WHITAKER BAYOU
SARASOTA COUNTY, FLORIDA

RECONNAISSANCE REEVALUATION REPORT

FLOOD CONTROL
SECTION 205

US Army Corps of Engineers
Jacksonville District
South Atlantic Division
SYLLABUS

The purpose of this reevaluation report is to confirm continued Federal Government interest (as per ER 1105-2-100) in participating in a solution to the reduction of flood damages in the Whitaker Bayou drainage basin, Sarasota County, Florida. A Reconnaissance Report was originally completed in March of 1982 at the request of Sarasota County under the authority of Section 205 of the Flood Control Act of 1948, as amended. The study was deferred in 1986 at the request of the local sponsor due to lack of funds. In February of 1993, the local sponsor requested that the study be reactivated.

The study area is located in Sarasota County, Florida, which is on the west coast of peninsular Florida, about 40 miles south of Tampa. The study area is suburban with existing development adjacent to the channel right of way in many areas. Heavy rains of September 1971, September 1981, and most recently, June of 1992 caused extensive flooding to the area and impacted many residential structures.

The plan investigated in this report includes improvements of a 2.1 mile section of earthen trapezoidal channel, along with a steel sheet pile drop structure. The plan further includes the replacement of nine culvert/embankment bridges and five bridges with piers. The channel's side slopes and bottom width would be riprapped for a cumulative total of about 750 linear feet. The plan reduces flooding in the study area by enlarging the existing trapezoidal channel; providing a 10-year level of protection with a benefit-cost ratio of 1.27 and a total project cost of $6,298,591. This plan, along with other plans of varying levels of protection, will be investigated further in the feasibility phase of the study to determine the plan which optimizes net benefits.

This report recommends that there is a Federal interest in preparing a detailed project report for flood damage reduction along Whitaker Bayou, Sarasota, Florida.
TABLE OF CONTENTS

Title

Authority .................................................. 1
Purpose and Scope ......................................... 1
Description of Study Area ............................... 1
Prior Studies and Reports ............................... 3
Problems, Needs, and Opportunities ................ 3
Planning Objectives ..........................6
Study Constraints ................................. 6
Analyses ............................................ 7
Plan Formulation ................................... 8
Description of Plan .................................. 8
Economic Analysis .................................... 12
Cost Apportionment & Local Cooperation ........ 13
Feasibility Phase Planning ......................... 13
Conclusions ........................................ 14
Recommendations .................................... 15

LIST OF PLATES

No. Title ............................... Page No.
1 Flooded Area Map .................. 9
2 Proposed Plan ................. 10
3 Typical Cross Sections ....... 11
4 Economic Reach Delineation ....... C-2
LIST OF TABLES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Economic Analysis</td>
<td>12</td>
</tr>
<tr>
<td>C-1</td>
<td>Damage Reach Location</td>
<td>C-6</td>
</tr>
<tr>
<td>C-2</td>
<td>Structure &amp; Content Damages (w/o project)</td>
<td>C-7</td>
</tr>
<tr>
<td>C-3</td>
<td>Flood-Prone Structure Count (w/o project)</td>
<td>C-8</td>
</tr>
<tr>
<td>C-4</td>
<td>Auto Damages (w/o project)</td>
<td>C-9</td>
</tr>
<tr>
<td>C-5</td>
<td>Flood Damages (w/ project)</td>
<td>C-10</td>
</tr>
<tr>
<td>C-6</td>
<td>Flood-Prone Structure (w/ project)</td>
<td>C-11</td>
</tr>
<tr>
<td>C-7</td>
<td>Auto Damages (w/ project)</td>
<td>C-12</td>
</tr>
</tbody>
</table>

LIST OF FIGURES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Study Area</td>
<td>2</td>
</tr>
</tbody>
</table>

LIST OF PHOTOGRAPHS

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Whitaker Bayou Flooding, September 1971</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Whitaker Bayou Flooding, June 1992</td>
<td>4</td>
</tr>
</tbody>
</table>

LIST OF APPENDICES

APPENDIX A . . . . . . Original Reconnaissance Report
APPENDIX B . . . . Letter of Request from Local Sponsor
APPENDIX C . . . . . . . Economic Analysis
APPENDIX D . . . . . . . Real Estate Input
APPENDIX E . . . . . . . Draft Feasibility Cost Sharing Agreement, Initial Project Management Plan, and Study Network
APPENDIX F . . . . . . . Pertinent Correspondence
APPENDIX G . . . . . . . Cost Estimate
AUTHORITY

This reconnaissance report was prepared under the authority of Section 205 of the Flood Control Act of 1948 as amended. The study was requested by the Sarasota County Stormwater Environmental Utility in a letter dated February 4, 1993.

PURPOSE AND SCOPE

The purpose of this Reconnaissance Reevaluation Report is to determine whether or not there is an economic benefit for continued Federal Government interest in participating in a solution to the reduction of flood damages in the Whitaker Bayou drainage basin, Sarasota County, Florida. This report provides design refinements, updates the costs and benefits of one of the plans of the reconnaissance report, and adds costs of land acquisition, to determine if the plan remains economically justified.

DESCRIPTION OF STUDY AREA

Sarasota County is located on the west coast of Florida roughly 40 miles south of Tampa. The County is bounded by the Gulf of Mexico on the west, Manatee County to the north, De Soto County on the east, and Charlotte County to the south. The study area is located in Sarasota County with a large portion extending into the City of Sarasota, see Figure 1.

Land elevations are relatively low. Land elevations increase rather slowly moving eastward from the coast to about 30 feet in the eastern portion of the county. The City of Sarasota, bordering Sarasota Bay, is generally less than 20 feet above mean sea level.

The climate is relatively warm with an average annual temperature of 74°F. Rainfall is moderate with an average annual precipitation of 53 inches, with the majority of this occurring in the summer months. Tides along the coast are diurnal with a mean range of 2.3 feet.

Whitaker Bayou is a stream which provides an outlet for runoff for the northern portion of Sarasota County, see Figure 1.
The "main stream" originates in Manatee County to the north, flows generally southward, and empties into Sarasota Bay. A major tributary (Tributary A) is located east of the city and joins the main stream just north of Myrtle Street. Whitaker Bayou drains roughly 9 square miles. Stream slopes range from an average of about 3.9 feet per mile to 7 feet per mile.

Population growth in Sarasota County (1980-1990) has increased by 37%, from 202,251 to 277,766.

The study area is urban with residential development as the predominant land use, with several commercial pockets in the vicinity.

PRIOR STUDIES AND REPORTS

The original Whitaker Bayou Flood Control Reconnaissance Report was completed in March of 1982, see Appendix A. Two channelization alternatives investigated during the original reconnaissance report, which provided 10 and 50-year levels of protection, were found to be economically justified, with sound benefit cost ratios of 2.6 and 3.0, respectively.

