.00. The following pipelines cross the proposed levee alignment, and require relocation:

(1) Jefferson Parish. Two 8-inch waterlines run parallel to LA 45, with one line on each side. These lines cross the proposed alignment of the levee at the northern and southern edges of project. The estimated relocation cost is $28,720.00. This estimate is based on rerouting lines over the new levee.

(2) Louisiana Gas Service Company. The Louisiana Gas Service Company owns a 3-inch gas pipeline that runs parallel to LA 45. This line crosses the proposed levee alignment at the northern and southern edges of project. The estimated

relocation cost is $11,400.00. This estimate is based on rerouting the line over the new levee.

(3) U.S. Oil and Gas Incorporated. U.S. Oil and Gas Inc. owns a 2 1/2-inch abandoned pipeline that runs parallel to the existing levee on the north-eastern side of project at the end of Oak Drive. The estimated cost for removing the section of pipeline located within the proposed levee alignment is $7,000.00.

c. Power and Communication Lines. The estimated total cost for the relocation of affected power and communication lines is $38,120.00. The following powerlines, poles, and telephone cables are within the proposed levee alignment, and require relocation:

(1) Entergy Louisiana Inc. Electrical Power Service (Entergy). Entergy owns the following facilities:

(a) Powerlines and pole located north of Fleming Canal pumping station at approximate baseline station 1+40.

(b) Powerlines and pole located south of Fleming Park Road by Dufrene Street at approximate baseline station 13+34.

(c) Powerline and pole parallel to Gloria Drive at approximate baseline station 73+53.

(d) Powerline and pole south of Fleming Canal pumping station at approximate baseline station 182+88.

The estimated total cost for relocation of Entergy powerlines and poles is $15,080.00. This estimate is based on moving poles out of the proposed levee alignment, and detaching and reattaching associated electrical service lines.

(2) BellSouth Telecommunication Inc.(BellSouth).

(a) Underground BellSouth telephone cables that run parallel to LA 45 are affected at the northern and southern edge of project. The estimated relocation cost is $3,700.00. This estimate is based on rerouting cable over the new levee.

(b) One underground BellSouth telephone cable crossing Bayou Barataria at approximate station 151+75 is affected. This line crosses the bank at a proposed sheetpile floodwall location and will have to be sleeved through the sheetpile. The estimated relocation cost is $1,000.00.

The estimated total cost for relocation of BellSouth communication cables is $4,700.00.

(3) Jefferson Parish, LA. Jefferson Parish owns a powerline and pole located on the northeast side of Gloria Drive at approximate baseline station 72+33. They also own an electrical power/control station located south of, and associated with, the Fleming Canal pumping station at approximate baseline station 182+88. This station consists of a fenced-in antenna pole, power pole with electric panels, and a 4-feet by 6-feet concrete slab. The estimated cost for relocation of Jefferson Parish facilities is $18,340.00. This estimate is based on relocation of the electrical power/control station outside of the proposed levee alignment, and detaching and reattaching associated electrical service lines.

d. Drainage Pump Stations. The invert elevation of all discharge pipes running from pumping stations within the project must be above the flowline elevation of 5.0 ft. NGVD at the point where they cross the proposed levee crown. Discharge pipes from two of the five existing pumping stations fail to meet these requirements, and therefore have to be modified. The 24-inch discharge pipe associated with the Gloria Drive pumping station at approximate baseline station 71+63, and an 18-inch discharge pipe associated with the Perkins Street pumping station at approximate baseline station 175+57 will have to be raised to an invert elevation above 5.0 NGVD. The estimated relocation cost is $4,500.00.

STRUCTURAL DESIGN

C.1. INTRODUCTION.

Proposed flood protection for the Fisher School Basin, adjacent to the east bank of Bayou Barataria, will consist of a combination of an existing earthen levee along the eastern and southern study area boundaries that will be heightened and construction of new reinforced concrete floodwalls. The proposed flood protection system will encircle the basin and provide protection up to elevation 7.0 ft. NGVD.

Water elevations within the basin's protection system will be maintained by a series of existing pumping stations. Louisiana Highway 45 will be relocated at the northeastern and southern project limits by ramping over the earthen levee section along the highway's existing alignment in order to provide access to the protected area. The reinforced concrete floodwalls will be located in eight reaches interspersed by levee sections, and shall consist of I-Type, inverted T-Type and Bulkhead-Type walls. Approximately 7,316 linear feet of I-type, T-type and Bulkhead-Type floodwalls will be located in Reaches #1 through #6. Reaches #7 and #8 will contain a total of approximately 254 linear feet of I-Type floodwalls that is expected to be built integrally with two of the existing pumping stations. Reach #4 will contain two 30 feet lengths of uncapped steel sheetpiling located at two separate pumping stations for a total of 60 feet. The total length of structural flood protection for Reaches #1 through #8 will be approximately 7,630 feet.

From studies of aerial photographs of the area and site visits to the proposed flood protection alignment, several locations were identified where access from the protected side of the wall to the floodside of the wall will be provided. Needed access through the flood protection ranges from reinforced concrete stairs over the floodwall to vehicular and pedestrian swing type floodgates. The T-type floodwalls shall contain vehicular access gate openings that are capable of being closed during flood stages by means of hinged steel swing-type floodgates. (See Plate 15). The proposed floodwall alignment for this project will require a total of 11 access gates and 25 sets of access stairs. The access gates shall consist of one 5-feet opening pedestrian gate, eight 15-feet opening vehicular gates and two 30-feet opening vehicular gates.

The use of a Bulkhead-Type of wall was determined to be best suited for use in areas adjacent to existing bulkheads. Many of the existing bulkheads are anchored into their locations by means of buried anchor guy wires. There is no cost effective method for determining the number of bulkheads constructed using this method. Construction of a conventional I-Type floodwall would result in driving steel sheetpiling through the anchor guy wires, which would result in failure to the existing bulkheads unless they were somehow shored prior to construction. Given the expense of this type of shoring and the unknown number of bulkheads affected, the Bulkhead type of floodwall was considered to be the best option. In areas where the Bulkhead-Type of floodwall is proposed, no land acquisition is anticipated.

C.2. <u>FLOODWALL DESIGN</u>

a. I-Type Floodwall. The landside I-wall consists of a reinforced concrete cap encapsulating the top 3 feet of continuously interlocked steel sheetpiling. The steel sheetpiling shall have an approximate embedment to stick-up ratio of 3:1 and will provide stability for the I-wall as well as cut-off protection against under seepage. The concrete cap will have a uniform thickness of 21" and will generally extend from 2 feet below the existing natural ground up to elevation 7.0. Modified I-walls will contain small openings in the concrete above the adjacent ground surface that will be capable of being closed by means of steel swing gates mounted on the flood side of the walls. (See Plate 17)

b. Bulkhead-Type Floodwall. The Bulkhead walls will be constructed adjacent to the bayou side of existing bulkheads and shall consist of a 21 -inch wide reinforced concrete cap encapsulating the top portion of continuously interlocked steel sheetpiling. The steel sheetpiling for the bulkhead walls shall be designed to act as a cantilever retaining walls and shall have a clear distance of 2 feet to the existing bulkheads. The void between the existing bulkheads and the Bulkhead-Type floodwall will be backfilled with earthen material, and the concrete cap on the flood side of the bulkhead wall will extend 2 feet downward from the top of floodwall elevation. On the protected side of the bulkhead wall, the concrete cap will extend down from the top of the wall to a distance of 6 inches below the adjacent natural ground.

c. T-Type Floodwall. T-wall gate monoliths consist of reinforced concrete "Inverted T-type" monoliths, 25 feet in length for the 15-feet opening gates and 40 feet in length for the 30-feet opening gates, with bases supporting 21" thick reinforced concrete walls. The bases of each monolith are 8 feet wide by 2 1/2 feet thick and are supported by ten, and sixteen 12-inch diameter timber piles for the 15-feet and 30-feet opening gate monoliths, respectively. T-walls will be used in lieu of I-walls at locations where vehicular access through the flood protection system is required. Continuously interlocked steel sheetpiling that will tie into the adjacent I-walls will be located longitudinally along the bottom centerline of the base for cut-off protection against under seepage. Column sections two feet wide located adjacent to each side of the opening shall support the hinged steel swing gates in the open and closed positions. (See Plate 12)

C.3. OTHER PROJECT FEATURES

a. Swing-Type Floodgates. Hinged steel swing-type gates at vehicular and pedestrian access openings in the floodwall shall be located as shown on the drawings for the purpose of closing the openings in the flood protection system during high water stages. Swing gates shall be mounted by a hinge and pedestal to the floodside of the column sections and shall be stored back against the adjacent I-wall sections when in the opened position. (See Plate 13) A typical steel swing gate is a steel frame that consists of horizontal wide-flange main members at the top and bottom of the gate that are connected by vertical ribs and stiffener plates and is covered with a 5/16" thick skin plate (See Plate 15). Seal details built onto the steel swing gates shall be capable of providing watertight seals with the seal plates cast into the T-wall monolith along the sides and bottoms of the gates when in the closed position. Provisions will be made for locking the swing gates in both, the open and closed positions.

b. Access Ladders and Stairs. Steel ladders shall be provided at each gate location in order to allow personnel closing the steel swing gates during high water stages to have access back to the protected side of the floodwall after the gates have been closed. Ladders shall be hot-dipped galvanized after fabrication (See Plate 14). Reinforced concrete stairs will be constructed integrally with the landside I-Type floodwall at locations where a resident’s ready access to existing facilities adjacent to the waters edge has been interrupted.

FOUNDATION INVESTIGATION & DESIGN

D.1. GENERAL

This section describes the soil investigation and design for approximately 32,000 linear feet of improved levee located in the Fisher School Basin, Jean Lafitte, LA.

D.2. FIELD INVESTIGATION AND LABORATORY TESTING

Four (4) hand auger borings, 20 feet deep, were taken along the proposed levee and floodwall alignment. A visual classification of all samples obtained from the borings was conducted and the soil properties and stratification were then estimated from these classifications. During the next phase of the project, approximately 17 undisturbed borings will be obtained along the proposed flood protection alignment. At each floodgate location, one boring at least 60 feet deep will be acquired (for a total of 10 borings). The remaining seven (7) borings will be acquired along the levee alignment every 2500 feet at minimum depths of 30 feet. Visual classifications, atterberg limits, and unconfined compression, triaxial and consolidation tests will then be performed on selected samples.

D.3. FOUNDATION CONDITIONS

The design stratification as determined from the above mentioned borings consists primarily of soft clays with lenses of silt and a layer of silt from approximate elevation –10.0 ft. to –15.0 ft. NGVD. Definitive design stratification will be established using the undisturbed borings proposed for the next phase of this project.

D.4. STABILITY ANALYSES

a. Levees. Using survey cross sections and hand auger boring data, stability analyses were performed for composite design sections of the proposed levee embankment. This analysis was accomplished using the Lower Mississippi Valley Division (LMVD) Method of Planes Stability Analysis Program. The levee is designed for a minimum factor of safety of 1.30 which resulted in a required cross section consisting of a 5.0 foot wide levee crown with 1 on 4 side slopes. During preparation of detailed plans and specifications, data acquired from undisturbed borings will be used to verify the stability analysis. A soils report containing the data acquired during the subsurface investigation will be prepared.

b. Cantilever I-Wall (Floodwall). I-wall stability and required penetration were determined by the "Method of Planes". A "Factor of Safety" was applied to the soil parameters. For the friction angle, the F.S. was applied as follows:

$$F_d = \tan^{-1}\left(\frac{\tan F_a}{\text{factor of safety}}\right)$$

where, F_a = available friction angle

F_d = developed friction angle

The developed friction angle was used in determining lateral earth pressure coefficients. Using the resulting shear strengths, net horizontal water and earth pressure diagrams were determined for movement toward each side of the sheet pile. From the earth pressure diagrams, a summation of horizontal forces were equated to zero and a summation of overturning moments were determined for various tip penetrations. The depth of necessary penetration is the point of zero summation of moments. The following design cases were analyzed for determining required penetration for the levee/I-walls.

No significant wave load on I-wall:

Q-Case

F.S. = 1.5 with static water at still water level (SWL)
F.S. = 1.0 with static water at (SWL) plus 2 feet
General: If the penetration to head ratio is less than 3:1, then increase it to 3:1.

The cantilevered I-wall analysis will be rerun to verify the floodwall tip penetration using undisturbed boring test results and amended soil stratification in the next project phase.

D.5 PILE CAPACITY CURVES.

The pile capacity curves for concrete and timber piles (ranging from 12-inch to 18-inch) used to support the proposed floodgates were derived to illustrate the ultimate pile capacities at various depths. These pile capacities will be verified during the development of detailed plans and specifications using the data acquired from undisturbed borings or pile test data as appropriate.

D.6. SETTLEMENT.

The consolidation of levee embankment and floodgates will be analyzed in the next project phase. Consolidation tests will be performed on soil samples acquired from undisturbed borings. For each consolidation test, the compression index, C_C vs. elevation will be plotted to show the range of values at various depths. The settlement due to the proposed levee and floodwall will then be determined and the required embankment and floodwall overbuild estimated.

D.7. SEEPAGE CONTROL.

A sheetpile cutoff will be installed beneath each floodgate to an elevation, which will be determined via seepage analysis during the next phase of this project.

COST ESTIMATES

E.1. INTRODUCTION

A detailed description of project cost estimates is provided in this section. The concrete capped sheetpile floodwall and earthen levee embankment cost estimates are described on page A-53. Along the western project limit, adjacent to Bayou Barataria, the flood protection project consists mainly of concrete-capped sheetpile floodwall with floodgates interspersed for water access. At the southern and eastern project limits, an existing earthen levee will be heightened and lengthened to protect the Fisher School Basin.

E.2. ENGINEERING AND DESIGN ESTIMATES

Engineering and Design (E&D) for this project consists of preparing detailed design plates for construction. Pending approval of this DPR, additional funding will be provided to develop plans and specifications. E&D cost estimates are as follows:

Geotechnical Br.	$ 56,000.00
Structures Br.	$ 81,250.00
General Engineering Br.	$ 3,350.00
Cost Engineering Br.	$ 18,000.00
Hydraulics Br.	$ 2,500.00

Civil Br.	$ 80,000.00
Design Services Br.	$ 16,000.00
Surveys	$ 90,000.00
Engr Div Total	$347,100.00
Construction Div.	$ 25,000.00
Project Mgmt. Div.	$ 40,000.00
E&D TOTAL	**$412,100.00**

E.3. SUPERVISION AND ADMINISTRATION ESTIMATES

Supervision and Administration (S&A) of the construction contracts for this project is the responsibility of the U.S. Army Corps of Engineers. S&A cost estimates are as follows:

Construction Div.	$720,000.00
Project Mgmt. Div.	$30,000.00
S&A TOTAL	**$750,000.00**

ECONOMIC APPENDIX

TABLE OF CONTENTS

EVACUATION AND SUBSISTENCE COSTS
REOCCUPATION COSTS
FIA COST REDUCTION BENEFITS
TOTAL EMERGENCY COSTS

SECTION V – NET BENEFIT ANALYSIS

AVERAGE ANNUAL BENEFITS
AVERAGE ANNUAL COSTS
AVERAGE ANNUAL NET BENEFITS

SECTION VI – NON-STRUCTURAL ANALYSIS

SECTION VII – RISK ANALYSIS

SECTION I - INTRODUCTION

General. This appendix presents an economic evaluation of the improvements being considered for the Lafitte study area, which is located in Jefferson Parish, Louisiana. It was prepared in accordance with Engineering Regulation (ER) 1105-2-100, Planning Guidance. The National Economic Development Procedures Manual for Urban Flood Damage, prepared by the Water Resources Support Center, Institute for Water Resources, was used as a reference.

The evaluation consists of a description of the methodology used to determine economic damages and benefits under existing conditions, project costs, and benefit-to-cost analysis. The evaluation uses November 1997 price levels. The proposed improvements (see Plan Formulation) were evaluated by comparing estimated average annual benefits that would accrue to the study area with estimated average annual project costs. Benefits were converted to average annual values by using a Federal discount rate of 7-1/8 percent and a project life of 50 years. The estimated project base year (the year in which significant benefits will accrue as a result of project construction) is the year 2002.

National Economic Development Benefits Considered. The National Economic Development Procedures Manual for Urban Flood Damage recognizes four (4) primary categories of benefits for urban flood control plans: inundation reduction, intensification, location and employment benefits. Inundation reduction is the only category of NED benefits for urban areas considered in this analysis. In addition to the reduction in damages caused by inundation, this category also includes the reduction of emergency costs, evacuation and subsistence costs, reoccupation costs, and Federal Insurance Administration costs saved. The evaluation process involved the formulation and assessment of the flood control improvements, the identification of categories of possible flood control benefits, the determination of without- and with-project damages and costs incurred, and standard benefit-cost comparisons.

The basic economic evaluation included the comparison of the urban flood damage setting for "without-project" and "with-project" conditions. Without-project conditions, or existing conditions, reflect conditions expected to prevail in the absence of any alternative plan of improvement. With-project conditions reflect conditions in the project area with a proposed flood control improvement in place.

Inundation Reduction Benefits. Based on EC 1105-2-100, inundation reduction benefits are associated with physical damages or losses, income losses, and emergency costs. Most activities affected by a flood incur losses in one or more of these categories, but usually the majority of the benefits from a project result from the reduction of actual or potential physical damages due to inundation. Since income losses are difficult to quantify as a NED benefit because they can be compensated for by a postponement or transfer of activities to other establishments within the nation, they were not included in this analysis. However, there are viable benefits associated with cost reduction savings from flood emergency operations. These include emergency costs, evacuation and subsistence costs, and reoccupation costs saved. Although physical flood damage reduction and emergency cost reduction are both classified as inundation reduction benefits, they are discussed separately in the following paragraphs.

SECTION II - DESCRIPTION OF THE STUDY AREA

Population and Land Use. The town of Jean Lafitte Louisiana (population 1,500) is located in Jefferson Parish, it is one of eight parishes making up the New Orleans Metropolitan Statistical Area (MSA). The town is located on the West Bank of the Mississippi River, and south of the "Urbanized Area" of the New Orleans MSA, as defined by the 1990 census. Table 1 compares population estimates for the town of Jean Lafitte with the total population of Jefferson Parish and the New Orleans MSA from 1970 to 1993. Jean Lafitte was incorporated, and portions of it annexed, between 1970 and 1980.

Note that the population of Jean Lafitte increased from 936 to 1,496 between 1980 and 1990 while the total population of both Jefferson Parish and the New Orleans metro area slightly declined. The population increase in Jean Lafitte may be characteristic of trends in other communities developed in part by the lower cost of single-family housing and other properties, the appeal of lower population densities, the new construction of or improvements to rapid transportation systems, and higher crime rates in other parts of the metro area. Construction of an additional Mississippi River bridge near the New Orleans central business district could enhance residential developments in Jean Lafitte.

Preliminary surveys of estimated damage to residential property from recent flood and hurricane events, and the number of people living in an average household, indicate that approximately 822 of the 1,500 residents in Jean Lafitte have experienced losses from these events. This estimate is based on the general pattern of single-family dwelling units in the community, the total number (275) of residential structures and mobile homes impacted by recent events, and the 1990 census estimate of the size of an average household in the town of Jean Lafitte (275 x 2.99 persons/ household = 822 persons). As noted by the Bureau of the Census, a large number of people in the United States were not included in the 1990 census count for various reasons. The data shown in the table include only the information reported by the census.

In spite of frequent storms making up part of the semi-tropical climate of the area, the unusually low elevation of the delta, the mild climate, and the availability of abundant natural resources combine to promote economic development and population growth along the Louisiana Gulf Coast, the New Orleans metropolitan area, and the town of Jean Lafitte.

Since the population of Jean Lafitte is relatively small, the availability of published data on land use and other socio-economic conditions is limited. The 1990 census reported that the political boundaries of Jean Lafitte covered approximately 6.3 square miles, including 6.0 square miles of land area. Surveys conducted in conjunction with a preliminary phase of this study estimated that 271 residential structures experienced damage during recent hurricane and flooding events, including damage from Hurricane Juan in 1985. As previously mentioned, most of the residential structures in the town of Jean Lafitte are single-family units. In addition to the 275 residential structures, 34 commercial establishments experienced hurricane and flood damage.

The total land area in Jean Lafitte represents only about 2 percent of the total land area in Jefferson Parish. The 1990 census indicates that the political boundaries of Jefferson Parish, both East and West Banks of the Mississippi River, cover approximately 642.4 square miles, including 305.9 square miles of land and another 336.5 square miles of water. A 1980 summary of total land use for the parish prepared by the Louisiana Office of State Planning estimated the total land area of the parish at about 319.57 square miles. This preliminary estimate showed that 72 percent of the total land area in Jefferson Parish was wetland and beaches. About 15 percent was residential land (including a significant amount of the urbanized portion of the New Orleans metropolitan area); another 7 percent was commercial and industrial land; 4 percent was used for transportation, communication, and related services; and the remaining 2 percent was either agricultural land, forest land, strip mines and quarries, sandy areas other than beaches, and land in transition.

Table 1
Population Trends in the Town of Jean Lafitte
Jefferson Parish, and the New Orleans MSA

AREA	1970	1980	1990	1993/a
Jean Lafitte	539	936/b	1,469	1,519
Jefferson Parish	338,229	454,592	448,306	457,069
New Orleans MSA/c	1,144,791	1,304,212	1,286,270	1,306,546

a/ Louisiana Tech University, Business and Administration Research Division, unpublished 1994.

b/ The Town of Jean Lafitte was incorporated prior to the 1990 census. (See footnote 24, 1980 Census of Population, "Number of Inhabitants, Louisiana").

c/ Metropolitan Statistical Area, which currently includes Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, and St. Tammany Parishes.

SOURCES: U.S. Department of Commerce, Bureau of the Census, Census of Population for 1870 and 1980, "Number of Inhabitants, Louisiana"; and 1990 Census of Population and Housing, "Population and Housing Unit Counts, Louisiana". See also items a/ and b/ above.

Businesses and Employment. The businesses and related employment within the incorporated limits of Jean Lafitte include the markets and services traditionally required to maintain a small suburban community in close proximity to a much larger urban center. Businesses include such things as retail stores selling food, clothing, medical supplies, home furnishings, automobiles, trucks, and boats; and various service establishments providing health care, sanitation, legal services, and automobile and boat maintenance. Other business activities more unique to the local area include the operation and maintenance of the commercial fishing vessels docked along the bayou and activities in support of oil and gas production.

The much larger population of Jefferson Parish requires a much greater level of business activity. In addition to the types of business mentioned above, Jefferson Parish offers jobs associated with the Port of New Orleans, related industrial activity along the Mississippi River, petro-chemical industries, tourism, in a much larger volume and variety of markets.

Table 2 compares employment, unemployment, and unemployment rates, and the median family income in Jean Lafitte and Jefferson Parish. The 1990 census appears to be the first published information providing employment and median family income data for communities with populations of less than 2,500. The median family income estimates shown in the table are from the 1980 and 1990 census. They have not been adjusted to reflect the unusual pattern of inflation, which occurred nationally between 1979 and 1989.

The 1980 census indicated that Jefferson Parish ranked first among all Louisiana parishes in median family income. The 1990 census reported that the $32,446 median family income in Jefferson Parish was still among the highest in the State. It ranked slightly behind two other parishes in the New Orleans MSA, St. Charles Parish with $35,355 and St. Tammany Parishes with $35,033. The only other parish in the State with median family income higher than that of Jefferson was East Baton Rouge Parish with $34,198.

Table 2
1990 Civilian Labor Force, Employment, and Unemployment
And Income in Jean Lafitte LA and Jefferson Parish

AREA	1980/a	1990/b	1994/c (April)
Jean Lafitte:			
Civilian Labor Force	*	571	*
Employed	*	531	*
Unemployed	*	40	*
Unemployment Rate	*	7.0	*
Median Family Income	*	$22,125	*
Jefferson Parish:			
Civilian Labor Force	214,909	222,939	226,700
Employed	205,987	207,556	212,600
Unemployed	8,922	15,383	14,100
Unemployment Rate	4.2	6.9	6.2
Median Family Income	$21,920	$32,446	*

* Not available

a/ U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, "General Social and Economic Characteristics, Louisiana". Income data are for the entire previous (1979) year, and unadjusted for changing price levels.
b/ U.S. Department of Commerce, Bureau of the Census, 1990 Census of Population and Housing, "Summary Social, Economic, and Housing Characteristics, Louisiana". Income data are for the entire previous (1989) year and unadjusted for changing price levels.
c/ Louisiana, Department of Labor, unpublished data.

SECTION III – INUNDATION REDUCTION BENEFITS FOR STRUCTURES AND AUTOMOBILES

Flood Damage Reduction. Most of the benefits that accrue from a project are usually the result of reducing physical flood damages. Physical inundation reduction damages include structural damages to buildings and losses to contents; damages to roads, bridges, and other public utilities; and losses to personal property such as automobiles. In determining potential flood damages for this area, flood damages were evaluated for urban structures and automobiles.

Analysis of Flood Damages to Structures. In the initiation of urban flood damage analyses, field investigations were conducted and data were collected to identify the extent and character of flooding in the project area. The determination of existing urban flood damages was based on the integration of depth-damage relationships and flood frequency distributions to structures located in the area. Development of the existing structure data was based upon a comprehensive field survey of all the structures located within the alignment of the project area. Applicable flood damage curves were used to depict the relationships between the stage and area inundated, stage and frequency of occurrence, stage and damage, and damage and frequency of occurrence. These curves are the basis for the damage/benefit analysis in evaluating project alternatives.

Structure Inventory and Valuation. The study area surveyed was the area known as the Fisher School Basin located in the town of Jean Lafitte. A comprehensive field survey (100% inventory of all of the structures within the alignment) was conducted to identify every structure at risk in the study area. The survey estimated the number, value, and elevation of all structures. Ground elevations were determined using 1-foot contours shown on GIS maps provided by a contractor for Jefferson Parish. First floor elevations were estimated using a hand level to insure accuracy.

Structures were surveyed for pertinent characteristics. These included the type of structure and/or business, number of stories, type of foundation and construction, structure dimensions, physical condition of the structure, and the location. Structures were differentiated by 11 basic types -- residential one-story, residential two-story, mobile home, apartment or duplex, professional, retail and personal, warehouses and contractor services, public and semi-public, eating and recreation, groceries and gas stations, and repairs and home use.

Structure and Contents Valuation. Structure and contents values are major elements influencing the impact of depth-damage relationships and magnitude of flood damages to urban structures. For the purposes of estimating urban flood damages, a structure is defined as a building and any attached components, such as built-in appliances, shelves, carpeting, etc. The value of land is excluded in the determination of urban structure values. Contents represent furnishings and equipment, or all items within the structure that are not permanently attached.

Residential structure values were calculated using the Marshall and Swift Residential Estimator Program. This continuously price-adjusted computer program uses cost per square foot, geographically localized by zip code, to calculate a depreciated replacement value for each structure. Mobile homes within the area were assessed using an average value per structure based on size.

In the determination of nonresidential structure values, the Marshall and Swift Commercial Estimator Program was used. This program determines a cost per square foot based on a number of factors, including occupancy of the structure. Marshall and Swift considers over 100 occupancy categories. Buildings are classified by construction type in order to determine a base cost per square foot. The base cost is then adjusted for factors such as heating and cooling, local construction cost, current cost conditions, and age and life expectancy of the building. The value per square foot was multiplied by the square footage size of the building to determine a total value for each nonresidential structure. For depth-damage purposes, occupancy codes were aggregated into eight established categories of nonresidential use.

A summary of the major structure types by average structure value is depicted in Table 3. The data collected on all of the inventoried structures was manually transferred to structure files using the Urban Damage computer program. A summary of the inventory, grouped according to reach and structure type, is displayed in table 3.

Table 3

Structure Inventory

Category of Structures	Number of Structures	Value of Structures	Average Value
Residential (1-sty)	168	$ 6,762,700	$ 40,300
Residential (2-sty)	18	905,500	50,300
Mobile Homes	89	612,000	6,900
Commercial	34	3,763,500	110,700

Depth-Damage Relationships. To quantify the extent of flooding, which occurs in an area, depth-damage curves are utilized. Depth-damage relationships and contents to structure value ratios developed by a panel of experts as part of the Jefferson/Orleans Parish Feasibility Studies were used in this analysis. These curves were based on detailed damage surveys of selected residential and nonresidential properties in Jefferson and Orleans Parishes in the State of Louisiana. Each unit was visually inspected with estimated expected damages recorded at various levels of inundation. Structure types, structure value, and type of flooding differentiated these curves. Since the range of structure types in the Jean Lafitte area is virtually identical to those found in the Jefferson-Orleans study area, use of these data was deemed appropriate.

Damage Evaluation. In determining the number of structures flooded and resulting impact, the Urban Flood Damage Program was utilized to correlate existing structural and hydrologic data. Within the program, nine different types of urban structures were evaluated using hydrologic profile data, structure locations, first floor elevations, depth-damage relationships, and structure and contents values to compute the depth of flooding and resulting damages for each structure for selected frequency flood events. Table 4 displays the number of structures by flood frequency for each flood damage reach.

Table 4
Total Number of Structures Flooded by Frequency a/

Flood Frequency	Existing Conditions	6-Foot Levee	7-Foot Levee	8-Foot Levee
1	4	2	2	2
2	91	14	14	14
5	232	39	39	39
10	243	110	110	110
25	279	253	158	146
50	295	295	273	232
100	304	304	304	304
200	305	305	305	305
500	305	305	305	305

a/ Total numbers are cumulative. Damages begin with yard and slab damage 0.5 foot below first-floor elevation.

Analysis of Automobile Damages. There are also damages to other properties in the flood plain, which are incurred as a result of urban flooding. Some of these, such as automobile damages, are directly related to the structural flood damages. The elevation of each automobile is determined by its corresponding structure elevation. Automobile damages are then calculated by correlating depth of flooding, depth-damage per automobile, and damage per automobile.

Automobile Valuation. The 1990 census indicated that there were 1.8 vehicles per household in Jefferson Parish. For automobile flood damage calculations, it was assumed that each residence had one automobile, which was susceptible to damage. For slab homes, automobiles were placed at 0.5 foot below the first floor level, assuming garages and carports are lower than first-floor elevations of homes. For pier homes, automobiles were placed at ground elevation. The application of only one vehicle per structure reflects that a number of vehicles may not be parked at home during the time of a flood due to other uses or that they may be evacuated. Therefore, they are not subject to flooding. The current average damage per automobile was estimated to be $9,400, based on the replacement value of a depreciated used automobile according to the Louisiana Motor Vehicle Division and Census Data.

Summary of Expected Flood Damages To Structures, Contents, and Vehicles. The results of the flood damage analysis for existing and with-project conditions are presented in table 5 for structures and automobiles.

Table 5
Expected Annual Benefits to Structures and Automobiles

	Without-Project	With-Project		
Damage Category	Existing Conditions	6-Foot Levee	7-Foot Levee	8-Foot Levee
Residential	$ 527,800	$ 247,500	$ 169,200	$ 144,600
Commercial	261,000	111,100	82,000	75,800
Automobiles	436,800	154,500	116,500	99,200
Totals	1,225,600	513,100	367,700	319,600
Benefits		712,500	857,900	906,000

SECTION IV – INUNDATION REDUCTION BENEFITS FOR OTHER CATEGORIES

Introduction. A community typically incurs a variety of flood-related costs not associated with structural damages. These costs can be divided into three categories. The first includes the reduction in emergency costs, such as sandbagging and police overtime, repairs to public property, such as roads and bridges, and the subsequent clean-up of private and public properties. The second category includes the costs of evacuating and providing subsistence for those residents forced from their homes. The final category consists of the reoccupation costs required by homeowners in order to move back into their homes. Some of these damages and costs will be reduced due to the flood protection provided by the project. The reduction of these costs will be considered a benefit attributable to the project. This analysis is based only on existing condition and not future condition hydraulics. Thus, the benefits have been expressed as average annual values.

Emergency Costs. Benefits attributed to this category are defined as the elimination or lowering of emergency costs. The costs incurred as a result of flooding in the West Bank of Jefferson Parish were estimated for the following aspects of emergency operations: (1) Law Enforcement overtime (Sheriff's Office and City Police), (2) Department of Emergency Management overtime and food supplies for persons in the Emergency Operations Center, (3) Department of Public Works overtime for cleanup, placement of barricades, sand, sandbags, etc., and (4) Mosquito and Rodent Control Department overtime and supplies. The costs associated with evacuation and subsistence, and reoccupation are addressed in the following section of this report.

During October 1985, Hurricane Juan, after making one loop off the Louisiana coast and another loop on shore, eventually returned to the Gulf and made final landfall in the Florida Panhandle area. The storm affected Louisiana's weather for 4-5 days and the study area received widespread damages and incurred extensive emergency costs. Gages on the Harvey Canal indicated that the hurricane produced stages equivalent to a storm with an annual probability of .0167 (once in 60 years). The total emergency costs for the West Bank of Jefferson Parish for Hurricane Juan was estimated at approximately $4 million. With a total of 2,500 structures flooded on the West Bank of Jefferson Parish, this would mean an average of $1,600 of emergency costs per structure flooded above first floor elevation. After being price adjusted to November 1997 price levels, this amount was increased to $2,239.

In order to determine average annual emergency costs, the emergency costs for storms of different frequencies of occurrence must be known. The number of structures flooded above first floor elevation for the 10, 50 and 100 storm events were provided by SID program outputs for the base and with-project conditions. These numbers were then multiplied by the $2,239 average emergency cost per structure, in order to establish frequency-damage relationships. Finally, these relationships were entered into the Hydrologic Engineering Center's (HEC) Expected Annual Flood Damage Computation (EAD) program to determine the average annual costs for the project conditions.

Because fewer structures will flood with the project in place, a frequency-damage relationship with lower damages was entered into the EAD program. The portion of the average annual figure that will be reduced by the project is considered the emergency costs saved. Table 6 displays the associated cost savings.

Evacuation and Subsistence Costs. The emergency cost savings associated with the occurrence of hurricanes for both evacuation and subsistence may be claimed in this benefit category. The costs considered include meals, clothing and shelter assistance for evacuees. Hurricane Juan affected Louisiana's weather for four to five days as parishes along the Louisiana coast received widespread damages and incurred extensive emergency costs. Schools and armories were opened in the southern half of Louisiana for the evacuees forced to flee their homes because of flooding.

Based on May 1995 flood information, spending by non-profit organizations including the Salvation Army, the Volunteers of America, and the Southern Baptist Disaster Group, resulted in each family receiving $370 in subsistence and evacuation compensation. Using the Engineering News Record to reflect November 1997 price levels, this amount was increased to $399.

In order to determine average annual subsistence and evacuation costs, the subsistence and evacuation costs for storms of different frequencies of occurrence must be known. The number of structures flooded above first floor elevation for the 10, 50 and 100-year storm events were provided by SID program outputs for the base and with project conditions. These numbers were then multiplied by the $399 total subsistence and evacuation cost per structure, in order to establish frequency damage relationships. Finally, these relationships were entered into the EAD program to determine the average annual costs for the project conditions.

Because fewer structures will flood with the project in place, a frequency damage relationship with lower damages was entered into the EAD program. The portion of the average annual figure that will be reduced by the project is considered the emergency costs saved. These reductions in emergency costs for the selected plan are shown in table 6.

Reoccupation Costs. Benefits attributed to this category are defined as the elimination or lowering of reoccupation costs. These costs result from the flooding of residential structures at or above first floor elevation, and include the many hours that homeowners spend to contract, supervise, and inspect repairs, to clean and disinfect their homes, and to fill out casualty loss forms for flood insurance and other disaster assistance. Interviews with former flood victims in the Amite River and Tributaries project area were used to determine the hours spent on the aforementioned tasks.

Based on discussions with the president of the Amite River Citizens Organization, the average time spent in flood clean-up per household was estimated to be 115 hours. Because the homeowners were forced to forego other activities, including work time, during the flood aftermath, an opportunity cost of $14.59 per hour was assigned. This is the average hourly wage for the New Orleans MSA for employees covered under the Louisiana Employment Securities Law as of the third quarter of 1997. Thus, the total reoccupation costs for each household is $14.59 x 115 hours or $1,678.

In order to determine average annual reoccupation costs, the reoccupation costs for storms of different frequencies of occurrence must be known. The $1,678 cost per household was multiplied by the number of structures flooded above first floor elevation for events of three different frequencies of occurrence in the study area to develop a frequency-damage relationship. The frequency-damage relationship was entered into the EAD program to determine average annual reoccupation costs.

Because fewer structures will flood with the project in place, a frequency-damage relationship with lower damages was entered into the EAD program. The portion of the average annual figure that will be reduced by the project is considered the reoccupation costs saved. These reductions in reoccupation costs and emergency costs for the selected plans are shown in table 6.

<u>Flood Insurance Administration (FIA) Cost Reduction Benefits</u>. The net national cost of the flood insurance program includes the costs of claims adjustment, agent commissions, and the cost of servicing the policies. Potential benefits from a project will arise from a reduction in the administration overhead. This is achieved by any project which results in such property no longer being subject to flooding by a 100-year stage. The current administrative cost per policy is $131.

In order to determine the magnitude of this benefit, all of the residential properties in the project were considered. The analysis began with the following conditions based on observation and experience as reported by Flood Insurance Administration (FIA) officials. The FIA indicates that the percentage of properties currently covered by flood insurance differs by flood zone and those proportions are: 100% for the 0 to 25-year zone; 80% for the 25 to 50-year zone; 60% for the 50 to 100-year zone; and none above the 100-year stage.

The structure files were sorted according to residential structures found in the 0 to 25, 25 to 50, and 50 to 100-year flood zones. Their total elevations were then adjusted for slope and compared to the with project 100-year stage and those which exceeded that stage were sorted listed and counted. The number of structures which were no longer subject to flooding by the 100-year stage with the project in place were then assumed to have no flood insurance in their flood zone. This number was then multiplied by the adjusted potential benefit for each flood zone and the sum of these benefits for each zone of each basin was then reported in table 6.

Total Emergency Costs. The total NED benefits for this category are determined by combining the average annual cost savings from emergency cost and damage to public property, evacuation and subsistence measures, FIA costs saved, and reoccupation of houses by flood victims. The total average annual cost savings, apportioned by the hydrologic reach, is shown in table 6.

Table 6
Total Average Annual Emergency Cost Savings

Emergency Cost Savings Category	6-Foot Levee	7-Foot Levee	8-Foot Levee
Emergency Cost Savings	$ 137,300	$ 143,700	$ 145,300
Subsistence Cost Savings	28,000	29,300	29,600
Reoccupation Cost Savings	169,300	177,000	178,900
FIA Cost Savings	9,900	10,400	10,500
Totals	344,500	360,400	364,300

SECTION V – NET BENEFIT ANALYSIS

Average Annual Benefits. The economic justification of the plan given detailed consideration was determined by comparing estimates of the average annual costs and average annual benefits which are expected to accrue over the life of the project (50 years). Recommendation of any construction plan by the Corps of Engineers requires that average annual benefits equal or exceed average annual costs.

The values estimated for benefits and costs at the time of accrual were made comparable by conversion to an equivalent time basis using a designated interest rate. The interest rate used in this analysis is 7-1/8 percent. The period of analysis, or project life, utilized in the analysis is 50 years. The benefits and costs are expressed as the average annual value of the present worth of all expenditures and all plan outputs. These expenditures and outputs are measured at a specific point in time (base year). The base year, is the year in which the project becomes operational or when significant benefits start to accrue.

Estimated "with project" damages would be limited to the effects of rainfall or events exceeding the level of protection. The total benefits of the project include the benefits anticipated over the 50-year project. The benefits of the proposed plan were compared with the costs to determine the benefit-to-cost ratio as shown in table 7.

Average Annual Costs. Project costs developed include increasing the height of the existing levee and closure of any gaps in the alignment. Total project first costs also include costs for mitigation, real estate, and relocations. The schedule of yearly expenditures is annualized based on a base year of 2002.

Average Annual Net Benefits. The results of the final benefit-cost analysis for the various plans in the Lafitte project are summarized in table 7. All alternatives studied show a positive benefit-cost ratio. The 7-foot levee alternative shows the greatest net benefits which is $386,800.

Table 7
Benefit-Cost Summary

	6-Foot Levee Height	7-Foot Levee Height	8-Foot Levee Height
Construction Costs	$4,534,000	$4,845,000	$5,536,500
Real Estate	3,196,000	3,196,000	3,711,000
Relocations	693,200	693,200	767,000
Mitigation	19,000	19,000	22,500
Engineering & Design	412,100	412,100	412,100
Supervision & Administration	803,000	803,000	803,000
Interest During Construction	1,055,800	1,070,000	1,209,700
Total First Costs	10,713,100	11,038,300	12,461,800
Average Annual Costs	788,600	812,500	917,300
Operation and Maintenance	19,000	19,000	19,900
Total Average Annual Costs	807,600	831,500	936,300
Average Annual Benefits			
Inundation Reduction	712,400	857,900	906,100
Emergency Costs Saved	137,300	143,700	145,300
Evacuation & Subsistence Costs Saved	28,000	29,300	29,600
Reoccupation Costs Saved	169,300	177,000	178,900
FIA Costs Saved	9,900	10,400	10,500
Total Average Annual Benefits	1,056,900	1,218,300	1,270,400
Benefit-Cost Ratio	1.3	1.5	1.4
Net Benefits	249,300	386,800	334,100

SECTION V1 – NON-STRUCTURAL ANALYSIS

Non-structural measures are all those which reduce or avoid flood damages without significantly altering either the nature of the extent of flooding. Such measures reduce flood losses by either (1) changing the use made of floodplains (e.g., from residential to recreational use), or (2) retaining existing flood plain use with some accommodation of the flood hazard (e.g., elevating a resident). Non-structural measures include, but are not limit to, such actions as floodproofing of structures, regulation of floodplain use, temporary evacuation of hazard areas, relocation of activities to non-floodplain sites, acquisition of land or easements, redevelopment in a manner compatible with the flood hazard, and flood forecasting and warning.

Basically, two types of non-structural measures for flood protection exist – those that reduce existing damages and those that reimburse for existing damages and reduce future damage potential. Only those non-structural measures that reduce damages were investigated to varying degrees in this study and include the following:

a. Floodproofing by waterproofing of walls and openings in structures.
b. Raising structures in place.
c. Constructing walls or levees around structures.

The following results were obtained through the analysis of five of the alternatives mentioned above:

Flood Proofing Option

Number of structures considered	213
First Costs	$4,474,700
Average Annual Costs	329,500
Average Annual Benefits	430,400
Benefit-Cost Ratio	1.3
Net Benefits	100,900

Structure Raising Option

Number of structures considered	267
First Costs	$6,039,800
Average Annual Costs	444,700
Average Annual Benefits	293,000
Benefit-Cost Ratio	0.7
Net Benefits	(151,700)

Small Walls Option

Number of structures considered	180
First Costs	$3,286,600
Average Annual Costs	242,000
Average Annual Benefits	240,800
Benefit-Cost Ratio	1.0
Net Benefits	(1,200)

The non-structural portion of the Urban Flood Damage Analysis Program calculates the cost of implementing each alternative on a structure-by-structure basis using per square foot cost estimates specific to the type of alternative. Per square foot costs that were initialized at the time the program was finalized in 1988 were updated to February 1998 price levels using the Engineering News Record construction cost factors. Residential structures are evaluated using estimates of structure size, designated by small (S), medium (M), or large (L). Data input specific to non-residential structures includes the structure size (in square feet), number of doors, number of windows, height of windows from the ground, and number of 6-foot vehicular doors (e.g., garage doors). These data are used within the program to estimate the cost of implementing each non-structural measure considered.