The original report was approved and the Feasibility Phase was begun in 1983. The study was halted in 1986 at the request of the local sponsor due to lack of non-Federal matching funds.

In February of 1993 the Jacksonville District received a formal written request to resume work on the Whitaker Bayou study, see Appendix B. The region had been severely flooded following a storm in June of 1992. The Sarasota County Stormwater Environmental Utility was formed, with taxing authority, so that funding could be made readily available for stormwater management needs.

PROBLEMS, NEEDS AND OPPORTUNITIES

Flooding

The Whitaker Bayou drainage basin has experienced seasonal flooding basin wide, as well as serious flooding due to large tropical depressions and hurricanes.

Severe storm events occurred in both September 1971, Photo 1, and September 1981.

The most recent large scale flood event occurred 24-25 June, 1992, see Photo 2. Heavy rainfall was associated with a tropical disturbance in the Gulf of Mexico, 20 inches of rainfall fell in
Photo 1 - Flooding along Whitaker Bayou, September 1971

Photo 2 - Flooding 40th St. & Central Ave, Whitaker Bayou, June 1992
the Sarasota area. Claims paid by the National Flood Insurance Program as a result of this flood event reached $4,974,538 for Sarasota County. Property damage for the Tri-Par Estates (located along "Tributary A", Figure 1) area alone reached $300,000 for this particular flood event. Residents of this area submitted a petition of 807 signatures to the Sarasota County Stormwater Environmental Utility, the study's local sponsor, requesting relief from flooding problems.

Water Quality

Sarasota Bay, the receiving body of water for Whitaker Bayou, has been designated as an Outstanding Florida Waters, which affords it protection from both point source and nonpoint source pollution.

The major point source of pollution in the basin is the City of Sarasota's waste water treatment plant which discharges into a tributary of Whitaker Bayou. Whitaker Bayou has nutrient, dissolved oxygen, and coliform problems. The plant has a history of enforcement actions taken against it; and the City has explored a variety of political, engineering, and permitting options. The plant has been upgraded to an advanced water treatment facility. Currently, a combined system of "ridge and furrow" seepage irrigation and direct discharges to Whitaker Bayou are being used to dispose of wastewater. The plant is allowed a maximum of 59 days per year of direct discharge. Agricultural and urban stormwater runoff is also a problem in this basin.

Environmental Resources

The environmental setting in the Whitaker Bayou Basin has been significantly altered by residential and commercial development. From the mouth of Whitaker Bayou upstream approximately 1 mile, the bayou is tidally influenced. The bayou is bulkheaded from the mouth to the 27th St. bridge; docking facilities line the bulkhead.

Above the 27th St. Bridge, the bayou becomes both shallower and narrower and is largely overgrown with trees, bushes, vines, and weeds. In places, this overgrowth forms a canopy above the stream. Much of the bottom is littered with debris.

There are no significant environmental resources in the basin, nor any known threatened or endangered species. The Brown Pelican occurs in the Sarasota Bay area, but not in Whitaker Bayou.

Considered alternatives will be coordinated with appropriate State and Federal agencies during the Feasibility Phase of the study. Fish and Wildlife Coordination Act, Endangered Species Act, and National Environmental Policy Act requirements will be addressed and documented.
The original Reconnaissance Report was coordinated with the Florida Department of Environmental Regulation, the Southwest Florida Water Management District, and the U.S. Fish and Wildlife Service; see Appendix F.

Cultural Resources

A cultural resources investigation will be performed to identify and locate any potentially significant sites during the feasibility phase of the study. All work will be conducted in compliance with the National Historic Preservation Act of 1966, as amended (PL 89-665); the Archeological and Historic Preservation Act, as amended (PL 93-921); and Executive Order EO 11593. The original Reconnaissance Report was coordinated with the Florida Division of Archives, History, and Records; see Appendix F.

PLANNING OBJECTIVES

The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. More specifically, the objectives for the Whitaker Bayou area include:

- reduction of flood damages and other related costs in the Whitaker Bayou basin
- reduction to hazard of life and property due to flooding in the study area
- restoration, enhancement, and/or preservation of environmental attributes of the area
- protection, preservation, or minimization of impacts on significant historical and cultural resources of the study area

STUDY CONSTRAINTS

The primary constraint of this study is the study's scope. This particular investigation is a reevaluation of a previously approved Reconnaissance Report. A reconnaissance level study utilizes existing data and the readily obtainable information necessary to define and quantify the flooding and related problems in order to determine continued Federal interest in a solution to flood damage reduction.
Additional constraints are provided by Executive Order 11988. Under this Executive Order, the Corps is required to take action to:

- avoid development in the base flood plain
- reduce the hazard and risk associated with floods
- minimize the impact of floods on human safety, health and welfare
- restore and preserve the natural and beneficial values of the base flood plain

A further constraint is that the alternative plan with the greatest net economic benefits is required to be the plan recommended for Federal action. Contributions to national economic development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. In cases where the local sponsor prefers a plan more costly than the NED plan, and the increased development is not sufficient to warrant full Federal participation, the sponsor will be required to pay the difference in cost between the Federally supportable plan and the locally preferred plan.

ANALYSES

The purpose of this report was to update the costs (with the addition of real estate requirements) and benefits of a previously approved Reconnaissance Report to determine whether or not there is continued Federal Government interest. The engineering analyses is essentially that which was done prior to halting the study in 1986. This data was based on surveyed cross sections and geotechnical core borings. Both HEC-1 and HEC-2 models were utilized. The stage-frequency data was found to be very nearly the same as the work done in the original Reconnaissance Report. The cost estimate was based on this design data and may be found in Appendix G. The rationale for using this data was two fold; first, it was the best available information; and second, it reduced the number of bridge/culvert structures for replacement by about half, greatly decreasing the cost of the proposed plan.

Real Estate input, not provided for the original Reconnaissance Report, has been added to the cost of this study.

Two recent meetings have been held between representatives of the U.S. Army Corps of Engineers and the Florida Department of Environmental Protection. It is hoped that by coordinating early in the plan formulation process of this study, constructive input will help insure an implementable plan.
PLAN FORMULATION

The original Reconnaissance Report briefly covered various alternatives for the reduction of flood damages, to include both structural and non-structural solutions and no action. The non-structural solutions included flood plain zoning, a flood warning system, an evacuation of flood plain occupants, and flood proofing. Structural solutions investigated included levees, detention reservoirs, and channel modification. Of the alternatives investigated at the time, channel modification was found to be the most economically feasible.

During the feasibility phase of the study an effort will be made to take a new approach to flood control channel design, considering flood hazard reduction as just one component of a multi-objective riparian corridor management strategy. This strategy would also include, and give weight to the protection and enhancement of the riparian environment and the improvement of its esthetics.

DESCRIPTION OF PLAN

The proposed plan provides protection from the 10-year and more frequent storm events. The with and without-project flooded area maps are shown on Plate 1.