The non-structural analysis concludes that the flood proofing option would be the only option that would be economically justified. Since the plan is not considered to be the NED plan, no further consideration was given to non-structural measures.

SECTION VII – RISK-BASED ANALYSIS

General. Even though every attempt is made to ensure accuracy, a degree of uncertainty is implicit in many areas of planning for water resource projects. The uncertainty arises due to error in the data being measured or errors inherent in the methods used to estimate the values of certain critical variables. The potential for error exists throughout the traditional analysis because each of the variables has been assigned a single point value rather than a range of values. In order to compensate for possible error, risk-based analysis can be applied to the planning and design of water resource projects. This approach, which quantifies the extent of systematic risk, provides the decision-maker with a broader range of information. Thus, a decision can be made that reflects the explicit tradeoff between risks and costs.

Overview of Risk-Based Analysis. Risk-based analysis was used to determine the NED levee height for hurricane protection. Also, the inherent uncertainty associated with each of the key hydrologic/hydraulic and economic variables in the analysis was quantified.

The analysis considered a range of possible values, with a maximum and a minimum value, for each economic variable used to calculate the elevation- or stage-damage curves, and for each hydrologic/hydraulic variable used to calculate the stage-frequency curves. It also considered a probability distribution for the likely occurrence of any given outcome within the specified range. The @Risk program used Monte Carlo simulation to derive the possible occurrences of each variable. Randomly generated numbers were used to simulate the occurrences of selected variables from within the established ranges and distributions. In a normal distribution, 68 percent of the possible outcomes occur within one standard deviation on either side of the mean (expected value), 95 percent occur within two standard deviations on either side of the mean, and 99.7 percent occur within three standard deviations.

For each variable, the computerized Latin Hypercube sampling technique was used to sample from within the range of possible values. With each sample, or iteration, a different value was selected. The number of iterations performed affects the simulation execution time and the quality and accuracy of the results. In the project-sizing template spreadsheet that selects from all the economic and hydrologic/hydraulic variables, 5,000 iterations were run. The sum of all sampled values divided by the number of samples yielded the expected value, or mean. This process was conducted simultaneously for each economic variable associated with each structure inventoried. The resulting mean value and probability distributions formed a comprehensive picture of all possible outcomes. In order to illustrate the sensitivity of the results to changes in the number of iterations, New Orleans District conducted a test run of the economic uncertainty spreadsheets. It was determined that as the number of iterations was increased past 100, there was less than a 1 percent change in the mean or expected value. Also, there was considerably less than a 1 percent difference in the mean or expected value as the number of iterations was increased from 500 to 5,000.

Three @Risk simulation spreadsheets were used in the risk-based analysis for the Lafitte hurricane protection study. The first spreadsheet, which was developed in cooperation with Vicksburg District and Division, was used to calculate structural elevation-damage (or stage-damage) relationships in the risk-based analysis framework. The second spreadsheet, known as the project-sizing template, was developed by Hydrologic Engineering Center (HEC) and recently adapted for use in the Lafitte study by the Institute for Water Resources (IWR). This spreadsheet was used to integrate the results of the economic uncertainty analysis (elevation-damage curve with error) with the results of the hydrologic/hydraulic uncertainty analysis (stage-frequency curve with error) to produce expected annual damages under each of the three levee heights. The third spreadsheet was used to compare the without-project damages to the with-project damages, in order to produce the benefits under each of the three levee heights, and to perform the basic NED analysis.

Economic Uncertainty. In the Lafitte hurricane protection study, risk-based analysis was performed on four (4) key economic variables: structure values, contents-to-structure value ratios, first floor elevations, and depth-damage relationships. Each of these variables was analyzed for its impact on the elevation-damage curve. It should be noted that the additional benefit categories associated with structural inundation reduction benefits were not evaluated using risk-based analysis in the development of the elevation-damage curve.

Structure & Automobile Values. A sample of 18 residential structures was compiled during a field survey and valued using the Marshall and Swift (M&S) valuation Service. These values were then compared to the M&S value based on the more precise information provided by the owners of the 18 properties in order to determine the economic uncertainty associated with the field survey values. A similar procedure was used to compare the surveyed values of 28 non-residential structures with the M&S value based on information provided by the business owner. The estimation error from conducting a field survey reflects possible miscalculations in the square footage of the structure, and/or inaccurate judgments regarding the age and quality of the structure. On average, the field surveyed values were 1.7% below the values obtained from more accurate homeowner assessment and 3.8% about the values obtained from the business owners.

A NORMAL probability density function was used along with the surveyed value and a standard deviation of 11.4% for residential structures and 11.6% for non-residential structures. For automobiles, a triangular probability distribution function was used with the average value of a used car of $9,400. The average value of new car less taxes, license, and shipping charges was used as the maximum $16,800, while the 10-year depreciation value of an automobile was used as the minimum value $2,000.

<u>Contents-to-Structure Value Ratios</u>. Residential and commercial content information developed from on-site interviews with homeowners and business operators were used to develop contents-to-structure value ratios (CSVR). These data were grouped for each content category, and a normal probability distribution was used to describe the uncertainty associated with the use of the CSVR estimated from the interviews. The mean and standard deviation percentage derived for the residential categories are as follows: 71% and 24% for one-story residential structures; 50% and 30% for two-story residential structures; and 148% and 69% for mobile homes. The mean and standard deviation percentage for the 8 commercial categories are the following: 428% and 703% for eating establishments; 128% and 98% for grocery establishments; 23% and 13% for multi-family apartments; 78% and 79% for professional office-buildings; 82% and 108% for public facilities; 251% and 215% for repair structures; 148% and 117% for retail structures; and 372% and 540% for warehouse structures.

<u>First Floor Elevations</u>. The first floor elevations of structures were determined by using aerial photographs with 1-foot contours for the ground elevation and hand-levels in a vehicle during the field survey. This method was compared to determining the first floor elevation of 89 randomly selected structures throughout the Jefferson Parish area using engineering surveys. On average, the field survey method was .4 above the engineering surveys with a standard deviation of 0.6 feet. A TNORMAL probability density function was used to describe the

uncertainty associated with this variable because it was assumed that the errors would be randomly distributed within the truncated range of 1.2 feet.

Depth-Damage Relationships. An expert panel estimated a minimum, maximum, and most likely value for the damage percentage associated with each depth of flooding. A triangular probability distribution was used to describe the uncertainty associated with the use of depth-damage estimates made by the expert panel.

Economic Uncertainty Results. As discussed above, risk-based analysis was performed on 4 key economic variables: structure values, CSVRs, first floor elevations, and depth-damage relationships. Each of these variables was analyzed for its impact on the elevation-damage relationships.

In order to develop an interior frequency-damage relationship, a damage with error relationship was developed for each stage associated with the frequency events for the without- and with-project conditions. Within the @Risk program, 500 iterations from the Latin Hypercube sampling were run for each of the stages to determine a mean (expected value) damage and a standard deviation of the error for the interior reach (within the existing levee system). Each iteration uses a randomly selected value for each of the four economic variables. As the results of each iteration were compiled for an elevation, an elevation-damage with error curve was developed for the stages associated with the frequency events.

Table 8 shows the economic uncertainty surrounding the elevation-damage relationships associated with the stages for the various frequency events.

An exterior stage-frequency curve (outside the existing levee system) was also provided by the H&H Branch. This curve includes stages for nine frequency storms (1, 2, 5, 10, 25, 50, 100, 200, and 500-year events). A direct relationship between the exterior stage and the interior damage was assumed (i.e., an exterior stage of 6.0 feet results in a given interior damage value regardless of the event frequency). Combining the exterior stage-frequency relationships with the corresponding interior frequency-damage relationships derived an exterior elevation/interior damage relationship with error. These relationships were developed for the without-project conditions, and for the three levee sizes (6-foot, 7-foot, and 8-foot levee heights). These curves, which take into account the economic uncertainty, were then put into the project-sizing template that also addresses the inherent hydrologic/hydraulic uncertainty.

Hydrologic/Hydraulic Uncertainty. Risk and uncertainty analysis was performed on the exterior stage-frequency curves provided by the H&H Branch. The computer program "LIMIT", which was developed by HEC for non-analytical frequency curves, was used in the computation of confidence limits for each stage. The program extrapolated the stage-frequency curves for the 99.9 percent chance of exceedance (1-year storm) to the 0.01 percent chance of exceedance (10,000-year storm). The confidence level was found to be higher for the more frequent storm events, and lower for the less frequent storm events. For example, the computed error increases from 0.063 feet at the 50 percent chance of exceedance to 1.308 feet at the 0.01 percent chance of exceedance. (See the Hydrologic/Hydraulic Appendix for a more complete discussion of this type of uncertainty).

Project-Sizing Damage Results. The second spreadsheet used in the risk-based analysis was the project-sizing template that was developed by HEC and recently modified by IWR for stage-frequency data. It was used to integrate the results of the economic uncertainty analysis (elevation-damage with error) with the results of the hydrologic/hydraulic uncertainty analysis (stage-frequency with error) to produce the without-project and with-project expected annual damages in a risk-based framework. Within the @Risk program, 2,000 iterations from the Latin Hypercube sampling were run for the without-project conditions, and for each of the three levee sizes. This process was used to determine a mean (expected value) damage and a standard deviation of the error. With each sample, or iteration, a different flood event was selected from the range of possible events. The sum of all sampled values divided by the number of samples yielded the expected value, or mean damage with error, which together with the probability distributions formed a comprehensive picture of all possible outcomes. Table 9 shows the mean or expected damage, standard deviation of the error, and the minimum and maximum damage values for without-project conditions, and for the three levee sizes.

Project-Sizing Expected Annual Benefit Results. Project benefits with error are defined as the difference between the without-project and with-project damages with error. In order to calculate these benefits with a mean, or expected value, and a probability distribution, a third @Risk spreadsheet was developed using the histogram function from the statistical reports produced by the project-sizing template. The histogram function contains the range of damages and their associated probabilities for the without-project and with-project conditions. Within this @Risk spreadsheet, 5,000 iterations from the Latin Hypercube sampling were run for the without-project conditions and for each of the three levee heights under the with-project conditions. This procedure was used to determine a mean (expected value) benefit and a standard deviation of the error. With each sample, or iteration, a different level of damage was selected from the range of possible without-project and with-project damages. Since there is a correlation between the without-project and with-project conditions, a correlation factor was used in the program to ensure that with each iteration, the without-project and with-project damages selected from the range would have a similar set of underlying assumptions. For example, if the program under without-project conditions randomly selected a structure value below the mean within the probability distribution, then the program would also randomly select a structure value below the mean under with-project conditions. Thus, if a value representing low without-project damages were selected, a similar low with-project damage value would be selected from the probability distribution. The sum of all sampled values divided by the number of samples yielded the expected values, or mean without-project damages and mean with-project damages. Finally, the program took the difference between the mean without-project damages and the mean with-project damages and produced the mean expected annual benefits and probability distribution for each of the three levee heights.

Table 10 shows the expected benefits, standard deviation of the error, and the minimum and maximum benefit values for the with-project conditions under the three levee alternatives. It also illustrates the effectiveness of each levee size in reducing the without-project expected annual damages.

<u>Comparison of Project-Sizing Expected Annual Benefits and Costs</u>. The expected annual benefits with error for each of the three levels of protection were then compared to the average annual costs for the three levee heights, which was derived from the traditional non-risk based analysis. Table 7 of this appendix provides a detailed summary of the average annual costs for leach of the three levee sizes, including interest during construction, gross investment, operation and maintenance costs, and mitigation costs.

Table 11 shows the first costs, the average annual costs, expected annual benefits from the project-sizing template, the net benefits derived for each of the three levee heights, and the benefit-cost ratios. The project-sizing average annual benefits are approximately 7 to 8 percent lower than those derived using the traditional analysis. However, a consistent relationship exists between the benefits and the three levee heights under both the traditional and risk-based approaches. In spite of being reduced, the project-sizing benefits remained considerably higher than the costs of the 3 levee sizes.

The probabilities associated with a given level of net benefits can be determined by subtracting the mean expected annual benefits from the annual cost under the 3 levee sizes. The expected annual net benefit probability curve was adjusted to include the point estimates for the additional benefit categories associated with structural inundation reduction benefits before being converted to a net benefit probability curve. Figures 1, 2, and 3 display the project-sizing net benefits for each of the levee sizes and the corresponding probabilities derived from the risk-based analysis. As shown in the figures, there is better than a 99 percent chance that net benefits will be positive and the benefit-cost ratio is greater than 1.0 for a 6-foot levee, 99.1 percent for a 7-foot levee, and a 97.9 percent for an 8-foot levee.

NED Level of Protection. The NED level of protection is the one that most reasonably maximizes net tangible economic development benefits consistent with Federal regulations. Benefits are maximized at the point where the excess benefits over costs is the greatest. The net benefits of the project begin to decrease at any level of protection past this point. The NED level of protection was determined by comparing the average annual costs to the mean expected annual benefits with error under each of the three levee heights.

As previously shown in Table 11, the 7-foot levee height level of protection yielded the highest net benefits and is the NED plan. It should be noted that this alternative was also found to yield the highest net benefits in the traditional analysis. As shown previously in Figure 2, which displays the expected annual net benefit-probability curve for the 7-foot levee height, there is a 99.1 percent chance that net benefits are positive and the benefit-cost ratio greater than 1.0.

Table 12 summarizes the annual net benefits for each plan considered. In addition, the table presents an estimate of net benefits that exceed specified probabilities. In the case of the NED plan, i.e., the 7-foot levee alternative, there is a 95 percent probability that annual net benefits will exceed $247,000. The table also suggests that the probability that annual net benefits for the NED plan will exceed its expected value ($533,000) is approximately 48 percent.

If construction alternatives other than the NED plan are to be recommended, table 12 provides useful information that may assist in a decision. For instance, while the 6-foot levee plan would be less costly to implement compared to the 7-foot levee plan, the probability that net benefits for the 6-foot plan will be less than $533,000 (the expected value of net benefits for the 7-foot levee plan) is 86 percent. If, however, the 8-foot levee is selected, there is a 42 percent probability that net benefits will be as high as $533,000, the expected value of net benefits associated with the NED plan.

In the evaluation of these results as an aide to plan selection, explicit recognition must be taken of the degree to which project sponsors are averse to or accepting of risk-taking behavior. In the example provided above, the selection of the 8-foot levee plan may be viewed as a risky decision since the expected value of net benefits is less than that of the NED plan; however, the potential rewards for this risky behavior may also be seen as sufficient to justify this decision.

Table 8
Stage-Damage Relationships*
($1,000's)

Elevation	Expected Damages	Standard Deviation
1.8	$ 31.2	$ 30.0
2.0	57.6	33.1
2.1	77.2	40.7
2.5	221.2	85.3
2.7	349.2	117.3
2.9	527.0	154.7
3.2	905.3	217.7
3.4	1,242.1	264.6
3.7	1,881.1	339.1
3.8	2,129.2	365.3
4.0	2,673.3	420.5
4.1	2,967.5	447.9
4.6	4,592.8	564.3
5.0	5,965.0	639.8
6.0	8,986.4	764.4
7.0	11,148.6	850.3
7.3	11,672.4	867.7
8.0	12,686.3	890.3
9.0	13,666.1	895.5

*500 iterations, latin Hypercube sampling.

Table 9
Expected Annual Damages With Error
Without and With-Project Conditions
($1,000's)

		With Project		
	Without-Project	6-Foot Levee	7-Foot Levee	8-Foot Levee
Expected Damages	$1,205	$ 570	$ 432	$ 383
Standard Deviation	381	265	206	185
Minimum Damages	222	35	35	35
Maximum Damages	2,816	1,786	1,419	1,271

Table 10
Expected Annual Benefits With Error
($1,000's)

	Project Alternatives		
	6-Foot Levee	7-Foot Levee	8-Foot Levee
Expected Benefits	$ 635	$ 773	$ 822
Standard Deviation	118	176	198
Minimum Benefits	186	187	187
Maximum Benefits	1,030	1,389	1,545
% Damages Prevented	53%	64%	68%

Note: Table 9 and 10 do not include the additional benefit categories associated with inundation reduction to structures including emergency and FIA cost reductions.

Table 11
Summary of Expected Annual Costs and Benefits
($1,000's)

Construction Plans	First Costs	Expected Annual		Net Benefits	B/C Ratio
		Benefits 1/	Costs 2/		
6.0 feet	$3,372	$ 979	$581	$ 398	1.69
7.0 feet	3,573	1,133	600	533	1.89
8.0 feet	4,084	1,186	684	502	1.73

1/ Benefits were computed using risk-based analysis for inundation reduction to structures and vehicles and the point estimates from the other associated benefit categories were added.
2/ Costs were calculated using non-risk-based analysis.

Table 12
Expected Value and Probabilistic Values of Net Benefits
($1,000's)

Levee Alternative	Expected Annual NED Benefit and NED Cost			Probability Net Benefits Exceeds Indicated Amount				
	Benefits	Costs	Net Benefits	0.95	0.75	0.50	0.25	0.05
6-Foot	$ 979	$581	$398	$204	$313	$388	$491	$562
7-Foot	1,133	600	533	247	417	508	660	815
8-Foot	1,186	684	502	181	374	469	638	825

REAL ESTATE SUPPLEMENT
FISHER SCHOOL BASIN
JEAN LAFITTE, LOUISIANA

PREPARED IN THE OFFICE OF THE DISTRICT ENGINEER
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
NEW ORLEANS, LOUISIANA

JANUARY 23, 1998
Revised: 14 September 1998

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

REAL ESTATE PLAN

1. General. This Plan contains information that is tentative in nature for planning purposes only. The final real property acquisition lines and the estimate of value are subject to change even after approval of the Project Management Plan. All plates and exhibits referred to are within this plan.

2. Purpose. The purpose of this project is to provide flood protection to the Fisher School Basin in the town of Jean Lafitte. The study area is experiencing repetitive structural damages due to flooding.

3. Project Information.

a. Project Authorization. The Fisher School Basin Jean Lafitte, Louisiana project is being conducted by the New Orleans District under the authority of Section 205 of the 1948 Flood Control Act, as amended, in response to requests for Federal flood control assistance from officials of the town of Jean Lafitte.

b. Designation and Location. The designated name of the project is "Jean Lafitte, Louisiana - Fisher School Basin". The location of the project area is shown at Maps, Plate 1 – General Location and Vicinity.

4. Location of Work. The project area is located in southeastern Louisiana in the vicinity of New Orleans on the west bank of the Mississippi River. The town of Jean Lafitte is located on the eastern bank of Bayou Barataria in the southern portion of Jefferson Parish. Limits were defined based on repetitive structural flooding damages. The proposed alignment of the flood protection initiates on the east bank of Bayou Barataria at a location 1,800 feet south of the Louisiana Highway 302 Bridge. From this point, the alignment proceeds north along the natural ridge of Bayou Barataria; thence east along the bankline of the Intracoastal Waterway to intersect with Canal E1. From this point, the alignment commences south, parallel to Canal E1 ; thence west to tie into an existing levee at the North Canal. The alignment commences south to the Gloria Drive Pump Station ; thence east and south around the rear of Oak Drive, thence west to intersect with the natural ridge of Bayou Barataria at the point of origin. The alignment encompasses both the Fisher School Basin and the Fleming Curve Basin and forms a single hydrologic basin (See Maps, Plate 2 – Plan View).

5. Description of the Project. The recommended plan involves elevating 4.7 miles of an existing earthen levee to elevation 7.0’ NGVD. Approximately 3.0 miles will be raised using hauled-in fill from an off-site location. The remaining levee will consist of 1.7 miles of concrete capped sheetpile floodwall and 11 swing-type floodgates, along Barataria Bayou; Bayou Villars; and the Intracoastal Waterway in areas insufficient to construct an earthen levee. Also, along this reach there will be approximately 25 sets of stairs to maintain public access. The plan follows the existing levee alignment as much as possible to minimize project costs and adverse impacts on the natural environment, local residents, and commercial facilities. Louisiana Highway 45 (LA 45), which is a major highway through the town of Jean Lafitte, will be raised to tie into the final levee alignment. It is not anticipated that LA 45 will be faced with closure. It is expected to remain open throughout construction. (See Maps, Plate 2 – Plan View)

The construction will require approximately 5 residences to be demolished and removed. It is understood at this time that the residences are occupied rentals. The landowner is entitled to compensation for the value of the structures and the renters entitled to relocation benefits as displaced persons under Public Law 91-646, as amended. These costs have been incorporated into the real estate estimates. Along the bayou, construction will require removal of several piers/boathouses affecting approximately 60 ownerships. The landowner is entitled to compensation for the value of the structures removed and these costs have also been incorporated into the real estate estimates. In the area of Fleming Curve there are existing bulkheads and an estimated six boat slips affected by this project. The construction of the floodwalls will follow the existing bulkhead alignment wherever possible and will line the existing slips as to not disturb ownership access nor increase project cost. The floodwalls will be constructed from the waters edge using a barge and driving the sheetpile. For this work the navigational servitude will be used. Once the floodwalls are constructed, backfill will be placed. The 11 operational swing-type floodgates have been incorporated into the project along Bayou Barataria to maintain boat, vehicular, and pedestrian access to the water.

As stated earlier in this paragraph, all borrow for the site will be hauled in from another location and is the responsibility of the contractor. The contractor is required to meet all Corps of Engineers guidelines for environmental clearances when selecting the required area. The mitigation for this project will be purchased from a mitigation bank located in Terrebonne Parish. Five acres will be required by this project for mitigation. The cost of the mitigation from the mitigation bank is $3,500 an acre. The Corps of Engineers receives .6 credits per acre and we are in need of 3 credits for the project.

The project will be constructed under two easements: a Perpetual Flood Protection Levee Easement consisting of 17.7 acres and a Temporary Work Area Easement consisting of 3.4 acres. Included in the 3.4 acres of temporary easement is 0.52 acres for staging area and .3 acres of private road being used for access. The duration for construction is approximately 2.5 years.

The town of Jean Lafitte has a population of 1,500. It is projected that approximately 120 landowners will be affected by this project. (See Plates 3-8.)

6. Proposed Estates and Acreages.

The estates to be used for this project are a Perpetual Flood Protection Levee Easement consisting of 17.7 acres and a Temporary Work Area Easement consisting of 3.4 acres for 3 years. (See Exhibit “A1” for a description of the estates.)

7. Existing Federal Interests.

a. Structures, Facilities, and Lands. There are no existing Federal interests associated with this project.

b. Navigational Servitude. Some of the work along Bayou Barataria will be done below its ordinary high water mark. Bayou Barataria is an inland water course that is presently used in interstate or foreign commerce. Therefore, it is part of the Navigable Waters of the United States (33 CFR Part 329). The work to be performed is flood protection work. The United States Supreme Court has recognized flood control works as an aid to interstate and foreign commerce. See United States v. Appalachian Power Co., 311 U.S. 377, 61 S.Ct.291, 85 L.Ed. 243 (1940); Kaiser Aetna v. United States, 444 U.S. 164, 100 S.Ct. 383, 62 L.Ed.2d 332 (1979). Accordingly, this work will be accomplished within an area where the Federal Government can assert its superior right under the Commerce Clause of the United States Constitution to aid commerce. Therefore, the Government needs no further real estate interests to perform said work.

8. Uniform Relocation Assistance (Public Law 91-646) as amended. An estimated five residences will be affected by the project. The residences are currently occupied rental properties. The compensation for which the affected parties are entitled to by law is shown at Exhibit “B1” entitled Chart of Accounts for Fisher School Basin in Jean Lafitte, LA, line item 01R2.

9. Status of Environmental Assessment; Cultural Resources Investigations; Section 404 Evaluation; and HTRW Investigations. The draft Environmental Assessment (EA) was completed October 1998, #271. The final EA is expected to be completed by mid-December 1998 and submitted to Division for approval. The cultural resources investigations concluded that the Fleming/Berthoud Cemetery (16JE36), is located within the project area near the shoreline of Bayou Barataria at the intersection of Bayou Villars. However, this area has been designated as a “No Work Area” and therefore, will not be impacted by the project. All Section 404 Evaluations are complete and the project is in compliance with the specified guidelines. Acquisition will not be initiated until all HTRW investigation clearances have been received.

10. Endangered Species. There is evidence of bald eagles nesting in the vicinity, over a mile from the project site. However, project impact to the bald eagles nesting in the area is unlikely. The distance to the nest from the construction site is great enough that the eagles would not be disturbed. The proposed levee would have virtually no impact on food supply for the eagles.

11. Baseline Cost Estimate/COAs. (See Exhibit “A” entitled Chart of Accounts for Fisher School Basin in Jean Lafitte, LA.”)

12. Appraisal Information.

a. Highest and Best Use of Land. The highest and best uses in the project area are residential and recreational.

b. Timber. Any timber value present is included in the overall appraised value of the land.

c. Minerals. The Government will not acquire mineral rights to the property.

13. Cost Estimates. A summary of Real Estate costs using December 17, 1997 valuation date is as follows:

	Acres	Unit Value	Total Value
(a) Lands and Damages (Title III)			
Perpetual Flood Protection Levee Easement			
Residential (Waterfront)	5.7	$219,150	$1,249,155
Residential	5.4	$ 28,227	$ 152,424
Recreation	6.6	$ 270	$ 1,782
Temporary Work Area Easement (3 years)			
Residential (Waterfront)	0.9	$ 69,626	$ 62,663
Residential	1.3	$ 8,970	$ 11,661
Recreational	0.9	$ 86	$ 77
Road Access	0.3	N/A	$ 1,500
Improvements			$ 12,000
Severence Damage (Cost to Cure)			$ 165,000
Total ®			$1,656,000

(b)	Contingencies 25% ®	$ 414,000
(c)	Total Lands, Easements and Rights-of-Way	$2,070,000
(d)	Acquisition Costs	$1,089,000
(e)	PL 91-646 (URA), Title II payments	$ 37,000
(f)	Total Estimated Real Estate Cost ®	$3,196,000

14. Maps. Plate 1 shows the General Location and Vicinity of the project area; Plate 2 shows Plan View; and Plates 3-8 shows the Plan View depicting the affected ownerships.

15. Relocations of Utilities and Facilities. (See Exhibit "C1" for the Attorney's Preliminary Investigation and Report of Compensable Interest.

16. Landowner's Meetings. Corps of Engineers representatives held the first landowner's meeting at Jean Lafitte Town Hall on 20 January 1998, to discuss with the residence, the impact of the project in their area. For those directly impacted by the project, the reception was generally favorable.

17. Access. Access to the sites will be by existing local and state-owned streets and one privately owned road, Radio Tower Road, that will be provided to the project under the Temporary Work Area Easement.

18. Churches/Cemetaries. There are no churches located in the immediate vicinity of the Jean Lafitte project. However, there is a cemetary within the project area. The “Fleming/Berthoud Cemetary” has been designated a “No Work Area” and therefore, will not be impacted by the project. (See Maps, Plate 7)

19. Local Sponsor. The potential non-Federal sponsor for this project is the West Jefferson Levee District (WJLD). We have also maintained close coordination with the Jefferson Parish Department of Public Works and the U.S. Fish and Wildlife Service.

The WJLD is a subdivision of the State of Louisiana. The Louisiana Legislature created the WJLD by Louisiana Revised Statute (La. R.S.) 38:291 R. Its statutory authority can be found in La. R.S. 38:328. This latter statute states that the WJLD has “the authority to establish adequate drainage, flood control, and water resources development, including but not limited to construction of reservoirs, diversion canals, gravity and pump drainage systems, erosion control measures, marsh management, and other flood control works as they relate to tidewater flooding, hurricane protection, and saltwater intrusion.”

La. R.S. 38:328 gives the WJLD the authority to “enter into contracts or other agreements with any person or entity concerning the providing of lands, servitudes, rights-of-way, and relocations, and may engage jointly in the exercise of any power to include the construction, operation, and maintenance of any facilities and improvements for the purpose of the projects” which the statute authorizes, listed above. Thus, it has the authority to fulfill the responsibilities of a local sponsor for this project.

La. R.S. 38:351 gives all levee districts in Louisiana the power of “quick take”:

> Notwithstanding any other law to the contrary, and in addition to the methods and procedures for acquisition or utilitization of servitudes for levee and related purposes by levee districts and levee and drainage districts, whenever

> any levee district or levee and drainage district cannot appropriate or amicably acquire immovable property needed for levee purposes, including but not limited to flooding and hurricane protection purposes, the levee district or levee and drainage district may acquire the property by expropriation prior to judgment in accordance with the provisions of this Part. The methods of expropriation provided by this Part shall be authorized for corporeal property and servitudes and for both riparian and nonriparian property.

WJLD is the local sponsor for many projects with the Corps of Engineers. Its staff is very familiar with the laws and regulations governing the acquisition of property for Federal projects, including Public Law 91-646. The landowners for this project are aware of its objectives, and are supportive of the project. Accordingly, we anticipate that the WJLD can acquire most project real estate through negotiations. WJLD uses contractors to acquire most of its real estate, and should have no problems in fulfilling its obligations. The New Orleans District has worked closely with WJLD’s contractors in the past, and found them to be very competent.

The WJLD has satisfactorily supported other local-sponsored projects with the Corps of Engineers. We anticipate the WJLD can handle the real estate acquisition for this project with full capability.

TEMPORARY WORK AREA EASEMENT

A temporary easement and right-of-way in, on, over and across Tracts No. ___, for a period not to exceed three (3) years, beginning with the date possession of the land is granted to the United States, for use by the United States, its representatives, agents and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Fisher School Basin Flood Protection Project, together with the right to trim, cut, fell, and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures or obstacles within the limits of the right-of-way; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

FLOOD PROTECTION LEVEE EASEMENT

A perpetual and assignable right and easement in Tract No. ___ to construct, maintain, repair, operate, patrol and replace a flood protection levee and/or floodwall, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

JEAN LAFITTE, FISHER SCHOOL BASIN, LOUISIANA

FEASIBILITY STUDY

WATER QUALITY

AUGUST 1997

JEAN LAFITTE, FISHER SCHOOL BASIN
FEASIBILITY STUDY
WATER QUALITY ASSESSMENT

TABLE OF CONTENTS

JEAN LAFITTE, FISHER SCHOOL BASIN
FEASIBILITY STUDY
WATER QUALITY ASSESSMENT

1.0 GENERAL. This section considers the applicable standards and criteria used to assess existing water quality in the area. It also describes existing water quality and identifies the potential water quality impacts associated with the alternatives proposed in the Jean Lafitte, Fisher School Basin Feasibility Study.

2.0 WATER QUALITY STANDARDS AND CRITERIA. The Louisiana Department of Environmental Quality (LDEQ) and the US Environmental Protection Agency (EPA) have established ambient water quality standards and criteria applicable to surface waters in the State of Louisiana. These standards and criteria are discussed in the following paragraphs.

2.1 Applicable Louisiana State Standards. The LDEQ has established general written water quality standards that are applicable to all waters of the State of Louisiana. The general written standards relate to the condition of the water as affected by waste discharges or human activity as opposed to purely natural phenomena, and are as follows. The standards were last revised in 1997.

2.1.1 LDEQ Descriptive Water Quality Standards.

(a) Aesthetics. The waters of the state shall be maintained in an aesthetically attractive condition and shall meet the generally accepted aesthetic qualifications. All waters shall be free from such concentrations of substances attributable to wastewater or other discharges sufficient to:

1. settle to form objectionable deposits;

2. float as debris, scum, oil, or other matter to form nuisances or to negatively impact the aesthetics;

3. result in objectionable color, odor, taste, or turbidity;

4. injure, be toxic, or produce demonstrated adverse physiological or behavioral responses in humans, animals, fish, shellfish, wildlife, or plants; or

5. produce undesirable or nuisance aquatic life.

(b) Color. Water color shall not be increased to the extent that it will interfere with present usage or projected future use of the state's waterbodies.

1. Waters shall be free from significant increases over natural background color levels.

2. A source of drinking water supply shall not exceed 75 color units on the platinum-cobalt scale.

3. No increases in true or apparent color shall reduce the level of light penetration below that required by desirable indigenous species of aquatic life.

(c) Floating, Suspended, and Settleable solids. There shall be no substances present in concentrations sufficient to produce distinctly visible solids or scum, nor shall there be any formation of long-term bottom deposits of slimes or sludge banks attributable to waste discharges from municipal, industrial, or other sources including agricultural practices, mining, dredging, and the exploration for and production of oil and natural gas. The administrative authority (LDEQ) may exempt certain short-term activities permitted under Sections 402 or 404 and certified under Section 401 of the Clean Water Act, such as maintenance dredging of navigable waterways or other short-term activities determined by the state as necessary to accommodate legitimate uses or emergencies or to protect the public health and welfare.

(d) Taste and Odor. Taste- and odor- producing substances in the waters of the state shall be limited to concentrations that will not interfere with the production of potable water by conventional water treatment methods or impart unpalatable flavor to food fish, shellfish, and wildlife, or result in offensive odors arising from the waters, or otherwise interfere with the designated water uses.

(e) Toxic Substances. No substances shall be present in the waters of the state or the sediments underlying said waters in quantities that alone or in combination will be toxic to human, plant, or animal life or significantly increase health risks due to exposure to the substances or consumption of contaminated fish or other aquatic life. The numerical criteria (LAC 33:IX.1113.C.6) specify allowable concentrations in water for several individual toxic substances to provide protection from the toxic-effects of these substances. Requirements for the protection from the toxic effects of other toxic substances not included in the numerical criteria and required under the general criteria are described in LAC 33:IX.1121.

(f) Oil and Grease. Free or floating oil or grease shall not be present in quantities large enough to interfere with the designated water uses, nor shall emulsified oils be present in quantities large enough to interfere with the designated uses.

(g) Foaming or Frothing Materials. Foaming and frothing materials of a persistent nature are not permitted.

(h) Nutrients. The naturally occurring range of nitrogen-phosphorous ratios shall be maintained. This range shall not apply to designated intermittent streams. To establish the appropriate range of ratios and compensate for natural seasonal fluctuations, the administrative authority (LDEQ) will use site-specific studies to establish limits for nutrients. Nutrient concentrations that produce aquatic growth to the extent that it creates a public nuisance or interferes with designated water uses shall not be added to any surface waters.

(i) Turbidity.

1. Turbidity other than that of natural origin shall not cause substantial visual contrast with the natural appearance of the waters of the state or impair any designated water use. Turbidity shall not significantly exceed background; background is defined as the natural condition of the water. Determination of background will be on a case-by-case basis.

2. As a guideline, maximum turbidity levels, expressed as nephelometric turbidity units (NTU), are established and shall apply for the following named waterbodies and major aquatic habitat types of the state:

a. Red, Mermentau, Atchafalaya, Mississippi, and Vermilion Rivers and Bayou Teche -- 150 NTU;

b. estuarine lakes, bays, bayous, and canals -- 50 NTU;

c. Amite, Pearl, Ouachita, Sabine, Calcasieu, Tangipahoa, Tickfaw, and Tchefuncte Rivers -- 50 NTU;

d. freshwater lakes, reservoirs, and oxbows -- 25 NTU;

e. designated scenic streams and outstanding natural resource waters not specifically listed above -- 25 NTU; and

f. for other state waters not included above and in waterbody segments where natural background turbidity exceeds the values specified above, the turbidity in NTU caused by any discharges shall be restricted to the appropriate background value plus 10 percent. This shall not apply to designated intermittent streams.

3. The administrative authority (LDEQ) may exempt for short periods certain activities permitted under Sections 402 or 404 and certified under Section 401 of the Clean Water Act, such as maintenance dredging of navigable waterways or other short-term activities that the state determines are necessary to accommodate legitimate uses or emergencies or to protect the public health and welfare.

(j) Flow. The natural flow of state waters shall not be altered to such an extent that the basic character and water quality of the ecosystem are adversely affected except in situations where alterations are necessary to protect human life or property. If alterations to the natural flow are deemed necessary, all reasonable steps shall be taken to minimize the adverse impacts of such alterations. Additionally, all reasonable steps shall be taken to mitigate the adverse impacts of unavoidable alterations.

(k) Radioactive Materials. Radioactive materials in the surface waters of the state designated for drinking water supply use shall not exceed levels established pursuant to the Federal Safe Drinking Water Act (P.L. 93-523 et Seq.).

(l) Biological and Aquatic Community Integrity. The biological and community structure and function in state waters shall be maintained, protected, and restored except where not attainable and feasible as defined in LAC 33:IX.1109.B.3. This is the ideal condition of the aquatic community inhabiting the unimpaired water bodies of a specified habitat and region as measured by community structure and function. The biological integrity will be guided by the fish and wildlife propagation use designated for that particular water body. Fish and wildlife propagation uses are defined in LAC 33.IX.1111.C. The condition of these aquatic communities shall be determined from the measures of physical, chemical, and biological characteristics of each surface water body type, according to its designated use (LAC 33:IX.1123). Reference site conditions will represent naturally attainable conditions. These sites should be the least impacted and most representative of water body types. Such reference sites or segments of water bodies shall be those observed to support the greatest variety and abundance of aquatic life in the region as is expected to be or has been recorded during past surveys in natural settings essentially undisturbed by human impacts, development, or discharges. This condition shall be determined by consistent sampling and reliable measures of selected, indicative communities of animals and/or invertebrates as established by the office and may be used in conjunction with acceptable chemical, physical, and microbial water quality measurements and records as deemed for this purpose.

(m) Other substances and Characteristics. General criteria on other substances and characteristics not specified in this section will be developed as needed.

2.1.2 Numerical Criteria. Numerical criteria identified in Table 1 apply to specified waterbodies, and to their tributaries, distributaries, and interconnected streams and waterbodies contained in the water management subsegment if they are not specifically named therein, unless unique chemical, physical, and/or biological conditions preclude the attainment of the criteria. In those cases, natural background levels of these conditions may be used to establish site-specific water quality criteria. Those waterbodies officially approved and designated by the state and EPA as intermittent streams, man-made waterbodies, or naturally dystrophic waters may be excluded from some or all numerical criteria as stated in LAC 33:IX.1109. Although naturally occurring variations in water quality may exceed criteria, water quality conditions attributed to human activities must not exceed criteria when flows are greater than or at critical conditions (as defined in LAC 33:IX.1115.C).

A list of surface waters in the study area for which numerical criteria are included in the published tables is shown in Table 1. Table 1 also includes designated use categories for the surface waters listed. Designated water uses for each stream are represented as follows:

A = Primary Contact Recreation
B = Secondary Contact Recreation
C = Propagation of Fish and Wildlife
D = Drinking Water Supply
E = Oyster Propagation
F = Agriculture
G = Outstanding Natural Resource Waters

(a) pH. The pH shall fall within the range of 6.0 to 9.0 standard units (su) unless natural conditions exceed this range or where otherwise specified in the tables. No discharge of wastes shall cause the pH of the water body to vary by more than one pH unit within the specified pH range for that subsegment where the discharge occurs.

(b) Chlorides, Sulfates, and Dissolved Solids. Numerical criteria for these parameters generally represent the arithmetic mean of existing data from the nearest sampling location plus three standard deviations. For estuarine and coastal marine waters subsegments that have no listed criteria (i.e. designated N/A), criteria will be established on a case-by-case basis using field determination of ambient conditions and the designated uses. For water bodies not specifically listed in the Numerical Criteria and Designated Table, increases over background levels of chlorides, sulfates, and total dissolved solids may be permitted. Such increases will be permitted at the discretion of the office (LDEQ) on a case-by-case basis and shall not cause in-stream concentrations to exceed 250, 250, and 500 mg/L for chlorides, sulfates, and total dissolved solids, respectively, except where a use attainability analysis indicates that higher levels will not affect the designated uses. In permitting such increases, the office (LDEQ) shall consider their potential effects of resident biota and downstream water bodies in addition to the background conditions. Under no circumstances shall an allowed increase over background conditions cause any numerical criteria to be exceeded in any listed water body or any other general or numerical criteria to be exceeded in either listed or unlisted water bodies.

(c) Dissolved Oxygen. The following dissolved oxygen (DO) values represent minimum criteria for the type of water specified. Naturally occurring variations below the criterion specified may occur for short periods. These variations reflect such natural phenomena as the reduction in photosynthesis activity and oxygen production by plants during hours of darkness. However, no waste discharge or human activity shall lower the DO concentration below the specified minimum. These DO criteria shall apply except in those water bodies which qualify for an excepted water use as specified in LAC 33.IX.1109.C or where exempted or excluded elsewhere in these standards. DO criteria for specific state water bodies are contained in LAC 33.IX.1123.

1. Fresh Water. For a diversified population of warmwater biota including sport fish, the DO concentration shall be at or above 5 mg/L.

2. Estuarine Waters. Dissolved oxygen concentrations in estuarine waters shall not be less than 4 mg/L at any time.

3. Coastal Marine Waters (Including Nearshore Gulf of Mexico). Dissolved oxygen concentrations in coastal waters shall not be less than 5 mg/L, except when the upwellings and other natural phenomena cause this value to be lower.

(d) Temperature.

1. The temperature criteria enumerated in Table 1, in most cases, represent maximum values obtained from existing data. In a few cases, however, a limited number of unusually high temperatures in the range of 35^{O} to $36^{O}C$ ($95-97^{O}F$) have been deleted because these values are believed to have been recorded during conditions of unseasonably high temperatures and/or unusually low flows or water levels and therefore, do not represent normal maximum temperatures.

2. The criterion consists of two parts, a temperature differential and a maximum temperature. The temperature differential represents the maximum permissible increase above ambient conditions after mixing. No additional process heat shall be added once the ambient temperature reaches the maximum temperature specified in the standards, except under natural conditions such as unusually hot, dry weather, as provided for in the following sections.

a. Fresh Water. The following temperature standards apply to freshwater:

i. maximum of $2.8^{o}C$ ($5^{o}F$) rise above ambient for streams and rivers.

ii. maximum of $1.7^{o}C$ ($3^{o}F$) rise above ambient for lakes and reservoirs.

iii. maximum temperature of $32.2^{o}C$ ($90^{o}F$), except where otherwise listed in the tables. Maximum temperature may be varied on a case-by-case basis to allow for the effects of natural conditions such as unusually hot and/or dry weather.

b. Estuarine and Coastal Waters. The following temperature standards apply to estuarine and coastal waters:

i. maximum of $2.2^{o}C$ ($4^{o}F$) rise above ambient from October through May.

ii. maximum $1.1^{o}C$ ($2^{o}F$) rise above ambient from June through September; and

iii. maximum temperature of 35°C (95°F), except when natural conditions elevate temperature above this level.

3. These temperature criteria shall not apply to privately-owned reservoirs or reservoirs constructed solely for industrial cooling purposes.

(e) Bacteria.

1. The applicability of bacterial criteria to a particular stream segment depends upon the use designation of that individual stream segment. Limitations are placed on either the most probable number (MPN) fecal or total coliform concentration, or on a combination of both in order to achieve the stream sanitary quality required for the most restrictive designated use classification.