The plan involves improving the conveyance of a 11,200 foot segment of the existing Whitaker Bayou mainstream. The improvements would consist of enlarging the stream with an earthen trapezoidal channel section extending from Sta. 17+65 to 129+22, the provision of one steel sheet pile drop structure, and the replacement of nine culvert/embankment bridges and five bridges with piers. Channel side slopes and bottom would be riprapped from Sta.85+28 to Sta. 92+75, See Plate 2. Typical channel cross sections, both existing and proposed, may be found on Plate 3.
major tributary mentioned earlier flows through a large mobile home park. The upper basin of the main stream has primarily middle income single-family residences.

10. The environmental setting in the Whitaker Basin has been significantly altered reflecting residential and commercial development. From the mouth of Whitaker Bayou upstream approximately 1 mile, the bayou is tidally influenced. A seawall has been constructed on both sides of Whitaker Bayou from the mouth upstream to the 27th Street bridge; docking facilities are located along the seawall for small boat mooring.

11. Above the 27th Street bridge, Whitaker Bayou becomes shallower and narrower. Stream depth varies according to local rainfall and season. From the 27th Street bridge north to the Kennel Club, the stream is overgrown with trees, bushes, vines, and weeds. In places, this overgrowth forms a canopy above the stream. Much of the bottom is littered with debris.

12. Typical vegetation occurring along Whitaker Bayou are palms, pines (Pinus spp.), Brazilian pepper (Schinus terebinthifolius), hackberry (Celtis spp.), Hickory (Carya spp.), and oak (Quercus spp.). There are no endangered or threatened species occurring in the study area. The brown pelican (Pelecanus occidentalis) may occur near the mouth of Whitaker Bayou in Sarasota Bay. Reference to the National Register of Historic Places lists no properties in the study area.

13. The study alternatives considered in this report would have no adverse impacts on significant environmental resources because of the developed state of the area.

FLOOD PROBLEMS

14. Flooding occurs frequently in the Whitaker Bayou Basin. It is most common in the spring and early fall. Flooding occurs from two basic sources in the Sarasota area, local rains and tropical disturbances. Whitaker Bayou is also subject to flooding caused by coastal storm surge. The most significant floods striking the Sarasota area have been associated with hurricanes passing through the area. Below are brief descriptions of those hurricanes which have affected Sarasota.

a. 24 October 1921 -- This storm, originating in the western Caribbean, hit the Florida west coast just north of Tarpon Springs. Severe flooding occurred at Sarasota due to tides of 7 feet above normal. Damages were estimated at $200,000.

b. 19 September 1926 -- This storm was one of the most destructive to strike Florida. It originated in the Atlantic, passed directly over Miami, and entered the gulf at Fort Myers. Sarasota had abnormally high tides with all of the islands and keys submerged. Damage at Sarasota was estimated at $1 million.
EXISTING CHANNEL HAS A SIDE SLOPE OF 1 ON 1 (V:H). PROPOSED CHANNEL SIDE SLOPE WOULD BE 1 ON 2 (V:H).

SECTION 205
RECONNAISSANCE REPORT
WHITAKER BAYOU
SARASOTA, FLORIDA
TYPICAL CROSS SECTIONS
(MAIN STREAM)
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA
ECONOMIC ANALYSIS

The plan investigated is designed for the 10-year level of protection. The total first cost of the plan is $6,728,499 (includes construction, lands, and interest during construction); with a corresponding annual cost of $544,249 (annual cost based on a 50 year project life). Total annual benefits are $690,100; with a benefit cost ratio of 1.27.

Table 1 summarizes the economic analysis of the plan. Note that the cost of highway bridges is displayed as a separate item since the cost of alteration of highway bridges necessitated by a flood control project is considered part of the sponsor's LERRDs (lands, easements, rights-of-way, relocations, and dredged material disposal areas) responsibility (as per EP 1165-2-1, 10-4.a.(1)). Alterations or modifications to existing railroad bridges necessitated by changes in the configuration of the channel at the existing crossing will be considered part of the project construction cost and cost shared accordingly.

Table 1
Economic Analysis

<table>
<thead>
<tr>
<th>PROJECT COSTS</th>
<th>HIGHWAY BRIDGES</th>
<th>ALL OTHER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTRUCTION*</td>
<td>$1,770,451</td>
<td>$3,706,140</td>
<td>$5,476,591</td>
</tr>
<tr>
<td>LANDS**</td>
<td></td>
<td></td>
<td>$822,000</td>
</tr>
<tr>
<td>INTEREST DURING CONSTRUCTION</td>
<td></td>
<td></td>
<td>$429,908</td>
</tr>
<tr>
<td>(IDC), 24 MONTHS @ 7.75%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL INVESTMENT COST</td>
<td></td>
<td></td>
<td>$6,728,499</td>
</tr>
<tr>
<td>AMORTIZATION &amp; INTEREST</td>
<td>$534,249</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPERATION &amp; MAINTENANCE</td>
<td></td>
<td></td>
<td>$10,000</td>
</tr>
<tr>
<td>TOTAL ANNUAL COST</td>
<td></td>
<td></td>
<td>$544,249</td>
</tr>
<tr>
<td>FLOOD CONTROL BENEFITS: INUNDATION</td>
<td></td>
<td></td>
<td>$690,100</td>
</tr>
<tr>
<td>BENEFIT COST RATIO</td>
<td></td>
<td></td>
<td>1.27</td>
</tr>
<tr>
<td>NET NED BENEFITS</td>
<td></td>
<td></td>
<td>$145,851</td>
</tr>
</tbody>
</table>

* - construction costs include a 25% increase for general contingencies plus an additional 15% for E&D (engineering & design) and S&A (supervision & administration)

** - Real estate contingencies of 25% were included to cover uncertainties associated with such elements as valuation variance,
negotiation latitude, condemnation awards and interest, and refinement of boundary lines during ownership verification. See Appendix D.

COST APPORTIONMENT & LOCAL COOPERATION

Under the provisions of Federal Law, implementation of a flood control project for Whitaker Bayou will require the non-Federal sponsor to provide a cash contribution of 5 percent of the first cost; all LERRDs; and an additional cash contribution (if necessary) so that the total non-Federal share is at least 25 percent of the total project cost. The maximum non-Federal share is 50 percent of the total project cost. One exception to the maximum non-Federal share is if the Federal share exceeds $5 million statutory limit for a Section 205 project, the non-Federal share is increased by the amount that exceeds this limit.

Using the proposed plan as an example, the total project cost is $6,298,591. The 5 percent cash contribution required from the local sponsor totals $314,930 and the estimated cost for LERRDs (to include highway bridges) is $2,592,451. The non-Federal share is a minimum of 25 percent ($1,574,648) with a maximum contribution of 50 percent ($3,149,296). The cash contribution plus the LERRD total $2,907,381, this amount is the local sponsor's responsibility.