2. Table 1 lists the applicable criteria for each individual Louisiana stream segment and designates one of the following four criteria as applicable according to present and/or anticipated water usage of the segment:

a. PRIMARY CONTACT RECREATION. Based on a minimum of not less than five samples taken over not more than a 30-day period, the fecal coliform content shall not exceed a log mean of 200/100 mL nor shall more than 10 percent of the total samples during any 30-day period or 25 percent of the total samples collected annually exceed 400/100 mL.

b. SECONDARY CONTACT RECREATION. Based on a minimum of not less than 5 samples taken over not more than a 30-day period, the fecal coliform content shall not exceed a log mean of 1,000/100 mL nor shall more than 10 percent of the total samples during any 30-day period or 25 percent of the total samples collected annually exceed 2,000/100 mL.

c. DRINKING WATER SUPPLY. The monthly arithmetic mean of total coliform most probable number (MPN) shall not exceed 10,000/100 mL, nor shall the monthly arithmetic mean of fecal coliforms exceed 2,000/100 mL.

d. OYSTER PROPAGATION. The fecal coliform median MPN shall not exceed 14 fecal coliforms per 100 mL, and not more than 10 percent of the samples shall exceed an MPN of 43/100 mL for a 5-tube decimal dilution test in those portions of the area most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.

TABLE 1

1998 LDEQ NUMERICAL STANDARDS APPLICABLE TO SURFACE WATERS IN THE STUDY AREA

	Water Uses[1]								CL	SO_4	DO	pH Range	Bacterial Standard	Temp-erature	TDS
Stream Description	A	B	C	D	E	F	G		mg/L	mg/L	mg/L	su	BAC[2]	^{O}C	mg/L
020601-Intracoastal Waterway-Bayou Villars to Mississippi River (Estuarine)	X	X	X						N/A	N/A	4.0	6.5-9.0	1	35	N/A
020802-Bayou Barataria/ Barataria Waterway to Bayou Rigolettes (Estuarine)	X	X	X						N/A	N/A	4.0	6.5-9.0	1	35	N/A

1 A - Primary Contact Recreation; B - Secondary Contact Recreation; C - Fish and Wildlife Propagation; D - Drinking Water Supply; E - Oyster Propagation; F - Agriculture; G - Outstanding Natural Resource

2 BAC - Bacterial standard (dependent upon water use designation)

(f) <u>Toxic substances</u>. Numerical criteria for specific toxic substances are listed in Table 2.

1. Numerical criteria for specific toxic substances are mostly derived from the following publications of the Environmental Protection Agency: Water Quality Criteria, 1972 (commonly referred to as the "Blue Book"); Quality Criteria for Water, 1976 (commonly referred to as the "Red Book"); Ambient Water Quality Criteria, 1980 (EPA 440/5-80); Ambient Water Quality Criteria, 1984 (EPA 440/5-84-85); and Quality Criteria for Water, 1986 - with updates (commonly referred to as the "Gold Book"). Natural background conditions, however, are also considered. These toxic substances are selected for criteria development because of their known or suspected occurrence in Louisiana waters and potential threat to attainment of designated water uses.

2. The criteria for protection of aquatic life are based on acute and chronic concentrations in fresh and marine waters as specified in the EPA criteria documents and are developed primarily for attainment of the fish and wildlife propagation use. Where a specific numerical criterion is not derived in EPA criteria documents, a criterion is developed by applying an appropriate application factor for acute and chronic effects to the lowest LC50 value for a representative Louisiana species.

3. Criteria for human health are derived using EPA guidelines, procedures, and equations for water bodies used as drinking water supplies and those not used as drinking water supplies. Criteria applied to water bodies designated as drinking water supplies are developed to protect that water supply for human consumption, including protection against taste and odor effects, to protect it for primary and secondary contact recreation, and to prevent contamination of fish and aquatic life consumed by humans. Criteria for water bodies not designated as drinking water supplies are developed to protect them for primary and secondary contact recreation and to prevent contamination of fish and aquatic life consumed by humans. In some cases, the maximum contaminant levels (MCLs) from the National Drinking Water Regulations, when more restrictive, are used as the criteria. For those toxic substances that are suspected or proven carcinogens, an incremental cancer risk

level of 10^{-6} (1 in 1,000,000) is used in deriving criteria, with the exception of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and hexachlorocyclohexane (lindane, gamma BHC), in which case 10^{-5} (1 in 100,000) is used to derive the criteria.

4. Metals criteria are based on dissolved metal concentrations in ambient waters. Hardness values are averaged from two-year data compilations contained in the latest Louisiana Water Quality Data Summary or other comparable data compilations or reports.

5. For purposes of criteria assessment, the most stringent criteria for each toxic substance will apply. For determination of criteria attainment in ambient water where the criteria are below the detection limit, then no detectable concentrations will be allowed. However, for dilution calculations or water quality modeling used to develop total maximum daily load and wasteload allocations, the assigned criteria, even if below the detection limit, will be used.

TABLE 2
1997 LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
NUMERICAL CRITERIA FOR SPECIFIC TOXIC SUBSTANCES
(In micrograms per liter (ug/L) or parts per billion, (ppb) unless designated otherwise)

	Aquatic Life Protection				Human Health Protection	
	Freshwater		Marine Water		Drinking Water Supply[1]	Non-Drinking Water Supply[2]
Toxic Substances	Acute	Chronic	Acute	Chronic		
Pesticides and PCBs						
Aldrin	3.00	-	1.300	-	0.04 ng/L	0.04 ng/L[3]
Chlordane	2.40	0.0043	0.090	0.0040	0.19 ng/L	0.19 ng/L
DDT	1.10	0.0010	0.130	0.0010	0.19 ng/L	0.19 ng/L
TDE (DDD)	0.03	0.0060	1.250	0.2500	0.27 ng/L	0.27 ng/L
DDE	52.5	10.5000	0.700	0.1400	0.19 ng/L	0.19 ng/L
Dieldrin	2.50	0.0019	0.710	0.0019	0.05 ng/L	0.05 ng/L
Endosulfan	0.22	0.0560	0.034	0.0087	0.47	0.64
Endrin	0.18	0.0023	0.037	0.0023	0.26	0.26
Heptachlor	0.52	0.0038	0.053	0.0036	0.07 ng/L	0.07 ng/L
Hexachlorocyclohexane (gamma BHC, Lindane)	5.30	0.21	0.160	-	0.11	0.20
Polychlorinated Biphenyls, Total (PCBs)	2.00	0.0140	10.000	0.0300	0.01 ng/L	0.01 ng/L
Toxaphene	0.73	0.0002	0.210	0.0002	0.24 ng/L	0.24 ng/L
2,4-Dichlorophenoxyacetic acid (2,4-D)	-	-	-	-	100.00	-
2-(2,4,5-Trichlorophenoxy) propionic acid (2,4,5-TP; Silvex)	-	-	-	-	10.00	-
Volatile Organic Chemicals						
Benzene	2,249	1,125	2,700	1,350	1.1	12.5
Carbon Tetrachloride (Tetrachloromethane)	2,730	1,365	15,000	7,500	0.22	1.2
Chloroform (Trichloromethane)	2,890	1,445	8,150	4,075	5.3	70

TABLE 2
1997 LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
NUMERICAL CRITERIA FOR SPECIFIC TOXIC SUBSTANCES
(In micrograms per liter (ug/L) or parts per billion, (ppb) unless designated otherwise)

Ethylbenzene	3,200	1,600	8,760	4,380	2.39 mg/L	8.1 mg/L[4]
1,2-Dichloroethane (EDC)	11,800	5,900	11,300	5,650	0.36	6.8
1,1,1-Trichloroethane	5,280	2,640	3,120	1,560	200.0	-
1,1,2-Trichloroethane	1,800	900	-	-	0.56	6.9
1,1,2,2-Tetrachloroethane	932	466	902	451	0.16	1.8
1,1-Dichloroethylene	1,160	580	22,400	11,200	0.05	0.58
Trichloroethylene	3,900	1,950	200	100	2.8	21
Tetrachloroethylene	1,290	645	1,020	510	0.65	2.5
Toluene	1,270	635	950	475	6.1 mg/L	46.2 mg/L
Vinyl Chloride (Chloroethylene)	-	-	-	-	1.9	35.8
Bromoform (Tribromomethane)	2,930	1,465	1,790	895	3.9	34.7
Bromodichloromethane	-	-	-	-	0.2	3.3
Acid - Extractable Organic Chemicals						
Methylene chloride (Dichloromethane)	19,300	9,650	25,600	12,800	4.4	87
Methyl chloride (Chloromethane)	55,000	27,500	27,000	13,500	-	-
Dibromochloromethane	-	-	-	-	0.39	5.08
1,3-Dichloropropene	606	303	79	39.5	9.86	162.79
2-Chlorophenol	258	129	-	-	0.10	126.4
3-Chlorophenol	-	-	-	-	0.10	-
4-Chlorophenol	383	192	535	268	0.10	-
2,3-Dichlorophenol	-	-	-	-	0.04	-
2,4-Dichlorophenol	202	101	-	-	0.30	232.6
2,5-Dichlorophenol	-	-	-	-	0.50	-
2,6-Dichlorophenol	-	-	-	-	0.20	-
3,4-Dichlorophenol	-	-	-	-	0.30	-
Phenol (Total)[5]	700	350	580	290	5.00	50.0
Base/Neutral Extractable Organic Chemicals						
Benzidine	250	125	-	-	0.08	0.17

TABLE 2
1997 LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
NUMERICAL CRITERIA FOR SPECIFIC TOXIC SUBSTANCES
(In micrograms per liter (ug/L) or parts per billion, (ppb) unless designated otherwise)

					ng/L	ng/L
Hexachlorobenzene	-	-	-	-	0.25 ng/L	0.25 ng/L
Hexachlorobutadiene[6]	5.1	1.02	1.6	0.32	0.09	0.11
Other Organics						
2,3,7,8-Tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD)[9]	-	-	-	-	0.71 ppq[8]	0.72 ppq
Metals and Inorganics						
Arsenic	360	190	69.00	36.00	50.0	-
Chromium III (Tri)[7]	980	120	515.00	103.00	50.0	-
	1,700	210				
	3,100	370				
Chromium VI (Hex)	16	11	1.10 mg/L	50.0	50.0	-
Zinc[7]	65	59	95.00	86.00	5.0 mg/L	-
	120	110				
	210	190				
Cadmium[7]	15.4	0.66	45.62	10.00	10.0	-
	33.7	1.13				
	73.6	2.0				
Copper[7]	9.9	7.1	4.37	4.37	1.0 mg/L	-
	19.2	12.8				
	36.9	23.1				
Lead[7]	34	1.3	220.0	8.50	50.0	-
	82	3.2				
	200	7.7				
Mercury	2.4	0.012[10]	2.10	0.025[10]	2.0	-
Nickel[7]	790	88	75.00	8.30	-	-
	1,400	160				
	2,500	280				

TABLE 2
1997 LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
NUMERICAL CRITERIA FOR SPECIFIC TOXIC SUBSTANCES
(In micrograms per liter (ug/L) or parts per billion, (ppb) unless designated otherwise)

Cyanide	45.9	5.4	1.0	-	663.8	12,844

1 Applies to surface waterbodies designated as a Drinking Water Supply and also protects for primary and secondary contact recreation and fish consumption.
2 Applies to surface waterbodies not designated as a Drinking Water Supply and protects for primary and secondary contact recreation and fish consumption.
3 ng/L = nanograms per liter, parts per trillion
4 mg/L = milligrams per liter, parts per million
5 Total phenol as measured by the 4 – aminoantipyrine (4AAP) method
6 Includes Hexachloro-1,3-butadiene
7 Hardness-dependent criteria for fresh water based on the following natural logarithm formulas for acute and chronic protection (in descending order, numbers represent criteria in ug/L at hardness values of 50, 100, and 200 mg/L $CaCO_3$):

Chromium III: $acute = e^{(0.8190[\ln(hardness)] + 3.6880)}$
$chronic = e^{(0.8190[\ln(hardness)] + 1.5610)}$

Zinc: $acute = e^{(0.8473[\ln(hardness)] + 0.8604)}$
$chronic = e^{(0.8473[\ln(hardness)] + 0.7614)}$

Cadmium: $acute = e^{(1.1280[\ln(hardness)] - 1.6774)}$
$chronic = e^{(0.7852[\ln(hardness)] - 3.4900)}$

Copper: $acute = e^{(0.9422[\ln(hardness)] - 1.3844)}$
$chronic = e^{(0.8545[\ln(hardness)] - 1.3860)}$

Lead: $acute = e^{(1.2730[\ln(hardness)] - 1.4600)}$
$chronic = e^{(1.2730[\ln(hardness)] - 4.7050)}$

Nickel: $acute = e^{(0.8460[\ln(hardness)] + 3.3612)}$
$chronic = e^{(0.8460[\ln(hardness)] + 1.1645)}$

8 ppq = parts per quadrillion
9 Advances in scientific knowledge concerning the toxicity, cancer potency, metabolism, or exposure pathways of toxic pollutants that affect the assumptions on which existing criteria are based may necessitate a revision of dioxin numerical criteria at any time. Such revisions, however, will be accomplished only after proper consideration of designated water uses. Any proposed revision will be consistent with state and Federal regulations.
10 If the four-day average concentration for total mercury exceeds 0.012 ug/L in freshwater or 0.025 ug/L in saltwater more than once in a three-year period, the edible portion of aquatic species of concern must be analyzed to determine whether the concentration of methyl mercury exceeds the FDA action level (1.0 mg/kg). If the FDA action level is exceeded, the state must notify the appropriate EPA Regional Administrator, initiate a revision of its mercury criterion in its water quality standards so as to protect designated uses, and take other appropriate action such as issuance of a fish consumption advisory for the affected area.

2.2 General Description of Water Quality Parameters.

(a) Total Suspended Solids (TSS). Total suspended solids in waterbodies consist mainly of particulate material originating in other parts of the drainage area. Some of the more important sources of solids are eroded soil particles, particularly from construction sites or other unvegetated soil surfaces, but also to an important extent from grassed areas and agricultural areas; dirt and dust; fuel residue and other material including rubber, metal and synthetic substances associated with vehicular traffic; fallout from combustion of fossil fuels and other materials; solid waste and debris from poorly managed or exposed material storage sites, dumps and landfills; animal wastes; and leaves and other plant residue. Many pollutants become attached to the accumulating solid particles, and metals and organic compounds become physically or chemically adsorbed to clay particles. Excessive suspended solids levels in water generate unsightly turbidity plumes, and may interfere with the ability of sight-dependent fish and other organisms to obtain food, or may clog their breathing or feeding apparatus.

(b) Turbidity. Turbidity in water is caused by materials that inhibit light penetration, and reduce the clarity of, the water. It may be caused by microorganisms or various minerals, including plant detritus, silica, and sediment particles. The turbidity of a water sample is a measure of the reduction in intensity of visible light passing through the sample. Turbidity affects the aquatic system by limiting light transmission and the process of photosynthesis, which is vital to biological productivity. It is sometimes used as a broad indicator of suspended solids levels.

(c) pH. The pH level of a water body is a chemical measure of its tendency toward acidity or alkalinity. A pH value of 7.0 indicates neutrality. Most natural waters ore slightly basic, with pH values between 7.0 and 8.0. Technically, pH is the $1og_{10}$ of the reciprocal of the hydrogen ion concentration in water. Wide deviations of pH from the neutral or slightly basic range may signal the presence of important contaminants, particularly toxic substances. Industrial wastewater, for example, is often highly acidic.

(d) Biochemical Oxygen Demand (BOD). Biochemical oxygen demand is a useful indicator of biodegradable organic material, including natural materials such as simple sugars, fats and proteins, and more complex organic chemicals synthesized by man. For the most part, biodegradable materials are not toxic to aquatic organisms. Their primary importance from a water quality perspective is that their decaying process requires either dissolved or combined oxygen, and the oxygen supply of the receiving water body may become dangerously depleted. Since certain levels of dissolved oxygen are needed to sustain life and permit normal functioning of aquatic species and to prevent the existence of undesirable anaerobic conditions, excessive BOD levels in waterbodies may produce oxygen deficits, depending on the assimilative capacity of the receiving water and its rate of natural reaeration. The most common BOD measurement is an oxygen consumption test over a five-day period. The ultimate BOD level may be estimated by extrapolation from test results over different time periods.

(e) Chemical Oxygen Demand (COD). Chemical oxygen demand is a general indicator of the amount of potentially biodegradable material in water. Various industrial chemicals and other organic chemicals that degrade slowly or only under highly oxidized conditions are better represented by COD than by BOD. The COD test does not distinguish between stable and unstable organic matter and is therefore not directly related to BOD values.

(f) Nutrients. Nutrients occur in nature in many forms. Nitrogen is an essential component of all proteins, chlorophyll and other important biological compounds. In organic matter, nitrogen decomposes from complex proteins through amino acids to ammonia, nitrites and nitrates, and is also synthesized from nitrates into plant and animal biomass (nitrogen fixation). The natural nitrogen cycle depends on microbiological activity for these processes. Nitrogen is present in waterbodies in many forms, including ammonia, organic nitrogen, nitrites and nitrates. Kjeldahl nitrogen refers to a laboratory process that is used to measure the ammonia content of a nitrogen sample.

(g) Nitrates. Nitrates are the end product of the aerobic stabilization of organic nitrogen, but they may also result from excessive fertilizer applications or from untreated domestic wastewater. Chemical fertilizer plants produce high nitrate levels in their wastewater. Despite their many sources, nitrates do not normally persist at high levels in natural waterbodies, but become converted to biomass by natural processes. When nitrate levels greatly exceed the biological requirements of a waterbody, eutrophication (over-enrichment) may occur, resulting in algal blooms or other undesirable conditions. Nitrites are seldom present in natural surface waters at significant levels except under polluted conditions and in the presence of ammonia.

(h) Phosphorus. Phosphorus occurs most commonly in nature as phosphates and orthophosphates and is a constituent of fertile soils, plants and animal tissue. It is an essential nutrient along with nitrogen for biological productivity and also undergoes cycles of decomposition and photosynthesis. It originates in domestic and industrial wastes, detergents and fertilizers. Phosphorus is often the critical parameter in the eutrophication of lakes and other waterbodies that act as nutrient sinks.

(i) Pathogentic Bacteria. Pathogenic bacteria in water may be harmful to humans, particularly if ingested while swimming. Organisms that are discharged from the intestinal tracts of humans or animals in fecal material may be pathogenic to humans or may alternatively serve as useful indicators of fecal pollution and the probable presence of pathogens. The most commonly employed pathogenic indicators are in the coliform group of bacteria, which consist predominantly of harmless organisms.

(j) Fecal Coliforms. Fecal coliforms are measured by federal and state regulatory agencies to monitor for the presence of human and/or animal fecal pollution in water. Total coliforms are also measured as a more general indicator of fecal pollution, but these organisms may also originate in natural soils. None of the coliform group are ideal indicators of fecal pollution since they do not always exist in the same proportions to the pathogens. In order to be a reliable indicator of fecal pollution, an indicator should have a somewhat longer survival time in water than intestinal pathogens, but should nevertheless die off soon after the pathogens, so that their absence would assure the bacteriological safety of the water. The E. coli bacterial strain has been promoted as a superior indicator of fecal pollution, and has been adopted by EPA as the regulatory parameter for human health in bathing waters. E. coli is expected to eventually replace fecal coliform as the official State of Louisiana indicator organism for primary contact recreation.

(k) <u>Metals</u>. Many metals are known to be chronically or acutely toxic to various aquatic species above certain concentration levels in both saltwater and fresh water. The LDEQ currently has numerical criteria for fresh water aquatic life for the following eight metals: arsenic, chromium, zinc cadmium, copper, lead, mercury and nickel. The metals criteria are for the dissolved fraction of the metal in the water column and are typically hardness-dependent. Generally, as the hardness of a waterbody increases, the toxicity of the metals decrease. Thus, the maximum fresh water aquatic life criteria for metals increases as the hardness increases. These metals are discussed briefly in the following paragraphs.

1. <u>Arsenic (As)</u>. Arsenic concentrations in natural waterbodies areas vary widely but are usually 5 ug/L or more. Arsenic is emitted to the environment by coal - fuel power plants.

2. <u>Chromium (Cr)</u>. Chromium is more common than cadmium in natural estuaries, typically at about 0.5 ug/L. Chromium salts are used for electroplating and in cleaning agents, and are also present in paints, fungicides and wood preservatives.

3. <u>Cadmium (Cd)</u>. Cadmium usually occurs at low levels in the natural estuarine environment, often below 0.01 ug/L, but waters affected by municipal and/or industrial development probably have much higher concentrations. Industrial sources include effluents from petrochemical plants, metallurgical processes and electroplating. It is extremely toxic to fish.

4. <u>Copper (Cu)</u>. Copper is relatively plentiful in the natural environment, ranging from about 1 to 10 ug/L. Pertinent industrial sources of copper include petroleum refineries.

5. <u>Lead (Pb)</u>. Lead occurs in most natural waterbodies at 1 ug/L or less. It is much more plentiful, however, in waters in and near inhabited areas. It is used in storage batteries and other metal products, but is no longer permitted in paint pigments and gasoline additives.

6. <u>Mercury (Hg)</u>. Mercury background levels in natural waterbodies may range from 0.01 to 0.1 ug/L. It is used in the electrolytic preparation of chlorine and caustic soda, in mercury battery cells and thermometers, and in various other laboratory and industrial

applications. The chronic criterion was derived on the basis that all mercury discharged to the environment is methyl mercury, the form that evolves in sediment and in fish and the aquatic food chain. It is known, however, that almost all mercury discharged is mercury (II), a much less toxic form. The FDA action level for the concentration of methyl mercury in the edible portions of fish is considered to be a more relevant criterion for consumable species than the referenced chronic criterion.

2.3 EPA Water Quality Criteria. The EPA has established ambient water quality criteria applicable to surface waters in the study area. These criteria are shown in Tables 3, 4 and 5. The numerical criteria listed in Tables 3, 4 and 5 have been developed for various physical parameters, nutrients, metals, PCB's, and organic pesticides for uses of freshwater aquatic life, marine and estuarine aquatic life, and public water supply, respectively.

2.3.1 EPA Water Quality Tables.

TABLE 3

1986 EPA **FRESH WATER** AQUATIC LIFE CRITERIA
(All values in ug/L except where noted)

Parameter	Chronic (24-Hour Average)	Acute (Maximum at Any Time)	Chronic[1] (4-Day Average)	Acute[2] (1-Hour Average)
Aesthetic Qualities	(Narrative statement - SEE CRITERIA DOCUMENT[3])			
Aldrin[P]	-	3.0	-	-
Alkalinity	(20 mg/L MINIMUM)			
Ammonia	(Criteria are pH and temperature dependent-SEE CRITERIA DOCUMENT)			
Arsenic (III)[P]	-	-	190	360
Boron	(750 ug/L for long term irrigation on sensitive crops)			
Cadmium[4,P]	-	-	1.1/1.6/2.0	3.9/6.2/8.6
Chlordane[P]	0.0043	2.4	-	-
Chlorine	-	-	11	19
Chlorpyrifos	-	-	0.041	0.083
Chromium (VI)[P]	-	-	11	16
Chromium (III)[4]	-	-	210/289/370	1700/2420/3100
Color	(Narrative statement - SEE CRITERIA DOCUMENT)			
Copper[4,P]	-	-	12/17/21	18/26/34
Cyanide[P]	-	-	5.2	22
DDT[P]	0.0010	1.1	-	-
Demeton[P]	0.1	-	-	-
Dieldrin[P]	0.0019	2.5	-	-
Endosulfan[P]	0.056	0.22	-	-
Endrin[P]	0.0023	0.18	-	-
Gases, Total Dissolved	(Narrative statement - SEE CRITERIA DOCUMENT)			
Guthion	0.01	-	-	-
Heptachlor[P]	0.0038	0.52	-	-
Hexachlorocyclohexane (Lindane)[P]	0.080	2.0	-	-
Iron	1000	-	-	-
Lead[4,P]	-	-	3.2/5.3/7.7	82/137/200
Malathion	0.1	-	-	-
Mercury[P]	-	-	0.012	2.4
Methoxychlor	0.03	-	-	-
Mirex	0.001	-	-	-
Nickel[4,P]	-	-	160/222/280	1400/1999/2500
Oil and Grease	(Narrative statement - SEE CRITERIA DOCUMENT)			
Oxygen, Dissolved	(Warmwater and Coldwater Matrix - SEE CRITERIA DOCUMENT)			

TABLE 3

1986 EPA **FRESH WATER** AQUATIC LIFE CRITERIA
(All values in ug/L except where noted)

Parathion	-	-	0.013	0.065
Polychlorinated Biphenyls (PCB's)[P]	0.014	2.0	-	-
Pentachlorophenol (PCP)[5,P]	-	-	3.5/13/43	5.5/20/68
PH	(6.5 - 9.0 su)	-	-	-
Silver[4,P]	-	4.1/8.2/13	-	-
Solids (Suspended) and Turbidity	(Narrative statement - SEE CRITERIA DOCUMENT)			
Sulfide-Hydrogen Sulfide	2.0	-	-	-
Temperature	(Species dependent criteria - SEE CRITERIA DOCUMENT)			
Toxaphene[P]	-	-	0.0002	0.73
Zinc[P]	-	-	110/149/190	120/165/210

1 4-day average concentration not to be exceeded more than once every 3 years on the average.
2 1-hour average concentration not to be exceeded more than once every 3 years on the average.
3 *EPA Quality Criteria for Water 1986*, EPA 440/5-86-001, May 1, 1986.
4 Hardness dependent criteria. Values presented are for 100/150/200 mg/L as $CaCO_3$.
5 pH dependent criteria. Values presented are for 6.5/7.8/9.0 standard pH units.
P Priority Pollutant.

TABLE 4

1986 EPA **SALTWATER** AQUATIC LIFE CRITERIA
(All values in ug/L except where noted)

Parameter	Chronic (24-Hour Average)	Acute (Maximum at Any Time)	Chronic[1] (4-Day Average)	Acute[2] (1-Hour Average)
Aesthetic Qualities	(Narrative statement - SEE CRITERIA DOCUMENT[3])			
Aldrin[P]	-	1.3	-	-
Arsenic (III)[P]	-	-	36	69
Cadmium[P]	-	-	9.3	43
Chlordane[P]	0.004	0.09	-	-
Chlorine	-	-	7.5	13
Chlorpyrifos	-	-	0.0056	0.011
Chromium (VI)[P]	-	-	50	1100
Color	(Narrative statement - SEE CRITERIA DOCUMENT)			
Copper[P]	-	-	-	2.9
Cyanide[P]	-	-	-	1.0
DDT[P]	0.0010	0.13	-	-
Demeton[P]	0.1	-	-	-
Dieldrin[P]	0.0019	0.71	-	-
Endosulfan[P]	0.0087	0.034	-	-
Endrin[P]	0.0023	0.037	-	-
Gases, Total Dissolved	(Narrative statement - SEE CRITERIA DOCUMENT)			
Guthion	0.01	-	-	-
Heptachlor[P]	0.0036	0.053	-	-
Hexachlorocyclohexane (Lindane)[P]	-	0.16	-	-
Lead[P]	-	-	5.6	140
Malathion	0.1	-	-	-
Mercury[P]	-	-	0.025	2.1
Methoxychlor	0.03	-	-	-
Mirex	0.001	-	-	-
Nickel[P]	-	-	8.3	75
Oil and Grease	(Narrative statement - SEE CRITERIA DOCUMENT)			
Polychlorinated Biphenyls (PCB's)[P]	0.030	10	-	-
Pentachlorophenol (PCP)[3,P]	-	-	7.9	13
PH	(6.5 - 8.5 su)	-	-	-
Phosphorus (Elemental)	0.10	-	-	-
Selenite (inorganic)[P]	54	410	-	-
Silver[P]	-	2.3	-	-
Sulfide-Hydrogen Sulfide	2.0	-	-	-
Temperature	(Species dependent criteria - SEE CRITERIA DOCUMENT)			

TABLE 4

1986 EPA **SALTWATER** AQUATIC LIFE CRITERIA
(All values in ug/L except where noted)

Toxaphene[P]	-	-	0.0002	0.21
Zinc[P]	-	-	86	95

1 4-day average concentration not to be exceeded more than once every 3 years on the average.
2 1-hour average concentration not to be exceeded more than once every 3 years on the average.
3 *EPA Quality Criteria for Water 1986*, EPA 440/5-86-001, May 1, 1986.
P Priority Pollutant.

TABLE 5

1986 EPA **HUMAN HEALTH** CRITERIA
(Units per liter)

Parameter	Fish and Water Ingestion	Fish Consumption Only	Drinking Water M.C.L.[1]	Organo-leptic Criteria[2]
Acenapthene[P]	-	-	-	0.02 mg
Acrolein[P]	320 ug	780 ug	-	-
Acrylonitrile[P,C]	0.58/0.058/0.006 ug	6.5/0.65/0.065/ ug	-	-
Aesthetic Qualities	(Narrative Statement - SEE CRITERIA DOCUMENT[3)]			
Aldrin[P,C]	0.74/0.074/0.0074 ng	0.79/0.079/0.0079 ng	-	-
Antimony[P]	146 ug	45,000 ug	-	-
Arsenic[P,C]	22/2.2/0.22 ng	175/17.5/1.75 ng	0.05 mg	-
Asbestos[P,C]	300,000/30,000/3,000 Fibers	-	-	-
Bacteria	(For Primary Recreation And Shellfish Uses - SEE CRITERIA DOCUMENT)			
Barium	-	-	1.0 mg	-
Benzene[P,C]	6.6/0.66/0.066 ug	400/40.0/4.0 ug	-	-
Benzidine[P,C]	1.2/0.12/0.01 ng	5.3/0.53/0.05 ng	-	-
Beryllium[P,C]	68/6.8/0.68 ng	1170/117.0/11.71 ng	-	-
Cadmium	10 ug	-	0.010 mg	-
Carbon Tetrachloride[P,C]	4/0.40/0.04 ug	69.4/6.94/0.69 ug	-	-
Chlordane[P,C]	4.6/0.46/0.046 ng	4.8/0.48/0.048 ng	-	-
Chloroethyl Ether (BIS-2)[P,C]	0.3/0.03/0.003 ug	13.6/1.36/0.136 ug	-	-
Chloroform[P,C]	1.9/0.19/0.019 ug	157/15.7/1.57 ug	-	-
Chloroisopropyl Ether (Bis-2)[P]	34.7 ug	4.36 mg	-	-
Chloromethyl Ether (BIS)[C]	[37.6/3.76/0.376]x10^{-3} ug	[18.4/1.84/0.184]x10^{-3} ug	-	-
2-Chlorophenol[P]	-	-	-	0.1 ug
4 Chlorophenol	-	-	-	0.1 ug
Chlorophenoxy Herbicides(2,4,5,-TP) (Silvex)	10 ug	-	10 ug	-
Chlorophenoxy Herbicides(2,4-D)	100 ug	-	100 ug	-
Chloro-4 Methyl-3 Phenol	-	-	-	3000 ug
Chromium (VI)[P]	50 ug	-	0.05 mg	-
Chromium(III)	170 mg	3,433 mg	-	-
Color	(Narrative statement - SEE CRITERIA DOCUMENT)			
Copper[P]	-	-	-	1 mg
Cyanide[P]	200 ug	-	200 ug	-
DDT[P,C]	0.24/0.024/0.0024 ng	0.24/0.024/0.0024 ng	-	-
Dibutyl Phtalate[P]	34 mg	154 mg	-	-
Dichlorobenzenes[P]	400 ug	2.6 mg	-	-

TABLE 5

1986 EPA **HUMAN HEALTH** CRITERIA
(Units per liter)

Dichlorobenzidine[P,C]	0.103/0.010/0.001 ug	0.204/0.200/0.002 ug	-	-
1,2 Dichloroethane[P,C]	9.4/0.94/0.094 ug	2,430/243/24.3 ug	-	-
Dichloroethylenes[P,C]	0.33/0.033/0.003 ug	18.5/1.85/0.185 ug	-	-
2,4-Dichlorophenol	3.09 mg	-	-	0.3 ug
Dichloropropene[P]	87 ug	14.1 mg	-	-
Dieldrin[P,C]	0.71/0.071/0.0071 ng	0.76/0.076/0.0076 ng	-	-
Diethyl Phthalate[P]	350 mg	1.8 g	-	-
2,4-Dimethylphenol[P]	-	-	-	400 ug
Dimethyl Phthalate[P]	313 mg	2.9 g	-	-
2,4 Dinitrotoluene[C]	1.1/0.11/0.011 ug	91/9.1/0.91 ug	-	-
2,4 Dinitro-o-Cresol[P]	13.4 ug	765 ug	-	-
2,3,7,8-TCDD (Dioxin)[P,C]	[0.13/0.013/0.0013]x10^{-6} ug	[0.14/0.014/0.0014]x 10^{-6} ug	-	-
Diphenylhydrazine[P]	422/42/4 ng	5.6/0.56/0.056 ug	-	-
Di-2-EthylHexyl Phthalate[P]	15 mg	50 mg	-	-
Endosulfan[P]	74 ug	159 ug	-	-
Endrin[P]	1.0 ug	-	0.0002 mg	-
Ethylbenzene[P]	1.4 mg	3.28 mg	-	-
Fluorathene[P]	42 ug	54 ug	-	-
Halomethanes[P,C]	1.9/0.19/0.019 ug	157/15.7/1.57 ug	-	-
Heptachlor[P,C]	2.78/0.28/0.028 ng	2.85/0.29/0.029 ng	-	-
Hexachloroethane[C]	19/1.9/0.19 ug	87.4/8.74/0.87 ug	-	-
Hexachlorobenzene[P,C]	7.2/0.72/0.072 ng	7.4/0.74/0.074 ng	-	-
Hexachlorobutadiene[P,C]	4.47/0.45/0.045 ug	500/50/5 ug	-	-
Hexachlorocyclohexane-Alpha[P,C]	92/9.2/0.92 ng	310/31/3.1 ng	-	-
Hexachlorocyclohexane-Beta[P,C]	163/16.3/1.63 ng	547/54.7/5.47 ng	-	-
Hexachlorocyclohexane-Gama[P,C]	186/18.6/1.86 ng	625/62.5/6.25 ng	-	-
Hexachlorocyclohexane-Technical[P,C]	123/12.3/1.23 ng	414/41.4/4.14 ng	-	-
Hexachlorocyclopentadiene[P]	206 ug	-	-	1 ug
Iron	0.3 mg	-	0.3 mg	-
Isophorone[P]	5.2 mg	520 mg	-	-
Lead[P]	50 ug	-	0.05 mg	-
Manganese	50 ug	100 ug	50 ug	-
Mercury[P]	144 ng	146 ng	0.002 mg	-
Methoxychlor	100 ug	-	0.1 mg	-
Monochlorobenzene[P]	488 ug	-	-	20 ug
Nickel[P]	13.4 ug	100 ug	-	-
Nitrates	10 mg	-	10 mg	-
Nitrobenzene[P]	19.8 mg	-	-	30 ug
Nitrosodibutylamine N[P,C]	64/6.4/0.64 ng	5,868/587/58.7 ng	-	-
Nitrosodiethylamine N[P,C]	8/0.8/0.08 ng	12400/1,240/124 ng	-	-
Nitrosodimethylamine N[P,C]	14/1.4/0.14 ng	160000/16,000/1600 ng	-	-

TABLE 5

1986 EPA **HUMAN HEALTH** CRITERIA
(Units per liter)

Nitrosodiphenylamine N[P,C]	49000/4,900/490 ng	161000/16,100/1610 ng	-	-
Nitrosopyrrolidine N[P,C]	160/16/1.6 ng	919000/91,900/9190 ng	-	-
Oil and Grease	(Narrative Statement - SEE CRITERIA DOCUMENT)			
PCB's[P,C]	0.79/0.079/0.0079 ng	0.79/0.079/0.0079 ng	-	-
Pentachlorobenzene	74 ug	85 ug	-	-
Pentachlorophenol[P]	1.01 mg	-	-	-
Phenol[P]	3.5 mg	-	-	0.3 mg
Polynuclear Aromatic Hydrocarbons[P,C]	28/2.8/0.28 ng	311/31.1/3.11 ng	-	-
Selenium[P]	10 ug	-	0.01 mg	-
Silver[P]	50 ug	-	0.05 mg	-
Solids (Dissolved) And Salinity	-	-	250 mg	-
Tainting Substances	(Narrative Statement - SEE CRITERIA DOCUMENT)			
1,2,4,5 Tetrachlorobenzene[P]	38 ug	48 ug	-	-
1,1,2,2-tetrachloroethane[P,C]	1.7/0.17/0.017 ug	107/10.7/1.07 ug	-	-
Tetrachloroethylene[P,C]	8/0.8/0.08 ug	88.5/8.85/0.88 ug	-	-
Thalium[P]	13 ug	48 ug	-	-
Toluene[P]	14.3 mg	424 mg	-	-
Toxaphene[P,C]	7.1/0.71/0.07 ng	7.3/0.73/0.07 ng	0.005 mg	-
1,1,1-trichloroethane[P]	18.4 mg	1.03 g	-	-
1,1,2-trichloroethane[P,C]	6/0.6/0.06 ug	418/41.8/4.18 ug	-	-
Trichloroethylene[P,C]	27/2.7/0.27 ug	807/80.7/8.07 ug	-	-
2,4,5-trichlorophenol	2,600 ug	-	-	1 ug
2,4,6-trichlorophenol[P,C]	12/1.2/0.12 ug	36/3.6/0.36 ug	-	2 ug
Vinyl Chloride[P,C]	20/2/0.2 ug	5246/525/52.5 ug	-	-

1 M.C.L. is maximum contaminant level.
2 To control undesirable taste and order quality of ambient water. It should be recognized that organoleptic data have limitations as a basis for establishing water quality criteria, and have no demonstrated relationship to potential adverse human health effects.
3 *EPA Quality Criteria for Water 1986*, EPA 440/5-86-001, May 1, 1986.
P Priority Pollutant.
C Carcinogenic pollutant. For the maximum protection of human health from the potential carcinogenic effects resulting from exposure to these pollutants through ingestion of contaminated water and contaminated aquatic organisms, the ambient water concentrations should be zero based on the nonthreshold assumption for these chemicals. The levels presented are for $10^{-5}/10^{-6}/10^{-7}$ incremental increase of cancer risk over the lifetime.

2.3.2 Additional EPA Water Quality Criteria. Additional EPA water quality criteria are as follows:

(a) Aesthetic qualities. All waters free from substances attributable to wastewater or other discharges that:

1. settle to form objectionable deposits;

2. float as debris, scum, oil, or other matter to form nuisances;

3. produce objectionable color, odor, taste, or turbidity;

4. injure or are toxic or produce adverse physiological responses in humans, animals or plants; and

5. produce undesirable or nuisance aquatic life.

(b) Color. Waters shall be virtually free from substances producing objectionable color for aesthetic purposes; the source of supply should not exceed 75 color units on the platinum-cobalt scale for domestic water supplies, and increased color (in combination with turbidity) should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life.

(c) Dissolved oxygen. Water should contain sufficient DO to maintain aerobic conditions in the water column and, except as affected by natural phenomena, at the sediment-water interface. Numerical criteria are available for varying aquatic life stages for coldwater and warmwater species.

(d) Fecal coliform bacteria.

1. Bathing waters. Based on a minimum of five samples equally spaced over a 30-day period, the geometric mean of the E. coli density should not exceed 126 per 100 mL for freshwater bathing. For the above sampling period, the geometric means of the enterococci density should not exceed 33 and 35 per 100 mL for freshwater and marine bathing, respectively. The annual primary contact recreation criteria of 400 colonies/100 mL is exceeded at many locations. In general, the areas with the lowest levels are in areas 2 and 3, and the areas with the highest levels are 4 and 6. Fecal coliform concentrations in Bayou Grand Caillou and Bayou Terrebonne (both are in area 4) appear to exceed the criteria for secondary contact recreation at least 25% of the time as well. In area 6, Bayou Choctaw exceeds the secondary contact criteria nearly 40 percent of the time, and Grand Bayou also experiences levels in excess of the secondary contact criteria on occasion. Samples from the Bayou Teche at Franklin station in area 3 exceed the secondary contact criteria over 40 percent of the time.

2. Shellfish harvesting waters. The median fecal coliform bacterial concentration should not exceed 14 MPN/100 mL for the taking of shellfish, with not more than 10 percent of samples exceeding 43 MPN/100 mL.

(e) Oil and grease. For domestic water supply: virtually free from oil and grease, particularly from the tastes and odors that emanate from petroleum products. For aquatic life: (1) levels of individual petrochemicals in the water column should not exceed 0.01 times the lowest continuous flow 96-hour LC_{50} to several important freshwater or marine species, each having a demonstrated high susceptibility to oils and petrochemicals; (2) levels of oils or petrochemicals in the sediment which cause deleterious effects to the biota should not be allowed; and (3) surface waters shall be virtually free from floating nonpetroleum oils of vegetable or animal origin, as well as petroleum derived oils.

(f) Settleable and suspended solids. Freshwater fish and aquatic life: settleable and suspended solids should not reduce the depth of the compensation point for photosynthetic activity by more than 10 percent from the seasonally established norm for aquatic life.

(g) Tainting substances. Materials should not be present in concentrations that individually or in combination produce undesirable flavors which are detectable by organoleptic tests performed on the edible portions of aquatic organisms.

The LDEQ general criteria state that "all waters of the state shall be capable of supporting desirable diversified species of fish, shellfish and wildlife." Therefore, EPA criteria for freshwater or marine aquatic life, Tables 3 and 4, respectively, are held to apply to all surface waters. Also, EPA criteria for the protection of human health apply to all surface waters.

3.0 EXISTING WATER QUALITY.

3.1 Water Use Designations. The Louisiana Department of Environmental Quality (LDEQ) has established seven water use designations for surface waters in the State. The seven designated water uses follow.

A = Primary Contact Recreation
B = Secondary Contact Recreation
C = Fish and Wildlife Propagation
D = Drinking Water Supply
E = Oyster Propagation
F = Agriculture
G = Outstanding Natural Resource Waters

Specifically, LDEQ has designated the waters of Jean Lafitte Fisher School Basin study area according to the following uses:

Primary Contact Recreation
Secondary Contact Recreation
Propagation of Fish and Wildlife
Drinking Water Supply
Oyster Propagation
Agriculture
Outstanding Natural Resource Waters

For the primary contact recreation designation, a waterbody should be suitable for activities such as swimming, water skiing, and skin diving. A waterbody designated for Secondary Contact Recreation should be suitable for activities such as boating, fishing, and limited contact incident to shoreline activities. The propagation of fish and wildlife designation means the waterbody should also be suitable for preservation and reproduction of aquatic biota such as indigenous species of fish, invertebrates, reptiles, amphibians, and other wildlife associated with the aquatic environment. Drinking water supply refers to the use of water for human consumption and general household use. Oyster propagation is the use of water to maintain biological systems that support economically important species of oysters, clams, mussels , or other mollusks so that their productivity is preserved and the health of human consumers of these species is protected. Agriculture involves the use of water for crop spraying, irrigation, livestock watering, poultry operations, and other farm purposes not related to human consumption. Outstanding natural resource waters are those waterbodies designated for preservation, protection, reclamation or enhancement of wilderness, aesthetic qualities, ecological regimes, such as those Designated under the Louisiana Natural and Scenic Rivers System or those designated by LDEQ as waters of ecological significance.

3.2 Water Use Support Classification. LDEQ classifies water use support based upon either an evaluation of land use, citizen complaints, etc., or upon actual monitored data. Only an evaluated assessment is available for the study area, and the results of this evaluated assessment are discussed below.

3.2.1 Evaluated Assessment. LDEQ has classified the waters of the Jean Lafitte, Fisher School Basin Study Area as either FULLY or PARTIALLY supporting their designated uses based upon an evaluated assessment as shown in Table 6.

TABLE 6

1996 LDEQ WATER USE SUPPORT CLASSIFICATION
EVALUATED ASSESSMENT

Waterbody Segment Code/ Description	Source [1]	Type	Size	Segment Class [2]	Overall Degree of Support [3]	Degree of Support [4]			Suspected Source
						P C R	S C R	F W P	
1. 020601/ Intracoastal Waterway-Bayou Villars to Mississippi River (Estuarine)	NPS	R	15.0	EL	FULL	P	T	T	Minor industrial Point Sourc Plants (small flows); Inflow infiltration; Urban runoff/sto Spills; Contaminated Sedime
2. 020802/ Bayou Barataria/ Barataria Waterway to Bayou Rigolettes (Estuarine)	NPS	R	6.0	EL	FULL	P	P	F	Minor industrial point sourc plants (small flows) ; Petrole activities; Channelization; Sp Contaminated Sediments.

[1] Source may be Point Source (PS) or Non-Point Source (NPS)
[2] Segment Class may be Water Quality Limited (WQL) or Effluent Limited (EL)
[3] Overall Degree of Support may be FULL, PARTIAL, or NOT supporting designated uses. The overall degree of support of THREATENED has been eli
[4] Individual Degree of Support may be FULLY (F), THREATENED (T), PARTIALLY (P), or NOT supporting (N). The overall degree of use support is b 3 values assigned to the individual use support statements for primary contact recreation (PCR), secondary contact recreation (SCR) and fish and wildlife p corresponding numerical values for the individual use support statements are 4 for F, 3 for T, 2 for P, and 1 for N. Average support values from 2.5 to 4.0 support rating of FULLY supporting.

3.3 Existing Water Quality Data. No active water quality monitoring stations were identified in the study area. Prior to 1994, there were three stations located near the study area as part of Jefferson Parish's storm water drainage canal sampling program. These three stations were as follows.

Station 19 - Bayou Barataria @ Rosethorne Park
Station 20 - Bayou Barataria @ the small pumping station on LA Highway 45
Station 21 - Bayou Barataria just past Joe's Landing on LA Highway 301

The data for Stations 19, 20, and 21 are listed in Tables 7, 8, and 9, respectively. All of the pH values for each of the three stations are within the allowable range of 6.5 to 9.0 su. Fecal coliform levels at all three stations exceeded the state standard within the 3 year monitoring period. Fecal coliform levels at stations 19 and 21 exceeded the state acute criteria for primary contact recreation (400 per mL) 3 times in 16 samples, and exceeded the secondary contact recreation criteria (2000 per mL) once during the monitoring period. At station 20, the fecal coliform exceeded the primary contact recreation standard 8 times in 16 samples, and the secondary contact recreation standard on 3 occasions. On one occasion, the fecal coliform levels at Station 20 were 28,000 per 100 mL versus the primary contact recreation standard of 400 per 100 mL.

For all three stations, none of the cadmium, chromium, or arsenic concentrations exceed the LDEQ criteria for the estuarine aquatic life in 15 samples per station. Only one sample exceeded the LDEQ chronic lead criterion (8.5 mg/l) for estuarine aquatic life. This sample had a lead concentration of 11.76 ug/L and was collected at Station 19 in January 1993. No exceedances of the LDEQ acute criteria for lead were identified. None of the mercury concentrations at the three stations exceeded the LDEQ acute criteria for estuarine aquatic life. However, 10 of 15 mercury samples taken at station Stations 19, 10 of 15 samples taken at Station 20; and 12 of 15 samples taken at Station 20 exceeded the LDEQ chronic mercury criteria for estuarine aquatic life. At least 13, 9, and 4 of the 15 samples taken at stations 19, 20, and 21, respectively, exceeded both the LDEQ acute and chronic copper criteria (both 4.37 ug/L) for estuarine aquatic life. The mean copper concentrations for Stations 19 and 20 were above 4.37 ug/L whereas the mean copper concentration for Station 21 was below 4.37 ug/L.

3.4 Results of Water and Sediment Quality Testing. As part of this water quality assessment, water samples were taken at three sites. These sites were the forebay of the Gloria Drive pumping station, the tailbay of the Verret Street pumping station, and on the unprotected side of the existing levee near the Town Auditorium. Sediment samples were taken in the forebay of the Verret Street pumping station, just downstream of the Louisiana Highway 45 bridge. Both the water and the sediment samples were tested for priority pollutants.

The results of the water testing were compared to the water quality standards and criteria of the Louisiana Department of Environmental Quality. Very few contaminants were detected in any of the water samples. Trace amounts of D-BHC were detected at both the Gloria Street and the Verret Street pumping station sites. A trace amount of B-Endosulfan was detected at the site near the Town Auditorium. Arsenic was detected in very small quantities at all three sites tested, as was copper and nickel. Zinc was detected at the Town Auditorium site. None of these parameters exceeded the state water quality criteria. No testing for fecal coliform was performed at these sites.

Since no sediment quality criteria have been established, the results of the sediment sample testing were compared to Sediment Quality Benchmarks (SQBs) compiled by the National Oceanic and Atmospheric Administration (NOAA) and by the State of Florida Department of Environmental Protection (FDEP). These benchmarks are shown in Table 10.

Table 7

Jean Lafitte, Fisher School Basin Sampling Data

Bayou Barataria at Rosethorne Park (Station 19)

Date	BOD (mg/L)	TSS (mg/L)	PH (s.u.)	Fecal Coliform #/100 mL	E. Coli #/100 mL	Fecal Strep #/100 mL	COD (mg/L)	Cd (ug/L)	Cr (ug/L)	Cu (ug/L)	Hg (ug/L)
2/90	2	97	7.53	800	470		27	0.10	1.38	3.60	0.20
3/90	2	47	7.74	1400	1600		36	0.41	1.00	6.12	0.26
4/90	2	52	7.97	300	200		44				
5/90	2	113	7.67	550	560		4	0.01	0.52	7.48	0.67
6/90	2	44	7.91	30	60		16	0.12	0.80	7.59	0.27
7/90	1	28	7.98	810	110		19	0.23	1.57	4.69	0.32
8/90	3	41	7.99	100		460		0.19	0.77	14.79	0.20
9/90	1	29	7.46	500		210	32	0.01	1.03	4.70	0.20
5/27/92	2	38	8.33	100		100	10	6.60	0.90	5.20	<0.20
7/22/92	1	36	7.86	50		100	22	<0.12	1.20	10.50	<0.10
9/23/92	1	29	7.46	500		210	32	<0.05	8.86	5.73	<0.15
11/4/92	4	64	7.97	800		3,300	20	<0.05	1.07	5.20	0.88
1/13/93	4	53	7.08	7800		5,600	26	<0.05	0.68	5.89	<0.15
7/21/93	2	25	7.64	100		100	26	<1.00	<10.00	<5.00	0.37
9/22/93	3	27	7.82	220		140	29	<1.00	<10.00	12.19	0.40
11/17/93	5	43	7.71	800		1,200	16	<0.05	2.76	13.00	<0.15
Mean	2	49	7.79	901	500	1,132	22	0.59	2.17	7.28	0.28
Log Mean				310							

Table 8
Jean Lafitte Fisher School Basin Sampling Data
on LA Highway 45 (Station 20)

Date	BOD (mg/L)	TSS (mg/L)	PH (s.u.)	Fecal Coliform #/100 mL	E. Coli #/100 mL	Fecal Strep #/100 mL	COD (mg/L)	Cd (ug/L)	Cr (ug/L)	Cu (ug/L)	Hg (ug/L)
2/15/90	2	78	7.49	730	800		200	0.10	2.57	11.26	0.20
3/15/90	1	63	7.60	5300	4400		36	0.27	1.00	7.10	0.27
4/26/90	1	59	7.98	150	180		108				
5/10/90	1	49	7.71	640	620		20	0.01	0.63	6.86	0.20
6/14/90	1	67	7.73	320	200		32	1.12	1.25	6.39	0.85
7/26/90	1	34	7.87	1400	970		33	0.01	1.48	3.92	0.20
8/23/90	1	28	7.85	350		290	51	0.15	0.37	4.68	0.20
9/19/90	1	31	7.57	190		70	20	0.01	0.13	1.10	0.20
5/27/92	1	44	7.93	100		400	16	0.31	1.20	4.70	<0.20
7/22/92	2	60	7.56	1800		2000	29	<0.12	1.10	2.80	<0.10
9/23/92	2	40	7.41	360		260	35	<0.05	2.04	7.16	<0.15
11/4/92	4	52	7.76	28000		21000	32	0.15	1.63	6.88	0.75
1/13/93	5	70	7.14	11000		8500	34	<0.05	1.63	3.63	<0.15
7/21/93	2	143	7.70	200		200	42	<1.00	<10.00	<5.00	0.31
9/22/93	3	65	7.61	200		300	39	1.17	<10.00	21.48	0.29
11/17/93	5	42	7.61	1800		3500	38	0.89	3.22	<0.51	<0.15
Mean	2	58	7.66	3284	1195	3652	48	0.32	1.88	6.05	0.26
Log Mean				772							

Table 9
Jean Lafitte Fisher School Basin Sampling Data
on Highway 301 (Station 21)

Date	BOD (mg/L)	TSS (mg/L)	PH (s.u.)	Fecal Coliform #/100 mL	E. Coli #/100 mL	Fecal Strep #/100 mL	COD (mg/L)	Cd (ug/L)	Cr (ug/L)	Cu (ug/L)	Hg (ug/L)
2/15/90	1	84	8.07	80	90		57	0.10	1.58	1.66	0.20
3/15/90	1	51	7.89	330	320		96	0.31	1.00	6.25	0.23
4/26/90	2	31	7.88	110	140		84				
5/10/90	1	28	7.82	220	120		28	0.90	0.36	5.71	0.20
6/14/90	1	13	7.57	250	100		44	0.01	0.65	7.99	0.41
7/26/90	2	15	8.01	120	20		55	0.01	1.79	7.31	0.20
8/2390	2	16	7.78	400		310	109	0.01	0.63	4.01	0.20
9/19/90	2	20	7.94	230		100	64	0.01	0.10	2.10	0.20
5/27/92	2	23	7.69	200		200	54	0.50	0.80	8.60	<0.20
7/22/92	1	11	7.58	100		100	40	<0.12	0.90	3.40	<0.10
9/23/92	2	31	7.49	250		390	39	<0.05	<0.45	3.00	0.25
11/4/92	4	29	7.77	560		1300	60	<0.05	1.00	2.86	0.72
1/13/93	5	47	7.41	3300		5400	34	<0.05	0.84	2.58	<0.15
7/21/93	2	29	7.63	100		500		<1.00	<10.00	<5.00	0.34
9/22/93	2	13	7.53	20		20	39	<1.00	<10.00	<5.00	0.43
11/17/93	4	30	7.80	660		720	64	0.32	3.23	<0.51	0.28
Mean	2	29	7.74	433	132	1,132	58	0.22	1.54	4.05	0.26
Log Mean				215							

TABLE 10
SEDIMENT QUALITY BENCHMARKS

	NOAA[a]		FDEP[b]	
CHEMICAL	ER-L	ER-M	TEL	PEL
Inorganics (mg/kg dry weight)				
Antimony	2	25		
Arsenic	8.2	70	7.24	41.6
Cadmium	1.2	9.6	0.68	4.21
Chromium	81	370	52.3	160
Copper	34	270	18.7	108
Lead	46.7	218	30.2	112
Mercury	0.15	0.71	0.13	0.7
Nickel	20.9	51.6	15.9	42.8
Silver	1.0	3.7	0.73	1.77
Zinc	150	410	124	271
Organics (ug/kg dry weight)				
Acenapthene	16	500	6.71	88.9
Acenaphthylene	44	640	5.87	128
Anthracene	85.3	1100	46.9	245
Benz(a)anthracene	261	1600	74.8	693
Benzo(a)pyrene	430	1600	88.8	763
Bis (2ethylhexyl)-phthalate			182	2647
Chlordane	0.5	6	2.26	4.79
Chrysene	384	2800	108	846
DDD,op’- + pp’-	2	20		
DDD,pp’-			1.19	4.77
DDE,pp’-	2.2	27	2.07	3.74
DDT,op’- + pp’-1	7			
DDT,pp’-			1.19	4.77
DDT,Total	1.58	46.1	3.89	51.7
Dibenzo(a,h)-anthracene	63.4	260	6.22	135
Dieldrin	0.02	8	0.72	4.3
Endrin	0.02	45		
Fluoranthene	600	5100	113	1494
Fluorene	19	540	21.2	144
Lindane			0.32	0.99
2-Methyl napthalene	70	670	20.2	201
Naphthalene	160	2100	34.6	391
PAH, Total LMW	552	3160	312	1442
PAH, Total HMW	1700	9600	655	6676
PAH, Total	4022	44792	1684	16770
PCB, Total	22.7	180	21.6	189
Phenanthrene	240	1500	86.7	544
Pyrene	665	2600	153	1398

[a]NOAA=National Oceanic and Atmospheric Administration; ER-L=effects range low; ER-M=effects range median.
[b]FDEP=Florida Department of Environmental Protection; TEL=threshold effects level; PEL=probable effects level.

These data, while not criteria or standards, provide a basis on which to evaluate relative sediment quality. The results of the sediment tests were compared to the ER-L and TEL benchmarks, for those parameters tested. The ER-L represents the lower 10^{th} percentile of chemical concentrations observed or predicted to be associated with biological effects. The TEL represents the upper limit of sediment contaminant concentration dominated by no effects data. Arsenic and mercury exceeded both the ER-L and the TEL benchmarks, while Copper and Nickel exceeded only the TEL benchmark

3.5 Existing Water Quality Summary. Various exceedances of LDEQ's water quality criteria were identified in this water quality assessment. The most persistent water quality problems in the study area appear to be fecal coliform which exceeded the primary contact recreation standard 50 percent of the time at Station 20. Mercury and Copper appear to be the other contaminants of concern in the study area. Mercury concentrations exceed both the chronic and acute water quality standard for mercury in at least 10, 10, and 12 of 15 samples each taken at stations 19, 20, and 21 respectively; and exceeded the TEL and ER-L for the sediment sample tested as part of this study. The copper concentrations at stations 19, 20, and 21 exceeded both the chronic and acute state water quality criteria for copper in 13, 9, and 4 of 15 samples each, and exceeded the TEL benchmark at the sample location.

4.0 PROJECTED WATER QUALITY.

4.1 Introduction. This section sets forth the projected impacts to water quality in the study area that might reasonably be expected to result from the implementation of the selected alternative. Impacts due to the no-action alternative or without project condition are also discussed. Data was obtained from , from results of testing area sediments and water, and from LDEQ publications. These sources were used to obtain information on the specific aspects of potential water quality impacts.

4.2 Future Without Project Conditions. For the without project condition, projected water quality for the study area is expected to remain similar to current conditions. The study area is protected by an existing non-Federal ring levee, and would continue to be pumped in the absence of a Federal project. Minor industrial point sources, package plants, petroleum activities, channelizations, spills, contaminated sediments, siltation, salinity, total dissolved solids, chlorides, and oil and grease are the major factors which currently affect water quality in the study area. These are expected to continue to be the major factors affecting water quality in the study area. Recent increased regulation and legislation as well as an increase in public awareness of environmental issues may result in slight reductions in the amount of pollutants released into the study area, which would result in slight improvements in its water quality.

4.3 Future With Project Conditions. The proposed ring levee around the town of Jean Lafitte is designed to reduce the frequency of flooding in the town of Jean Lafitte in lower Jefferson Parish along Bayou Barataria. The only alternative studied, other than the no-action alternative, is the ring levee alternative. The effects of the project can effectively be broken down into those due to temporary construction activities, and those due the effects of removing the study area from the flood plain.

4.3.1 Effects of Construction. The effects of construction may include (but are not limited to) increased turbidity and sedimentation, increased temperature, increased oxygen demand, and decreased oxygen; and contamination from construction equipment and operations. The effects of construction are, by nature, temporary and cease with the end of the construction period.

Sediment runoff is a primary concern during construction activities. Site preparation activities and construction of temporary access roads result in denuded areas from which soil readily erodes. This erosion increases sedimentation and turbidity. The suspended sedimentary particles contribute dissolved minerals including sodium, potassium, calcium, magnesium, nitrates, and phosphates to the stream. These minerals act as nutrients in the water column, increasing plant growth. This, in turn, stimulates animal production and decomposition, increasing the oxygen demand. Simultaneously, the suspended particles decrease the light penetration and interfere with the photosynthetic production of oxygen. The particles also absorb solar energy from the sunlight and transform this energy into heat, elevating the temperature of the stream. Oxygen is less soluble in warm water than in cold water. The combination of these three effects results in an overall minor decrease in oxygen levels.

NPDES legislation requires a Pollution Prevention Plan (PPP) for each project in order to reduce contamination in the waterways due to the construction process. Often included in the PPP are temporary and permanent controls such as hay bales, silt fences, sedimentation ponds, vehicle washing racks, and seeding and mulching denuded areas. Even with these measures, however, some effects can be expected. The effects of construction, however, are generally temporary and subside when construction stops and denuded areas are restored.

4.3.2 Effects of Removing the Study Area from the Floodplain. Permanent changes due to construction of the proposed ring levee include: a slight increase in runoff due to compaction of the proposed levee, the contribution of herbicides and fertilizers due to maintenance of the proposed levee, and conversion of wetland habitat in those areas where there is no levee existing. Steps can be taken to minimize the amount of herbicides and fertilizers that enter the water column. These steps include using microfoil booms to apply herbicides, thus minimizing the amount of waste product.

No significant differences in organics, metals, nutrient, or pathogen levels are expected to result from this project. Induced development is not expected since the levee alignment primarily follows the limits of existing development. Since this system is already a pumped system, no significant effects are expected due to the addition of additional pumping capacity.

4.4 Summary of Overall Effects. The primary effects of this project are short term effects from construction that may include increased turbidity and sedimentation, and contamination from construction equipment and operations. The effects of construction are generally temporary and subside when construction ceases. Effects resulting from the removal of the protected area from the floodplain include an slight increase in runoff, and additional herbicides and fertilizers in the water column due to maintenance of the levee. Water quality after completion of the project should be similar to the existing water quality.

5.0 REFERENCES.

EPA, Impacts of Construction Activities in Wetlands of the United States, EPA-600/3-76-045, April 1976.

Jones, D.S.; Hull, R.N.; and Suter, G.W. II. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment Associated Biota: 1996 Revision. USDOE-ES/ER/TM-95/RS, June 1996.

LDEQ Office of Water Resources, State of Louisiana, Water Quality Management Plan, Volume 5, Water Quality Inventory 1996.

LDEQ Office of Water Resources, Water Pollution Control Reference Materials, Rule: Chapter 11, 1991.

LDEQ, Environmental Regulatory Code, Part IX. Water Quality Regulations, February 1997.

The Mitre Corporation prepared for EPA, Impact of Hydrologic Modifications on Water Quality, April 1975.

USACE Waterways Experiment Station, Incorporation of Environmental Features in Flood Control Channel Projects, May 1985.

Fisher Basin

Designed By: R.L.Tillman
Estimated By: Stephen Martinez

Prepared By: Cost Engineering Branch

Preparation Date: 08/07/98
Effective Date of Pricing: 08/07/98

Sales Tax: 8.75%

M C A C E S G O L D E D I T I O N

Release 5.30

** PROJECT SETTINGS **

ESTIMATE TYPE : A-Crews with Auto Reprice

SALES TAX : 8.75%

DATE OF ESCALATION SCHEDULE : 08/07/98

PROJECT DIRECT COST COLUMNS

Col Type	L	E	M	U	X
Rep Width	12	12	12	12	0
Title	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	(Unused)

PROJECT INDIRECT COST COLUMNS

Col Type	U	O	U	P	B
Rep Width	10	10	10	10	10
Title	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND

PROJECT OWNER COST COLUMNS

Col Type	U	E	U	X	X
Rep Width	14	12	12	0	0
Title	CONTINGN	ESCALATN	OTHER	(Unused)	(Unused)

PROJECT BREAKDOWN

PROJECT ID	Length	Trail Sep	Level Title	2nd View Order
Level 1 ID :	2		Contract	0
Level 2 ID :	2	N	Feature	0
Level 3 ID :	2	N	Sub-feat	0
Level 4 ID :	2	N	Catagory	0
Level 5 ID :	2		Element	0
Level 6 ID :	2	.	bid-item	0

Owner Cost Level : 1

** PROJECT SETTINGS **

```
2ND VIEW COLUMNS

         Quantity Column Width : 10

Col Type   X         X         X         X         X
Rep Width   0         0         0         0         0
Title      (Unused)  (Unused)  (Unused)  (Unused)  (Unused)


Shadow     X         X         X         X         X


DETAIL REPORT FORMATTING

PAGE OPTIONS               Page Break Levels : 6
                    Table of Contents Levels : 6

                                               0 1 2 3 4 5 6 7

ROW OPTIONS           Print Titles at Levels :   Y Y N N N Y
                      Print Totals at Levels :   Y Y N N N Y
                       Print Notes at Levels : Y Y Y Y Y Y Y Y
                          Print Unit Cost Row : Y
                            Print Page Footer : Y
                              Show Cost Codes : Y

COLUMNS OPTIONS                Print Crew Id : Y
                                 Crew Output : Y
                                   Unit Cost : Y

UPB TITLES            No. of Levels to Print : 0
                         Bracket Titles With : N N
                        Include titles Notes : N
```

** PROJECT SETTINGS **

OTHER REPORT FORMATTING

COLUMN TITLES FOR SUMMARY REPORTS

Column 1 DISTRIBU : Distribution
Column 2 OVERHEAD : Overhead
Column 3 HOME OFC : Home Office Percent
Column 4 PROFIT : Profit
Column 5 BOND : Bond

Column 1 CONTINGN : Contingency
Column 2 ESCALATN : Escalation
Column 3 OTHER : Other
Column 4 (Unused) : (Unused)
Column 5 (Unused) : (Unused)

STANDARD COLUMN WIDTHS	SUMMARY FEATURES
Quantity Columns : 10	Round Totals Column : N-None
Total cost Columns : 12	Contingency Notes : No
Unit Cost Columns : 10	Show Project Totals : Yes

SPECIAL REPORT FORMATTING OPTIONS

First Alternate ID : (None)
Show Markup at Level : 0
Display Indirect/Owner Markup as : A - Unit Costs Only
CSI Sort at Level : (None)

** PROJECT SETTINGS **

REPORT SELECTION

Project Settings : Y Profit Guidelines : N
Contractor Settings : N
Link Listing : Y Measurement Units : Original

	REPORT FORMAT TYPE			FOR LEVEL (S)						
	Direct	Indirect	Owner	0	1	2	3	4	5	6
Detail :	Y									
Project :	Y	Y	Y		N	Y	N	N	N	Y
Contractor :	N	N		N	N	N	N	N	N	N
Division :	N	N	N	N	N	N	N	N	N	N
System :	N	N	N	N	N	N	N	N	N	N
2nd View :	N									
Crew :	Y			N	N	N	N	N	N	Y
Labor :	Y									
Equipment :	Y									
Prime Labor Cost Level :	N									

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

			AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
A Fisher Basin Flood Protection								
	Contingency	P		0.00				
	Escalation	P		0.00				
	Other	P		0.00				
A 010102 A 1 Real Estate Supplement/Plan								
	Contingency	A	300					
	Escalation	O						
	Other	O						
A 010102 A 5 All Other Re-analysis/Documents								
	Contingency	A	540					
	Escalation	O						
	Other	O						
A 010102 B 1 By Government								
	Contingency	A	6,130					
	Escalation	O						
	Other	O						
A 010102 B 2 By Local Sponsor								
	Contingency	A	138,000					
	Escalation	O						
	Other	O						
A 010102 B 4 Review of LS								
	Contingency	A	4,030					
	Escalation	O						
	Other	O						
A 010102 C 2 By LS								
	Contingency	A	7,500					
	Escalation	O						
	Other	O						
A 010102 C 4 Review of LS								
	Contingency	A	1,500					
	Escalation	O						
	Other	O						
A 010102 E 3 By LS								
	Contingency	A	37,500					
	Escalation	O						
	Other	O						
A 010102 E 5 Review of LS								
	Contingency	A	4,500					
	Escalation	O						
	Other	O						

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

			AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
A 010102 F 1 By Government								
	Contingency	A	880					
	Escalation	O						
	Other	O						
A 010102 F 2 By LS								
	Contingency	A	2,050					
	Escalation	O						
	Other	O						
A 010102 F 4 Review of LS								
	Contingency	A	850					
	Escalation	O						
	Other	O						
A 010102 G 1 By Government								
	Contingency	A	560					
	Escalation	O						
	Other	O						
A 010102 G 2 By LS								
	Contingency	A	4,380					
	Escalation	O						
	Other	O						
A 010102 G 4 Review of LS								
	Contingency	A	880					
	Escalation	O						
	Other	O						
A 010102 G 5 Other								
	Contingency	A	0					
	Escalation	O						
	Other	O						
A 010102 R 1B By LS								
	Contingency	A	414,000					
	Escalation	O						
	Other	O						
A 010102 T 2 Administrative Costs								
	Contingency	A	750					
	Escalation	O						
	Other	O						
A 010102 T 3 PL 91-646 Assistance								
	Contingency	A	230					
	Escalation	O						
	Other	O						

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
A 01010230 1 Project Cooperation Agreement							
Contingency	A	230					
Escalation	O						
Other	O						
A 01010202 1 Relocation of Roads							
Contingency	A	300					
Escalation	O						
Other	O						
A 01010202 2 Relocation of Cemeteries etc.							
Contingency	A	8,100					
Escalation	O						
Other	O						
A 02010201 01 LA HWY 45 - New Ramps							
Contingency	A	81,520					
Escalation	O						
Other	O						
A 02010201 02 LA HWY 45 - Detours							
Contingency	A	54,672					
Escalation	O						
Other	O						
A 02010202 1 Jefferson Parish Waterline							
Contingency	A	8,257					
Escalation	O						
Other	O						
A 02010202 2 LA Gas Service Pipeline							
Contingency	A	3,278					
Escalation	O						
Other	O						
A 02010202 3 U.S. Oil & Gas Inc. Pipelines							
Contingency	A	2,013					
Escalation	O						
Other	O						
A 02010203 1 Entergy, Powerlines & Poles							
Contingency	A	4,336					
Escalation	O						
Other	O						
A 02010203 01 Bellsouth Underground Tel.Cables							
Contingency	A	1,351					
Escalation	O						
Other	O						

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
A 02010203 02 Powerlines & Control Station							
Contingency	A	5,273					
Escalation	O						
Other	O						
A 02010203 03 Pipeline Relocation							
Contingency	A	0					
Escalation	O						
Other	O						
A 02010203 04 Telephone Line Relocation							
Contingency	A	0					
Escalation	O						
Other	O						
A 02010203 05 Miscellaneous							
Contingency	A	0					
Escalation	O						
Other	O						
A 02010204 1 Jefferson Parish Discharge Pipes							
Contingency	A	1,294					
Escalation	O						
Other	O						
A 11010201 01 Mob & Demob							
Contingency	A	28,750					
Escalation	O						
Other	O						
A 11010202 01 Reinf Conc-Bulkhead Fldwl-walls							
Contingency	A	31,000					
Escalation	O						
Other	O						
A 11010202 02 Landside Floodwall, Walls & Col.							
Contingency	A	246,000					
Escalation	O						
Other	O						
A 11010202 03 Concrete Base Slabs							
Contingency	A	12,000					
Escalation	O						
Other	O						
A 11010202 04 Concrete Stabilization Slabs							
Contingency	A	4,500					
Escalation	O						
Other	O						

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

			AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
A 11010202 05 Stairs								
	Contingency	A	9,000					
	Escalation	O						
	Other	O						
A 11010202 06 CZ 101, Landside F/W								
	Contingency	A	259,126					
	Escalation	O						
	Other	O						
A 11010202 07 CZ 114, Bulkhead F/W								
	Contingency	A	141,050					
	Escalation	O						
	Other	O						
A 11010202 08 Timber Piling								
	Contingency	A	21,600					
	Escalation	O						
	Other	O						
A 11010202 09 Excavation								
	Contingency	A	5,400					
	Escalation	O						
	Other	O						
A 11010202 10 Backfill, Landside F/W								
	Contingency	A	4,800					
	Escalation	O						
	Other	O						
A 11010202 11 Backfill, Bulkhead F/W								
	Contingency	A	1,400					
	Escalation	O						
	Other	O						
A 11010202 12 Fertilizing, Seeding, & Mulching								
	Contingency	A	420					
	Escalation	O						
	Other	O						
A 11010202 13 Steel Swing Gates								
	Contingency	A	16,050					
	Escalation	O						
	Other	O						
A 11010202 14 Clearing & Grubbing								
	Contingency	A	5,000					
	Escalation	O						
	Other	O						

** OWNER, OVERTIME, AND ADJUSTMENTS SETTINGS **

		AMOUNT	PERCENT	*ESCALATN DATE* BEGIN	END	*ESCALATN INDEX* BEGIN	END
A 11010202 15 Embankment, Semicompacted Fill							
Contingency	A	160,000					
Escalation	O						
Other	O						
A 11010202 16 Fertilizing & Seeding							
Contingency	A	3,000					
Escalation	O						
Other	O						

0. Fisher Basin
** LINK LISTING **

0. Fisher Basin	REFERENCE	REF VALUE	OPERATOR	LOCAL INPUT	QUANTITY	UOM
0 Fisher Basin					1.0000	EA
A 110102 Fisher Basin Flood Protection					1.0000	EA
A 11010201 Mobilization & Demobilization					2.0000	EA
A 11010201 01 Mob & Demob					4.0000	WD
MOBHR16 mob						
Number of Mob/Demob Days	A 01	4.0000	* Multiply by			WD
Hours per Day	N	8.0000	* Multiply by			HOURS
Number of Mob/Demob	P	2.0000				EA
MOBHR16 mob					64.0000	HOURS
MOBHR26 labor mob hours						
Number of Days for Mob/Demob	A 01	4.0000	* Multiply by			WD
Hours per Day	N	8.0000	* Multiply by			HR/WD
Number of Mob/Demob	P	2.0000				EA
MOBHR26 labor mob hours					64.0000	HOURS
AIR COMPRESSOR 185 CFM	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
AIR COMPRESSOR 900 CFM	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
BACKHOE CAT 235 C 2.0 CY	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
LDR/BKHOE KENT RAM 999,CHISEL	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
2.0 concrete bucket - manual	W MOBHR16	64.0000 HOU	* Multiply by	2.0000	128.0000	HR
CHERRYPICKER GROVE 22 TON	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
CHERRYPICKER GROVE 30 TON	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
MANUAL COMPACTOR WACKER GVR 151	W MOBHR16	64.0000 HOU	* Multiply by	2.0000	128.0000	HR
CRANE AMER 5299-A 60T 75' boom	W MOBHR16	64.0000 HOU	* Multiply by	2.0000	128.0000	HR
DOZER D-4 W/BLADE	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
F E LOADER CAT 953 2.0 CY crwlr	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
MOTOR GRADER CAT 12-G	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
PILE HAMMER VULCAN 06 900 CFM	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
WATER PUMP 3" HOMELITE	W MOBHR16	64.0000 HOU	* Multiply by	2.0000	128.0000	HR
FARM TRACTOR JD 2355	W MOBHR16	64.0000 HOU	* Multiply by	3.0000	192.0000	HR
WATER TRUCK 2000 GAL	W MOBHR16	64.0000 HOU	* Multiply by	2.0000	128.0000	HR
DUMP TRUCK 20 CY	W MOBHR16	64.0000 HOU	* Multiply by	13.0000	832.0000	HR
FLATBED TRUCK 8X12	W MOBHR16	64.0000 HOU	* Multiply by	1.0000	64.0000	HR
CONCRETE VIBR. 3.5"	W MOBHR16	64.0000 HOU	* Multiply by	4.0000	256.0000	HR
WELDER 400 AMP	W MOBHR16	64.0000 HOU	* Multiply by	2.0000	128.0000	HR
LABORER - METRO RATE	W MOBHR26	64.0000 HOU	* Multiply by	4.0000	256.0000	HR

A 11010201 01. Mob & Demob	REFERENCE	REF VALUE	OPERATOR	LOCAL INPUT	QUANTITY UOM
OILER - METRO RATE	W MOBHR26	64.0000 HOU *	Multiply by	1.0000	64.0000 HR
PEO-ALL EXCPT DRGLNE-METRO RATE	W MOBHR26	64.0000 HOU *	Multiply by	13.0000	832.0000 HR
TRUCK DRIVER - METRO RATE	W MOBHR26	64.0000 HOU *	Multiply by	17.0000	1088.0000 HR
BACKHOE CAT 225B 1.25 CY	W MOBHR16	64.0000 HOU *	Multiply by	1.0000	64.0000 HR
PILE DRIVING LEADS -10"x37" 60'	W MOBHR16	64.0000 HOU *	Multiply by	1.0000	64.0000 HR
DOZER, Cat D-5 w/ blade	W MOBHR16	64.0000 HOU *	Multiply by	2.0000	128.0000 HR
pressure washer 3000 psi	W MOBHR16	64.0000 HOU *	Multiply by	2.0000	128.0000 HR
flatbed trk,8x16,64k GVW,350HP	W MOBHR16	64.0000 HOU *	Multiply by	1.0000	64.0000 HR
PILE HAMMER MKT V5B W/POWER PACK	W MOBHR16	64.0000 HOU *	Multiply by	1.0000	64.0000 HR
A 11010202 Fisher Basin Flood Protection					1.0000 EA
A 11010202 15 Embankment, Semicompacted Fill					100000.0000 CY
DUMP016 dump time (in minutes)					
dump time (in minutes)	N	2.0000			MIN
DUMP016 dump time (in minutes)					2.0000 MIN
DUMPTI6 dump time(in hours)					
dump time(in minutes)	W DUMP016	2.0000	/ Divide by		MIN
minutes per hour	N	60.0000			MIN/HR
DUMPTI6 dump time(in hours)					0.0333 HR
HAUL1W6 haul distance (1 way)					
haul distance (1 way)	N	15.0000			MILES
HAUL1W6 haul distance (1 way)					15.0000 MILES
HAULD 6 haul distance (round trip)					
haul distance (1 way)	W HAUL1W6	15.0000	* Multiply by		MILES
make round trip	N	2.0000			MI
HAULD 6 haul distance (round trip)					30.0000 MI
LOAD016 load time (in minutes)					
load time (in minutes)	N	3.0000			MIN
LOAD016 load time (in minutes)					3.0000 MIN

A 11010202 15. Embankment, Semicompacted Fill
** LINK LISTING **

A 11010202 15. Embankment, Semicompacted	REFERENCE	REF VALUE	OPERATOR	LOCAL INPUT	QUANTITY	UOM
LOADTI6 load time (in hours)						
load time (in minutes)	W LOAD016	3.0000	/ Divide by			MIN
minutes per hour	N	60.0000				MIN/HR
LOADTI6 load time (in hours)					0.0500	HR
NTRUCK6 number of trucks needed						
production rate	W PRODRT6 (	150.0000	/ Divide by			CY/HR
work time per hour	W WKTIME6 (	0.8000	/ Divide by			HR
truck cycle time	W TRKCYC6	0.9404	* Multiply by			HR
truck payload	W TRKPAY6	13.0000)	* Multiply by			CY
	N	1.0000)	U Round Up			TRUCKS
round UP to whole number	N	1.0000				TRUCKS
NTRUCK6 number of trucks needed					14.0000	TRUCKS
PRODRT6 production rate						
production rate (CY/HR)	N	150.0000				CY/HR
PRODRT6 production rate					150.0000	CY/HR
QUANTY6 excavation quantity						
excavation quantity	N	100000.0000				CY
QUANTY6 excavation quantity					100000.0000	CY
TIME1 6 total work hours						
excavation quantity	W QUANTY6 (	100000.0000	/ Divide by			CY
production rate	W PRODRT6	150.0000)	R Round			CY/HR
(round UP to whole number)	N	1.0000				FACTOR
TIME1 6 total work hours					667.0000	HRS
TLOADF6 truck load factor						
load factor	N	0.6667				FACTOR
TLOADF6 truck load factor					0.6667	FACTOR
TRKCAP6 truck capacity						

A 11010202 15. Embankment, Semicompacted	REFERENCE	REF VALUE	OPERATOR	LOCAL INPUT	QUANTITY	UOM
truck capacity	N	20.0000				CY
TRKCAP6 truck capacity					20.0000	CY
TRKCYC6 truck cycle time						
truck load time	W LOADTI6	0.0500	+ Add to			HR
haul distance	W HAULD 6 (	30.0000	/ Divide by			MI
travel speed	W TRKSPD6	35.0000)	+ Add to			MPH
dump time	W DUMPTI6	0.0333				HR
TRKCYC6 truck cycle time					0.9404	HR
TRKHRS6 total truck hours						
work time	W TIME1 6	667.0000	* Multiply by			HRS
number of trucks needed	W NTRUCK6	14.0000				TRUCKS
TRKHRS6 total truck hours					9338.0000	HR
TRKPAY6 truck payload - CY per cycle						
truck capacity	W TRKCAP6 (	20.0000	* Multiply by			CY
truck load factor	W TLOADF6	0.6667)	R Round			FACTOR
round number	N	1.0000				CY
TRKPAY6 truck payload - CY per cycle					13.0000	CY
TRKSPD6 truck speed						
truck speed	N	35.0000				MPH
TRKSPD6 truck speed					35.0000	MPH
WKTIME6 work time per hour						
time efficiency per hour	N	0.8000				FACTOR
WKTIME6 work time per hour					0.8000	HR
EQ1 BACKHOE CAT 225B 1.25 CY	W TIME1 6	667.0000 HRS	* Multiply by	1.0000	667.0000	HR
EQ2 DOZER, Cat D-5 w/ blade	W TIME1 6	667.0000 HRS	* Multiply by	2.0000	1334.0000	HR
EQ3 DUMP TRUCK 20 CY	W TRKHRS6	9338.0000 HR	* Multiply by	1.0000	9338.0000	HR
EQ4 WATER TRUCK 2000 GAL	W TIME1 6	667.0000 HRS	* Multiply by	0.2500	166.7500	HR
EQ5 MOTOR GRADER CAT 12-G	W TIME1 6	667.0000 HRS	* Multiply by	0.2500	166.7500	HR

A 11010202 15. Embankment, Semicompacted Fill
** LINK LISTING **

A 11010202 15. Embankment, Semicompacted		REFERENCE	REF VALUE	OPERATOR	LOCAL INPUT	QUANTITY UOM
EQ6	FARM TRACTOR W/DISC J.D. 2355	W TIME1 6	667.0000 HRS *	Multiply by	1.0000	667.0000 HR
EQ7	WATER PUMP 3" HOMELITE	W TIME1 6	667.0000 HRS *	Multiply by	2.0000	1334.0000 HR
LB1	OILER	A EQ1	667.0000 HR *	Multiply by	1.0000	667.0000 HR
LB2	TRUCK DRIVER	A EQ3	9338.0000 HR *	Multiply by	1.0000	9338.0000 HR
LB3	PEO-backhoe	A EQ1	667.0000 HR *	Multiply by	1.0000	667.0000 HR
LB4	PEO-dozer	A EQ2	1334.0000 HR *	Multiply by	1.0000	1334.0000 HR
LB5	PEO-tractor	A EQ6	667.0000 HR *	Multiply by	1.0000	667.0000 HR
LB6	PEO-motor grader	A EQ5	166.7500 HR *	Multiply by	1.0000	166.7500 HR
LB7	TRUCK DRIVER - water truck	A EQ4	166.7500 HR *	Multiply by	1.0000	166.7500 HR
LB8	LABORER	W TIME1 6	667.0000 HRS *	Multiply by	1.0000	667.0000 HR
LB9	flagmen	W TIME1 6	667.0000 HRS *	Multiply by	1.0000	667.0000 HR

A 01. Real Estate/Lands &		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST

A. Fisher Basin Flood Protection
A 01. Real Estate/Lands & Damages
Lands and Damages costs provided by Real Estate Division, NOD.
A 010102 A 1. Real Estate Supplement/Plan

		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR	Real Estate Supp				0.00	0.00	0.00	1200.00	1200.00	
	lement/ Plan	1.00 LS		0.00	0	0	0	1,200	1,200	1200.00
TOTAL	Real Estate Supp	1.00 EA			0	0	0	1,200	1,200	1200.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 010102 A 5. All Other Re-analysis/Documents									
USR	All Other Re-ana				0.00	0.00	0.00	2160.00	2160.00	
	lysis	1.00 LS		0.00	0	0	0	2,160	2,160	2160.00
TOTAL	All Other Re-ana	1.00 EA			0	0	0	2,160	2,160	2160.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 B 1. By Government										
USR By Government					0.00	0.00	0.00	24500.00	24500.00	
	1.00	LS		0.00	0	0	0	24,500	24,500	24500.00
TOTAL By Government	1.00	EA			0	0	0	24,500	24,500	24500.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 B 2. By Local Sponsor									
USR By Local Sponsor				0.00	0.00	0.00	552000.00	552000.00	
	1.00 LS		0.00	0	0	0	552,000	552,000	552000.00
TOTAL By Local Sponsor	1.00 EA			0	0	0	552,000	552,000	552000.00

A 01. Real Estate/Lands &	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 B 4. Review of LS										
USR Review of LS					0.00	0.00	0.00	16120.00	16120.00	
	1.00	LS		0.00	0	0	0	16,120	16,120	16120.00
TOTAL Review of LS	1.00	EA			0	0	0	16,120	16,120	16120.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 C 2. By LS									
USR By LS				0.00	0.00	0.00	30000.00	30000.00	
	1.00 LS		0.00	0	0	0	30,000	30,000	30000.00
TOTAL By LS	1.00 EA			0	0	0	30,000	30,000	30000.00

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 C 4. Review of LS									
USR Review of LS				0.00	0.00	0.00	6000.00	6000.00	
	1.00 LS		0.00	0	0	0	6,000	6,000	6000.00
TOTAL Review of LS	1.00 EA			0	0	0	6,000	6,000	6000.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 E 3. By LS									
USR By LS				0.00	0.00	0.00	150000.00	150000.00	
	1.00 LS		0.00	0	0	0	150,000	150,000	150000.00
TOTAL By LS	1.00 EA			0	0	0	150,000	150,000	150000.00

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 E 5. Review of LS									
USR Review of LS				0.00	0.00	0.00	18000.00	18000.00	
	1.00 LS		0.00	0	0	0	18,000	18,000	18000.00
TOTAL Review of LS	1.00 EA			0	0	0	18,000	18,000	18000.00

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 F 1. By Government									
USR By Government				0.00	0.00	0.00	3500.00	3500.00	
	1.00 LS		0.00	0	0	0	3,500	3,500	3500.00
TOTAL By Government	1.00 EA			0	0	0	3,500	3,500	3500.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 F 2. By LS									
USR By LS				0.00	0.00	0.00	8200.00	8200.00	
	1.00 LS		0.00	0	0	0	8,200	8,200	8200.00
TOTAL By LS	1.00 EA			0	0	0	8,200	8,200	8200.00