The requirements of local cooperation, implementation arrangements, and construction cost sharing will be developed during the feasibility study.

FEASIBILITY PHASE PLANNING

Cost Sharing Policy

All water resource studies undertaken by the Corps of Engineers are conducted in two phases - a Reconnaissance Phase and a Feasibility Phase. The two-phase study procedure is designed to encourage non-Federal participation throughout the Feasibility Study and to increase the certainty that planned projects will be implemented.

The cost of the Reconnaissance Phase is accomplished entirely at Federal expense. The cost of the subsequent Feasibility Phase ($787,300), however, is to be shared equally (50/50 split) between the Federal government and a non-Federal sponsor. The non-Federal contribution for the Feasibility Phase is $393,650. Up to one-half of the non-Federal contribution, or one-quarter of the cost of the feasibility phase ($196,825), may be in the form of in-kind services.
A cost sharing agreement must be negotiated at the end of the Reconnaissance Phase that commits the non-Federal local sponsor to provide 50 percent of the Feasibility Phase cost. A draft Feasibility Cost Sharing Agreement with attached Initial Project Management Plan and Study Network may be found in Appendix E. Federal funds to initiate the Feasibility Phase of this study will be allocated and approved by higher authority.

Purposes

The purposes of the Feasibility Phase are as follows:

- to conduct detailed engineering, economic, and environmental investigations to support plan formulation and evaluation
- to identify the NED plan
- to estimate costs and benefits to a level of detail suitable for project justification, if applicable
- to determine the appropriate construction cost-sharing arrangements and obtain non-Federal support, as necessary
- to prepare the appropriate documentation for Federal authorization
- to recommend favorable projects for authorization and construction
- a target for the completion of the Feasibility Phase is 24 months
- the Feasibility phase should cost no more than 15 percent of the implementation cost of the recommended solution

CONCLUSIONS

This Reconnaissance Reevaluation Report for Whitaker Bayou indicates that it is economically feasible for Federal involvement in the implementation of a flood control project in Sarasota County to protect the area from overflow of Whitaker Bayou. In that the study area is all but built-out, the preliminary plans are acceptable and pose no significant threat to the area's natural and environmental resources. Further detailed study is required to determine the NED plan.
RECOMMENDATIONS

I recommend that a detailed Feasibility Phase study be undertaken to develop a plan for flood damage reduction measures in the Whitaker Bayou drainage basin of Sarasota, Florida. I recommend that funding be allocated under Section 205 of the Flood Control Act of 1948, as amended, for the preparation of a Detailed Project Report in accordance with existing Federal policies, guidelines, and regulations for water resource development projects.

TERRY L. RICE
COL, Corps of Engineers
Commanding
APPENDIX A

RECONNAISSANCE REPORT
COMPLETED MARCH 1982
SECTION 205
RECONNAISSANCE REPORT

WHITAKER BAYOU
SARASOTA, FLORIDA

Department of the Army
Jacksonville District, Corps of Engineers
Jacksonville, Florida
March 1982
SECTION 205
RECONNAISSANCE REPORT
WHITAKER BAYOU
SARASOTA, FLORIDA

INTRODUCTION

STUDY AUTHORITY

1. The studies presented in this report were conducted under the authority contained in Section 205 of the Flood Control Act of 1948, as amended. Section 205 generally authorizes the Chief of Engineers to construct small flood control projects provided that such work is advisable, is in the overall public interest, and meets certain conditions and limitations.

PURPOSE AND SCOPE

2. The purpose of this report is to present the results of studies conducted to identify the problems and needs related to flooding in the Whitaker Bayou Basin, investigate potential solutions to those problems identified, and determine if further studies are warranted. The overall scope of this report and the investigations conducted during its preparation are primarily limited to addressing flood problems in Whitaker Bayou. The report presents the results of preliminary engineering, environmental, and economic analysis of alternatives for reducing flood damages in the basin.

STUDY PARTICIPANTS AND COORDINATION

3. The Departments of Planning and Engineering for the city of Sarasota provided much of the basic information regarding land use and previous flooding that was used in preparation of this report.

STUDIES OF OTHERS

4. Other studies used in the preparation of this report are given below:


   b. City of Sarasota Comprehensive City Plan prepared by the city of Sarasota in June 1979.
PROBLEM IDENTIFICATION

STUDY AREA

5. The city of Sarasota is located in Sarasota County along the central west coast of Florida, about 40 miles south of Tampa (see Figure 1). The city experienced a 21.5 percent increase in population from 1970 to 1980, increasing from 40,237 to 48,868. The county experienced a higher growth rate of 67.5 percent over the same period, increasing from 120,413 to 201,731. This rapid growth can be attributed to the semi-tropical setting and general living conditions found in the area. The climate is warm with an average annual temperature of about 74 degrees. Rainfall is moderate with an average annual precipitation of 53 inches with the major portion occurring in the summer months. Tides along the coast are mixed with a mean range of 2.3 feet.

6. Sarasota County is a typical Florida gulf coast county. Land elevations are fairly low and the mainland is separated from the gulf by various bays and inlets formed by numerous keys which border the gulf. Land elevations increase rather slowly moving inland ranging from mean sea level to about 30 feet in the western portion of the county. The city of Sarasota, bordering Sarasota Bay, is generally less than 20 feet above mean sea level.

7. Whitaker Bayou is a small stream which provides a major outlet for runoff for the northern portion of Sarasota (see Figure 1). The main stream originates in Manatee County to the north, flows generally southward, and empties into Sarasota Bay. A major tributary, shown on Figure 1, rises west of the city and joins the main stream just north of Myrtle Street. In all, Whitaker Bayou drains about 9.0 square miles. Stream slopes range from an average of 3.9 feet per mile to about 7 feet per mile.

8. Development in Whitaker Basin varies along the stream with the upper portion about 60 - 70 percent developed and the lower portion 80 - 85 percent developed. The lower portion of the basin is mixed between residential, commercial, and light industrial development. The middle basin is primarily residential with some commercial and one industrial activity. The upper basin is primarily residential with two significant commercial developments, a race track and an airport.

9. Residential development in the basin also varies considerably. The lower basin has primarily upper middle class single-family residences mixed with professional buildings, shopping centers, and a few high rise condominiums. The middle basin along the main stream has primarily middle income single-family housing with small commercial stores. To the east of the main stream, along several lesser tributaries, residential development changes to medium to high density and low to lower middle income. The one
c. 10 September 1960 (Donna) -- This major storm originated in the Atlantic, passed over the keys in southern Florida, traveled northward over to Fort Myers, turned northwest, and re-entered the Atlantic at Flagler Beach. Tides at Sarasota were about 3 feet above normal. Rainfall averaged 5 to 7 inches in Sarasota County.

d. 18 October 1968 (Gladys) -- This storm originated in the Caribbean, passed over Cuba, entered the gulf, and turned north-northwest parallel to the coast. It eventually turned northeast and hit the coast at Homosassa, crossed the Florida peninsula, and entered the Atlantic near St. Augustine. Tides in Sarasota were 4 to 5 feet above normal causing flooding and wave damage.

e. 18 June 1972 (Agnes) -- This storm formed near the northeast tip of the Yucatan Peninsula and traveled northward striking the Florida coast at Panama City. In Sarasota, tides were about 2 to 3 feet above normal causing erosion and wave damage.