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 F 4. Review of LS									
USR Review of LS				0.00	0.00	0.00	3400.00	3400.00	
	1.00 LS		0.00	0	0	0	3,400	3,400	3400.00
TOTAL Review of LS	1.00 EA			0	0	0	3,400	3,400	3400.00

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 G 1. By Government									
USR By Government				0.00	0.00	0.00	2240.00	2240.00	
	1.00 LS		0.00	0	0	0	2,240	2,240	2240.00
TOTAL By Government	1.00 EA			0	0	0	2,240	2,240	2240.00

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 G 2. By LS									
USR By LS				0.00	0.00	0.00	17500.00	17500.00	
	1.00 LS		0.00	0	0	0	17,500	17,500	17500.00
TOTAL By LS	1.00 EA			0	0	0	17,500	17,500	17500.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 G 4. Review of LS								
USR Review of LS			0.00	0.00	0.00	3500.00	3500.00	
	1.00 LS	0.00	0	0	0	3,500	3,500	3500.00
TOTAL Review of LS	1.00 EA		0	0	0	3,500	3,500	3500.00

A 01. Real Estate/Lands &	QUANTY UOM CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 010102 G 5. Other							
TOTAL Other	1.00 EA		0	0	0	0	0	0.00
	A 010102 R 1B. By LS							
USR By LS			0.00	0.00	0.00	828000.00	828000.00	
	1.00 LS	0.00	0	0	0	828,000	828,000	828000.00
USR By LS			0.00	0.00	0.00	828000.00	828000.00	
	1.00 LS	0.00	0	0	0	828,000	828,000	828000.00
TOTAL By LS	1.00 EA		0	0	0	1,656,000	1,656,000	1656000

A 01. Real Estate/Lands &		QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 010102 T 2. Administrative Costs										
USR	Administrative C					0.00	0.00	0.00	3000.00	3000.00	
	osts	1.00	LS		0.00	0	0	0	3,000	3,000	3000.00
TOTAL	Administrative C	1.00	EA			0	0	0	3,000	3,000	3000.00

A 01. Real Estate/Lands &		QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 010102 T 3. PL 91-646 Assistance										
USR	PL 91-646 Assistance	1.00	LS		0.00	0.00 0	0.00 0	0.00 0	900.00 900	900.00 900	900.00
TOTAL	PL 91-646 Assist	1.00	EA			0	0	0	900	900	900.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 01010230 1. Project Cooperation Agreement									
USR PCA				0.00	0.00	0.00	900.00	900.00	
	1.00 LS		0.00	0	0	0	900	900	900.00
TOTAL Project Cooperat	1.00 EA			0	0	0	900	900	900.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 01010202 1. Relocation of Roads									
USR	Roads & Bridges				0.00	0.00	0.00	1200.00	1200.00	
		1.00 LS		0.00	0	0	0	1,200	1,200	1200.00
TOTAL	Relocation of Ro	1.00 EA			0	0	0	1,200	1,200	1200.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 01010202 2. Relocation of Cemeteries etc.									
USR	Utilities & Stru				0.00	0.00	0.00	32400.00	32400.00	
	ctures	1.00 LS		0.00	0	0	0	32,400	32,400	32400.00
TOTAL	Relocation of Ce	1.00 EA			0	0	0	32,400	32,400	32400.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 010102R2 2B. By LS								
USR By LS				0.00	0.00	0.00	30000.00	30000.00	
	1.00 LS		0.00	0	0	0	30,000	30,000	30000.00
TOTAL By LS	1.00 EA			0	0	0	30,000	30,000	30000.00

A. Fisher Basin Flood Protection

A 01. Real Estate/Lands &	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR Roundoff					0.00	0.00	0.00	70.00	70.00	
	1.00	LS		0.00	0	0	0	70	70	70.00
TOTAL Real Estate/Land	1.00	EA			0	0	0	2,562,790	2,562,790	2562790

A 02. Relocations	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST

A 02. Relocations
Relocation costs include 5% Owner's E&D and 10% Owner's Contract Administration.
A 02010201 01. LA HWY 45 - New Ramps

USR LA HWY 45					0.00	0.00	0.00	271734.00	271734.00	
	1.00	LS		0.00	0	0	0	271,734	271,734	271734.00
TOTAL LA HWY 45 - New	1.00	EA			0	0	0	271,734	271,734	271734.00

A. Fisher Basin Flood Protection

A 02. Relocations		QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 02010201 02. LA HWY 45 - Detours										
USR	LA HWY 45 - Deto					0.00	0.00	0.00	156205.00	156205.00	
	urs	1.00	LS		0.00	0	0	0	156,205	156,205	156205.00
	TOTAL LA HWY 45 - Deto					0	0	0	156,205	156,205	

A 02. Relocations		QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 02010202 1. Jefferson Parish Waterline										
USR	8 Inch Waterline					0.00	0.00	0.00	33028.00	33028.00	
		1.00	LS		0.00	0	0	0	33,028	33,028	33028.00
	TOTAL Jefferson Parish					0	0	0	33,028	33,028	

A 02. Relocations	QUANTY UOM CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 02010202 2. LA Gas Service Pipeline								
USR 3 Inch Gas Pipel			0.00	0.00	0.00	13110.00	13110.00	
ine	1.00 LS	0.00	0	0	0	13,110	13,110	13110.00
TOTAL LA Gas Service P			0	0	0	13,110	13,110	

A 02. Relocations		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 02010202 3. U.S. Oil & Gas Inc. Pipelines									
USR	2 1/2 Inch Aband				0.00	0.00	0.00	8050.00	8050.00	
	oned Pipeline	1.00 LS		0.00	0	0	0	8,050	8,050	8050.00
TOTAL	U.S. Oil & Gas I				0	0	0	8,050	8,050	

A 02. Relocations		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 02010203 1. Entergy, Powerlines & Poles									
USR	Entergy Powerlin				0.00	0.00	0.00	17342.00	17342.00	
	es & Poles	1.00 LS		0.00	0	0	0	17,342	17,342	17342.00
	TOTAL Entergy, Powerli				0	0	0	17,342	17,342	

A. Fisher Basin Flood Protection

A 02. Relocations		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 02010203 01. Bellsouth Underground Tel.Cables									
USR	Bellsouth Underg				0.00	0.00	0.00	5405.00	5405.00	
	round Tel.Cables	1.00 LS		0.00	0	0	0	5,405	5,405	5405.00
TOTAL	Bellsouth Underg				0	0	0	5,405	5,405	

A 02. Relocations		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 02010203 02. Powerlines & Control Station									
USR	Powerlines & Con				0.00	0.00	0.00	21091.00	21091.00	
	trol Station	1.00 LS		0.00	0	0	0	21,091	21,091	21091.00
TOTAL	Powerlines & Con				0	0	0	21,091	21,091	

A 02. Relocations	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 02010203 03. Pipeline Relocation									
TOTAL Pipeline Relocat	1.00 EA			0	0	0	0	0	0.00
A 02010203 04. Telephone Line Relocation									
TOTAL Telephone Line R	1.00 EA			0	0	0	0	0	0.00
A 02010203 05. Miscellaneous									
TOTAL Miscellaneous	1.00 EA			0	0	0	0	0	0.00
A 02010204 1. Jefferson Parish Discharge Pipes									
USR 24" & 18" Discha				0.00	0.00	0.00	5175.00	5175.00	
rge Pipes	1.00 LS		0.00	0	0	0	5,175	5,175	5175.00
TOTAL Jefferson Parish				0	0	0	5,175	5,175	

A. Fisher Basin Flood Protection

A 02. Relocations	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 020102XX 1. Roundoff									
USR Roundoff				0.00	0.00	0.00	66.00	66.00	
	1.00 LS		0.00	0	0	0	66	66	66.00
TOTAL Roundoff	1.00 EA			0	0	0	66	66	66.00
TOTAL Relocations	1.00 EA			0	0	0	531,206	531,206	531206.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11. Fisher Basin Flood Protection										
A 11010201 01. Mob & Demob										
This item is for all equipment, labor, and materials required to mobilize to and demobilize from the jobsite. Mobilization will take 2 wd and Demob will be 1 wd.										
USR PM AIR COMPRESSOR 1					0.00	2.20	0.00	0.00	2.20	
85 CFM	64.00	HR	AIRA	1.00	0	141	0	0	141	2.20
USR PM AIR COMPRESSOR 9					0.00	8.33	0.00	0.00	8.33	
00 CFM	64.00	HR	AIRC	1.00	0	533	0	0	533	8.33
USR PM BACKHOE CAT 235					0.00	43.82	0.00	0.00	43.82	
C 2.0 CY	64.00	HR	BKHC	1.00	0	2,804	0	0	2,804	43.82
USR PM LDR/BKHOE KENT R					0.00	1.89	0.00	0.00	1.89	
AM 999,CHISEL	64.00	HR	BKHF	1.00	0	121	0	0	121	1.89
USR PM 2.0 concrete buc					0.00	0.36	0.00	0.00	0.36	
ket - manual	128.00	HR	BKTA	1.00	0	46	0	0	46	0.36
USR PM CHERRYPICKER GRO					0.00	16.92	0.00	0.00	16.92	
VE 22 TON	64.00	HR	CHYAA	1.00	0	1,083	0	0	1,083	16.92
USR PM CHERRYPICKER GRO					0.00	22.21	0.00	0.00	22.21	
VE 30 TON	64.00	HR	CHYB	1.00	0	1,421	0	0	1,421	22.21
USR PM MANUAL COMPACTOR					0.00	0.58	0.00	0.00	0.58	
WACKER GVR 151	128.00	HR	COMP	1.00	0	74	0	0	74	0.58
USR PM CRANE AMER 5299-					0.00	38.46	0.00	0.00	38.46	
A 60T 75' boom	128.00	HR	CRNA	1.00	0	4,923	0	0	4,923	38.46
USR PM DOZER D-4 W/BLAD					0.00	8.82	0.00	0.00	8.82	
E	64.00	HR	DOZA	1.00	0	564	0	0	564	8.82
USR PM F E LOADER CAT 9					0.00	15.48	0.00	0.00	15.48	
53 2.0 CY crwlr	64.00	HR	FELA	1.00	0	991	0	0	991	15.48

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR PM MOTOR GRADER CAT					0.00	16.15	0.00	0.00	16.15	
12-G	64.00	HR	MOTG	1.00	0	1,034	0	0	1,034	16.15
USR PM PILE HAMMER VULC					0.00	7.05	0.00	0.00	7.05	
AN 06 900 CFM	64.00	HR	PILC	1.00	0	451	0	0	451	7.05
USR PM WATER PUMP 3" HO					0.00	0.16	0.00	0.00	0.16	
MELITE	128.00	HR	PMPC	1.00	0	20	0	0	20	0.16
USR PM FARM TRACTOR JD					0.00	2.49	0.00	0.00	2.49	
2355	192.00	HR	TRCB	1.00	0	478	0	0	478	2.49
USR PM WATER TRUCK 2000					0.00	5.81	0.00	0.00	5.81	
GAL	128.00	HR	TRKA	1.00	0	744	0	0	744	5.81
USR PM DUMP TRUCK 20 CY					0.00	17.69	0.00	0.00	17.69	
	832.00	HR	TRKB	1.00	0	14,718	0	0	14,718	17.69
USR PM FLATBED TRUCK 8X					0.00	4.28	0.00	0.00	4.28	
12	64.00	HR	TRKD	1.00	0	274	0	0	274	4.28
USR PM CONCRETE VIBR.					0.00	0.31	0.00	0.00	0.31	
3.5"	256.00	HR	VIBR	1.00	0	79	0	0	79	0.31
USR PM WELDER 400 AMP					0.00	1.19	0.00	0.00	1.19	
	128.00	HR	WELD	1.00	0	152	0	0	152	1.19
USR PM LABORER - METRO					12.32	0.00	0.00	0.00	12.32	
RATE	256.00	HR	LABM	1.00	3,153	0	0	0	3,153	12.32
USR PM OILER - METRO RA					13.07	0.00	0.00	0.00	13.07	
TE	64.00	HR	OILM	1.00	836	0	0	0	836	13.07
USR PM PEO-ALL EXCPT DR					20.42	0.00	0.00	0.00	20.42	
GLNE-METRO RATE	832.00	HR	PEOM	1.00	16,987	0	0	0	16,987	20.42
USR PM TRUCK DRIVER - M					13.07	0.00	0.00	0.00	13.07	
ETRO RATE	1088.00	HR	TRKM	1.00	14,217	0	0	0	14,217	13.07

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR PM trailering charg					0.00	0.00	0.00	900.00	900.00	
es x 1.5 - LG	12.00	EA		0.00	0	0	0	10,800	10,800	900.00
USR PM safety & misc x					0.00	0.00	0.00	6006.00	6006.00	
1.5	1.00	LS		0.00	0	0	0	6,006	6,006	6006.00
USR PM trailering charg					0.00	0.00	0.00	800.00	800.00	
es x 1.5 - SMall	5.00	EA		0.00	0	0	0	4,000	4,000	800.00
USR PM BACKHOE CAT 225B					0.00	26.95	0.00	0.00	26.95	
1.25 CY	64.00	HR	BKHB	1.00	0	1,725	0	0	1,725	26.95
USR PM PILE DRIVING LEA					0.00	3.66	0.00	0.00	3.66	
DS -10"x37" 60'	64.00	HR	CRNL1	1.00	0	234	0	0	234	3.66
USR PM DOZER, Cat D-5 w					0.00	14.33	0.00	0.00	14.33	
/ blade	128.00	HR	DOZE	1.00	0	1,834	0	0	1,834	14.33
USR PM pressure washer					0.00	0.69	0.00	0.00	0.69	
3000 psi	128.00	HR	PRESWASH	1.00	0	88	0	0	88	0.69
USR PM flatbed trk,8x16					0.00	11.21	0.00	0.00	11.21	
,64k GVW,350HP	64.00	HR	TRKJ	1.00	0	717	0	0	717	11.21
USR PM PILE HAMMER MKT					0.00	11.70	0.00	0.00	11.70	
V5B W/POWER PACK	64.00	HR	PILF	1.00	0	749	0	0	749	11.70
TOTAL Mob & Demob	4.00	WD			35,193	36,001	0	20,806	92,000	22999.96

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 01. Reinf Conc-Bulkhead Fldwl-walls This item covers the cost for all equipment, labor, materials, and supplies necessary to construct concrete walls and columns. The unit price used for the materials (which include the reinforcing steel, formwork, concrete, etc.) is referenced from ongoing projects in New Orleans.										
USR PM Reinforced Concr					57.04	8.97	0.00	0.00	66.01	
ete install	310.00	CY	CONCM	3.20	17,682	2,781	0	0	20,463	66.01
Conc Placemnt Incl Fmwk,Rstl,Etc										
USR PM Safety & misc					0.00	0.00	0.00	1198.21	1198.21	
	1.00	LS		0.00	0	0	0	1,198	1,198	1198.21
USR PM MATL- reinf conc					0.00	0.00	250.13	0.00	250.13	
, resteel, fmwk	310.00	CY		0.00	0	0	77,539	0	77,539	250.12
TOTAL Reinf Conc-Bulkh	310.00	CY			17,682	2,781	77,539	1,198	99,200	320.00

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 02. Landside Floodwall, Walls & Col.									
This item covers the cost for all equipment, labor, materials, and supplies necessary to construct concrete walls and columns. The unit price used for the materials (which include the reinforcing steel, formwork, concrete, etc.) is referenced from ongoing projects in New Orleans.									
USR PM Reinforced Concr				57.04	8.97	0.00	0.00	66.01	
ete install	2050.00 CY	CONCM	3.20	116,928	18,392	0	0	135,320	66.01
Conc Placemnt Incl Fmwk,Rstl,Etc									
USR PM Safety & misc				0.00	0.00	0.00	7923.66	7923.66	
	1.00 LS		0.00	0	0	0	7,924	7,924	7923.66
USR PM MATL- reinf conc				0.00	0.00	250.13	0.00	250.13	
, resteel, fmwk	2050.00 CY		0.00	0	0	512,756	0	512,756	250.13
TOTAL Landside Floodwa	2050.00 CY			116,928	18,392	512,756	7,924	656,000	320.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 03. Concrete Base Slabs										
This item covers the cost for all equipment, labor, materials, and supplies necessary to construct reinforced concrete base slabs. The unit price for all materials (including resteel, concrete, & formwork etc.) is referenced from ongoing projects advertised by NOD.										
USR PM Reinf. Concrete					14.80	0.95	0.00	0.00	15.75	
Base Slab	200.00	CY	BSLBM	10.00	2,960	190	0	0	3,150	15.75
USR PM Safety & Miscell					0.00	0.00	0.00	2749.86	2749.86	
aneous	1.00	LS		0.00	0	0	0	2,750	2,750	2749.86
Conc Fldwl Base Slab										
USR PM Matl's, resteel,					0.00	0.00	130.50	0.00	130.50	
formwork, conc.	200.00	CY		0.00	0	0	26,100	0	26,100	130.50
TOTAL Concrete Base Sl	200.00	CY			2,960	190	26,100	2,750	32,000	160.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 04. Concrete Stabilization Slabs This item covers the cost for all equipment, labor, materials, and supplies necessary for constructing stabilization slabs. The unit price for materials is referenced from ongoing projects advertised by NOD.										
USR PM Concrete Stab. S					9.79	0.00	0.00	0.00	9.79	
lab	150.00	CY	STABM	5.00	1,468	0	0	0	1,468	9.79
Stabilization Slab										
USR PM Safety & Miscell					0.00	0.00	0.00	417.84	417.84	
aneous	1.00	LS		0.00	0	0	0	418	418	417.84
USR PM Matl's, concrete					0.00	0.00	67.43	0.00	67.43	
& formwork	150.00	CY		0.00	0	0	10,114	0	10,114	67.43
TOTAL Concrete Stabili	150.00	CY			1,468	0	10,114	418	12,000	80.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 05. Stairs										
This item covers the cost for all equipment, labor, materials, and supplies necessary to construct concrete stairs. The unit price used for materials (including resteel, formwork, concrete, etc.) is referenced from similar projects advertised by NOD.										
USR PM Reinforced Concr					57.04	8.97	0.00	0.00	66.01	
ete install	75.00	CY	CONCM	3.20	4,278	673	0	0	4,951	66.01
Conc Placemnt Incl Fmwk,Rstl,Etc										
USR PM Safety & misc					0.00	0.00	0.00	289.89	289.89	
	1.00	LS		0.00	0	0	0	290	290	289.89
USR PM MATL- reinf conc					0.00	0.00	250.13	0.00	250.13	
, resteel, fmwk	75.00	CY		0.00	0	0	18,759	0	18,759	250.12
TOTAL Stairs	75.00	CY			4,278	673	18,759	290	24,000	320.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 06. CZ 101, Landside F/W This item covers the cost for all equipment, labor, material, and supplies necessary to furnish and drive CZ 101 steel sheet piling.										
USR PM Driving Steel Sh					0.99	0.65	0.00	0.00	1.64	
eet Piling	69100	SF	STPLM	150.00	68,381	45,191	0	0	113,573	1.64
Pile Driving,Steel Sheet Pz-22										
USR PM Safety & Miscell					0.00	0.00	0.00	13830.66	13830.66	
aneous	1.00	LS		0.00	0	0	0	13,831	13,831	13830.66
USR PM Matl's, CZ 101 S					0.00	0.00	8.16	0.00	8.16	
heet Pile	69100	SF		0.00	0	0	563,597	0	563,597	8.16
TOTAL CZ 101, Landside	69100	SF			68,381	45,191	563,597	13,831	691,000	10.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 07. CZ 114, Bulkhead F/W This item covers the cost for all equipment, labor, material, and supplies necessary to furnish and drive CZ 114 steel sheet piling.										
USR PM Driving Steel Sh					0.99	0.65	0.00	0.00	1.64	
eet Piling	40300	SF	STPLM	150.00	39,881	26,356	0	0	66,237	1.64
Pile Driving,Steel Sheet Pz-22										
USR PM Safety & Miscell					0.00	0.00	0.00	12599.79	12599.79	
aneous	1.00	LS		0.00	0	0	0	12,600	12,600	12599.79
USR PM Matl's, CZ 114 S					0.00	0.00	9.24	0.00	9.24	
heet Pile	40300	SF		0.00	0	0	372,523	0	372,523	9.24
TOTAL CZ 114, Bulkhead	40300	SF			39,881	26,356	372,523	12,600	451,360	11.20

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 08. Timber Piling This item covers the cost for furnishing and driving all timber piling for this project. Timber piles will be delivered to the project site by a local supplier.									
USR PM Driving Timber P				0.65	0.39	0.00	0.00	1.05	
ile	6000.00 LF	WDPLM	240.00	3,910	2,362	0	0	6,271	1.05
Pile Driving, Timber , 12" Dia									
USR PM Materials, Timbe				0.00	0.00	8.16	0.00	8.16	
r Piles	6000.00 LF		0.00	0	0	48,938	0	48,938	8.16
Pile Driving, Timber , 12" Dia									
USR PM Safety & Miscell				0.00	0.00	0.00	2391.30	2391.30	
aneous	1.00 LS		0.00	0	0	0	2,391	2,391	2391.30
TOTAL Timber Piling	6000.00 LF			3,910	2,362	48,938	2,391	57,600	9.60

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 09. Excavation This item covers the cost for all equipment, labor, materials, and supplies necessary to perform all excavation operations.									
USR PM Structural Excav				2.50	1.96	0.00	0.00	4.46	
ation	3000.00 CY	SEXCM	18.00	7,508	5,870	0	0	13,378	4.46
Structural Excavation									
USR PM Safety & Miscell				0.00	0.00	0.00	1021.80	1021.80	
aneous	1.00 LS		0.00	0	0	0	1,022	1,022	1021.80
TOTAL Excavation	3000.00 CY			7,508	5,870	0	1,022	14,400	4.80

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 10. Backfill, Landside F/W										
This item covers the cost for all equipment, labor, materials, and supplies necessary for performing backfilling operations for this project.										
PM Safety & Miscell					0.00	0.00	0.00	844.00	844.00	
aneous	1.00	LS		0.00	0	0	0	844	844	844.00
USR PM Backfill, Landsi					2.43	3.55	0.00	0.00	5.98	
de F/W	2000.00	CY	FILHL29	210.00	4,866	7,090	0	0	11,956	5.98
TOTAL Backfill, Landsi	2000.00	CY			4,866	7,090	0	844	12,800	6.40

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 11. Backfill, Bulkhead F/W										
This item covers the cost for all equipment, labor, materials, and supplies necessary for performing backfilling operations for this project.										
PM Safety & Miscell					0.00	0.00	0.00	295.40	295.40	
aneous	1.00	LS		0.00	0	0	0	295	295	295.40
USR PM Backfill, Bulkhe					2.43	3.55	0.00	0.00	5.98	
ad F/W	700.00	CY	FILHL29	210.00	1,703	2,482	0	0	4,185	5.98
TOTAL Backfill, Bulkhe	700.00	CY			1,703	2,482	0	295	4,480	6.40

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 12. Fertilizing, Seeding, & Mulching This item covers the cost for fertilizing, seeding, and mulching. The price shown below reflects a subcontracted price per acre referenced from ongoing projects throughout New Orleans.									
USR PM Subcontracted Fe				0.00	0.00	0.00	1600.00	1600.00	
rt/Seed/Mulch	0.70 AC		0.00	0	0	0	1,120	1,120	1600.00
TOTAL Fertilizing, See	0.70 AC			0	0	0	1,120	1,120	1600.00

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST

A 11010202 13. Steel Swing Gates

This item covers the cost to fabricate, paint, and install 10 steel swing gates and 10 pedestrian gates. The breakdown on the sizes are as follow:

Swing Gates -- 1 each 15'x 3.5'
2 each 15'x 4'
3 each 15'x 5'
1 each 30'x 3.5'
1 each 30'x 4'

Pedestrian Gates -- 10 each 6.5'x 3.5'

The unit price used for this item is referenced from ongoing projects in New Orleans.

	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR PM Steel Swing Gate					0.00	0.00	0.00	2.00	2.00	
(Subcontracted)	21400	LBS		0.00	0	0	0	42,800	42,800	2.00
TOTAL Steel Swing Gate	21400	LBS			0	0	0	42,800	42,800	2.00

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 14. Clearing & Grubbing This item covers the cost for all equipment, labor, materials, and supplies necessary to clear and grub the project site.									
USR PM Clearing & Grubb				356.55	402.25	0.00	0.00	758.80	
ing	25.00 AC	CLRHM	0.16	8,914	10,056	0	0	18,970	758.80
Clearing & Grubbing - Heavy									
USR PM Safety & Miscell				0.00	0.00	0.00	1029.89	1029.89	
aneous	1.00 LS		0.00	0	0	0	1,030	1,030	1029.89
TOTAL Clearing & Grubb	25.00 AC			8,914	10,056	0	1,030	20,000	800.00

A 11010202 15. Embankment, Semicompacted Fill

This item of work consists of furnishing all equipment, labor, materials and supplies necessary for excavating, hauling, spreading and compacting the semicompacted fill material. The embankment material will be excavated from a local borrow pit. A backhoe will excavate the material and on-road dump trucks will haul the material to the required areas. At the levee, dozers will spread and compact the embankment.

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR PM safety & misc					0.00	0.00	0.00	1685.38	1685.38	
	1.00	LS		0.00	0	0	0	1,685	1,685	1685.38
USR PM testing					0.00	0.00	0.00	11000.00	11000.00	
	1.00	LS		0.00	0	0	0	11,000	11,000	11000.00
USR PM small tools					0.00	0.00	0.00	0.00	0.00	
	1.00	LS		0.00	0	0	0	0	0	0.00
USR PM BACKHOE CAT 225B					0.00	39.38	0.00	0.00	39.38	
1.25 CY	667.00	HR	BKHB	1.00	0	26,266	0	0	26,266	39.38
USR PM DOZER, Cat D-5 w					0.00	30.11	0.00	0.00	30.11	
/ blade	1334.00	HR	DOZE	1.00	0	40,167	0	0	40,167	30.11
USR PM DUMP TRUCK 20 CY					0.00	36.55	0.00	0.00	36.55	
	9338.00	HR	TRKB	1.00	0	341,304	0	0	341,304	36.55
USR PM WATER TRUCK 2000					0.00	14.49	0.00	0.00	14.49	
GAL	166.75	HR	TRKA	1.00	0	2,416	0	0	2,416	14.49
USR PM MOTOR GRADER CAT					0.00	25.57	0.00	0.00	25.57	
12-G	166.75	HR	MOTG	1.00	0	4,264	0	0	4,264	25.57
USR PM FARM TRACTOR W/D					0.00	5.89	0.00	0.00	5.89	
ISC J.D. 2355	667.00	HR	TRAC	1.00	0	3,929	0	0	3,929	5.89
USR PM WATER PUMP 3" HO					0.00	1.31	0.00	0.00	1.31	
MELITE	1334.00	HR	PMPC	1.00	0	1,748	0	0	1,748	1.31
USR PM OILER					13.07	0.00	0.00	0.00	13.07	
	667.00	HR	OILM	1.00	8,716	0	0	0	8,716	13.07
USR PM TRUCK DRIVER					13.07	0.00	0.00	0.00	13.07	
	9338.00	HR	TRKM	1.00	122,020	0	0	0	122,020	13.07

A. Fisher Basin Flood Protection

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
USR PM PEO-backhoe				20.42	0.00	0.00	0.00	20.42	
	667.00 HR	PEOM	1.00	13,618	0	0	0	13,618	20.42
USR PM PEO-dozer				20.42	0.00	0.00	0.00	20.42	
	1334.00 HR	PEOM	1.00	27,237	0	0	0	27,237	20.42
USR PM PEO-tractor				20.42	0.00	0.00	0.00	20.42	
	667.00 HR	PEOM	1.00	13,618	0	0	0	13,618	20.42
USR PM PEO-motor grader				20.42	0.00	0.00	0.00	20.42	
	166.75 HR	PEOM	1.00	3,405	0	0	0	3,405	20.42
USR PM TRUCK DRIVER - w				13.07	0.00	0.00	0.00	13.07	
ater truck	166.75 HR	TRKM	1.00	2,179	0	0	0	2,179	13.07
USR PM LABORER				12.32	0.00	0.00	0.00	12.32	
	667.00 HR	LABM	1.00	8,215	0	0	0	8,215	12.32
USR PM flagmen				12.32	0.00	0.00	0.00	12.32	
	667.00 HR	LABM	1.00	8,215	0	0	0	8,215	12.32
TOTAL Embankment, Semi	100000 CY			207,221	420,093	0	12,685	640,000	6.40

A 11. Fisher Basin Flood	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 16. Fertilizing & Seeding									
This item covers the cost for fertilizing and seeding. The price per acre shown below reflects a subcontracted quote referenced from ongoing projects in New Orleans.									
USR PM Fertilizing & Seeding	1.00 LS		0.00	0.00 0	0.00 0	0.00 0	12000.00 12,000	12000.00 12,000	12000.00
TOTAL Fertilizing & Se				0	0	0	12,000	12,000	

A 11. Fisher Basin Flood	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 11010202 XX. Roundoff										
USR PM Roundoff					0.00	0.00	0.00	44.00	44.00	
	1.00	LS		0.00	0	0	0	44	44	44.00
TOTAL Roundoff					0	0	0	44	44	
TOTAL Fisher Basin Flo	1.00	EA			520,893	577,538	1,630,326	134,048	2,862,804	2862804

A 30. Engineering & Desig	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 30. Engineering & Design									
A 30010203 1. Engineering Div., Geotech Branch									
USR Geotech Branch				0.00	0.00	0.00	56000.00	56000.00	
	1.00 LS		0.00	0	0	0	56,000	56,000	56000.00
TOTAL Engineering Div.				0	0	0	56,000	56,000	

A 30. Engineering & Desig	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 30010203 2. Engineering Div., Struct. Branch										
USR Structures Branch					0.00	0.00	0.00	81250.00	81250.00	
	1.00	LS		0.00	0	0	0	81,250	81,250	81250.00
TOTAL Engineering Div.					0	0	0	81,250	81,250	

A 30. Engineering & Desig		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 30010203 3. Engineering Div.,General Eng. BR									
USR	General Engineer				0.00	0.00	0.00	3350.00	3350.00	
	ing Branch	1.00 LS		0.00	0	0	0	3,350	3,350	3350.00
	TOTAL Engineering Div.				0	0	0	3,350	3,350	

A. Fisher Basin Flood Protection

A 30. Engineering & Desig	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 30010203 4. Engineering Div., Cost Eng. Br									
USR Cost Engineering				0.00	0.00	0.00	18000.00	18000.00	
Branch	1.00 LS		0.00	0	0	0	18,000	18,000	18000.00
TOTAL Engineering Div.				0	0	0	18,000	18,000	

A 30. Engineering & Desig	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 30010203 5. Engineering Div., Hydraulics Br									
USR Hydraulics Branch	1.00 LS		0.00	0.00 0	0.00 0	0.00 0	2500.00 2,500	2500.00 2,500	2500.00
TOTAL Engineering Div.				0	0	0	2,500	2,500	

A 30. Engineering & Desig	QUANTY UOM CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 30010203 6. Engineering Div., Civil Branch								
USR Civil Branch			0.00	0.00	0.00	80000.00	80000.00	
	1.00 LS	0.00	0	0	0	80,000	80,000	80000.00
TOTAL Engineering Div.			0	0	0	80,000	80,000	

A 30. Engineering & Desig		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 30010203 7. Engineering Div., Design Service									
USR	Design Services				0.00	0.00	0.00	16000.00	16000.00	
	Branch	1.00 LS		0.00	0	0	0	16,000	16,000	16000.00
	TOTAL Engineering Div.				0	0	0	16,000	16,000	

A 30. Engineering & Desig	QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 30010203 8. Engineering Div., Surveys									
USR Surveys				0.00	0.00	0.00	90000.00	90000.00	
	1.00 LS		0.00	0	0	0	90,000	90,000	90000.00
TOTAL Engineering Div.				0	0	0	90,000	90,000	

A 30. Engineering & Desig		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 30010203 9. Construction Division									
USR	Construction Division	1.00 LS		0.00	0.00 0	0.00 0	0.00 0	25000.00 25,000	25000.00 25,000	25000.00
TOTAL	Construction Div				0	0	0	25,000	25,000	

A. Fisher Basin Flood Protection

A 30. Engineering & Desig		QUANTY UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
	A 30010203 10. Project Management Division									
USR	Project Manageme nt	1.00 LS		0.00	0.00 0	0.00 0	0.00 0	40000.00 40,000	40000.00 40,000	40000.00
TOTAL	Project Manageme				0	0	0	40,000	40,000	
TOTAL	Engineering & De	1.00 EA			0	0	0	412,100	412,100	412100.00

A 31. Construction Manage	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 31. Construction Management - S & A										
A 31 1 2 3 1. S & A for Construction Div.										
USR Construction Div					0.00	0.00	0.00	720000.00	720000.00	
ision	1.00	LS		0.00	0	0	0	720,000	720,000	720000.00
TOTAL S & A for Constr	1.00	EA			0	0	0	720,000	720,000	720000.00

A 31. Construction Manage	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 31 1 2 3 2. S & A for Project Management										
USR Project Manageme nt					0.00	0.00	0.00	30000.00	30000.00	
	1.00	LS		0.00	0	0	0	30,000	30,000	30000.00
TOTAL S & A for Projec	1.00	EA			0	0	0	30,000	30,000	30000.00
TOTAL Construction Man	1.00	EA			0	0	0	750,000	750,000	750000.00

A XX. Mitigation	QUANTY	UOM	CREW ID	OUTPUT	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A XX. Mitigation										
A XX 1 1 1 1. Mitigation										
USR Mitigation					0.00	0.00	0.00	17500.00	17500.00	
	1.00	LS		0.00	0	0	0	17,500	17,500	17500.00
TOTAL Mitigation	1.00	EA			0	0	0	17,500	17,500	17500.00
TOTAL Mitigation	1.00	EA			0	0	0	17,500	17,500	17500.00
TOTAL Fisher Basin Flo	1.00	EA			520,893	577,538	1,630,326	4,407,644	7,136,400	7136400
TOTAL Fisher Basin	1.00	EA			520,893	577,538	1,630,326	4,407,644	7,136,400	7136400

** PROJECT OWNER SUMMARY - Feature **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
A Fisher Basin Flood Protection								
A 01 Real Estate/Lands & Damages	1.00	EA	2,562,790	633,210	0	0	3,196,000	3196000
A 02 Relocations	1.00	EA	531,206	161,994	0	0	693,200	693200.00
A 11 Fisher Basin Flood Protection	1.00	EA	3,578,505	949,095	0	0	4,527,600	4527600
A 30 Engineering & Design	1.00	EA	412,100	0	0	0	412,100	412100.00
A 31 Construction Management - S & A	1.00	EA	750,000	0	0	0	750,000	750000.00
A XX Mitigation	1.00	EA	17,500	0	0	0	17,500	17500.00
TOTAL Fisher Basin Flood Protection	1.00	EA	7,852,101	1,744,299	0	0	9,596,400	9596400
TOTAL Fisher Basin	1.00	EA	7,852,101	1,744,299	0	0	9,596,400	9596400

** PROJECT OWNER SUMMARY - bid-item **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
A Fisher Basin Flood Protection								
A 01 Real Estate/Lands & Damages								
A 0101 Real Estate Lands & Damages								
A 010102 Real Estate Lands & Damages								
A 010102 A Project Planning								
A 010102 A 1 Real Estate Supplement/Pl	1.00	EA	1,200	300	0	0	1,500	1500.00
A 010102 A 5 All Other Re-analysis/Doc	1.00	EA	2,160	540	0	0	2,700	2700.00
TOTAL Project Planning	1.00	EA	3,360	840	0	0	4,200	4200.00
A 010102 B Acquisitions								
A 010102 B 1 By Government	1.00	EA	24,500	6,130	0	0	30,630	30630.00
A 010102 B 2 By Local Sponsor	1.00	EA	552,000	138,000	0	0	690,000	690000.00
A 010102 B 4 Review of LS	1.00	EA	16,120	4,030	0	0	20,150	20150.00
TOTAL Acquisitions	1.00	EA	592,620	148,160	0	0	740,780	740780.00
A 010102 C Condemnations								
A 010102 C 2 By LS	1.00	EA	30,000	7,500	0	0	37,500	37500.00
A 010102 C 4 Review of LS	1.00	EA	6,000	1,500	0	0	7,500	7500.00
TOTAL Condemnations	1.00	EA	36,000	9,000	0	0	45,000	45000.00
A 010102 E Appraisal								
A 010102 E 3 By LS	1.00	EA	150,000	37,500	0	0	187,500	187500.00
A 010102 E 5 Review of LS	1.00	EA	18,000	4,500	0	0	22,500	22500.00
TOTAL Appraisal	1.00	EA	168,000	42,000	0	0	210,000	210000.00
A 010102 F PL 91-646 Assistance								
A 010102 F 1 By Government	1.00	EA	3,500	880	0	0	4,380	4380.00
A 010102 F 2 By LS	1.00	EA	8,200	2,050	0	0	10,250	10250.00
A 010102 F 4 Review of LS	1.00	EA	3,400	850	0	0	4,250	4250.00
TOTAL PL 91-646 Assistance	1.00	EA	15,100	3,780	0	0	18,880	18880.00

** PROJECT OWNER SUMMARY - bid-item **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
A 010102 G Temporary Permits/Licenses/R								
A 010102 G 1 By Government	1.00	EA	2,240	560	0	0	2,800	2800.00
A 010102 G 2 By LS	1.00	EA	17,500	4,380	0	0	21,880	21880.00
A 010102 G 4 Review of LS	1.00	EA	3,500	880	0	0	4,380	4380.00
TOTAL Temporary Permits/License	1.00	EA	23,240	5,820	0	0	29,060	29060.00
A 010102 R Land Payments								
A 010102 R 1B By LS	1.00	EA	1,656,000	414,000	0	0	2,070,000	2070000
TOTAL Land Payments	1.00	EA	1,656,000	414,000	0	0	2,070,000	2070000
A 010102 T Lerrd Crediting								
A 010102 T 2 Administrative Costs	1.00	EA	3,000	750	0	0	3,750	3750.00
A 010102 T 3 PL 91-646 Assistance	1.00	EA	900	230	0	0	1,130	1130.00
TOTAL Lerrd Crediting	1.00	EA	3,900	980	0	0	4,880	4880.00
A 01010230 Project Cooperation Agreemen								
A 01010230 1 Project Cooperation Agree	1.00	EA	900	230	0	0	1,130	1130.00
TOTAL Project Cooperation Agree	1.00	EA	900	230	0	0	1,130	1130.00
A 010102O2 Relocations								
A 010102O2 1 Relocation of Roads	1.00	EA	1,200	300	0	0	1,500	1500.00
A 010102O2 2 Relocation of Cemeteries	1.00	EA	32,400	8,100	0	0	40,500	40500.00
TOTAL Relocations	1.00	EA	33,600	8,400	0	0	42,000	42000.00
A 010102R2 PL 91-646 Assistance Payment								
A 010102R2 2B By LS	1.00	EA	30,000	0	0	0	30,000	30000.00
TOTAL PL 91-646 Assistance Paym	1.00	EA	30,000	0	0	0	30,000	30000.00
A 010102XX Roundoff	1.00	EA	70	0	0	0	70	70.00
TOTAL Real Estate Lands & Damag	1.00	EA	2,562,790	633,210	0	0	3,196,000	3196000
TOTAL Real Estate Lands & Damag	1.00	EA	2,562,790	633,210	0	0	3,196,000	3196000

** PROJECT OWNER SUMMARY - bid-item **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
TOTAL Real Estate/Lands & Damag	1.00	EA	2,562,790	633,210	0	0	3,196,000	3196000
A 02 Relocations								
A 0201 Relocations								
A 020102 Relocations								
A 02010201 Highway Relocations								
A 02010201 01 LA HWY 45 - New Ramps	1.00	EA	271,734	81,520	0	0	353,254	353254.00
A 02010201 02 LA HWY 45 - Detours			156,205	54,672	0	0	210,877	
TOTAL Highway Relocations	1.00	EA	427,939	136,192	0	0	564,131	564131.00
A 02010202 Pipeline Relocations								
A 02010202 1 Jefferson Parish Waterlin			33,028	8,257	0	0	41,285	
A 02010202 2 LA Gas Service Pipeline			13,110	3,278	0	0	16,388	
A 02010202 3 U.S. Oil & Gas Inc. Pipel			8,050	2,013	0	0	10,063	
TOTAL Pipeline Relocations			54,188	13,548	0	0	67,736	
A 02010203 Power & Comm. Lines Relocati								
A 02010203 1 Entergy, Powerlines & Pol			17,342	4,336	0	0	21,678	
A 02010203 01 Bellsouth Underground Tel			5,405	1,351	0	0	6,756	
A 02010203 02 Powerlines & Control Stat			21,091	5,273	0	0	26,364	
TOTAL Power & Comm. Lines Reloc	1.00	EA	43,838	10,960	0	0	54,798	54798.00
A 02010204 Drainage Pumping Stations								
A 02010204 1 Jefferson Parish Discharg			5,175	1,294	0	0	6,469	
TOTAL Drainage Pumping Stations			5,175	1,294	0	0	6,469	
A 020102XX Roundoff								
A 020102XX 1 Roundoff	1.00	EA	66	0	0	0	66	66.00
TOTAL Roundoff	1.00	EA	66	0	0	0	66	66.00
TOTAL Relocations	1.00	EA	531,206	161,994	0	0	693,200	693200.00

** PROJECT OWNER SUMMARY - bid-item **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
TOTAL Relocations	1.00	EA	531,206	161,994	0	0	693,200	693200.00
TOTAL Relocations	1.00	EA	531,206	161,994	0	0	693,200	693200.00
A 11 Fisher Basin Flood Protection								
A 1101 Fisher Basin Flood Protection								
A 110102 Fisher Basin Flood Protection								
A 11010201 Mobilization & Demobilizatio								
A 11010201 01 Mob & Demob	4.00	WD	115,000	28,750	0	0	143,750	35937.45
TOTAL Mobilization & Demobiliza	2.00	EA	115,000	28,750	0	0	143,750	71874.90
A 11010202 Fisher Basin Flood Protectio								
A 11010202 01 Reinf Conc-Bulkhead Fldwl	310.00	CY	124,000	31,000	0	0	155,000	500.00
A 11010202 02 Landside Floodwall, Walls	2050.00	CY	820,000	246,000	0	0	1,066,000	520.00
A 11010202 03 Concrete Base Slabs	200.00	CY	40,000	12,000	0	0	52,000	260.00
A 11010202 04 Concrete Stabilization Sl	150.00	CY	15,000	4,500	0	0	19,500	130.00
A 11010202 05 Stairs	75.00	CY	30,000	9,000	0	0	39,000	520.00
A 11010202 06 CZ 101, Landside F/W	69100.00	SF	863,750	259,125	0	0	1,122,875	16.25
A 11010202 07 CZ 114, Bulkhead F/W	40300.00	SF	564,200	141,050	0	0	705,250	17.50
A 11010202 08 Timber Piling	6000.00	LF	72,000	21,600	0	0	93,600	15.60
A 11010202 09 Excavation	3000.00	CY	18,000	5,400	0	0	23,400	7.80
A 11010202 10 Backfill, Landside F/W	2000.00	CY	16,000	4,800	0	0	20,800	10.40
A 11010202 11 Backfill, Bulkhead F/W	700.00	CY	5,600	1,400	0	0	7,000	10.00
A 11010202 12 Fertilizing, Seeding, & M	0.70	AC	1,400	420	0	0	1,820	2600.00
A 11010202 13 Steel Swing Gates	21400.00	LBS	53,500	16,050	0	0	69,550	3.25
A 11010202 14 Clearing & Grubbing	25.00	AC	25,000	5,000	0	0	30,000	1200.00
A 11010202 15 Embankment, Semicompacted	100000.00	CY	800,000	160,000	0	0	960,000	9.60
A 11010202 16 Fertilizing & Seeding			15,000	3,000	0	0	18,000	
A 11010202 XX Roundoff			55	0	0	0	55	
TOTAL Fisher Basin Flood Protec	1.00	EA	3,463,505	920,345	0	0	4,383,850	4383850
TOTAL Fisher Basin Flood Protec	1.00	EA	3,578,505	949,095	0	0	4,527,600	4527600
TOTAL Fisher Basin Flood Protec	1.00	EA	3,578,505	949,095	0	0	4,527,600	4527600
TOTAL Fisher Basin Flood Protec	1.00	EA	3,578,505	949,095	0	0	4,527,600	4527600
A 30 Engineering & Design								
A 3001 E & D								

** PROJECT OWNER SUMMARY - bid-item **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
A 300102 E & D								
A 30010203 E & D								
A 30010203 1 Engineering Div., Geotech			56,000	0	0	0	56,000	
A 30010203 2 Engineering Div., Struct.			81,250	0	0	0	81,250	
A 30010203 3 Engineering Div.,General			3,350	0	0	0	3,350	
A 30010203 4 Engineering Div., Cost En			18,000	0	0	0	18,000	
A 30010203 5 Engineering Div., Hydraul			2,500	0	0	0	2,500	
A 30010203 6 Engineering Div., Civil B			80,000	0	0	0	80,000	
A 30010203 7 Engineering Div., Design			16,000	0	0	0	16,000	
A 30010203 8 Engineering Div., Surveys			90,000	0	0	0	90,000	
A 30010203 9 Construction Division			25,000	0	0	0	25,000	
A 30010203 10 Project Management Divisi			40,000	0	0	0	40,000	
TOTAL E & D			412,100	0	0	0	412,100	
TOTAL E & D			412,100	0	0	0	412,100	
TOTAL E & D			412,100	0	0	0	412,100	
TOTAL Engineering & Design	1.00	EA	412,100	0	0	0	412,100	412100.00
A 31 Construction Management - S & A								
A 31 1 S & A								
A 31 1 2 S & A								
A 31 1 2 3 S & A								
A 31 1 2 3 1 S & A for Construction Di	1.00	EA	720,000	0	0	0	720,000	720000.00
A 31 1 2 3 2 S & A for Project Managem	1.00	EA	30,000	0	0	0	30,000	30000.00
TOTAL S & A	1.00	EA	750,000	0	0	0	750,000	750000.00
TOTAL S & A	1.00	EA	750,000	0	0	0	750,000	750000.00
TOTAL S & A	1.00	EA	750,000	0	0	0	750,000	750000.00
TOTAL Construction Management -	1.00	EA	750,000	0	0	0	750,000	750000.00
A XX Mitigation								
A XX 1 Mitigation								
A XX 1 1 Mitigation								
A XX 1 1 1 Mitigation								

** PROJECT OWNER SUMMARY - bid-item **

	QUANTITY	UOM	CONTRACT	CONTINGN	ESCALATN	OTHER	TOTAL COST	UNIT COST
A XX 1 1 1 1 Mitigation	1.00	EA	17,500	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	17,500	17500.00
TOTAL Fisher Basin Flood Protec	1.00	EA	7,852,101	1,744,299	0	0	9,596,400	9596400
TOTAL Fisher Basin	1.00	EA	7,852,101	1,744,299	0	0	9,596,400	9596400

** PROJECT INDIRECT SUMMARY - Feature **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
A Fisher Basin Flood Protec										
A 01 Real Estate/Lands & Da	1.00	EA	2,562,790	0	0	0	0	0	2,562,790	2562790
A 02 Relocations	1.00	EA	531,206	0	0	0	0	0	531,206	531206.00
A 11 Fisher Basin Flood Pro	1.00	EA	2,862,804	715,701	0	0	0	0	3,578,505	3578505
A 30 Engineering & Design	1.00	EA	412,100	0	0	0	0	0	412,100	412100.00
A 31 Construction Managemen	1.00	EA	750,000	0	0	0	0	0	750,000	750000.00
A XX Mitigation	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
TOTAL Fisher Basin Flood Pro	1.00	EA	7,136,400	715,701	0	0	0	0	7,852,101	7852101
TOTAL Fisher Basin	1.00	EA	7,136,400	715,701	0	0	0	0	7,852,101	7852101
Contingency									1,744,299	
TOTAL INCL OWNER COSTS									9,596,400	

** PROJECT INDIRECT SUMMARY - bid-item **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
A Fisher Basin Flood Protec										
A 01 Real Estate/Lands & Da										
A 0101 Real Estate Lands &										
A 010102 Real Estate Lands										
A 010102 A Project Planning										
A 010102 A 1 Real Estate S	1.00	EA	1,200	0	0	0	0	0	1,200	1200.00
A 010102 A 5 All Other Re-	1.00	EA	2,160	0	0	0	0	0	2,160	2160.00
TOTAL Project Plann	1.00	EA	3,360	0	0	0	0	0	3,360	3360.00
A 010102 B Acquisitions										
A 010102 B 1 By Government	1.00	EA	24,500	0	0	0	0	0	24,500	24500.00
A 010102 B 2 By Local Spon	1.00	EA	552,000	0	0	0	0	0	552,000	552000.00
A 010102 B 4 Review of LS	1.00	EA	16,120	0	0	0	0	0	16,120	16120.00
TOTAL Acquisitions	1.00	EA	592,620	0	0	0	0	0	592,620	592620.00
A 010102 C Condemnations										
A 010102 C 2 By LS	1.00	EA	30,000	0	0	0	0	0	30,000	30000.00
A 010102 C 4 Review of LS	1.00	EA	6,000	0	0	0	0	0	6,000	6000.00
TOTAL Condemnations	1.00	EA	36,000	0	0	0	0	0	36,000	36000.00
A 010102 E Appraisal										
A 010102 E 3 By LS	1.00	EA	150,000	0	0	0	0	0	150,000	150000.00
A 010102 E 5 Review of LS	1.00	EA	18,000	0	0	0	0	0	18,000	18000.00
TOTAL Appraisal	1.00	EA	168,000	0	0	0	0	0	168,000	168000.00
A 010102 F PL 91-646 Assist										
A 010102 F 1 By Government	1.00	EA	3,500	0	0	0	0	0	3,500	3500.00
A 010102 F 2 By LS	1.00	EA	8,200	0	0	0	0	0	8,200	8200.00
A 010102 F 4 Review of LS	1.00	EA	3,400	0	0	0	0	0	3,400	3400.00
TOTAL PL 91-646 Ass	1.00	EA	15,100	0	0	0	0	0	15,100	15100.00

** PROJECT INDIRECT SUMMARY - bid-item **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
A 010102 G Temporary Permit										
A 010102 G 1 By Government	1.00	EA	2,240	0	0	0	0	0	2,240	2240.00
A 010102 G 2 By LS	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
A 010102 G 4 Review of LS	1.00	EA	3,500	0	0	0	0	0	3,500	3500.00
TOTAL Temporary Per	1.00	EA	23,240	0	0	0	0	0	23,240	23240.00
A 010102 R Land Payments										
A 010102 R 1B By LS	1.00	EA	1,656,000	0	0	0	0	0	1,656,000	1656000
TOTAL Land Payments	1.00	EA	1,656,000	0	0	0	0	0	1,656,000	1656000
A 010102 T Lerrd Crediting										
A 010102 T 2 Administrativ	1.00	EA	3,000	0	0	0	0	0	3,000	3000.00
A 010102 T 3 PL 91-646 Ass	1.00	EA	900	0	0	0	0	0	900	900.00
TOTAL Lerrd Crediti	1.00	EA	3,900	0	0	0	0	0	3,900	3900.00
A 01010230 Project Cooperat										
A 01010230 1 Project Coope	1.00	EA	900	0	0	0	0	0	900	900.00
TOTAL Project Coope	1.00	EA	900	0	0	0	0	0	900	900.00
A 010102O2 Relocations										
A 010102O2 1 Relocation of	1.00	EA	1,200	0	0	0	0	0	1,200	1200.00
A 010102O2 2 Relocation of	1.00	EA	32,400	0	0	0	0	0	32,400	32400.00
TOTAL Relocations	1.00	EA	33,600	0	0	0	0	0	33,600	33600.00
A 010102R2 PL 91-646 Assist										
A 010102R2 2B By LS	1.00	EA	30,000	0	0	0	0	0	30,000	30000.00
TOTAL PL 91-646 Ass	1.00	EA	30,000	0	0	0	0	0	30,000	30000.00
A 010102XX Roundoff	1.00	EA	70	0	0	0	0	0	70	70.00
TOTAL Real Estate L	1.00	EA	2,562,790	0	0	0	0	0	2,562,790	2562790
TOTAL Real Estate L	1.00	EA	2,562,790	0	0	0	0	0	2,562,790	2562790

** PROJECT INDIRECT SUMMARY - bid-item **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL Real Estate/L	1.00	EA	2,562,790	0	0	0	0	0	2,562,790	2562790
A 02 Relocations										
A 0201 Relocations										
A 020102 Relocations										
A 02010201 Highway Relocati										
A 02010201 01 LA HWY 45 - N	1.00	EA	271,734	0	0	0	0	0	271,734	271734.00
A 02010201 02 LA HWY 45 - D			156,205	0	0	0	0	0	156,205	
TOTAL Highway Reloc	1.00	EA	427,939	0	0	0	0	0	427,939	427939.00
A 02010202 Pipeline Relocat										
A 02010202 1 Jefferson Par			33,028	0	0	0	0	0	33,028	
A 02010202 2 LA Gas Servic			13,110	0	0	0	0	0	13,110	
A 02010202 3 U.S. Oil & Ga			8,050	0	0	0	0	0	8,050	
TOTAL Pipeline Relo			54,188	0	0	0	0	0	54,188	
A 02010203 Power & Comm. Li										
A 02010203 1 Entergy, Powe			17,342	0	0	0	0	0	17,342	
A 02010203 01 Bellsouth Und			5,405	0	0	0	0	0	5,405	
A 02010203 02 Powerlines &			21,091	0	0	0	0	0	21,091	
TOTAL Power & Comm.	1.00	EA	43,838	0	0	0	0	0	43,838	43838.00
A 02010204 Drainage Pumping										
A 02010204 1 Jefferson Par			5,175	0	0	0	0	0	5,175	
TOTAL Drainage Pump			5,175	0	0	0	0	0	5,175	
A 020102XX Roundoff										
A 020102XX 1 Roundoff	1.00	EA	66	0	0	0	0	0	66	66.00
TOTAL Roundoff	1.00	EA	66	0	0	0	0	0	66	66.00
TOTAL Relocations	1.00	EA	531,206	0	0	0	0	0	531,206	531206.00

** PROJECT INDIRECT SUMMARY - bid-item **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
TOTAL Relocations	1.00	EA	531,206	0	0	0	0	0	531,206	531206.00
TOTAL Relocations	1.00	EA	531,206	0	0	0	0	0	531,206	531206.00
A 11 Fisher Basin Flood Pro										
A 1101 Fisher Basin Flood P										
A 110102 Fisher Basin Flood										
A 11010201 Mobilization & D										
A 11010201 01 Mob & Demob	4.00	WD	92,000	23,000	0	0	0	0	115,000	28749.95
TOTAL Mobilization	2.00	EA	92,000	23,000	0	0	0	0	115,000	57499.90
A 11010202 Fisher Basin Flo										
A 11010202 01 Reinf Conc-Bu	310.00	CY	99,200	24,800	0	0	0	0	124,000	400.00
A 11010202 02 Landside Floo	2050.00	CY	656,000	164,000	0	0	0	0	820,000	400.00
A 11010202 03 Concrete Base	200.00	CY	32,000	8,000	0	0	0	0	40,000	200.00
A 11010202 04 Concrete Stab	150.00	CY	12,000	3,000	0	0	0	0	15,000	100.00
A 11010202 05 Stairs	75.00	CY	24,000	6,000	0	0	0	0	30,000	400.00
A 11010202 06 CZ 101, Lands	69100.00	SF	691,000	172,750	0	0	0	0	863,750	12.50
A 11010202 07 CZ 114, Bulkh	40300.00	SF	451,360	112,840	0	0	0	0	564,200	14.00
A 11010202 08 Timber Piling	6000.00	LF	57,600	14,400	0	0	0	0	72,000	12.00
A 11010202 09 Excavation	3000.00	CY	14,400	3,600	0	0	0	0	18,000	6.00
A 11010202 10 Backfill, Lan	2000.00	CY	12,800	3,200	0	0	0	0	16,000	8.00
A 11010202 11 Backfill, Bul	700.00	CY	4,480	1,120	0	0	0	0	5,600	8.00
A 11010202 12 Fertilizing,	0.70	AC	1,120	280	0	0	0	0	1,400	2000.00
A 11010202 13 Steel Swing G	21400.00	LBS	42,800	10,700	0	0	0	0	53,500	2.50
A 11010202 14 Clearing & Gr	25.00	AC	20,000	5,000	0	0	0	0	25,000	1000.00
A 11010202 15 Embankment, S	100000.00	CY	640,000	160,000	0	0	0	0	800,000	8.00
A 11010202 16 Fertilizing &			12,000	3,000	0	0	0	0	15,000	
A 11010202 XX Roundoff			44	11	0	0	0	0	55	
TOTAL Fisher Basin	1.00	EA	2,770,804	692,701	0	0	0	0	3,463,505	3463505
TOTAL Fisher Basin	1.00	EA	2,862,804	715,701	0	0	0	0	3,578,505	3578505
TOTAL Fisher Basin	1.00	EA	2,862,804	715,701	0	0	0	0	3,578,505	3578505
TOTAL Fisher Basin	1.00	EA	2,862,804	715,701	0	0	0	0	3,578,505	3578505
A 30 Engineering & Design										
A 3001 E & D										

** PROJECT INDIRECT SUMMARY - bid-item **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
A 300102 E & D										
A 30010203 E & D										
A 30010203 1 Engineering D			56,000	0	0	0	0	0	56,000	
A 30010203 2 Engineering D			81,250	0	0	0	0	0	81,250	
A 30010203 3 Engineering D			3,350	0	0	0	0	0	3,350	
A 30010203 4 Engineering D			18,000	0	0	0	0	0	18,000	
A 30010203 5 Engineering D			2,500	0	0	0	0	0	2,500	
A 30010203 6 Engineering D			80,000	0	0	0	0	0	80,000	
A 30010203 7 Engineering D			16,000	0	0	0	0	0	16,000	
A 30010203 8 Engineering D			90,000	0	0	0	0	0	90,000	
A 30010203 9 Construction			25,000	0	0	0	0	0	25,000	
A 30010203 10 Project Manag			40,000	0	0	0	0	0	40,000	
TOTAL E & D			412,100	0	0	0	0	0	412,100	
TOTAL E & D			412,100	0	0	0	0	0	412,100	
TOTAL E & D			412,100	0	0	0	0	0	412,100	
TOTAL Engineering &	1.00	EA	412,100	0	0	0	0	0	412,100	412100.00
A 31 Construction Managemen										
A 31 1 S & A										
A 31 1 2 S & A										
A 31 1 2 3 S & A										
A 31 1 2 3 1 S & A for Con	1.00	EA	720,000	0	0	0	0	0	720,000	720000.00
A 31 1 2 3 2 S & A for Pro	1.00	EA	30,000	0	0	0	0	0	30,000	30000.00
TOTAL S & A	1.00	EA	750,000	0	0	0	0	0	750,000	750000.00
TOTAL S & A	1.00	EA	750,000	0	0	0	0	0	750,000	750000.00
TOTAL S & A	1.00	EA	750,000	0	0	0	0	0	750,000	750000.00
TOTAL Construction	1.00	EA	750,000	0	0	0	0	0	750,000	750000.00
A XX Mitigation										
A XX 1 Mitigation										
A XX 1 1 Mitigation										
A XX 1 1 1 Mitigation										

** PROJECT INDIRECT SUMMARY - bid-item **

	QUANTITY	UOM	DIRECT	DISTRIBU	OVERHEAD	HOME OFC	PROFIT	BOND	TOTAL COST	UNIT COST
A XX 1 1 1 1 Mitigation	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
TOTAL Mitigation	1.00	EA	17,500	0	0	0	0	0	17,500	17500.00
TOTAL Fisher Basin	1.00	EA	7,136,400	715,701	0	0	0	0	7,852,101	7852101
TOTAL Fisher Basin	1.00	EA	7,136,400	715,701	0	0	0	0	7,852,101	7852101
Contingency									1,744,299	
TOTAL INCL OWNER COSTS									9,596,400	

** PROJECT DIRECT SUMMARY - Feature **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A Fisher Basin Flood Protection								
A 01 Real Estate/Lands & Damages	1.00	EA	0	0	0	2,562,790	2,562,790	2562790
A 02 Relocations	1.00	EA	0	0	0	531,206	531,206	531206.00
A 11 Fisher Basin Flood Protection	1.00	EA	520,893	577,538	1,630,326	134,048	2,862,804	2862804
A 30 Engineering & Design	1.00	EA	0	0	0	412,100	412,100	412100.00
A 31 Construction Management - S & A	1.00	EA	0	0	0	750,000	750,000	750000.00
A XX Mitigation	1.00	EA	0	0	0	17,500	17,500	17500.00
TOTAL Fisher Basin Flood Protection	1.00	EA	520,893	577,538	1,630,326	4,407,644	7,136,400	7136400
TOTAL Fisher Basin	1.00	EA	520,893	577,538	1,630,326	4,407,644	7,136,400	7136400
Distribution							715,701	
TOTAL INCL INDIRECTS							7,852,101	
Contingency							1,744,299	
TOTAL INCL OWNER COSTS							9,596,400	

** PROJECT DIRECT SUMMARY - bid-item **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A Fisher Basin Flood Protection								
A 01 Real Estate/Lands & Damages								
A 0101 Real Estate Lands & Damages								
A 010102 Real Estate Lands & Damages								
A 010102 A Project Planning								
A 010102 A 1 Real Estate Supplement/Plan	1.00	EA	0	0	0	1,200	1,200	1200.00
A 010102 A 5 All Other Re-analysis/Docum	1.00	EA	0	0	0	2,160	2,160	2160.00
TOTAL Project Planning	1.00	EA	0	0	0	3,360	3,360	3360.00
A 010102 B Acquisitions								
A 010102 B 1 By Government	1.00	EA	0	0	0	24,500	24,500	24500.00
A 010102 B 2 By Local Sponsor	1.00	EA	0	0	0	552,000	552,000	552000.00
A 010102 B 4 Review of LS	1.00	EA	0	0	0	16,120	16,120	16120.00
TOTAL Acquisitions	1.00	EA	0	0	0	592,620	592,620	592620.00
A 010102 C Condemnations								
A 010102 C 2 By LS	1.00	EA	0	0	0	30,000	30,000	30000.00
A 010102 C 4 Review of LS	1.00	EA	0	0	0	6,000	6,000	6000.00
TOTAL Condemnations	1.00	EA	0	0	0	36,000	36,000	36000.00
A 010102 E Appraisal								
A 010102 E 3 By LS	1.00	EA	0	0	0	150,000	150,000	150000.00
A 010102 E 5 Review of LS	1.00	EA	0	0	0	18,000	18,000	18000.00
TOTAL Appraisal	1.00	EA	0	0	0	168,000	168,000	168000.00
A 010102 F PL 91-646 Assistance								
A 010102 F 1 By Government	1.00	EA	0	0	0	3,500	3,500	3500.00
A 010102 F 2 By LS	1.00	EA	0	0	0	8,200	8,200	8200.00
A 010102 F 4 Review of LS	1.00	EA	0	0	0	3,400	3,400	3400.00
TOTAL PL 91-646 Assistance	1.00	EA	0	0	0	15,100	15,100	15100.00

** PROJECT DIRECT SUMMARY - bid-item **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 010102 G Temporary Permits/Licenses/Rig								
A 010102 G 1 By Government	1.00	EA	0	0	0	2,240	2,240	2240.00
A 010102 G 2 By LS	1.00	EA	0	0	0	17,500	17,500	17500.00
A 010102 G 4 Review of LS	1.00	EA	0	0	0	3,500	3,500	3500.00
TOTAL Temporary Permits/Licenses/	1.00	EA	0	0	0	23,240	23,240	23240.00
A 010102 R Land Payments								
A 010102 R 1B By LS	1.00	EA	0	0	0	1,656,000	1,656,000	1656000
TOTAL Land Payments	1.00	EA	0	0	0	1,656,000	1,656,000	1656000
A 010102 T Lerrd Crediting								
A 010102 T 2 Administrative Costs	1.00	EA	0	0	0	3,000	3,000	3000.00
A 010102 T 3 PL 91-646 Assistance	1.00	EA	0	0	0	900	900	900.00
TOTAL Lerrd Crediting	1.00	EA	0	0	0	3,900	3,900	3900.00
A 01010230 Project Cooperation Agreement								
A 01010230 1 Project Cooperation Agreeme	1.00	EA	0	0	0	900	900	900.00
TOTAL Project Cooperation Agreeme	1.00	EA	0	0	0	900	900	900.00
A 010102O2 Relocations								
A 010102O2 1 Relocation of Roads	1.00	EA	0	0	0	1,200	1,200	1200.00
A 010102O2 2 Relocation of Cemeteries et	1.00	EA	0	0	0	32,400	32,400	32400.00
TOTAL Relocations	1.00	EA	0	0	0	33,600	33,600	33600.00
A 010102R2 PL 91-646 Assistance Payments								
A 010102R2 2B By LS	1.00	EA	0	0	0	30,000	30,000	30000.00
TOTAL PL 91-646 Assistance Paymen	1.00	EA	0	0	0	30,000	30,000	30000.00
A 010102XX Roundoff	1.00	EA	0	0	0	70	70	70.00
TOTAL Real Estate Lands & Damages	1.00	EA	0	0	0	2,562,790	2,562,790	2562790
TOTAL Real Estate Lands & Damages	1.00	EA	0	0	0	2,562,790	2,562,790	2562790

** PROJECT DIRECT SUMMARY - bid-item **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
TOTAL Real Estate/Lands & Damages	1.00	EA	0	0	0	2,562,790	2,562,790	2562790
A 02 Relocations								
A 0201 Relocations								
A 020102 Relocations								
A 02010201 Highway Relocations								
A 02010201 01 LA HWY 45 - New Ramps	1.00	EA	0	0	0	271,734	271,734	271734.00
A 02010201 02 LA HWY 45 - Detours			0	0	0	156,205	156,205	
TOTAL Highway Relocations	1.00	EA	0	0	0	427,939	427,939	427939.00
A 02010202 Pipeline Relocations								
A 02010202 1 Jefferson Parish Waterline			0	0	0	33,028	33,028	
A 02010202 2 LA Gas Service Pipeline			0	0	0	13,110	13,110	
A 02010202 3 U.S. Oil & Gas Inc. Pipelin			0	0	0	8,050	8,050	
TOTAL Pipeline Relocations			0	0	0	54,188	54,188	
A 02010203 Power & Comm. Lines Relocation								
A 02010203 1 Entergy, Powerlines & Poles			0	0	0	17,342	17,342	
A 02010203 01 Bellsouth Underground Tel.C			0	0	0	5,405	5,405	
A 02010203 02 Powerlines & Control Statio			0	0	0	21,091	21,091	
TOTAL Power & Comm. Lines Relocat	1.00	EA	0	0	0	43,838	43,838	43838.00
A 02010204 Drainage Pumping Stations								
A 02010204 1 Jefferson Parish Discharge			0	0	0	5,175	5,175	
TOTAL Drainage Pumping Stations			0	0	0	5,175	5,175	
A 020102XX Roundoff								
A 020102XX 1 Roundoff	1.00	EA	0	0	0	66	66	66.00
TOTAL Roundoff	1.00	EA	0	0	0	66	66	66.00
TOTAL Relocations	1.00	EA	0	0	0	531,206	531,206	531206.00

** PROJECT DIRECT SUMMARY - bid-item **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
TOTAL Relocations	1.00	EA	0	0	0	531,206	531,206	531206.00
TOTAL Relocations	1.00	EA	0	0	0	531,206	531,206	531206.00
A 11 Fisher Basin Flood Protection								
A 1101 Fisher Basin Flood Protection								
A 110102 Fisher Basin Flood Protection								
A 11010201 Mobilization & Demobilization								
A 11010201 01 Mob & Demob	4.00	WD	35,193	36,001	0	20,806	92,000	22999.96
TOTAL Mobilization & Demobilizati	2.00	EA	35,193	36,001	0	20,806	92,000	45999.92
A 11010202 Fisher Basin Flood Protection								
A 11010202 01 Reinf Conc-Bulkhead Fldwl-w	310.00	CY	17,682	2,781	77,539	1,198	99,200	320.00
A 11010202 02 Landside Floodwall, Walls &	2050.00	CY	116,928	18,392	512,756	7,924	656,000	320.00
A 11010202 03 Concrete Base Slabs	200.00	CY	2,960	190	26,100	2,750	32,000	160.00
A 11010202 04 Concrete Stabilization Slab	150.00	CY	1,468	0	10,114	418	12,000	80.00
A 11010202 05 Stairs	75.00	CY	4,278	673	18,759	290	24,000	320.00
A 11010202 06 CZ 101, Landside F/W	69100.00	SF	68,381	45,191	563,597	13,831	691,000	10.00
A 11010202 07 CZ 114, Bulkhead F/W	40300.00	SF	39,881	26,356	372,523	12,600	451,360	11.20
A 11010202 08 Timber Piling	6000.00	LF	3,910	2,362	48,938	2,391	57,600	9.60
A 11010202 09 Excavation	3000.00	CY	7,508	5,870	0	1,022	14,400	4.80
A 11010202 10 Backfill, Landside F/W	2000.00	CY	4,866	7,090	0	844	12,800	6.40
A 11010202 11 Backfill, Bulkhead F/W	700.00	CY	1,703	2,482	0	295	4,480	6.40
A 11010202 12 Fertilizing, Seeding, & Mul	0.70	AC	0	0	0	1,120	1,120	1600.00
A 11010202 13 Steel Swing Gates	21400.00	LBS	0	0	0	42,800	42,800	2.00
A 11010202 14 Clearing & Grubbing	25.00	AC	8,914	10,056	0	1,030	20,000	800.00
A 11010202 15 Embankment, Semicompacted F	100000.00	CY	207,221	420,093	0	12,685	640,000	6.40
A 11010202 16 Fertilizing & Seeding			0	0	0	12,000	12,000	
A 11010202 XX Roundoff			0	0	0	44	44	
TOTAL Fisher Basin Flood Protecti	1.00	EA	485,700	541,537	1,630,326	113,242	2,770,804	2770804
TOTAL Fisher Basin Flood Protecti	1.00	EA	520,893	577,538	1,630,326	134,048	2,862,804	2862804
TOTAL Fisher Basin Flood Protecti	1.00	EA	520,893	577,538	1,630,326	134,048	2,862,804	2862804
TOTAL Fisher Basin Flood Protecti	1.00	EA	520,893	577,538	1,630,326	134,048	2,862,804	2862804

A 30 Engineering & Design

A 3001 E & D

** PROJECT DIRECT SUMMARY - bid-item **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A 300102 E & D								
A 30010203 E & D								
A 30010203 1 Engineering Div., Geotech B			0	0	0	56,000	56,000	
A 30010203 2 Engineering Div., Struct. B			0	0	0	81,250	81,250	
A 30010203 3 Engineering Div.,General En			0	0	0	3,350	3,350	
A 30010203 4 Engineering Div., Cost Eng.			0	0	0	18,000	18,000	
A 30010203 5 Engineering Div., Hydraulic			0	0	0	2,500	2,500	
A 30010203 6 Engineering Div., Civil Bra			0	0	0	80,000	80,000	
A 30010203 7 Engineering Div., Design Se			0	0	0	16,000	16,000	
A 30010203 8 Engineering Div., Surveys			0	0	0	90,000	90,000	
A 30010203 9 Construction Division			0	0	0	25,000	25,000	
A 30010203 10 Project Management Division			0	0	0	40,000	40,000	
TOTAL E & D			0	0	0	412,100	412,100	
TOTAL E & D			0	0	0	412,100	412,100	
TOTAL E & D			0	0	0	412,100	412,100	
TOTAL Engineering & Design	1.00	EA	0	0	0	412,100	412,100	412100.00
A 31 Construction Management - S & A								
A 31 1 S & A								
A 31 1 2 S & A								
A 31 1 2 3 S & A								
A 31 1 2 3 1 S & A for Construction Div.	1.00	EA	0	0	0	720,000	720,000	720000.00
A 31 1 2 3 2 S & A for Project Managemen	1.00	EA	0	0	0	30,000	30,000	30000.00
TOTAL S & A	1.00	EA	0	0	0	750,000	750,000	750000.00
TOTAL S & A	1.00	EA	0	0	0	750,000	750,000	750000.00
TOTAL S & A	1.00	EA	0	0	0	750,000	750,000	750000.00
TOTAL Construction Management - S	1.00	EA	0	0	0	750,000	750,000	750000.00
A XX Mitigation								
A XX 1 Mitigation								
A XX 1 1 Mitigation								
A XX 1 1 1 Mitigation								

** PROJECT DIRECT SUMMARY - bid-item **

	QUANTITY	UOM	LABOR	EQUIPMNT	MATERIAL	SUPPLIES	TOTAL COST	UNIT COST
A XX 1 1 1 1 Mitigation	1.00	EA	0	0	0	17,500	17,500	17500.00
TOTAL Mitigation	1.00	EA	0	0	0	17,500	17,500	17500.00
TOTAL Mitigation	1.00	EA	0	0	0	17,500	17,500	17500.00
TOTAL Mitigation	1.00	EA	0	0	0	17,500	17,500	17500.00
TOTAL Mitigation	1.00	EA	0	0	0	17,500	17,500	17500.00
TOTAL Fisher Basin Flood Protecti	1.00	EA	520,893	577,538	1,630,326	4,407,644	7,136,400	7136400
TOTAL Fisher Basin	1.00	EA	520,893	577,538	1,630,326	4,407,644	7,136,400	7136400
Distribution							715,701	
TOTAL INCL INDIRECTS							7,852,101	
Contingency							1,744,299	
TOTAL INCL OWNER COSTS							9,596,400	

** CREW BACKUP - bid-item **

ITEM ID DESCRIPTION

A 010102 A 1. Real Estate Supplement/Plan
A 010102 A 5. All Other Re-analysis/Documents
A 010102 B 1. By Government
A 010102 B 2. By Local Sponsor
A 010102 B 4. Review of LS
A 010102 C 2. By LS
A 010102 C 4. Review of LS
A 010102 E 3. By LS
A 010102 E 5. Review of LS
A 010102 F 1. By Government
A 010102 F 2. By LS
A 010102 F 4. Review of LS
A 010102 G 1. By Government
A 010102 G 2. By LS
A 010102 G 4. Review of LS
A 010102 G 5. Other
A 010102 R 1B. By LS
A 010102 T 2. Administrative Costs
A 010102 T 3. PL 91-646 Assistance
A 01010230 1. Project Cooperation Agreement
A 010102O2 1. Relocation of Roads
A 010102O2 2. Relocation of Cemeteries etc.
A 010102R2 2B. By LS
A 02010201 01. LA HWY 45 - New Ramps
A 02010201 02. LA HWY 45 - Detours
A 02010202 1. Jefferson Parish Waterline
A 02010202 2. LA Gas Service Pipeline
A 02010202 3. U.S. Oil & Gas Inc. Pipelines
A 02010203 1. Entergy, Powerlines & Poles
A 02010203 01. Bellsouth Underground Tel.Cables
A 02010203 02. Powerlines & Control Station
A 02010203 03. Pipeline Relocation
A 02010203 04. Telephone Line Relocation
A 02010203 05. Miscellaneous
A 02010204 1. Jefferson Parish Discharge Pipes
A 020102XX 1. Roundoff
A 11010201 01. Mob & Demob
A 11010202 01. Reinf Conc-Bulkhead Fldwl-walls
CONCM CONCRETE PLACEMENT & all(FLDWL)- METRO PROD = 100% CREW HOURS = 97

A 11010202 02. Landside Floodwall, Walls & Col.
CONCM CONCRETE PLACEMENT & all(FLDWL)- METRO PROD = 100% CREW HOURS = 641

A 11010202 03. Concrete Base Slabs
BSLBM CONC FLDWL BASE SLAB - METRO PROD = 100% CREW HOURS = 20

A 11010202 04. Concrete Stabilization Slabs
STABM CONC. STABILIZATION SLAB - METRO PROD = 100% CREW HOURS = 30

A 11010202 05. Stairs
CONCM CONCRETE PLACEMENT & all(FLDWL)- METRO PROD = 100% CREW HOURS = 23

ITEM ID	DESCRIPTION		
A 11010202 06.	CZ 101, Landside F/W		
STPLM	STEEL SHEET PILING - METRO	PROD = 100%	CREW HOURS = 461
A 11010202 07.	CZ 114, Bulkhead F/W		
STPLM	STEEL SHEET PILING - METRO	PROD = 100%	CREW HOURS = 269
A 11010202 08.	Timber Piling		
WDPLM	TIMBER PILING - METRO	PROD = 100%	CREW HOURS = 25
A 11010202 09.	Excavation		
SEXCM	STRUCTURAL EXCAVATION - METRO	PROD = 100%	CREW HOURS = 167
A 11010202 10.	Backfill, Landside F/W		
FILHL29	FILL HAULED, 29-12cy, 225, 1.5 D-6	PROD = 100%	CREW HOURS = 10
A 11010202 11.	Backfill, Bulkhead F/W		
FILHL29	FILL HAULED, 29-12cy, 225, 1.5 D-6	PROD = 100%	CREW HOURS = 3
A 11010202 12.	Fertilizing, Seeding, & Mulching		
A 11010202 13.	Steel Swing Gates		
A 11010202 14.	Clearing & Grubbing		
CLRHM	CLEARING & GRUBBING,HEAVY,METRO	PROD = 100%	CREW HOURS = 156
A 11010202 15.	Embankment, Semicompacted Fill		
A 11010202 16.	Fertilizing & Seeding		
A 11010202 XX.	Roundoff		
A 30010203 1.	Engineering Div., Geotech Branch		
A 30010203 2.	Engineering Div., Struct. Branch		
A 30010203 3.	Engineering Div.,General Eng. BR		
A 30010203 4.	Engineering Div., Cost Eng. Br		
A 30010203 5.	Engineering Div., Hydraulics Br		
A 30010203 6.	Engineering Div., Civil Branch		
A 30010203 7.	Engineering Div., Design Service		
A 30010203 8.	Engineering Div., Surveys		
A 30010203 9.	Construction Division		
A 30010203 10.	Project Management Division		
A 31 1 2 3 1.	S & A for Construction Div.		
A 31 1 2 3 2.	S & A for Project Management		
A XX 1 1 1 1.	Mitigation		

** LABOR BACKUP - bid-item **

											**** TOTAL ****	
SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	DEFAULT	HOURS
A	010102 A	1. Real Estate Supplement/Plan										
A	010102 A	5. All Other Re-analysis/Documents										
A	010102 B	1. By Government										
A	010102 B	2. By Local Sponsor										
A	010102 B	4. Review of LS										
A	010102 C	2. By LS										
A	010102 C	4. Review of LS										
A	010102 E	3. By LS										
A	010102 E	5. Review of LS										
A	010102 F	1. By Government										
A	010102 F	2. By LS										
A	010102 F	4. Review of LS										
A	010102 G	1. By Government										
A	010102 G	2. By LS										
A	010102 G	4. Review of LS										
A	010102 G	5. Other										
A	010102 R	1B. By LS										
A	010102 T	2. Administrative Costs										
A	010102 T	3. PL 91-646 Assistance										
A	01010230	1. Project Cooperation Agreement										
A	010102O2	1. Relocation of Roads										
A	010102O2	2. Relocation of Cemeteries etc.										
A	010102R2	2B. By LS										
A	02010201	01. LA HWY 45 - New Ramps										
A	02010201	02. LA HWY 45 - Detours										
A	02010202	1. Jefferson Parish Waterline										
A	02010202	2. LA Gas Service Pipeline										
A	02010202	3. U.S. Oil & Gas Inc. Pipelines										
A	02010203	1. Entergy, Powerlines & Poles										
A	02010203	01. Bellsouth Underground Tel.Cables										
A	02010203	02. Powerlines & Control Station										
A	02010203	03. Pipeline Relocation										
A	02010203	04. Telephone Line Relocation										
A	02010203	05. Miscellaneous										
A	02010204	1. Jefferson Parish Discharge Pipes										
A	020102XX	1. Roundoff										
A	11010201	01. Mob & Demob										
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	256
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	64
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	832
USR	TRKM	TRUCK DRIVER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	1088
A	11010202	01. Reinf Conc-Bulkhead Fldwl-walls										
USR	CARM	CARPENTER	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	97
USR	CMNM	CEMENT MASON	13.22	16.7%	40.0%	1.68	0.00	23.27	HR	03/18/96	0.00	194
USR	CRHM	CARPENTER HELPER	9.21	16.7%	40.0%	2.60	0.00	17.64	HR	03/18/96	0.00	97
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	97
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	484
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	48
A	11010202	02. Landside Floodwall, Walls & Col.										