15. Local storms directly affecting Whitaker Bayou have caused considerable flood damage along the stream. The flat topography adjacent to the stream in the middle and upper basin result in widespread flooding when the stream overflows its banks. The most recent flood occurred on 27 September 1981, damaging several houses. No damages were estimated.

HYDROLOGY AND HYDRAULICS

16. Based on the previous flooding experienced and the high degree of development in the basin, an analysis of the basin was performed to determine flooding potential along the stream. Table 1 presents flow-frequency data for select points in the basin. The flows were developed using HEC-1 and rainfall data from Technical Paper No. 40. Curve numbers reflecting runoff characteristics were derived from land use and soil cover.

**Table 1**

<table>
<thead>
<tr>
<th>LOCATION (STATION)</th>
<th>DRAINAGE AREA (ACRES)</th>
<th>FLOOD FLOW (CFS)</th>
<th>2-YR</th>
<th>5-YR</th>
<th>10-YR</th>
<th>25-YR</th>
<th>50-YR</th>
<th>100-YR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0+00</td>
<td>5768.3</td>
<td></td>
<td>1030</td>
<td>1993</td>
<td>2538</td>
<td>3100</td>
<td>3598</td>
<td>4094</td>
</tr>
<tr>
<td>16+90</td>
<td>5709.8</td>
<td></td>
<td>1024</td>
<td>1984</td>
<td>2525</td>
<td>3083</td>
<td>3580</td>
<td>4074</td>
</tr>
<tr>
<td>25+00</td>
<td>5676.7</td>
<td></td>
<td>1021</td>
<td>1979</td>
<td>2519</td>
<td>3075</td>
<td>3572</td>
<td>4055</td>
</tr>
<tr>
<td>48+90</td>
<td>4982.1</td>
<td></td>
<td>854</td>
<td>1690</td>
<td>2159</td>
<td>2642</td>
<td>3076</td>
<td>3504</td>
</tr>
<tr>
<td>81-80</td>
<td>4593.4</td>
<td></td>
<td>823</td>
<td>1635</td>
<td>2088</td>
<td>2551</td>
<td>2978</td>
<td>3392</td>
</tr>
<tr>
<td>21+50 on Tributary A</td>
<td>2086.1</td>
<td></td>
<td>470</td>
<td>915</td>
<td>1156</td>
<td>1400</td>
<td>1631</td>
<td>1849</td>
</tr>
</tbody>
</table>

1/ Station Map Location
0+00 Mouth of Whitaker Bayou
16+90 North of Tamiami Trail
25+00 Junction of Tributary
48+90 Central Avenue
81+80 Junction with Tributary A
21+50 (Trib.A) On Tributary A at junction with Tributary
17. Water surface profiles for Whitaker Bayou were developed from the data in Table 1 using the HEC-2 backwater model. Table 2 shows the stage-frequency data thus developed at selected points along the stream.

**TABLE 2**

STAGE-FREQUENCY DATA

(Feet above Mean Sea Level)

<table>
<thead>
<tr>
<th>LOCATION (STATION)</th>
<th>FLOOD STAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-YR</td>
</tr>
<tr>
<td>Tributary A</td>
<td></td>
</tr>
<tr>
<td>16+90</td>
<td>3.0</td>
</tr>
<tr>
<td>48+90</td>
<td>8.3</td>
</tr>
<tr>
<td>81+80</td>
<td>12.5</td>
</tr>
<tr>
<td>117+00</td>
<td>16.9</td>
</tr>
<tr>
<td>131+00</td>
<td>18.8</td>
</tr>
<tr>
<td>21+50</td>
<td>14.9</td>
</tr>
<tr>
<td>63+50</td>
<td>19.2</td>
</tr>
</tbody>
</table>

FLOOD DAMAGES

18. Based on the flood stages developed, estimates were made of the number of structures subject to flood damage in the basin. In the 100-year flood plain there are about 632 residential structures, 94 commercial buildings, 13 apartment buildings, and 170 mobile homes. Table 3 shows the estimated damages to these structures for selected events.

**TABLE 3**

SELECTED FLOOD DAMAGES

<table>
<thead>
<tr>
<th>TYPE OF STRUCTURE</th>
<th>FLOOD EVENT/DAMAGES ($1,000's)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-YR</td>
</tr>
<tr>
<td>Residence</td>
<td>$714</td>
</tr>
<tr>
<td>Commercial</td>
<td>648</td>
</tr>
<tr>
<td>Apartment</td>
<td>0</td>
</tr>
<tr>
<td>Mobile Home</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>$1,368</td>
</tr>
</tbody>
</table>
19. Based on the damages thus determined, average annual damages were estimated to be $2,861,100. It should be noted that these damages are estimated for structures and contents only. Other damages, temporary evacuation, emergency costs, etc., were not determined at this stage.

OTHER PROBLEMS

20. No other significant water resource problems were identified during these initial investigations. Therefore, studies were focused on flooding and potential solutions to the flood problems.

FORMULATION OF ALTERNATIVES

21. Because of the limited scope of this reconnaissance study, alternative measures for reducing flood damages were analyzed in only sufficient detail to determine potential feasibility and possible impacts. The alternatives considered in this study are discussed below.

NO ACTION

22. This alternative represents the without project condition for the study area. Under this alternative, flooding would continue to periodically strike the area, causing property damage and threatening the life and safety of those living in or passing through the area.

FLOOD PLAIN ZONING

23. The city of Sarasota has already adopted necessary zoning ordinances regarding flood plain development. However, most of the existing development within the flood plain was constructed prior to the adoption of such ordinances. While these ordinances will undoubtedly limit damage to future development, damage to existing development would continue.

FLOOD WARNING SYSTEM

24. The small size of the watershed limits the effectiveness of such a warning system for local rain-induced flooding. The potential for other flooding resulting from tropical disturbances is adequately covered in existing National Weather Service broadcasts. The small size of the basin does not readily lend itself to the establishment of a site dedicated system.