** LABOR BACKUP - bid-item **

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	CARM	CARPENTER	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	641
USR	CMNM	CEMENT MASON	13.22	16.7%	40.0%	1.68	0.00	23.27	HR	03/18/96	0.00	1281
USR	CRHM	CARPENTER HELPER	9.21	16.7%	40.0%	2.60	0.00	17.64	HR	03/18/96	0.00	641
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	641
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	3203
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	320
A 11010202 03. Concrete Base Slabs												
USR	CARM	CARPENTER	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	20
USR	CMNM	CEMENT MASON	13.22	16.7%	40.0%	1.68	0.00	23.27	HR	03/18/96	0.00	40
USR	CRHM	CARPENTER HELPER	9.21	16.7%	40.0%	2.60	0.00	17.64	HR	03/18/96	0.00	20
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	10
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	80
A 11010202 04. Concrete Stabilization Slabs												
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	15
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	90
A 11010202 05. Stairs												
USR	CARM	CARPENTER	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	23
USR	CMNM	CEMENT MASON	13.22	16.7%	40.0%	1.68	0.00	23.27	HR	03/18/96	0.00	47
USR	CRHM	CARPENTER HELPER	9.21	16.7%	40.0%	2.60	0.00	17.64	HR	03/18/96	0.00	23
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	23
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	117
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	12
A 11010202 06. CZ 101, Landside F/W												
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	461
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	921
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	461
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	691
USR	PILM	PILEDRIVERMAN	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	1382
USR	TRKM	TRUCK DRIVER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	230
USR	WELM	WELDER	12.69	16.7%	40.0%	3.08	0.00	23.81	HR	02/22/95	0.00	115
A 11010202 07. CZ 114, Bulkhead F/W												
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	269
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	537
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	269
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	403
USR	PILM	PILEDRIVERMAN	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	806
USR	TRKM	TRUCK DRIVER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	134
USR	WELM	WELDER	12.69	16.7%	40.0%	3.08	0.00	23.81	HR	02/22/95	0.00	67
A 11010202 08. Timber Piling												
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	50
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	25
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	75
USR	PILM	PILEDRIVERMAN	12.21	16.7%	40.0%	2.60	0.00	22.54	HR	03/18/96	0.00	75
A 11010202 09. Excavation												

** LABOR BACKUP - bid-item **

SRC	LABOR ID	DESCRIPTION	BASE	OVERTM	TXS/INS	FRNG	TRVL	RATE	UOM	UPDATE	**** TOTAL **** DEFAULT	HOURS
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	333
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	167
A 11010202 10. Backfill, Landside F/W												
USR	FOREMAN3	foreman 3 $26.50/hr	26.50	0.0%	0.0%	0.00	0.00	26.50	HR	01/21/93	0.00	10
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	19
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	10
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	29
USR	TRKM	TRUCK DRIVER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	281
A 11010202 11. Backfill, Bulkhead F/W												
USR	FOREMAN3	foreman 3 $26.50/hr	26.50	0.0%	0.0%	0.00	0.00	26.50	HR	01/21/93	0.00	3
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	7
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	3
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	10
USR	TRKM	TRUCK DRIVER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	98
A 11010202 12. Fertilizing, Seeding, & Mulching												
A 11010202 13. Steel Swing Gates												
A 11010202 14. Clearing & Grubbing												
USR	FOREMAN1	foreman 1 $24/hr	24.00	0.0%	0.0%	0.00	0.00	24.00	HR	06/20/91	0.00	78
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	313
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	156
A 11010202 15. Embankment, Semicompacted Fill												
USR	LABM	LABORER	7.54	16.7%	40.0%	0.00	0.00	12.32	HR	02/21/95	0.00	1334
USR	OILM	OILER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	667
USR	PEOM	PEO-ALL EXCPT DRGLNE	12.50	16.6%	40.0%	0.00	0.00	20.42	HR	03/18/96	0.00	2835
USR	TRKM	TRUCK DRIVER	8.00	16.6%	40.0%	0.00	0.00	13.07	HR	03/18/96	0.00	9505
A 11010202 16. Fertilizing & Seeding												
A 11010202 XX. Roundoff												
A 30010203 1. Engineering Div., Geotech Branch												
A 30010203 2. Engineering Div., Struct. Branch												
A 30010203 3. Engineering Div.,General Eng. BR												
A 30010203 4. Engineering Div., Cost Eng. Br												
A 30010203 5. Engineering Div., Hydraulics Br												
A 30010203 6. Engineering Div., Civil Branch												
A 30010203 7. Engineering Div., Design Service												
A 30010203 8. Engineering Div., Surveys												
A 30010203 9. Construction Division												
A 30010203 10. Project Management Division												
A 31 1 2 3 1. S & A for Construction Div.												
A 31 1 2 3 2. S & A for Project Management												
A XX 1 1 1 1. Mitigation												

** EQUIPMENT BACKUP - bid-item **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	** TOTAL ** HOURS
A	010102 A	1. Real Estate Supplement/Plan									
A	010102 A	5. All Other Re-analysis/Documents									
A	010102 B	1. By Government									
A	010102 B	2. By Local Sponsor									
A	010102 B	4. Review of LS									
A	010102 C	2. By LS									
A	010102 C	4. Review of LS									
A	010102 E	3. By LS									
A	010102 E	5. Review of LS									
A	010102 F	1. By Government									
A	010102 F	2. By LS									
A	010102 F	4. Review of LS									
A	010102 G	1. By Government									
A	010102 G	2. By LS									
A	010102 G	4. Review of LS									
A	010102 G	5. Other									
A	010102 R	1B. By LS									
A	010102 T	2. Administrative Costs									
A	010102 T	3. PL 91-646 Assistance									
A	01010230	1. Project Cooperation Agreement									
A	01010202	1. Relocation of Roads									
A	01010202	2. Relocation of Cemeteries etc.									
A	010102R2	2B. By LS									
A	02010201	01. LA HWY 45 - New Ramps									
A	02010201	02. LA HWY 45 - Detours									
A	02010202	1. Jefferson Parish Waterline									
A	02010202	2. LA Gas Service Pipeline									
A	02010202	3. U.S. Oil & Gas Inc. Pipelines									
A	02010203	1. Entergy, Powerlines & Poles									
A	02010203	01. Bellsouth Underground Tel.Cables									
A	02010203	02. Powerlines & Control Station									
A	02010203	03. Pipeline Relocation									
A	02010203	04. Telephone Line Relocation									
A	02010203	05. Miscellaneous									
A	02010204	1. Jefferson Parish Discharge Pipes									
A	020102XX	1. Roundoff									
A	11010201	01. Mob & Demob									
USR	AIRA	AIR COMPRESSOR 185 CFM	1.59	0.61	1.76				1.43	5.39 HR	64
USR	AIRC	AIR COMPRESSOR 900 CFM	6.00	2.33	6.08				5.34	19.75 HR	64
USR	BKHB	BACKHOE CAT 225B 1.25 CY	17.38	6.03	3.54				12.43	39.38 HR	64
USR	BKHC	BACKHOE CAT 235 C 2.0 CY	32.53	11.29	5.36				22.86	72.04 HR	64
USR	BKHF	LDR/BKHOE KENT RAM 999,CHISEL	1.55	0.34					2.62	4.51 HR	64
USR	BKTA	2.0 concrete bucket - manual	0.27	0.09					0.13	0.49 HR	128
USR	CHYAA	CHERRYPICKER GROVE 22 TON	11.76	5.16	3.41				5.61	25.94 HR	64
USR	CHYB	CHERRYPICKER GROVE 30 TON	15.22	6.99	3.41				9.60	35.22 HR	64
USR	COMP	MANUAL COMPACTOR WACKER GVR 151	0.49	0.09	0.41				0.68	1.67 HR	128
USR	CRNA	CRANE AMER 5299-A 60T 75' boom	24.92	13.54	1.79				7.68	47.93 HR	128
USR	CRNL1	PILE DRIVING LEADS -10"x37" 60'	2.83	0.83					5.78	9.44 HR	64
USR	DOZA	DOZER D-4 W/BLADE	6.41	2.41	2.41				7.89	19.12 HR	64
USR	DOZE	DOZER, Cat D-5 w/ blade	10.40	3.93	3.04				12.74	30.11 HR	128
USR	FELA	F E LOADER CAT 953 2.0 CY crwlr	11.49	3.99	2.79				15.52	33.79 HR	64

** EQUIPMENT BACKUP - bid-item **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	** TOTAL ** HOURS
USR	MOTG	MOTOR GRADER CAT 12-G	11.06	5.09	2.90				6.52	25.57 HR	64
USR	PILC	PILE HAMMER VULCAN 06 900 CFM	5.45	1.60					7.35	14.40 HR	64
USR	PILF	PILE HAMMER MKT V5B W/POWER PACK	9.04	2.66	2.64				12.02	26.36 HR	64
USR	PMPC	WATER PUMP 3" HOMELITE	0.12	0.04	0.82				0.33	1.31 HR	128
USR	PRESWASH	pressure washer 3000 psi	0.60	0.09	0.45				0.78	1.92 HR	128
USR	TRCB	FARM TRACTOR JD 2355	1.95	0.54	1.50				1.90	5.89 HR	192
USR	TRKA	WATER TRUCK 2000 GAL	4.38	1.43	4.18				4.50	14.49 HR	128
USR	TRKB	DUMP TRUCK 20 CY	13.54	4.15	7.39				11.47	36.55 HR	832
USR	TRKD	FLATBED TRUCK 8X12	3.19	1.09	4.18				3.95	12.41 HR	64
USR	TRKJ	flatbed trk,8x16,46k GVW,260HP	8.59	2.62	8.01				8.81	28.03 HR	64
USR	VIBR	CONCRETE VIBR. 3.5", add 82 cfm	0.27	0.04					0.79	1.10 HR	256
USR	WELD	WELDER 400 AMP	0.87	0.32	1.87				1.08	4.14 HR	128
A	11010202 01.	Reinf Conc-Bulkhead Fldwl-walls									
USR	AIRA	AIR COMPRESSOR 185 CFM	1.59	0.61	1.76				1.43	5.39 HR	97
USR	BKTA	2.0 concrete bucket - manual	0.27	0.09					0.13	0.49 HR	97
USR	CHYB	CHERRYPICKER GROVE 30 TON	15.22	6.99	3.41				9.60	35.22 HR	48
USR	PRESWASH	pressure washer 3000 psi	0.60	0.09	0.45				0.78	1.92 HR	97
USR	VIBR	CONCRETE VIBR. 3.5", add 82 cfm	0.27	0.04					0.79	1.10 HR	291
A	11010202 02.	Landside Floodwall, Walls & Col.									
USR	AIRA	AIR COMPRESSOR 185 CFM	1.59	0.61	1.76				1.43	5.39 HR	641
USR	BKTA	2.0 concrete bucket - manual	0.27	0.09					0.13	0.49 HR	641
USR	CHYB	CHERRYPICKER GROVE 30 TON	15.22	6.99	3.41				9.60	35.22 HR	320
USR	PRESWASH	pressure washer 3000 psi	0.60	0.09	0.45				0.78	1.92 HR	641
USR	VIBR	CONCRETE VIBR. 3.5", add 82 cfm	0.27	0.04					0.79	1.10 HR	1922
A	11010202 03.	Concrete Base Slabs									
USR	AIRA	AIR COMPRESSOR 185 CFM	1.59	0.61	1.76				1.43	5.39 HR	20
USR	PRESWASH	pressure washer 3000 psi	0.60	0.09	0.45				0.78	1.92 HR	20
USR	VIBR	CONCRETE VIBR. 3.5", add 82 cfm	0.27	0.04					0.79	1.10 HR	40
A	11010202 04.	Concrete Stabilization Slabs									
A	11010202 05.	Stairs									
USR	AIRA	AIR COMPRESSOR 185 CFM	1.59	0.61	1.76				1.43	5.39 HR	23
USR	BKTA	2.0 concrete bucket - manual	0.27	0.09					0.13	0.49 HR	23
USR	CHYB	CHERRYPICKER GROVE 30 TON	15.22	6.99	3.41				9.60	35.22 HR	12
USR	PRESWASH	pressure washer 3000 psi	0.60	0.09	0.45				0.78	1.92 HR	23
USR	VIBR	CONCRETE VIBR. 3.5", add 82 cfm	0.27	0.04					0.79	1.10 HR	70
A	11010202 06.	CZ 101, Landside F/W									
USR	CHYB	CHERRYPICKER GROVE 30 TON	15.22	6.99	3.41				9.60	35.22 HR	230
USR	CRNA	CRANE AMER 5299-A 60T 75' boom	24.92	13.54	1.79				7.68	47.93 HR	461
USR	PILF	PILE HAMMER MKT V5B W/POWER PACK	9.04	2.66	2.64				12.02	26.36 HR	461
USR	TRKD	FLATBED TRUCK 8X12	3.19	1.09	4.18				3.95	12.41 HR	230
A	11010202 07.	CZ 114, Bulkhead F/W									
USR	CHYB	CHERRYPICKER GROVE 30 TON	15.22	6.99	3.41				9.60	35.22 HR	134
USR	CRNA	CRANE AMER 5299-A 60T 75' boom	24.92	13.54	1.79				7.68	47.93 HR	269
USR	PILF	PILE HAMMER MKT V5B W/POWER PACK	9.04	2.66	2.64				12.02	26.36 HR	269
USR	TRKD	FLATBED TRUCK 8X12	3.19	1.09	4.18				3.95	12.41 HR	134

** EQUIPMENT BACKUP - bid-item **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	** TOTAL ** HOURS
A	11010202 08.	Timber Piling									
USR	AIRC	AIR COMPRESSOR 900 CFM	6.00	2.33	6.08				5.34	19.75 HR	25
USR	CHYA	CHERRYPICKER GROVE 18 TON	11.11	4.88	3.41				5.39	24.79 HR	13
USR	CRNA	CRANE AMER 5299-A 60T 75' boom	24.92	13.54	1.79				7.68	47.93 HR	25
USR	PILC	PILE HAMMER VULCAN 06 900 CFM	5.45	1.60					7.35	14.40 HR	25
A	11010202 09.	Excavation									
USR	BKHA	BACKHOE CAT 215DLC 1.0 CY	16.12	5.03	2.68				11.39	35.22 HR	167
A	11010202 10.	Backfill, Landside F/W									
USR	BKHB	BACKHOE CAT 225B 1.25 CY	17.38	6.03	3.54				12.43	39.38 HR	10
USR	DOZB	DOZER D-6D W/BLADE	10.70	4.03	3.55				13.08	31.36 HR	14
USR	MOTG	MOTOR GRADER CAT 12-G	11.06	5.09	2.90				6.52	25.57 HR	5
USR	TRKA	WATER TRUCK 2000 GAL	4.38	1.43	4.18				4.50	14.49 HR	5
USR	TRKI	Dump truck, 12 cy, own-op	22.00							22.00 HR	276
A	11010202 11.	Backfill, Bulkhead F/W									
USR	BKHB	BACKHOE CAT 225B 1.25 CY	17.38	6.03	3.54				12.43	39.38 HR	3
USR	DOZB	DOZER D-6D W/BLADE	10.70	4.03	3.55				13.08	31.36 HR	5
USR	MOTG	MOTOR GRADER CAT 12-G	11.06	5.09	2.90				6.52	25.57 HR	2
USR	TRKA	WATER TRUCK 2000 GAL	4.38	1.43	4.18				4.50	14.49 HR	2
USR	TRKI	Dump truck, 12 cy, own-op	22.00							22.00 HR	97
A	11010202 12.	Fertilizing, Seeding, & Mulching									
A	11010202 13.	Steel Swing Gates									
A	11010202 14.	Clearing & Grubbing									
USR	DOZC	DOZER D-8N W/BLADE	25.05	8.69	7.22				23.40	64.36 HR	156
A	11010202 15.	Embankment, Semicompacted Fill									
USR	BKHB	BACKHOE CAT 225B 1.25 CY	17.38	6.03	3.54				12.43	39.38 HR	667
USR	DOZE	DOZER, Cat D-5 w/ blade	10.40	3.93	3.04				12.74	30.11 HR	1334
USR	MOTG	MOTOR GRADER CAT 12-G	11.06	5.09	2.90				6.52	25.57 HR	167
USR	PMPC	WATER PUMP 3" HOMELITE	0.12	0.04	0.82				0.33	1.31 HR	1334
USR	TRAC	FARM TRACTOR W/DISC J.D. 2355	1.95	0.54	1.50				1.90	5.89 HR	667
USR	TRKA	WATER TRUCK 2000 GAL	4.38	1.43	4.18				4.50	14.49 HR	167
USR	TRKB	DUMP TRUCK 20 CY	13.54	4.15	7.39				11.47	36.55 HR	9338
A	11010202 16.	Fertilizing & Seeding									
A	11010202 XX.	Roundoff									
A	30010203 1.	Engineering Div., Geotech Branch									
A	30010203 2.	Engineering Div., Struct. Branch									
A	30010203 3.	Engineering Div.,General Eng. BR									
A	30010203 4.	Engineering Div., Cost Eng. Br									
A	30010203 5.	Engineering Div., Hydraulics Br									
A	30010203 6.	Engineering Div., Civil Branch									
A	30010203 7.	Engineering Div., Design Service									
A	30010203 8.	Engineering Div., Surveys									
A	30010203 9.	Construction Division									
A	30010203 10.	Project Management Division									
A	31 1 2 3 1.	S & A for Construction Div.									

** EQUIPMENT BACKUP - bid-item **

SRC	ID.NO.	EQUIPMENT DESCRIPTION	DEPR	FCCM	FUEL	FOG	TR WR	TR REP	EQ REP	TOTAL RATE	** TOTAL ** HOURS

A 31 1 2 3 2. S & A for Project Management
A XX 1 1 1 1. Mitigation

No errors detected...

* * * END OF ERROR REPORT * * *

SUMMARY REPORTS SUMMARY PAGE

DETAILED ESTIMATE DETAIL PAGE

DETAILED ESTIMATE DETAIL PAGE

DETAILED ESTIMATE DETAIL PAGE

BACKUP REPORTS BACKUP PAGE

* * * END TABLE OF CONTENTS * * *

U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS DISTRICT
QUALITY CONTROL PLAN

Technical Document: Fisher School Basin Detailed Project Report (DPR)

Location: The study area is located along the eastern bank of Bayou Barataria in Jefferson Parish, Louisiana. The Fisher School Basin is located in the town of Jean Lafitte.

Project Description: The purpose of this project is to provide flood protection for residential and commercial structures, against tidal and rainfall events. The proposed project consists of earthen levees, sheetpile floodwalls, and floodgates.

Quality Control Process: The Quality Control Plan (QCP) for the Fisher School Basin feasibility study provides a review mechanism insuring that quality technical products are developed by the New Orleans District.

Technical Review: All planning and engineering review tasks will be accomplished in-house because the necessary expertise is located at the New Orleans District. The Fisher School Basin feasibility study is part of the Continuing Authorities Program and is considered to be a low risk project.

Technical review will be accomplished through a combination of formal and informal meetings throughout the course of the study. The more formal IPT and TRT meetings are scheduled at prescribed intervals during the study. The informal, one-on-one review meetings should occur prior to the release of data and/or final products to another office, but will vary by functional area. This process should ensure that cost-effective solutions are developed, while maintaining technical standards and requirements.

Technical Review Team: The objective of the TRT is to verify assumptions, methods, and procedures in developing alternatives and a recommended plan. The TRT is responsible for performing an independent technical review of the proposed project to avoid redesign efforts and assure accountability for the technical quality of the product. The local sponsor is involved throughout the study process by participating in the monthly coordination meetings and is invited to serve on the TRT.

In Planning, Programs and Project Management Division, TRT members were selected from each of the three branches. One or more reviewers will represent each functional area. The non-Federal sponsor will prepare the Environmental Assessment (EA) as part of its in-kind services to be provided for this study. The Environmental Analysis Branch, at the New Orleans District, will review and comment on the EA throughout the course of this study. The EA is part of the West Jefferson Levee District's in-kind services and was prepared by Coastal Engineering and Environmental Consultants (CEEC). The New Orleans District reviewed the EA as it was developed and submitted comments to CEEC.

In Engineering Division, TRT members were selected from the design offices based upon the study scope of work defined in the Project Study Plan (PSP). The following design offices will be represented: Cost Engineering Branch, Geotechnical Branch, Hydraulics and Hydrology Branch, Structures Branch and Civil Branch. One or more reviewers will represent each functional area.

Engineering Design Team

Name	Function	Office	Ext
Rich Varuso	Geotech Rep	CEMVN-ED-FS	2984
Robert Bass	Hydraulics Rep	CEMVN-ED-HC	1749
Rita Gaudin	Relocations Rep	CEMVN-ED-SR	2604
Stephen Martinez	Cost Rep	CEMVN-ED-C	1797
Richard Tillman	Structures Rep	CEMVN-ED-TF	2671
Joey Wagner	Projects Engr	CEMVN-ED-SP	1662

Engineering Technical Review Team

Edwin Dickson	Engr Div Rep	CEMVN-ED	1017
Bruce Bivona	Geotech Rep	CEMVN-ED-FD	1004
Burnell Thibodeaux	Hydraulics Rep	CEMVN-ED-HM	2445
David Wurtzel	Relocations Rep	CEMVN-ED-SR	2628
Darrell Normand	Cost Rep	CEMVN-ED-C	2727
Sam Kearns	Levees Rep	CEMVN-ED-LH	2718
Lary Yorke	Structures Rep	CEMVN-ED-TF	2664

Project Management Production Team*

Rodney Greenup	Study Manager	CEMVN-PM-W	2613
Toni Baldini	Economist	CEMVN-PM-AW	1913

Project Management Review Team

Name	Function	Office	Ext
Mark Wingate	TRT Manager	CEMVN-PM-W	2512
Brian Maestri	Economist	CEMVN-PM-AW	1915
Robert Martinson	Biologist	CEMVN-PM-RS	2582
Joan Exnicios	Archeologist	CEMVN-PM-RN	1760

Review Activities

DATE		
Scheduled	Actual	
10 Sep 97	10 Sep 97	Develop QCP and designate technical review team members
25 Sep 97	25 Sep 97	TRT meeting to discuss alternative screening and review preliminary levee design
26 Sep 97	26 Sep 97	Resolve comments and complete alternative screening
27 Feb 98	27 Feb 98	Draft feasibility report complete and distributed to IPT and TRT members
16 Mar 98	16 Mar 98	TRT meeting to review and discuss comments on draft report
17 Mar 98	14 Oct 98	Resolve comments and prepare summary of technical review
21 Sep 98	6 Nov 98	Certify technical review for DPR

Quality Control Records: Quality control records for both Planning, Programs and Project Management Division and Engineering Division will be maintained in a technical review package prepared by the IPT leader and summarized in the feasibility report. The package will consist of review comments from each reviewer and a certification checklist.

Metric System: The metric system WILL NOT be used for this project for the following reason(s):

All plans under consideration will be incorporated into existing parish drainage systems, which are all designed using the inch-pound system.

Rodney Mallett Jr. 11/9/98

Project Manager Date

Robert Wagner 11/9/98

Engineering Division Design Coordinator Date

Mark Wright 11/9/98

Technical Review Team Manager Date

TECHNICAL REVIEW CHECKLIST

Task/Issue	Completed/ Comment
GENERAL	
AUTHORITY	
a. Conformity with study authority?	YES
SCOPE OF INVESTIGATION	
b. Problems adequately addressed?	YES
OBJECTIVE OF INVESTIGATION	
c. Planning objectives clearly stated?	YES
RISK-BASED ANALYSIS	
d. Have the plans been sufficiently examined to determine the uncertainty inherent in the data or assumptions?	YES
PROJECT COST SHARING	
e. Is the apportionment of costs to local interests in conformance with present policy and evaluation procedure?	NO (*see below)
* *The fully funded first costs are estimated to be $9,962,000. The Federal limit for Section 205 projects is $5,000,000, of which approximately $311,000 is already expended. Therefore, the Fed share of first costs is $4,689,000 and the non-Fed share is $5,273,000 (which is greater than 50%).*	
f. Are there special circumstances that warrant consideration of increased non-Federal cost sharing?	YES
COORDINATION	
g. State/local/Federal coordination adequate, views considered?	YES
h. Conforms with laws, orders, & agency agreements?	YES
i. Preservation/conservation/historical/scientific interests consulted, views considered?	YES
PUBLIC INVOLVEMENT	
j. Was adequate public involvement conducted during the planning process to fully inform interested parties and to ascertain their views?	YES
k. Has there been adequate response to public concerns?	YES
l. Has the public involvement process been documented, and a discussion of the process prepared?	YES
POLICY ASPECTS	
m. Conforms to applicable policies?	YES

LEGAL/INSTITUIONAL	
n. Does the draft PCA reflect applicable cost sharing and financing policies; policies regarding evaluation of in-kind non-Federal contributions; and other provisions required by law and policy for new start construction projects?	YES
o. Has the sponsor demonstrated that it possesses all authorities necessary to implement its responsibilities under the PCA or submitted a plan to obtain those authorities?	YES
PLAN FORMULATION	
SCOPING	
a. Have all reasonable alternatives, including non-structural and no-action plans been adequately addressed?	YES
EXISTING CONDITIONS/ PLAN DEVELOPMENT	
b. Have the assumptions and rationale for the without-project conditions been explicitly stated and are they reasonable?	YES
ALTERNATIVE SCREENING	
c. Have both beneficial and adverse effects been adequately evaluated for the selected plan and alternatives?	YES
d. Has acquisition of necessary land for future project elements been adequately considered?	YES
e. Has a reasonable justification been provided for eliminating alternatives?	YES
PLAN SELECTION	
f. Are the reasons for selection of major elements of the recommended plan sound and adequate?	YES
g. Does the selected plan conform with existing policy? If not have the reasons for departure been adequately documented?	YES
REPORT REVIEW	
h. Consistency with recent guidance?	YES
i. Major tech review issues/resolution documented?	YES
ECONOMIC AND SOCIAL ANALYSIS	
j. Are the assumptions regarding future alternative conditions clearly stated and justified, and are these assumptions reasonable?	YES
k. Is the without-project condition reasonable and does it actually reflect how non-Federal interests will act if the resource under study is not developed?	YES

ENVIRONMENTAL ANALYSIS	
l. Adequate coordination conducted between Environmental, Engineering, and Real Estate?	YES
m. Coordination conducted with USFWS?	YES
n. HTRW survey performed?	YES
o. Have the project impacts been described, and impacts quantified with a habitat-based method?	YES
p. Have significant cultural resources been identified and evaluated?	YES
ENGINEERING ANALYSIS	
q. Is the supporting engineering data of sufficient detail to adequately describe the proposed design?	YES
r. Have alternative alignments been considered for project cost savings?	YES
s. Have adequate field investigations been conducted? Have adequate subsurface investigations been made to reasonable assure that the foundation is satisfactory?	NO (*see below)
* *Time and costs for surveys and soil borings were incorporated into the E&D estimate to reflect additional effort required during preparation of plans and specs.*	
t. Is the project constructable and operable?	YES
u. Are annual OM&R costs reasonable?	YES
v. Are quantity and cost estimates reasonable?	YES

QUALITY ASSURANCE AND TECHNICAL REVIEW SUMMARY

1. Technical review meetings for the subject study were conducted on 25 Sept 97, 16 Mar 98, 27 Aug 98, and 5 Oct 98. The technical review team was responsible for assessing the plan formulation, alternative analysis, environmental assessment, real estate supplement, and proposed levee design. A summary of the major comments is presented below:

a) COMMENT: Trapped water condition should be addressed from reverse head loading for stability and emergency drainage when system overtopped.

DISCUSSION: The TRT was concerned that in the event of overtopping, the exterior stages would subside faster than the interior drainage pumps could remove water and a reverse head on the levees would cause a failure.

RESOLUTION: H&H Br indicated that opening floodgates along Bayou Barataria would drain the area quickly and eliminate a reverse head condition.

b) COMMENT: Is drainage of levee system once overtopped considered in operation and maintenance costs?

DISCUSSION: No.

RESOLUTION: The O&M cost associated with overtopping is not significant.

c) COMMENT: Is any scour of materials on channel side of bulkheads considered in stability and/or O&M costs?

DISCUSSION: No.

RESOLUTION: The critical areas of the levee that are subject to scour and erosion are where Bayou Barataria is part of the GIWW. Areas subject to scour will be identified during P&S and the appropriate measures (riprap, armoring, etc.) will be included in the design. We do not anticipate riprap to be a significant cost.

d) COMMENT: Availability of sheetpile, if no exemption on "Buy American" clause should be addressed by Cost Engr Br.

DISCUSSION: Not Applicable

RESOLUTION: Not Applicable

e) COMMENT: Quality control of the earthen fill material should be stringent in these situations HTRW, environmental clearances, etc.

DISCUSSION: Design team concurs

RESOLUTION: Cost Engineering Branch assumed that a suitable borrow site can be located within five miles of the study area. A suitable borrow site will be identified during preparation of plans and specifications. Earthen material shall be tested to ensure compliance with Federal regulations concerning HTRW, water quality, environmental impacts, etc.

f) COMMENT: In light of the additional structural features added to the project, some funding should be provided to include a structures branch designer on the study team

DISCUSSION: Concur

RESOLUTION: Structures Br prepared a detail design and necessary report input.

g) COMMENT: Are project impacts on local storm water drainage into the adjacent waterway mitigated by additional drainage provisions

DISCUSSION: These features were not included in the draft report.

RESOLUTION: H&H Br. included a description of the interior drainage requirements for the final report.

h) COMMENT: Three soil borings were obtained for the study. Is this a sufficient number for development of P&S?

DISCUSSION: No. The hand-auger borings obtained during feasibility were used to identify different soil types and are not sufficient for developing project plans and specifications.

RESOLUTION: The cost of obtaining additional soil borings in the plans and specs phase is included in the project cost estimate.

i) COMMENT: Since this is single lift construction, the levee should be sufficiently overbuilt to accommodate the anticipated settlement and maintain the desired grade.

DISCUSSION: Concur

RESOLUTION: For feasibility, designers assumed six inches of settlement would occur over the entire reach. Soil borings and settlement calculations will be performed during P&S to refine these estimates.

j) COMMENT: In order to conserve costs, geo-fabric and 7-foot wide crown width should be considered in the levee design

DISCUSSION: The levee crown width was minimized to prevent vehicular access by unauthorized persons and to reduce project costs.

RESOLUTION: Geo-fabric may be incorporated into the final design. The levee crown width should remain at 5 feet.

k) COMMENT: The Fleming Curve pump station under construction was designed at elevations that are deficient to our current proposed project.

DISCUSSION: The West Jefferson Levee District indicated that the bulkhead for the new pump station is constructed to elevation 7.0 feet NGVD in order to tie into this proposed project.

RESOLUTION: During P&S, the as-built drawings shall be obtained from the West Jefferson Levee District to verify the elevation of the pump station, discharge pipes, bulkheads, etc.

l) COMMENT: There were no Real Estate representatives at the first technical review meeting. Some of the required relocations are private and the responsibility of RE Div

DISCUSSION: Concur

RESOLUTION: RE Div was provided a copy of the relocation items and consulted with Relocations Section to account for all relocation items affected by the project.

m) COMMENT: Relocations input was submitted ahead of the final design being prepared, thus resulting in some modifications later in the study process.

DISCUSSION: Concur

RESOLUTION: PD coordinated with Relocations to ensure that any changes in alignment were discussed and that additional relocations were included in the final report

n) COMMENT: Relocations personnel were not given sufficient time to officially correspond with affected owners

DISCUSSION: Additional time to develop costs was provided.

RESOLUTION: Relocations estimate was revised accordingly.

o) COMMENT: Report is not adequate to serve as the basis for preparation of plans and specifications due to lack of input.

DISCUSSION: Concur

RESOLUTION: Engineering Division was allowed to revise the original engineering design and provide additional background data, assumptions and calculations.

p) COMMENT: Engineering and Design costs for additional field investigations, design, and review work necessary to provide a basis for preparation of plans and specifications should be included as an item in the Total First Costs of the report.

DISCUSSION: Concur

RESOLUTION: Included in final report.

q) COMMENT: Design plates indicate existing bulkhead, which is to be removed, on the floodside of new sheetpile floodwall. Has the demolition, removal, and disposal cost for this work been included in the "Clearing and Grubbing" bid item?

DISCUSSION: The redesign by Structures Branch resulted in revised construction techniques. The new sheetpile floodwall will be constructed in the water where existing bulkheads interfere and on land where clearance permits.

RESOLUTION: The cost for clearing existing bulkhead is not required.

r) COMMENT: The typical all-earthen levee enlargements could pose stability problems. The proposed sections may have to be placed further from the bank, especially the section adjacent to the Barataria Waterway to achieve the proper safety factor.

DISCUSSION: Stability analyses were performed on composite design sections using LMVD Method of Planes Stability Analysis Program to achieve a minimum factor of safety of 1.3.

RESOLUTION: Verification of this analysis will be performed in P&S using additional boring data.

s) COMMENT: A statement should be made to address whether more borings and analysis will be performed to complete the project if the project goes beyond the feasibility phase.

DISCUSSION: Concur

RESOLUTION: Additional information is provided in the report.

2. All technical review documents will remain on file in Planning, Programs, and Project Management Division at the New Orleans District.

COMPLETION OF INDEPENDENT TECHNICAL REVIEW

The New Orleans District has completed the feasibility study of the Fisher School Basin located in Jean Lafitte, Louisiana. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses' alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy. The independent technical review was accomplished by an independent district team.

Technical Review Team Members	Date
Mark Wingate	6 Nov 98
Brian Maestri	6 NOV 98
Robert Martinson	26 Oct 98
Joan Exnicios	6 Nov 98
Edwin Dickson	26 Oct 98
Bruce Bivona	22 Oct 98
Burnell Thibodeaux	22 Oct 98
David Wurtzel	30 OCT 98
Darrell Normand	10/21/98
Sam Kearns	10/23/98
Lary Yorke	26 Oct 98

DRAFT ROJECT COOPERATION AGREEMENT
FOR
SECTION 205
STRUCTURAL FLOOD CONTROL PROJECTS
9 NOVEMBER 1998

PROJECT COOPERATION AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND THE
WEST JEFFERSON LEVEE DISTRICT
FOR CONSTRUCTION OF THE
FISHER SCHOOL BASIN – JEAN LAFITTE, LA
SECTION 205 FLOOD PROTECTION PROJECT

THIS AGREEMENT is entered into this _________________ day of ______________, 199__, by and between the DEPARTMENT OF THE ARMY (hereinafter the "Government"), represented by the U.S. Army Engineer for the New Orleans District (hereinafter the "District Engineer") and the **WEST JEFFERSON LEVEE DISTRICT** (hereinafter the "Non-Federal Sponsor"), represented by the President, Board of Commissioners.

WITNESSETH, THAT:

WHEREAS, the Fisher School Basin located in the town of Jean Lafitte, Louisiana (hereinafter the "Project") was approved for construction by **[PROJECT APPROVAL MEMO]** pursuant to the authority contained in Section 205 of the Flood Control Act of 1948, as amended, 33 U.S.C. 701s;

WHEREAS, the Government and the Non-Federal Sponsor desire to enter into a Project Cooperation Agreement for construction of the Project, as defined in Article I.A. of this Agreement;

WHEREAS, Section 103(a) of the Water Resources Development Act of 1986, Public Law 99-662, as amended, specifies the cost-sharing requirements applicable to the Project;

WHEREAS, under Section 205 of the Flood Control Act of 1948, as amended, the Government may expend up to $5,000,000 on a single flood control project;

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, provide that the Secretary of the Army shall not commence construction of any water resources project, or separable element thereof, until each non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

WHEREAS, the Non-Federal Sponsor does not qualify for a reduction of the maximum non-Federal cost share pursuant to the guidelines that implement Section 103(m) of the Water Resources Development Act of 1986, Public Law 99-662, as amended;

WHEREAS, the Government and Non-Federal Sponsor have the full authority and capability to perform as hereinafter set forth and intend to cooperate in cost-sharing and financing of the construction of the Project in accordance with the terms of this Agreement.

NOW, THEREFORE, the Government and the Non-Federal Sponsor agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

A. The term "Project" shall mean construction of earthen levees and concrete-capped sheetpile floodwalls to provide increased levels of flood protection to the town of Jean Lafitte, La as generally described in the feasibility report, dated November, 1998 and approved by **[CHOOSE THE APPROPRIATE ONE:** Assistant Secretary of the Army (Civil Works) / Chief of Engineers / Commander, __________ Division**]** on ________________, 19____.

B. The term "total project costs" shall mean all costs incurred by the Non-Federal Sponsor and the Government in accordance with the terms of this Agreement directly related to construction of the Project. Subject to the provisions of this Agreement, the term shall include, but is not necessarily limited to: engineering and design costs during the preparation of contract plans and specifications; engineering and design costs during construction; the costs of investigations to identify the existence and extent of hazardous substances in accordance with Article XV.A. of this Agreement; costs of historic preservation activities in accordance with Article XVIII.A. of this Agreement; actual construction costs, including the costs of alteration, lowering, raising, or replacement and attendant removal of existing railroad bridges and approaches thereto; supervision and administration costs; costs of participation in the Project Coordination Team in accordance with Article V of this Agreement; costs of contract dispute settlements or awards; the value of lands, easements, rights-of-way, relocations, and suitable borrow and dredged or excavated material disposal areas for which the Government affords credit in accordance with Article IV of this Agreement; and costs of audit in accordance with Article X of this Agreement. The term does not include any costs for operation, maintenance, repair, replacement, or rehabilitation; any costs due to betterments; or any costs of dispute resolution under Article VII of this Agreement.

C. The term "financial obligation for construction" shall mean a financial obligation of the Government, other than an obligation pertaining to the provision of lands, easements, rights-of-way, relocations, and borrow and dredged or excavated material disposal areas, that results or would result in a cost that is or would be included in total project costs.

D. The term "non-Federal proportionate share" shall mean the ratio of the Non-Federal Sponsor's total cash contribution required in accordance with Articles II.D.1. and II.D.3. of this Agreement to total financial obligations for construction, as projected by the Government.

E. The term "period of construction" shall mean the time from the date the Government first notifies the Non-Federal Sponsor in writing, in accordance with Article VI.B. of this Agreement, of the scheduled date for issuance of the solicitation for the first construction contract to the date that the District Engineer notifies the Non-Federal Sponsor in writing of the Government's determination that construction of the Project is complete.

F. The term "highway" shall mean any public highway, roadway, street, or way, including any bridge thereof.

G. The term "relocation" shall mean providing a functionally equivalent facility to the owner of an existing utility, cemetery, highway or other public facility, or railroad (excluding existing railroad bridges and approaches thereto) when such action is authorized as between the Non-Federal Sponsor and the Facility owner in accordance with applicable legal principles of just compensation. Providing a functionally equivalent facility may take the form of alteration, lowering, raising, or replacement and attendant removal of the affected facility or part thereof.

H. The term "fiscal year" shall mean one fiscal year of the Government. The Government fiscal year begins on October 1 and ends on September 30.

I. The term "functional portion of the Project" shall mean a portion of the Project that is suitable for tender to the Non-Federal Sponsor to operate and maintain in advance of completion of the entire Project. For a portion of the Project to be suitable for tender, the District Engineer must notify the Non-Federal Sponsor in writing of the Government's determination that the portion of the Project is complete and can function independently and for a useful purpose, although the balance of the Project is not complete.

J. The term "betterment" shall mean a change in the design and construction of an element of the Project resulting from the application of standards that the Government determines exceed those that the Government would otherwise apply for accomplishing the design and construction of that element.

ARTICLE II - OBLIGATIONS OF THE GOVERNMENT AND THE NON-FEDERAL SPONSOR

A. The Government, subject to the availability of funds and using those funds and funds provided by the Non-Federal Sponsor, shall expeditiously construct the Project (including alteration, lowering, raising, or replacement and attendant removal of existing railroad bridges and approaches thereto), applying those procedures usually applied to Federal projects, pursuant to Federal laws, regulations, and policies.

1. The Government shall afford the Non-Federal Sponsor the opportunity to review and comment on the solicitations for all contracts, including relevant plans and specifications, prior to the Government's issuance of such solicitations. The Government shall not issue the solicitation for the first construction contract until the Non-Federal Sponsor has confirmed in writing its willingness to proceed with the Project. To the extent possible, the Government shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract modifications, including change orders, prior to the issuance to the contractor of a Notice to Proceed. In any instance where providing the Non-Federal Sponsor with notification of a contract modification or change order is not possible prior to issuance of the Notice to Proceed, the Government shall provide such notification in writing at the earliest date possible. To the extent possible, the Government also shall afford the Non-Federal Sponsor the opportunity to review and comment on all contract claims prior to resolution thereof. The Government shall consider in good faith the comments of the Non-Federal Sponsor, but the contents of solicitations, award of contracts, execution of contract modifications, issuance of change orders, resolution of contract claims, and performance of all work on the Project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

2. Throughout the period of construction, the District Engineer shall furnish the Non-Federal Sponsor with a copy of the Government's Written Notice of Acceptance of Completed Work for each contract for the Project.

[INCLUDE PARAGRAPH II.A.3. IF THE NON-FEDERAL SPONSOR DESIRES A "VOLUNTARY COST CAP."]

3. Notwithstanding paragraph A.1. of this Article, if, upon the award of any contract for construction of the Project, cumulative financial obligations for construction would exceed $_______________, the Government and the Non-Federal Sponsor agree to defer award of that contract and all subsequent contracts for construction of the Project until such time as the Government and the Non-Federal Sponsor agree to proceed with further contract awards for the Project, but in no event shall the award of contracts be deferred for more than six months. **[A LONGER TIME MAY BE APPROVED BY THE CHIEF OF ENGINEERS. WHATEVER TIME IS SELECTED SHOULD BE GEARED TO SPONSOR'S FUNDING CYCLE. THE OBJECTIVE IS TO AFFORD THE SPONSOR THE OPPORTUNITY TO OBTAIN THE ADDED FUNDS.]** Notwithstanding this general provision for deferral of contract awards, the Government, after consultation with the Non-Federal Sponsor, may award a contract or contracts after the Chief of Engineers makes a written determination that the award of such contract or contracts must proceed in order to comply with law or to protect life or property from imminent and substantial harm.

B. The Non-Federal Sponsor may request the Government to accomplish betterments. Such requests shall be in writing and shall describe the betterments requested to be accomplished. If the Government in its sole discretion elects to accomplish the requested betterments or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs due to the requested betterments and shall pay all such costs in accordance with Article VI.C. of this Agreement.

C. When the District Engineer determines that the entire Project is complete or that a portion of the Project has become a functional portion of the Project, the District Engineer shall so notify the Non-Federal Sponsor in writing and furnish the Non-Federal Sponsor with an Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual (hereinafter the "OMRR&R Manual") and with copies of all of the Government's Written Notices of Acceptance of Completed Work for all contracts for the Project or the functional portion of the Project that have not been provided previously. Upon such notification, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the entire Project or the functional portion of the Project in accordance with Article VIII of this Agreement.

D. The Non-Federal Sponsor shall contribute a minimum of 35 percent, but not to exceed 50 percent, of total project costs in accordance with the provisions of this paragraph.

1. The Non-Federal Sponsor shall provide a cash contribution equal to 5 percent of total project costs in accordance with Article VI.B. of this Agreement.

2. In accordance with Article III of this Agreement, the Non-

Federal Sponsor shall provide all lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Government determines the Non-Federal Sponsor must provide for the construction, operation, and maintenance of the Project, and shall perform or ensure performance of all relocations that the Government determines to be necessary for the construction, operation, and maintenance of the Project.

3. If the Government projects that the value of the Non-Federal Sponsor's contributions under paragraphs D.1. and D.2. of this Article and Articles V, X, and XV.A. of this Agreement will be less than 25 percent of total project costs, the Non-Federal Sponsor shall provide an additional cash contribution, in accordance with Article VI.B. of this Agreement, in the amount necessary to make the Non-Federal Sponsor's total contribution equal to 35 percent of total project costs.

4. If the Government determines that the value of the Non-Federal Sponsor's contributions provided under paragraphs D.2. and D.3. of this Article and Articles V, X, and XV.A. of this Agreement has exceeded 45 percent of total project costs, the Government, subject to the availability of funds, shall reimburse the Non-Federal Sponsor for any such value in excess of 45 percent of total project costs. After such a determination, the Government, in its sole discretion, may provide any remaining Project lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas and perform any remaining Project relocations on behalf of the Non-Federal Sponsor.

E. The Non-Federal Sponsor may request the Government to provide lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or perform relocations on behalf of the Non-Federal Sponsor. Such requests shall be in writing and shall describe the services requested to be performed. If in its sole discretion the Government elects to perform the requested services or any portion thereof, it shall so notify the Non-Federal Sponsor in a writing that sets forth any applicable terms and conditions, which must be consistent with this Agreement. In the event of conflict between such a writing and this Agreement, this Agreement shall control. The Non-Federal Sponsor shall be solely responsible for all costs of the requested services and shall pay all such costs in accordance with Article VI.C. of this Agreement. Notwithstanding the provision of lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas or performance of relocations by the Government, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of cleanup and response in accordance with Article XV.C. of this Agreement.

F. The Government shall perform a final accounting in accordance with Article VI.D. of this Agreement to determine the contributions provided by the Non-Federal Sponsor in accordance with paragraphs B., D., and E. of this Article and Articles V, X, and XV.A. of this Agreement and to determine whether the Non-Federal Sponsor has met its obligations under paragraphs B., D., and E. of this Article.

G. The Non-Federal Sponsor shall not use Federal funds to meet the Non-Federal Sponsor's share of total project costs under this Agreement unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

H. The Non-Federal Sponsor agrees to participate in and comply with applicable Federal floodplain management and flood insurance programs.

I. Not less than once each year the Non-Federal Sponsor shall inform affected interests of the extent of protection afforded by the Project.

J. The Non-Federal Sponsor shall publicize flood plain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their use in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the Project.

ARTICLE III - LANDS, RELOCATIONS, DISPOSAL AREAS, AND PUBLIC LAW 91-646 COMPLIANCE

A. The Government, after consultation with the Non-Federal Sponsor, shall determine the lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those required for relocations, borrow materials, and dredged or excavated material disposal. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of the lands, easements, and rights-of-way that the Government determines the Non-Federal Sponsor must provide, in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with acquisition of such lands, easements, and rights-of-way. Prior to the end of the period of construction, the Non-Federal Sponsor shall acquire all lands, easements, and rights-of-way set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall provide the Government with authorization for entry to all lands, easements, and rights-of-way the Government determines the Non-Federal Sponsor must provide for that contract. For so long as the Project remains authorized, the Non-Federal Sponsor shall ensure that lands, easements, and rights-of-way that the Government determines to be required for the operation and maintenance of the Project and that were provided by the Non-Federal Sponsor are retained in public ownership for uses compatible with the authorized purposes of the Project.

B. The Government, after consultation with the Non-Federal Sponsor, shall determine the improvements required on lands, easements, and rights-of-way to enable the proper disposal of dredged or excavated material associated with the construction, operation, and maintenance of the Project. Such improvements may include, but are not necessarily limited to, retaining dikes, wasteweirs, bulkheads, embankments, monitoring features, stilling basins, and de-watering pumps and pipes. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions of such improvements in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with construction of such improvements. Prior to the end of the period of construction, the Non-Federal Sponsor shall provide all improvements set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall prepare plans and specifications for all improvements the Government determines to be required for the proper disposal of dredged or excavated material under that contract, submit such plans and specifications to the Government for approval, and provide such improvements in accordance with the approved plans and specifications.

C. The Government, after consultation with the Non-Federal Sponsor, shall determine the relocations necessary for the construction, operation, and maintenance of the Project, including those necessary to enable the removal of borrow materials and the proper disposal of dredged or excavated material. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of such relocations in detail sufficient to enable the Non-Federal Sponsor to fulfill its obligations under this paragraph, and shall provide the Non-Federal Sponsor with a written notice to proceed with such relocations. Prior to the end of the period of construction, the Non-Federal Sponsor shall perform or ensure the performance of all relocations as set forth in such descriptions. Furthermore, prior to issuance of the solicitation for each Government construction contract, the Non-Federal Sponsor shall prepare or ensure the preparation of plans and specifications for, and perform or ensure the performance of, all relocations the Government determines to be necessary for that contract.

D. The Non-Federal Sponsor in a timely manner shall provide the Government with such documents as are sufficient to enable the Government to determine the value of any contribution provided pursuant to paragraph A., B., or C. of this Article. Upon receipt of such documents the Government, in accordance with Article IV of this Agreement and in a timely manner, shall determine the value of such contribution, include such value in total project costs, and afford credit for such value toward the Non-Federal Sponsor's share of total project costs.