EVACUATION OF FLOOD PLAIN OCCUPANTS

25. This alternative would involve the acquisition and removal of those structures subject to frequent flooding. For this reconnaissance study, a preliminary analysis was made of the feasibility of two levels of relocation for Whitaker Bayou. Evacuation of all those occupants of the 2- and 10-year flood plains was analyzed. For the two year level of evacuation, 41 houses
and 19 commercial buildings would have to be acquired and the occupants moved. The total cost of this plan would be about $8.3 million. Annual costs would be $653,200, while annual benefits would be $1,552,100, giving a benefit-to-cost ratio of 2.4. The 10-year level of evacuation would require the acquisition and removal of 287 houses and 42 commercial buildings. The estimated first cost of this plan would be about $35 million. Annual costs and benefits would be $2,738,800 and $2,541,800, respectively. The benefit-to-cost ratio would be 0.93.

26. Based on preliminary data, a plan for evacuation of the lower flood plain is economically feasible. However, the costs of such a plan are high and the social impacts significant. Therefore, such a plan would require considerably more evaluation to determine the optimum level of this alternative.

FLOODPROOFING

27. Floodproofing of flood plain structures could be utilized to reduce flood damages in certain structures. However, there was insufficient data available during this stage to evaluate the economic feasibility of this alternative.

LEVEES

28. Levees could be provided along the stream to contain the floods within a specified floodway. However, this alternative was not considered practical due to the highly developed nature of the watershed and its general characteristics. Any levee would require significant right-of-way, disrupt local neighborhoods, and adversely affect the esthetics of the area.

DETENTION RESERVOIRS

29. This alternative could reduce flood damage in the watershed by selectively placing detention reservoirs in upstream areas to reduce downstream flood levels. However, based on the degree of development in the area, there did not appear to be sufficient available space for such upstream detention works without considerable relocation of existing development. Also, the multiple points of inflow and urban drainage works would tend to reduce the impact of such reservoirs on flood levels in the area.

CHANNEL MODIFICATION

30. This alternative could reduce flood damage in the watershed by increasing the hydraulic efficiency of Whitaker Bayou, thus allowing flood waters to drain more rapidly. This would reduce flood levels, thereby reducing expected flood damages. For this study, two preliminary designs were analyzed, a 10-year and a 50-year design. The basic design channel modification provides for the construction of a trapezoidal channel along the main stream and Tributary A. The bottom widths for each design are shown at various points on Table 4. The channel side slopes would be 2
horizontal to 1 vertical. For the 10-year design two drop structures would be provided, one at Station 95+00 on the main stream and one at Station 36+50 on Tributary A. For the 50-year design only one drop structure would be provided, located at Station 45+00 on Tributary A.

31. The effects of these two designs on flood levels in Whitaker Bayou are shown on Table 5. In comparing Tables 2 and 5, it can be seen that there is no effect from the channel modification on flooding in the lower end of Whitaker Bayou. This is primarily due to effects of storm surge. The channel modification effects do increase considerably upstream due to the lowering of the channel bottom and widening of the channel.

**TABLE 4**

**CHANNEL DESIGN**

<table>
<thead>
<tr>
<th>Reach</th>
<th>Station</th>
<th>10-Year Design</th>
<th>50-Year Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bottom Width</td>
<td>Bottom Width</td>
</tr>
<tr>
<td>Main Stream</td>
<td></td>
<td>(feet)</td>
<td>(feet)</td>
</tr>
<tr>
<td>0+00 to 16+90</td>
<td>Existing</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>16+90 to 48+60</td>
<td>Transition</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>48+60 to 48+90</td>
<td>Transition</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>48+90 to 95+00</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>95+00 to 142+00</td>
<td>15</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Tributary A</td>
<td></td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>0+00 to 21+50</td>
<td>Junction</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>21+50 to 21+60</td>
<td>Junction</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>21+60 to 82+00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 5**

**MODIFIED STAGE FREQUENCY DATA**

Flood Stage (Feet, m.s.l.)

<table>
<thead>
<tr>
<th>Location (Station)</th>
<th>10-Year Design</th>
<th>2-YR</th>
<th>5-YR</th>
<th>10-YR</th>
<th>25-YR</th>
<th>50-YR</th>
<th>100-YR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16+90</td>
<td>3.0</td>
<td>4.7</td>
<td>6.0</td>
<td>8.0</td>
<td>9.8</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>48+90</td>
<td>3.3</td>
<td>5.4</td>
<td>6.7</td>
<td>8.6</td>
<td>10.3</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>81+80</td>
<td>3.7</td>
<td>5.9</td>
<td>7.3</td>
<td>9.2</td>
<td>10.7</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>117+00</td>
<td>6.8</td>
<td>10.2</td>
<td>11.9</td>
<td>14.2</td>
<td>16.0</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>131+00</td>
<td>7.2</td>
<td>10.6</td>
<td>12.4</td>
<td>14.6</td>
<td>16.2</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>Tributary A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21+50</td>
<td>4.2</td>
<td>6.0</td>
<td>7.2</td>
<td>9.1</td>
<td>10.6</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>63+50</td>
<td>13.7</td>
<td>14.9</td>
<td>15.6</td>
<td>16.2</td>
<td>16.7</td>
<td>17.2</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 5 (Continued)

MODIFIED STAGE FREQUENCY DATA

<table>
<thead>
<tr>
<th>Location (Station)</th>
<th>2-YR</th>
<th>5-YR</th>
<th>10-YR</th>
<th>25-YR</th>
<th>50-YR</th>
<th>100-YR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainstream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16+90</td>
<td>3.0</td>
<td>4.7</td>
<td>6.0</td>
<td>8.0</td>
<td>9.8</td>
<td>12.0</td>
</tr>
<tr>
<td>48+90</td>
<td>3.3</td>
<td>5.4</td>
<td>6.7</td>
<td>8.6</td>
<td>10.3</td>
<td>12.1</td>
</tr>
<tr>
<td>81+80</td>
<td>3.7</td>
<td>5.9</td>
<td>7.3</td>
<td>9.2</td>
<td>10.7</td>
<td>12.5</td>
</tr>
<tr>
<td>117+00</td>
<td>4.0</td>
<td>6.5</td>
<td>8.0</td>
<td>9.8</td>
<td>11.2</td>
<td>12.9</td>
</tr>
<tr>
<td>131+00</td>
<td>4.0</td>
<td>6.6</td>
<td>8.0</td>
<td>9.8</td>
<td>11.2</td>
<td>12.9</td>
</tr>
<tr>
<td>Tributary A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21+50</td>
<td>4.1</td>
<td>6.0</td>
<td>7.2</td>
<td>9.1</td>
<td>10.6</td>
<td>12.5</td>
</tr>
<tr>
<td>63+50</td>
<td>13.7</td>
<td>14.9</td>
<td>15.6</td>
<td>16.2</td>
<td>16.7</td>
<td>17.2</td>
</tr>
</tbody>
</table>

32. Based on the two channel designs thus developed, preliminary cost estimates were made. Table 6 shows the estimated first cost of $9,245,000 for the 10-year design. Table 7 shows the corresponding annual costs of $725,000. Similar estimates were developed for the 50-year design, resulting in an estimated first cost of $10,640,000 with an annual cost of $834,000. It should be noted that both of these costs assume replacement of all existing bridges along the reaches being altered. It is doubtful if all would have to be replaced. However, given the scope of this investigation the need for such a replacement could not be determined and, therefore, all were assumed to be replaced. It should also be noted that the city presently owns or leases much of the land along the existing channel for maintenance. No costs were included at this stage for that purpose.

33. Annual benefits for each of the channel designs were determined based on reductions in flood elevations. Residual annual flood damages with the 10-year design would be $689,300 giving annual benefits of $2,171,800. For the 50-year design residual damages would be $660,200, yielding annual benefits of $2,200,900. These would yield benefit-to-cost ratios of 3.0 to 1 and 2.6 to 1 for the 10-year and 50-year designs, respectively.

SUMMARY ANALYSIS OF ALTERNATIVE PLANS

34. Of those alternative measures considered flood plain evacuation and channel modification both offer potentially economically-feasible methods for reducing flood damage in the Whitaker Bayou Basin. The impacts associated with these two alternative measures differ substantially even though both provide a significant reduction in flood damages. The alternative for floodplain evacuation would have significant social impacts on area residents by requiring the relocation of a significant number of people and businesses. This would have significant effects on community cohesion and
the local economy. Environmental effects of this alternative could be beneficial depending on the final use of the evacuated land.

TABLE 6
COST ESTIMATE
10-YEAR DESIGN

<table>
<thead>
<tr>
<th>Item</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td></td>
</tr>
<tr>
<td>Mobilization and demobilization</td>
<td>$115,000</td>
</tr>
<tr>
<td>Excavation</td>
<td></td>
</tr>
<tr>
<td>Main Stream 345,000 c.y. @ $3.10/c.y.</td>
<td>1,069,400</td>
</tr>
<tr>
<td>Tributary A 225,000 c.y. @ $2.75/c.y.</td>
<td>518,800</td>
</tr>
<tr>
<td>Clearing and Grubbing 17 acres @ $2,800/acre</td>
<td>47,600</td>
</tr>
<tr>
<td>Haul Roads 2 miles @ $16,600/mile</td>
<td>33,200</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>$1,884,000</td>
</tr>
<tr>
<td>Contingencies @ 25%</td>
<td>471,000</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>$2,355,000</td>
</tr>
<tr>
<td>E&amp;D and S&amp;A @ 15%</td>
<td>355,000</td>
</tr>
<tr>
<td>Subtotal:</td>
<td>$2,710,000</td>
</tr>
<tr>
<td>Railroad Bridges and Drop Structures</td>
<td>1,870,700</td>
</tr>
<tr>
<td>Total Federal:</td>
<td>$4,580,700</td>
</tr>
<tr>
<td>Non-Federal</td>
<td></td>
</tr>
<tr>
<td>Highway Bridges</td>
<td>$4,664,300</td>
</tr>
<tr>
<td>Right-of-way</td>
<td>0</td>
</tr>
<tr>
<td>Total Non-Federal</td>
<td>$4,664,300</td>
</tr>
<tr>
<td>TOTAL COST:</td>
<td>$9,245,000</td>
</tr>
</tbody>
</table>

TABLE 7
ANNUAL COST
10-YEAR DESIGN

<table>
<thead>
<tr>
<th>Item</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest and Amortization @ 7-5/8 %</td>
<td>$723,000</td>
</tr>
<tr>
<td>Maintenance</td>
<td>2,000</td>
</tr>
<tr>
<td>TOTAL ANNUAL COST:</td>
<td>$725,000</td>
</tr>
</tbody>
</table>

35. The alternative of channel modification would cause temporary disruptions of local activity during construction. However, there would be no long-term effects other than those associated with a reduction in flooding.
This alternative should not require the relocation of any business or residence, thus avoiding related economic and social impacts. The environmental impacts of the alternative would be adverse, though not significant. There would be a loss of the existing stream habitat and near bank vegetation, as well as a temporary degradation of water quality. However, as previously noted, the highly developed nature of this watershed has resulted in a significant alteration of the natural environment. There are no known threatened or endangered plant or animal species inhabiting the area which would be affected by this plan. Also, there are no known significant historical items in the area which would be affected.

36. It is recognized that a combination of floodplain evacuation and channel modification may be a more viable solution; however, such an analysis was beyond the scope of this investigation. Such a combination, as well as other alternatives and combinations, would be analyzed in more detailed studies.

CONCLUSIONS

37. Based on the above findings, it appears that there is a significant flood problem in the Whitaker Bayou Basin, feasible solutions to these problems do exist, and that there is a Federal interest in solving such problems. The city of Sarasota is very interested in pursuing detailed investigations and participating in a plan to reduce flood damage. Therefore, further study of these problems appears warranted at this time. A diagram outlining detailed studies necessary to identify the most feasible and desirable solution is shown on Figure 2. A cost estimate for such detailed studies is provided in Table 8.

TABLE 8
ESTIMATED DETAIL STUDY COSTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Involvement</td>
<td>$ 5,000</td>
</tr>
<tr>
<td>Social Institutional Studies</td>
<td>3,000</td>
</tr>
<tr>
<td>Cultural Resource Studies</td>
<td>5,000</td>
</tr>
<tr>
<td>Environmental Studies</td>
<td>10,000</td>
</tr>
<tr>
<td>Fish and Wildlife Studies</td>
<td>5,000</td>
</tr>
<tr>
<td>Economic Studies</td>
<td>20,000</td>
</tr>
<tr>
<td>Surveying and Mapping</td>
<td>30,000</td>
</tr>
<tr>
<td>Hydrology and Hydraulic Investigations</td>
<td>30,000</td>
</tr>
<tr>
<td>G&amp;M Investigations</td>
<td>30,000</td>
</tr>
<tr>
<td>Design and Cost Estimates</td>
<td>5,000</td>
</tr>
<tr>
<td>Real Estate Studies</td>
<td>5,000</td>
</tr>
<tr>
<td>Study Management</td>
<td>5,000</td>
</tr>
<tr>
<td>Plan Formulation</td>
<td>10,000</td>
</tr>
<tr>
<td>Report Preparation</td>
<td>3,000</td>
</tr>
<tr>
<td>Supervision and Administration</td>
<td>10,000</td>
</tr>
</tbody>
</table>

**TOTAL:** $176,000
38. It is recommended that this reconnaissance report be approved and funds allotted for preparation of a Detailed Project Report on Whitaker Bayou in Sarasota, Florida, under the authority of Section 205 of the Flood Control Act of 1948, as amended.