E. The Non-Federal Sponsor shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way required for the construction, operation, and maintenance of the Project, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, and shall inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV - CREDIT FOR VALUE OF LANDS, RELOCATIONS, AND DISPOSAL AREAS

A. The Non-Federal Sponsor shall receive credit toward its share of total project costs for the value of the lands, easements, rights-of-way, and suitable borrow and dredged or excavated material disposal areas that the Non-Federal Sponsor must provide pursuant to Article III of this Agreement, and for the value of the relocations that the Non-Federal Sponsor must perform or for which it must ensure performance pursuant to Article III of this Agreement. However, the Non-Federal Sponsor shall not receive credit for the value of any lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas that have been provided previously as an item of cooperation for another Federal project. The Non-Federal Sponsor also shall not receive credit for the value of lands, easements, rights-of-way, relocations, or borrow and dredged or excavated material disposal areas to the extent that such items are provided using Federal funds unless the Federal granting agency verifies in writing that such credit is expressly authorized by statute.

B. For the sole purpose of affording credit in accordance with this Agreement, the value of lands, easements, and rights-of-way, including those necessary for relocations, borrow materials, and dredged or excavated material disposal, shall be the fair market value of the real property interests, plus certain incidental costs of acquiring those interests, as determined in accordance with the provisions of this paragraph.

1. Date of Valuation. The fair market value of lands, easements, or rights-of-way owned by the Non-Federal Sponsor on the effective date of this Agreement shall be the fair market value of such real property interests as of the date the Non-Federal Sponsor provides the Government with authorization for entry thereto. The fair market value of lands, easements, or rights-of-way acquired by the Non-Federal Sponsor after the effective date of this Agreement shall be the fair market value of such real property interests at the time the interests are acquired.

2. General Valuation Procedure. Except as provided in paragraph B.3. of this Article, the fair market value of lands, easements, or rights-of-way shall be determined in accordance with paragraph B.2.a. of this Article, unless thereafter a different amount is determined to represent fair market value in accordance with paragraph B.2.b. of this Article.

a. The Non-Federal Sponsor shall obtain, for each real property interest, an appraisal that is prepared by a qualified appraiser who is acceptable to the Non-Federal Sponsor and the Government. The appraisal must be prepared in accordance with the applicable rules of just compensation, as specified by the Government. **[NOTE: SEE DRAFT CHAPTER 12 OF ER 405-1-12 FOR GUIDANCE ON THE USE OF FEDERAL VERSUS STATE RULES IN PREPARING AN APPRAISAL.]** The fair market value shall be the amount set forth in the Non-Federal Sponsor's appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's appraisal, the Non-Federal Sponsor may obtain a second appraisal, and the fair market value shall be the amount set forth in the Non-Federal Sponsor's second appraisal, if such appraisal is approved by the Government. In the event the Government does not approve the Non-Federal Sponsor's second appraisal, or the Non-Federal Sponsor chooses not to obtain a second appraisal, the Government shall obtain an appraisal, and the fair market value shall be the amount set forth in the Government's appraisal, if such appraisal is approved by the Non-Federal Sponsor. In the event the Non-Federal Sponsor does not approve the Government's appraisal, the Government, after consultation with the Non-Federal Sponsor, shall consider the Government's and the Non-Federal Sponsor's appraisals and determine an amount based thereon, which shall be deemed to be the fair market value.

b. Where the amount paid or proposed to be paid by the Non-Federal Sponsor for the real property interest exceeds the amount determined pursuant to paragraph B.2.a. of this Article, the Government, at the request of the Non-Federal Sponsor, shall consider all factors relevant to determining fair market value and, in its sole discretion, after consultation with the Non-Federal Sponsor, may approve in writing an amount greater than the amount determined pursuant to paragraph B.2.a. of this Article, but not to exceed the amount actually paid or proposed to be paid. If the Government approves such an amount, the fair market value shall be the lesser of the approved amount or the amount paid by the Non-Federal Sponsor, but no less than the amount determined pursuant to paragraph B.2.a. of this Article.

3. Eminent Domain Valuation Procedure. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted after the effective date of this Agreement, the Non-Federal Sponsor shall, prior to instituting such proceedings, submit to the Government notification in writing of its intent to institute such proceedings and an appraisal of the specific real property interests to be acquired in such proceedings. The Government shall have 60 days after receipt of such a notice and appraisal within which to review the appraisal, if not previously approved by the Government in writing.

a. If the Government previously has approved the appraisal in writing, or if the Government provides written approval of, or takes no action on, the appraisal within such 60-day period, the Non-Federal Sponsor shall use the amount set forth in such appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

b. If the Government provides written disapproval of the appraisal, including the reasons for disapproval, within such 60-day period, the Government and the Non-Federal Sponsor shall consult in good faith to promptly resolve the issues or areas of disagreement that are identified in the Government's written disapproval. If, after such good faith consultation, the Government and the Non-Federal Sponsor agree as to an appropriate amount, then the Non-Federal Sponsor shall use that amount as the estimate of just compensation for the purpose of instituting the eminent domain proceeding. If, after such good faith consultation, the Government and the Non-Federal Sponsor cannot agree as to an appropriate amount, then the Non-Federal Sponsor may use the amount set forth in its appraisal as the estimate of just compensation for the purpose of instituting the eminent domain proceeding.

c. For lands, easements, or rights-of-way acquired by eminent domain proceedings instituted in accordance with sub-paragraph B.3. of this Article, fair market value shall be either the amount of the court award for the real property interests taken, to the extent the Government determined such interests are required for the construction, operation, and maintenance of the Project, or the amount of any stipulated settlement or portion thereof that the Government approves in writing.

4. Incidental Costs. For lands, easements, or rights-of-way acquired by the Non-Federal Sponsor within a five-year period preceding the effective date of this Agreement, or at any time after the effective date of this Agreement, the value of the interest shall include the documented incidental costs of acquiring the interest, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such incidental costs shall include, but not necessarily be limited to, closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for payment of any Public Law 91-646 relocation assistance benefits provided in accordance with Article III.E. of this Agreement.

C. After consultation with the Non-Federal Sponsor, the Government shall determine the value of relocations in accordance with the provisions of this paragraph.

1. For a relocation other than a highway, the value shall be only that portion of relocation costs that the Government determines is necessary to provide a functionally equivalent facility, reduced by depreciation, as applicable, and by the salvage value of any removed items.

2. For a relocation of a highway, the value shall be only that portion of relocation costs that would be necessary to accomplish the relocation in accordance with the design standard that the State of Louisiana would apply under similar conditions of geography and traffic load, reduced by the salvage value of any removed items.

3. Relocation costs shall include, but not necessarily be limited to, actual costs of performing the relocation; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with performance of the relocation, but shall not include any costs due to betterments, as determined by the Government, nor any additional cost of using new material when suitable used material is available. Relocation costs shall be subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs.

D. The value of the improvements made to lands, easements, and rights-of-way for the proper disposal of dredged or excavated material shall be the costs of the improvements, as determined by the Government, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs. Such costs shall include, but not necessarily be limited to, actual costs of providing the improvements; planning, engineering and design costs; supervision and administration costs; and documented incidental costs associated with providing the improvements, but shall not include any costs due to betterments, as determined by the Government.

ARTICLE V - PROJECT COORDINATION TEAM

A. To provide for consistent and effective communication, the Non-Federal Sponsor and the Government, not later than 30 days after the effective date of this Agreement, shall appoint named senior representatives to a Project Coordination Team. Thereafter, the Project Coordination Team shall meet regularly until the end of the period of construction. The Government's Project Manager and a counterpart named by the Non-Federal Sponsor shall co-chair the Project Coordination Team.

B. The Government's Project Manager and the Non-Federal Sponsor's counterpart shall keep the Project Coordination Team informed of the progress of construction and of significant pending issues and actions, and shall seek the views of the Project Coordination Team on matters that the Project Coordination Team generally oversees.

C. Until the end of the period of construction, the Project Coordination Team shall generally oversee the Project, including issues related to design; plans and specifications; scheduling; real property and relocation requirements; real property acquisition; contract awards and modifications; contract costs; the Government's cost projections; final inspection of the entire Project or functional portions of the Project; preparation of the proposed OMRR&R Manual; anticipated requirements and needed capabilities for performance of operation, maintenance, repair, replacement, and rehabilitation of the Project; and other related matters.

D. The Project Coordination Team may make recommendations that it deems warranted to the District Engineer on matters that the Project Coordination Team generally oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider the recommendations of the Project Coordination Team. The Government, having the legal authority and responsibility for construction of the Project, has the discretion to accept, reject, or modify the Project Coordination Team's recommendations.

E. The costs of participation in the Project Coordination Team shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE VI - METHOD OF PAYMENT

OPTION II

A. The Government shall maintain current records of contributions provided by the parties and current projections of total project costs and costs due to betterments. By **[SPECIFIC DATE, BASED ON THE TIMING OF THE NON-FEDERAL SPONSOR'S FISCAL CYCLE]** of each year and at least quarterly thereafter, the Government shall provide the Non-Federal Sponsor with a report setting forth all contributions provided to date and the current projections of total project costs, of total costs due to betterments, of the components of total project costs, of each party's share of total project costs, of the Non-Federal Sponsor's total cash contributions required in accordance with Articles II.B., II.D., and II.E. of this Agreement, of the non-Federal proportionate share, and of the funds the Government projects to be required from the Non-Federal Sponsor for the upcoming fiscal year. On the effective date of this Agreement, total project costs are estimated to be $9,962,000, and the Non-Federal Sponsor's cash contribution required under Article II.D. of this Agreement is projected to be $5,273,000. Such amounts are estimates subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Non-Federal Sponsor.

B. The Non-Federal Sponsor shall provide the cash contribution required under Articles II.D.1. and II.D.3. of this Agreement in accordance with the provisions of this paragraph.

[ARTICLE VI.B.1. OFFERS THE NON-FEDERAL SPONSOR THREE MECHANISMS FROM WHICH TO CHOOSE IN DECIDING HOW TO PROVIDE ITS CASH CONTRIBUTION TO THE FEDERAL GOVERNMENT. THE NON-FEDERAL SPONSOR SHOULD INDICATE ITS CHOICE DURING THE COURSE OF NEGOTIATING THE AGREEMENT. THE PCA SHOULD REFLECT ONLY ONE MECHANISM.]

1. Not less than **[NUMBER OF DAYS, 30 OR MORE]** calendar days prior to the scheduled date for issuance of the solicitation for the first construction contract, the Government shall notify the Non-Federal Sponsor in

writing of such scheduled date and the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for construction through the first fiscal year of construction, including the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction. Not later than such scheduled date, the Non-Federal Sponsor shall **[INDICATE MECHANISM: [1]** provide the Government with the full amount of the required funds by delivering a check payable to "FAO, USAED, **[APPROPRIATE USACE DISTRICT]**" to the District Engineer. **[2]** verify to the satisfaction of the Government that the Non-Federal Sponsor has deposited the required funds in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor. **[3]** present the Government with an irrevocable letter of credit acceptable to the Government for the required funds.**]**

2. For the second and subsequent fiscal years of construction, the Government shall notify the Non-Federal Sponsor in writing, no later than 60 calendar days prior to the beginning of that fiscal year, of the funds the Government determines to be required from the Non-Federal Sponsor to meet the non-Federal proportionate share of projected financial obligations for construction for that fiscal year. No later than 30 calendar days prior to the beginning of the fiscal year, the Non-Federal Sponsor shall make the full amount of the required funds for that fiscal year available to the Government through the funding mechanism specified in Article VI.B.1. of this Agreement.

3. The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover: (a) the non-Federal proportionate share of financial obligations for construction incurred prior to the commencement of the period of construction; and (b) the non-Federal proportionate share of financial obligations for construction as they are incurred during the period of construction.

4. If at any time during the period of construction the Government determines that additional funds will be needed from the Non-Federal Sponsor to cover the non-Federal proportionate share of projected financial obligations for construction for the current fiscal year, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required, and the Non-Federal Sponsor, no later than **[NORMALLY 60]** calendar days from receipt of such notice, shall make the additional required funds available through the payment mechanism specified in Article VI.B.1. of this Agreement. **[EXPLANATORY NOTE: IF ADDITIONAL FUNDS ARE REQUIRED FROM THE NON-FEDERAL SPONSOR, THEY SHOULD BE REQUESTED IMMEDIATELY SO THAT THE NON-FEDERAL SPONSOR WILL MAINTAIN ITS PROPORTIONATE SHARE OF FINANCIAL OBLIGATIONS. FEDERAL FUNDS SHOULD NOT BE USED TO MEET ANY SHORTFALL IN SPONSOR FUNDS.]**

C. In advance of the Government incurring any financial obligation associated with additional work under Article II.B. or II.E. of this Agreement, the Non-Federal Sponsor shall **[INDICATE MECHANISM: [1]** provide the Government with the full amount of the funds required to pay for such additional work by delivering a check payable to "FAO, USAED, **[APPROPRIATE USACE DISTRICT]**" to the District Engineer. **[2]** verify to the satisfaction of the Government that the Non-Federal Sponsor has deposited the full amount of the funds required to pay for such additional work in an escrow or other account acceptable to the Government, with interest accruing to the Non-Federal Sponsor.**]** The Government shall draw from the funds provided by the Non-Federal Sponsor such sums as the Government deems necessary to cover the Government's financial obligations for such additional work as they are incurred. In the event the Government determines that the Non-Federal Sponsor must provide additional funds to meet its cash contribution, the Government shall notify the Non-Federal Sponsor in writing of the additional funds required. Within **[NORMALLY 30]** calendar days thereafter, the Non-Federal Sponsor shall provide the Government with a check for the full amount of the additional required funds.

D. Upon completion of the Project or termination of this Agreement, and upon resolution of all relevant claims and appeals, the Government shall conduct a final accounting and furnish the Non-Federal Sponsor with the results of the final accounting. The final accounting shall determine total project costs, each party's contribution provided thereto, and each party's required share thereof. The final accounting also shall determine costs due to betterments and the Non-Federal Sponsor's cash contribution provided pursuant to Article II.B. of this Agreement.

1. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor is less than its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Non-Federal Sponsor shall, no later than 90 calendar days after receipt of written notice, make a cash payment to the Government of whatever sum is required to meet the Non-Federal Sponsor's required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement.

2. In the event the final accounting shows that the total contribution provided by the Non-Federal Sponsor exceeds its required share of total project costs plus costs due to any betterments provided in accordance with Article II.B. of this Agreement, the Government shall, subject to the availability of funds, refund the excess to the Non-Federal Sponsor no later than 90 calendar days after the final accounting is complete; however, the Non-Federal Sponsor shall not be entitled to any refund of the 5 percent cash contribution required pursuant to Article II.D.1. of this Agreement. In the event existing funds are not available to refund the excess to the Non-Federal Sponsor, the Government shall seek such appropriations as are necessary to make the refund.

ARTICLE VII - DISPUTE RESOLUTION

As a condition precedent to a party bringing any suit for breach of this Agreement, that party must first notify the other party in writing of the nature of the purported breach and seek in good faith to resolve the dispute through negotiation. If the parties cannot resolve the dispute through negotiation, they may agree to a mutually acceptable method of non-binding alternative dispute resolution with a qualified third party acceptable to both parties. The parties shall each pay 50 percent of any costs for the services provided by such a third party as such costs are incurred. The existence of a dispute shall not excuse the parties from performance pursuant to this Agreement.

ARTICLE VIII - OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION (OMRR&R)

A. Upon notification in accordance with Article II.C. of this Agreement and for so long as the Project remains authorized, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the entire Project or the functional portion of the Project, at no cost to the Government, in a manner compatible with the Project's authorized purposes and in accordance with applicable Federal and State laws as provided in Article XI of this Agreement and specific directions prescribed by the Government in the OMRR&R Manual and any subsequent amendments thereto.

B. The Non-Federal Sponsor hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of inspection and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. If an inspection shows that the Non-Federal Sponsor for any reason is failing to perform its obligations under this Agreement, the Government shall send a written notice describing the non-performance to the Non-Federal Sponsor. If, after 30 calendar days from receipt of notice, the Non-Federal Sponsor continues to fail to perform, then the Government shall have the right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal Sponsor owns or controls for access to the Project for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Government shall operate to relieve the Non-Federal Sponsor of responsibility to meet the Non-Federal Sponsor's obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to ensure faithful performance pursuant to this Agreement.

ARTICLE IX - INDEMNIFICATION

The Non-Federal Sponsor shall hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the Project and any Project-related betterments, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X - MAINTENANCE OF RECORDS AND AUDIT

A. Not later than 60 calendar days after the effective date of this Agreement, the Government and the Non-Federal Sponsor shall develop procedures for keeping books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement. These procedures shall incorporate, and apply as appropriate, the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20. The Government and the Non-Federal Sponsor shall maintain such books, records, documents, and other evidence in accordance with these procedures and for a minimum of three years after the period of construction and resolution of all relevant claims arising therefrom. To the extent permitted under applicable Federal laws and regulations, the Government and the Non-Federal Sponsor shall each allow the other to inspect such books, documents, records, and other evidence.

B. Pursuant to 32 C.F.R. Section 33.26, the Non-Federal Sponsor is responsible for complying with the Single Audit Act of 1984, 31 U.S.C. Sections 7501-7507, as implemented by Office of Management and Budget (OMB) Circular No. A-133 and Department of Defense Directive 7600.10. Upon request of the Non-Federal Sponsor and to the extent permitted under applicable Federal laws and regulations, the Government shall provide to the Non-Federal Sponsor and independent auditors any information necessary to enable an audit of the Non-Federal Sponsor's activities under this Agreement. The costs of any non-Federal audits performed in accordance with this paragraph shall be allocated in accordance with the provisions of OMB Circulars A-87 and A-133, and such costs as are allocated to the Project shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

C. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the Non-Federal Sponsor is required to conduct under the Single Audit Act. Any such Government audits shall be conducted in accordance with Government Auditing Standards and the cost principles in OMB Circular No. A-87 and other applicable cost principles and regulations. The costs of Government audits performed in accordance with this paragraph shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

ARTICLE XI - FEDERAL AND STATE LAWS

In the exercise of their respective rights and obligations under this Agreement, the Non-Federal Sponsor and the Government agree to comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulations 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army", and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

ARTICLE XII - RELATIONSHIP OF PARTIES

A. In the exercise of their respective rights and obligations under this Agreement, the Government and the Non-Federal Sponsor each act in an independent capacity, and neither is to be considered the officer, agent, or employee of the other.

B. In the exercise of its rights and obligations under this Agreement, neither party shall provide, without the consent of the other party, any contractor with a release that waives or purports to waive any rights such other party may have to seek relief or redress against such contractor either pursuant to any cause of action that such other party may have or for violation of any law.

ARTICLE XIII - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, nor any resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XIV - TERMINATION OR SUSPENSION

A. If at any time the Non-Federal Sponsor fails to fulfill its obligations under Article II.B., II.D., II.E., VI, or XVIII.C. of this Agreement, the Government shall terminate this Agreement or suspend future performance under this Agreement unless the Assistant Secretary of the Army (Civil Works) determines that continuation of work on the Project is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project.

B. If the Government fails to receive annual appropriations in amounts sufficient to meet Project expenditures for the then-current or upcoming fiscal year, the Government shall so notify the Non-Federal Sponsor in writing, and 60 calendar days thereafter either party may elect without penalty to terminate this Agreement or to suspend future performance under this Agreement. In the event that either party elects to suspend future performance under this Agreement pursuant to this paragraph, such suspension shall remain in effect until such time as the Government receives sufficient appropriations or until either the Government or the Non-Federal Sponsor elects to terminate this Agreement.

C. In the event that either party elects to terminate this Agreement pursuant to this Article or Article XV of this Agreement, both parties shall conclude their activities relating to the Project and proceed to a final accounting in accordance with Article VI.D. of this Agreement.

D. Any termination of this Agreement or suspension of future performance under this Agreement in accordance with this Article or Article XV of this Agreement shall not relieve the parties of liability for any obligation previously incurred. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

ARTICLE XV - HAZARDOUS SUBSTANCES

A. After execution of this Agreement and upon direction by the District Engineer, the Non-Federal Sponsor shall perform, or cause to be performed, any investigations for hazardous substances that the Government or the Non-Federal Sponsor determines to be necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (hereinafter "CERCLA"), 42 U.S.C. Sections 9601-9675, that may exist in, on, or under lands, easements, and rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. However, for lands that the Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the District Engineer provides the Non-Federal Sponsor with prior specific written direction, in which case the Non-Federal Sponsor shall perform such investigations in accordance with such written direction. All actual costs incurred by the Non-Federal Sponsor for such investigations for hazardous substances shall be included in total project costs and cost shared in accordance with the provisions of this Agreement, subject to an audit in accordance with Article X.C. of this Agreement to determine reasonableness, allocability, and allowability of costs.

B. In the event it is discovered through any investigation for hazardous substances or other means that hazardous substances regulated under CERCLA exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project, the Non-Federal Sponsor and the Government shall provide prompt written notice to each other, and the Non-Federal Sponsor shall not proceed with the acquisition of the real property interests until both parties agree that the Non-Federal

Sponsor should proceed.

C. The Government and the Non-Federal Sponsor shall determine whether to initiate construction of the Project, or, if already in construction, whether to continue with work on the Project, suspend future performance under this Agreement, or terminate this Agreement for the convenience of the Government, in any case where hazardous substances regulated under CERCLA are found to exist in, on, or under any lands, easements, or rights-of-way that the Government determines, pursuant to Article III of this Agreement, to be required for the construction, operation, and maintenance of the Project. Should the Government and the Non-Federal Sponsor determine to initiate or continue with construction after considering any liability that may arise under CERCLA, the Non-Federal Sponsor shall be responsible, as between the Government and the Non-Federal Sponsor, for the costs of clean-up and response, to include the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall not be considered a part of total project costs. In the event the Non-Federal Sponsor fails to provide any funds necessary to pay for clean up and response costs or to otherwise discharge the Non-Federal Sponsor's responsibilities under this paragraph upon direction by the Government, the Government may, in its sole discretion, either terminate this Agreement for the convenience of the Government, suspend future performance under this Agreement, or continue work on the Project.

D. The Non-Federal Sponsor and the Government shall consult with each other in accordance with Article V of this Agreement in an effort to ensure that responsible parties bear any necessary clean up and response costs as defined in CERCLA. Any decision made pursuant to paragraph C. of this Article shall not relieve any third party from any liability that may arise under CERCLA.

E. As between the Government and the Non-Federal Sponsor, the Non-Federal Sponsor shall be considered the operator of the Project for purposes of CERCLA liability. To the maximum extent practicable, the Non-Federal Sponsor shall operate, maintain, repair, replace, and rehabilitate the Project in a manner that will not cause liability to arise under CERCLA.

ARTICLE XVI - NOTICES

A. Any notice, request, demand, or other communication required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and either delivered personally or by telegram or mailed by first-class, registered, or certified mail, as follows:

If to the Non-Federal Sponsor:

West Jefferson Levee District
Post Office Box 608
Marrero, La 70072

If to the Government:

U.S. Army Corps of Engineers
New Orleans District
Post Office Box 60276
New Orleans, La. 70160

B. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

C. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at the earlier of such time as it is actually received or seven calendar days after it is mailed.

ARTICLE XVII - CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XVIII - HISTORIC PRESERVATION

A. The costs of identification, survey and evaluation of historic properties shall be included in total project costs and cost shared in accordance with the provisions of this Agreement.

B. As specified in Section 7(a) of Public Law 93-291 (16 U.S.C. Section 469c(a)), the costs of mitigation and data recovery activities associated with historic preservation shall be borne entirely by the Government and shall not be included in total project costs, up to the statutory limit of one percent of the total amount the Government is authorized to expend for the Project.

C. The Government shall not incur costs for mitigation and data recovery that exceed the statutory one percent limit specified in paragraph B. of this Article unless and until the Assistant Secretary of the Army (Civil Works) has waived that limit in accordance with Section 208(3) of Public Law 96-515 (16 U.S.C. Section 469c-2(3)). Any costs of mitigation and data recovery that exceed the one percent limit shall not be included in total project costs but shall be cost shared between the Non-Federal Sponsor and the Government consistent with the minimum non-Federal cost sharing requirements for the underlying flood control purpose, as follows: 35 percent borne by the Non-Federal Sponsor, and 65 percent borne by the Government.

ARTICLE XIX - LIMITATION ON GOVERNMENT EXPENDITURES

In accordance with Section 205 of the Flood Control Act of 1948, as amended, the Government's financial participation in the Project is limited to $5,000,000 which shall include all Federal funds expended by the Government for planning, design, and implementation of the project except for coordination account funds expended prior to the first work allowance for study initiation. Notwithstanding any other provision of this Agreement, the Non-Federal Sponsor shall be responsible for all costs in excess of this amount.

[INCLUDE ARTICLE XX ONLY IF THE NON-FEDERAL SPONSOR IS A STATE AGENCY OR DERIVES ITS FUNDS DIRECTLY FROM STATE LEGISLATIVE APPROPRIATIONS AND THE STATE IS LIMITED BY ITS CONSTITUTION OR BY STATE STATUTES FROM COMMITTING FUTURE STATE LEGISLATIVE APPROPRIATIONS.]

ARTICLE XX - OBLIGATIONS OF FUTURE APPROPRIATIONS

Nothing herein shall constitute, nor be deemed to constitute, an obligation of future appropriations by the **[LEGISLATURE]** of the State of Louisiana.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the District Engineer.

THE DEPARTMENT OF THE ARMY	THE WEST JEFFERSON LEVEE DISTRICT
BY: ______________________________	BY: ______________________________
[TYPED NAME] **[TITLE IN FULL]**	**[TYPED NAME]** **[TITLE IN FULL]**
DATE: __________________________	DATE: __________________________

CERTIFICATE OF AUTHORITY

I, ___________________, do hereby certify that I am the principal legal officer of the West Jefferson Levee District, that the West Jefferson Levee District is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the West Jefferson Levee District in connection with the Fisher School Basin – Jean Lafitte, La., and to pay damages in accordance with the terms of this Agreement, if necessary, in the event of the failure to perform, as required by Section 221 of Public Law 91-611 (42 U.S.C. Section 1962d-5b), and that the persons who have executed this Agreement on behalf of the West Jefferson Levee District have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this ______________ day of _____________ 19___.

____
[TYPED NAME]
[TITLE IN FULL]

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form -LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[SIGNATURE OF PCA SIGNATORY]
[TYPED NAME]
[TITLE IN FULL]

DATE: ______________________________

PROJECT MANAGEMENT PLAN
FISHER SCHOOL BASIN FLOOD PROTECTION PROJECT
JEAN LAFITTE, LOUISIANA

INTRODUCTION

A Project Management Plan (PMP) is designed to identify and describe the steps required for the construction, operation and maintenance of a small flood protection project for the Fisher School Basin located in Jean Lafitte, Louisiana. This PMP would become effective following approval of the recommendations described by the Fisher School Basin Feasibility Report. The need for and contents of a PMP are described by Engineering Regulation 5-7-1.

SCOPE OF WORK

The Fisher School Basin project consists of a levee constructed to elevation +7.0 feet National Geodetic Vertical Datum (NGVD) for the purpose of providing flood protection to the town of Jean Lafitte. The levee construction will be accomplished using a combination of earthen levee sections, concrete-capped sheetpile floodwalls, and incorporate 11 floodgates into the design.

The Corps maintains responsibility for identifying design and technical review team members. The design team will perform the necessary steps to prepare plans and specifications, manage and satisfy all construction contracts, and ensure the completed project is turned over to the non-Federal sponsor for operation and maintenance. An independent technical review team will be responsible for concurrent technical review of the plans and specifications.

WORK BREAKDOWN STRUCTURE

Level 1. The Fisher School Basin Flood Protection Project

Level 2. Major Elements of the Project

Plans and Specifications Package
Construction Contracts

Level 3. Elements Subordinate to Level 2 Major Elements

Level 2. Plans and Specifications Package

Level 3. Engineering Design
Real Estate Acquisition
BCO Review

Level 4. Elements Subordinate to Level 3

Level 3. Engineering Design

Level 4. Topographic Surveys & Soil Borings
Foundational Analysis
Structural Analysis
Levee Design
Relocations Design
Final Construction Cost Estimates
Final Design Plates

Level 3. Real Estate Acquisition

Level 4. Identify Affected Property Owners
Appraise Property Values
Acquire Perpetual and Temporary Easements

Level 3. Biddability, Constructability, and Operability Review

Level 4. Review Plans and Specifications package
Issue BCO certification

ORGANIZATIONAL BREAKDOWN STRUCTURE

PLANNING, PROGRAMS AND PROJECT MGMT DIV.	CEMVN-PM
Project Management Branch – West	CEMVN-PM-W
Economics and Social Analysis Branch	CEMVN-PM-A
General Water Resources Section	CEMVN-PM-AW
Environmental Planning & Compliance Branch	CEMVN-PM-R
Environmental Analysis & Support Section	CEMVN-PM-RP
Natural & Cultural Resource Analysis Section	CEMVN-PM-RN

ENGINEERING DIVISION	CEMVN-ED
Design Services Branch	CEMVN-ED-S
Projects Engineering Section	CEMVN-ED-SP
Relocations Section	CEMVN-ED-SR
Survey Section	CEMVN-ED-SS

Geotechnical Branch	CEMVN-ED-F
Structural Foundations Section	CEMVN-ED-FS
Geology Section	CEMVN-ED-FG
Soil & Material Processing Unit	CEMVN-ED-FG-P
Sub-Surface Exploration Unit	CEMVN-ED-FG-S
Hydrology and Hydraulics Branch	CEMVN-ED-H
Coastal Engineering Section	CEMVN-ED-HC
Hydra-Modeling Section	CEMVN-ED-HM
Civil Branch	CEMVN-ED-L
Levees Section	CEMVN-ED-LS
Structures Branch	CEMVN-ED-T
Major Structures Section	CEMVN-ED-TM
REAL ESTATE DIVISION	CEMVN-RE
Planning and Control Branch	CEMVN-RE-P
Acquisition Branch	CEMVN-RE-A
Appraisals Branch	CEMVN-RE-E
Legal Support Branch	CEMVN-RE-L
OPERATIONS DIVISION	CEMVN-OD
Flood Control Section	CEMVN-OD-OS
CONSTRUCTION DIVISION	CEMVN-CD
Quality Assurance Branch	CEMVN-CD-Q
WEST JEFFERSON LEVEE DISTRICT	Local Sponsor

ASSIGNMENT OF RESPONSIBILITY

The following responsibilities were assigned for the Fisher School Basin project:

- U.S. Army Corps of Engineers, New Orleans District: The New Orleans District will provide project and program management, prepare all design documents, perform construction contract procurement, administration and construction management, negotiate the Project Cooperation Agreement, and coordinate or administer real estate acquisition with the non-Federal sponsor.

- West Jefferson Levee District: The non-Federal sponsor is responsible for acquiring all necessary lands, easements, rights-of-way, relocations, and disposal areas (LERRD's), and will operate and maintain the project.

BUDGETS AND COST ESTIMATES

A final construction cost estimate will be prepared as part of the plans and specifications package. Therefore, the MCASES cost estimate provided in Appendix E will not be revised following approval of the Fisher School Basin Feasibility Report.

CURRENT BENEFITS PLAN

Because the project will be completed within four years of initiation of the plans and specifications phase, benefits used in the economic analysis will not be reviewed.

RESOURCE ALLOCATION

The New Orleans District resources used to accomplish the scope of work are listed in the Organizational Breakdown Structure.

LOCAL COOPERATION

A Draft Project Cooperation Agreement (PCA) is included in the feasibility report. The PCA will be executed once Headquarters, U.S. Army Corps of Engineers, approves the project.

ACQUISITION PLAN

The U.S. Army Corps of Engineers is responsible for the engineering design and construction of all components within the project; subject to funding appropriated by the Congress of the United States. All construction contracts or work items are accomplished by the use of unrestricted competitive bids, contract award procedures, and the contracting officer's notice to proceed. Coordination will be conducted with the

Contracting Division, Engineering Division, Construction Division and Project Management Division of the U.S. Army Corps of Engineers, New Orleans District.

REAL ESTATE PLAN

The real estate plan for the Fisher School Basin involves acquisition of lands, easements, relocations, right-of-way, and disposal (LERRD), by the local sponsor, with the Uniform Real Property Acquisition and Relocation Assistance Policies Act of 1970, PL 91-646, as amended.

TOTAL QUALITY PLAN

All design computations and drawings are checked and reviewed by an in-house Technical Review Team prior to submittal to Mississippi Valley Division and prior to advertising. Construction Division and Operations Division review plans specific to the work involved, identifying codes, standards, regulations, technical processes and procedures.

VALUE ENGINEERING PLAN

The District’s Value Engineer will conduct a Value Engineering study during the preconstruction engineering and design (PED) phase with the objective of analyzing functions of design and construction, and making recommendations to improve the product quality at the lowest overall cost without sacrificing quality, aesthetics or operation and maintenance capability.

SAFETY PLAN

The District Safety Office will monitor the project and implement the USACE Safety Manual (ER 385-1-). Construction of project components will be routine, except that at all times construction sites will be designated “hard hat and steel-toed boot” areas.

SECURITY PLAN

A Security Plan is not necessary because the project does not involve sensitive or classified information.

CULTURAL RESOURCE PLAN

The project components discussed in this report were described in the greatest possible detail based on present development plans. If the project plans, component designs, location, or areas of impact are changed, the altered project plans will be reevaluated for compliance with State and Federal historic preservation authorities.

ENVIRONMENTAL PLAN

A draft Environmental Assessment (EA) is provided along with the feasibility report. The EA will be distributed for agency review and comment along with the feasibility report. Coordination and correspondence regarding the EA and issuance of a Finding of No Significant Impact, if applicable, will be the responsibility of the New Orleans District.

FEDERAL EMERGENCY MANAGEMENT AGENCY/ NATIONAL FLOOD INSURANCE PROGRAM

The proposed levee will provide protection below the 100-year design flood event, therefore, the Federal Emergency Management Agency (FEMA) will not revise the Flood Insurance Rate Maps for the project area.

OPERATION AND MAINTENANCE PLAN

The local sponsor will agree in the PCA to operate and maintain the project.

MANAGEMENT CONTROL PLAN

All labor and contractual expenses to the project are entered and tracked in a newly implemented Corps-wide system entitled "Corps of Engineers Financial Management System," or CEFMS.

REPORTING REQUIREMENTS

Monthly issue papers are provided to the District-wide Project Review Board (PRB) meetings that are held to address issues and track project performance. Minutes of the PRB meetings are forwarded to the Mississippi Valley Division.

CHANGE CONTROL

Any substantial design or construction changes would require changes to the PCA. Any changes to the PCA would require an amendment, requiring approval and processing through the Corps hierarchy.

COMMANDER'S ASSESSMENT OF THE FINANCING PLAN

The West Jefferson Levee District (WJLD) will serve as the local sponsor of the project, providing approximately $5.3 million for construction over a three year period. The Federal government will provide approximately $4.7 million during the same time period. Following construction, the WJLD will provide operation and maintenance costs, currently estimated as $19,000 in 1997 dollars. (See Table 1 for a breakdown of annual costs.)

Funding Sources and Uses

The Levee District uses fund accounting, and its financial statements show General, Debt Service, Special Revenue, and Capital Projects funds. The General Fund tracts most governmental revenues and expenditures. The Debt Service Fund accounts for payment of bonds outstanding; the Special Revenue Fund accounts for funds set aside to handle emergencies; and the Capital Projects Fund accounts for money used to build projects such as levees. The latter is divided into individual funds for particular projects, and one was set up in 1996 for the subject project.

The local sponsor's financing plan shows a combined projection of revenues and expenditures for its General and Lafitte Project funds, the two sources that will be used to pay for this project. (Lafitte and Fisher Basin are synonymous. Fisher Basin is in the town of Lafitte, and while Corps documents refer to the project as the Fisher Basin Project, the local sponsor has its capital fund for the project titled "Lafitte Levee." That name is used in this report to maintain consistency with WJLD's financial statements.)

Revenues and expenditures are projected in the financing plan over an eight year period, including three years after the project is completed, at which time the project will be in the operations and maintenance phase. Growth for recurring revenues is projected at 2.6% over the period, which compares favorably with the actual experience from 1995 to 1998, when the average growth rate was 3.3% for these sources (See Table 2).

The revenue projections also include a substantial portion of non-recurring revenue, i.e., revenue from an outside source that will not be available to the Levee District on a regular basis. The non-recurring revenue comes from interest earnings on funds granted by the Louisiana Department of Transportation and Development (DOTD) for construction of another project. The WJLD agreed in 1989 to be the local sponsor of the Corps' Westwego to Harvey Canal Hurricane Protection Project. Since that time, the project has been expanded to include three other areas of protection, substantially raising overall project costs. The DOTD has granted the Levee District funds to pay for that project, and has agreed to take over the local sponsor role for what will then be known as the West Bank Hurricane Protection Project (WBHPP). The transition of local sponsorship is awaiting execution of a new Project Cooperation Agreement.

To assist the Levee District in paying for the expanded project prior to the change in sponsorship, the DOTD has granted substantial amounts of money to WJLD. While these funds will not be available for the Fisher Basin Project, WJLD is free to use interest earnings on this money to pay for the Fisher Basin Levee. Moreover, much of the funding already turned over to an escrow account held by the Corps to pay for the WBHPP is earning interest payable to WJLD.

earnings are shown in Table 2 of the Financing Plan. The projection of interest earnings should be regarded as quite conservative. The projected balance draw down is based on current Corps projections of spending in the next several years, and does not take into consideration a substantial amount of credits due to the local sponsor. These project credits (for WBHPP) are expected to amount to several million dollars, and a portion them currently being audited. This credit will substantially reduce the rate of the balance draw down, and consequently, increase interest earnings beyond what are shown in the financing plan.

Non-debt service expenditures are also projected to grow at a 2.6% rate, and this comparison is also favorable with past performance: non-debt service expenditures actually fell by an average of 2.3% for the period (see Table 2).

Debt service is projected based on the terms of current bonds outstanding. No bonding is needed for this project, and no sales of additional bonds are anticipated in the near future.

As Table 1 of the Financing Plan shows, the projected revenues minus expenditures for the two funding sources will create a substantial balance during the construction period. Consequently, the Levee District will be able to pay for the project and will likely have substantial excess funds to transfer to its Special Revenue (or emergency) Fund. In the event of some cost overruns, funds from that account can be transferred back to the General or Lafitte funds to pay for the overruns.

The operation and maintenance costs of this project (O&M) are also shown in Table 1 of the financing plan. As the figures show, by FY 2003, the O&M will be just over 22,000, rising thereafter with inflation. These costs are insubstantial and are easily covered by the revenue sources identified.

The WJLD has served as local sponsor for the Westwego to Harvey Canal Project and other Corps projects in the past, and has a good record as a local sponsor. Given the conservative nature of the revenue and expense projections, the substantial fund balances expected, and the Levee District's past performance as a local sponsor, it is reasonable to expect that the sponsor will live up to its obligations in a timely fashion.

William L. Conner

WILLIAM L. CONNER
COL, EN
Commanding

West Jefferson Levee District

Fisher Basin Project Financing Plan

Table 1. Projection of Future Revenues and Expenditures

	ACTUAL FYE 1998	1990	2000	2001	2002	2003	2004	2005	2006
REVENUES									
STATE REVENUE SHARING	$ 358,414	$ 367,733	$ 377,410	$ 387,087	$ 397,123	$ 407,517	$ 417,911	$ 429,022	$ 440,132
STATE SOURCES--DOTD	1,614,722								
AD VALOREM TAXES	2,356,246	2,417,508	2,481,127	2,544,746	2,610,721	2,679,052	2,747,383	2,820,426	2,893,470
INTEREST--West Bank Hurricane Prot.	376,165	279,916	130,796	112,571	76,296	29,581	-	-	-
INTEREST--Gen. + Lafitte Funds	53,893	159,248	125,065	66,242	73,003	96,368	134,395	173,926	216,311
OTHER	171,100	175,549	180,168	184,788	189,579	194,541	199,503	204,807	210,111
TOTAL REVENUES	4,930,540	3,399,953	3,294,567	3,295,434	3,346,721	3,407,058	3,499,192	3,628,181	3,760,025
EXPENDITURES									
PERSONNEL	$ 972,163	$ 997,439	$ 1,023,688	$ 1,049,936	$ 1,077,157	$ 1,105,349	$ 1,133,542	$ 1,163,679	$ 1,193,816
EMPLOYEE EXPENDITURES	21,853	22,421	23,011	23,601	24,213	24,847	25,481	26,158	26,835
OFFICE	30,827	31,629	32,461	33,293	34,156	35,050	35,944	36,900	37,856
PROFESSIONAL SERVICES	114,618	117,598	120,693	123,787	126,997	130,321	133,645	137,198	140,751
REPAIRS AND MAINTENANCE	172,291	176,771	181,422	186,074	190,898	195,895	200,891	206,232	211,573
OPERATING	245,193	251,568	258,188	264,808	271,674	278,784	285,895	293,496	301,097
OTHER	244,705	251,067	257,674	264,281	271,133	278,230	285,326	292,912	300,498
CAPITAL OUTLAY	247,742	254,183	260,872	267,561	274,498	281,683	288,867	296,547	304,227
LEVEE CONSTRUCTION PROJECTS									
FISHER BASIN CONSTRUCTION		-	3,785,000	800,000	688,000				
FISHER BASIN O&M						22,163	22,740	23,331	23,938
DEBT SERVICE *	188,311	193,215	192,680	191,800	200,505	203,525	*201,097*	*201,097*	*201,097*
TOTAL EXPENDITURES	$ 2,237,703	$ 2,295,891	$ 6,135,690	$ 3,205,143	$ 3,159,231	$ 2,555,847	$ 2,613,427	$ 2,677,550	$ 2,741,688
EXCESS (DEFICIENCY) OF REVENUES OVER EXPENDITURES	2,692,837	1,104,062	(2,841,123)	90,290	187,489	851,211	885,764	950,631	1,018,337
FUND BALANCE BEGINNING OF YEAR **	593,990	3,286,827	4,390,889	1,549,766	1,640,056	1,827,546	2,678,756	3,564,521	4,515,152
END OF YEAR	$ 3,286,827	$ 4,390,889	$ 1,549,766	$ 1,640,056	$ 1,827,546	$ 2,678,756	$ 3,564,521	$ 4,515,152	$ 5,533,489

* Principal and interest for outstanding Excess Revenue Bond. The last three years shown (2004-2006) are an average figure taken from the schedule of debt service contained in the comprehensive financial statements.

** The fund balance shown is the General Fund plus the Lafitte Levee Fund.

West Jefferson Levee District

Fisher Basin Project Financing Plan

Table 2. Interest Earnings from West Bank Hurricane Protection Funds

Expected Rate of Return 4.4%

Fiscal Year	Previous Balance *	COE Withdrawal (Begin. of Yr.)	Begin. of Year Balance	Interest Earnings
1999	$ 6,361,716		$ 6,361,716	$ 279,916
2000	6,641,632	3,669,000	2,972,632	130,796
2001	3,103,427	545,000	2,558,427	112,571
2002	2,670,998	937,000	1,733,998	76,296
2003	1,810,294	1,138,000	672,294	29,581
2004	701,875	701,875	-	-

* Combines equity currently on hand in the West of Harvey Canal Capital Project Fund and funds in the escrow account for the West Bank Hurricane Protection Project.