ALFRED B. DEVEREAUX, JR.
Colonel, Corps of Engineers
Commander
APPENDIX B

LETTER OF REQUEST FROM LOCAL SPONSOR
Mr. A. J. Salem, Chief, Planning Division
US Army Corps of Engineers
Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019

Re: Whitaker Bayou, Sarasota County, Florida

Dear Mr. Salem:

In accordance with the provisions of Section 205 of the Flood Control Act of 1948, as amended, which authorizes the federal government to initiate investigations and studies to be made in the interest of flood control, Sarasota County hereby makes formal application for a study of Whitaker Bayou in Sarasota County, Florida.

A Reconnaissance Report, dated March 1982, was prepared by the Jacksonville District, Corps of Engineers, at the request of the City of Sarasota. That report recommended funds be allotted for preparation of a Detailed Project Report.

Stormwater management within the City of Sarasota has been consolidated with the County through an Interlocal Agreement. Under the agreement, the County is responsible for stormwater management, including drainage basin planning and implementation, within the City and County. As the responsible entity and at the request of the City, we are requesting that the Corps prepare the Detailed Project Report for Whitaker Bayou in fiscal year 1994. Funding for the local sponsor’s 50 percent share of the Detailed Project Report recommended by the 1982 Reconnaissance Report is currently programmed for fiscal year 1994.

We understand from discussions with Priscilla A. Trigg and Stu Appelbaum of your Planning Division that the Reconnaissance Report may have to be updated. If so, we have collected pertinent data relative to estimated flood damages and high water elevations which occurred during the flooding resulting from the June 1992 storm event. In addition, the U.S. Geological Survey established a stream flow gauge on Whitaker Bayou in 1991. The gauge data would also provide useful information for updating the report.
Completion of a basin master plan for Whitaker Bayou is a high priority in the City and County basin master planning program. Please let us know if additional information or assistance is needed to implement the Detailed Project Report for Whitaker Bayou in fiscal year 1994. County contact persons are J. P. Marchand, Manager, or Thomas A. Shoopman, Planning Engineer, at 1301 Cattlemen Road, Sarasota, Florida, 34232, (813) 378-6030.

Sincerely,

[Signature]
Robert S. LaSala
Deputy County Administrator

c: Dennis Daughters, P.E., City Engineer, City of Sarasota
APPENDIX C

ECONOMIC ANALYSIS
ECONOMIC EVALUATION

Flood Protection Effects - Flood damage to urban development and automobile damage were the major criteria selected to evaluate the National Economic Development (NED) impacts of the project alternative. The impacts are measured by the change in inundation damages or flood damages expected due to proposed modifications to the Whitaker Bayou water control system. The analysis includes the measurement of the various alternative impacts on land use development in the study area in the base year 1995 and at the end of the project life in the year 2045. Since no appreciable increase in future land use development is expected throughout the project life and an affluence factor multiplier was not applied to the contents of residential development during this period, flood damages occurring for each separate condition evaluated are identical for each year of the project study life. The methodology utilized and the calculations performed in each of these studies are discussed in the following paragraphs.

Analysis Methodology

Structure and Content Inundation damages - The analysis required the development of an existing land use pattern for the area under study. This was accomplished using aerial photographs and published data from local agencies. Tax assessment maps and aerial photographs at a scale of one inch equal to two hundred feet were used to locate structures affected by the 100 year flood elevation without project incentives in the Whitaker Bayou study area. One foot contour elevations were superimposed upon these maps and the structures were identified and counted. The study area was sub-divided into six reaches. Damage reach delineation is defined using cross-sectional information shown in table C-1. The six reaches are displayed in Plate C-1.

An examination of the without project flooding and the effects of this flooding on land use in the study area was then computed. The procedure included cataloguing the type of land use, the topographic elevation, the first floor elevation, the value of each structure and the personal property value in the structure. The elevation of structures was estimated using aerial photographs and tax maps with topographic contours. In 1984, the values of these structures were originally determined from computer tax rolls provided by the City of Sarasota and
increased by a percentage to represent fair market value. Recent sales information available for reach 4 indicates a market value increase of approximately 36% when compared to the average structural value for single family residential listed for reach 4 in 1984. Accordingly, structural values for reach 4 were increased by 36% over the 1984 average value. However, due to the lack of additional sales information, structural values for the remaining reaches were not changed from 1984 levels. Content values were estimated as a per-cent of structure value. The residential damage relationships for structural damage and content damage were estimated using national claims information from the Federal Emergency Management Agency (FEMA) during the period 1978 to 1991. Composite damage relationships for commercial and institutional land uses were developed using information from the Galveston District.

Depths of the without project 100 year, 50 year, 25 year, 10 year, 5 year and 2 year flood were then determined. The specific type of land use inundated by each flood was then determined and the depth of water each type was exposed to was estimated. Residential development is the primary type of urban development in the study area. Types of residential development include single family housing and mobile homes. Damage to lawns, pavement, shrubs and streets is primarily a function of the duration of flooding. Since flooding in the basin is of very short duration, the damage sustained to lawns, pavement, shrubs, and streets is minimal and was not computed.

Total damage estimates were tabulated for each storm mentioned above and estimated for the standard project flood. Flood frequencies and damage estimates were then combined to produce a frequency-damage curve. The frequency-damage curve was integrated to produce an expected value. This expected value is defined as average annual damage to existing development in the year 1995 for the without project condition.

Approximately 95% of the study area is already developed in its highest and best use. Therefore, no change in the type of existing development or additional quantities of development are expected in the future and flood damages occurring in the base year are identical for each year of the project life. Discounting a constant annuity over a 50 year project life using any discount rate yields the constant annual value of the annuity. Therefore, average annual equivalent flood damage is identical to average annual damage computed in the base year for the without project condition. The inundation reduction benefit is the difference between the average annual equivalent value of the damage associated with the without and with project flooding.

Automobile Damages - Another major inundation reduction benefit attributable to the project is damage prevented to automobiles. Data required to compute this benefit included the
number of automobiles affected, the value of an average automobile, and the damage susceptibility associated with flood depth. The methods used to evaluate these items are explained in the following paragraphs.

An in-depth evaluation of automobiles per residence conducted for the Hillsboro Canal Feasibility Study in Broward and Palm Beach Counties indicated that the average number of automobiles per occupied unit varied from 0.5 to 1.5 cars per unit. These averages varied depending upon the type of residential use analyzed and the county the land use was located in. Since the higher densities in the Hillsboro study were associated with single family residential development, a value of 1.5 cars per unit was used for this study. It was estimated that on the average, there will be sufficient warning time prior to the flood to allow the evacuation of 75% of the residents. Therefore, only 25% of the cars within the respective flood prone area will be susceptible to flood damage and damage potential to these automobiles is evaluated at their primary residence during the flood.

The value of an average automobile was calculated using averages computed for the Hillsboro Canal Study. The method utilized involved selecting typical automobiles in three size categories, compact, medium and large. Wholesale values were then determined for each automobile in each category for the years 1977 to 1992. Information provided by American Automobile Manufacturers Association indicated the percentage of the total automobiles on the road in the United States for each of the years from 1977 to 1992. The three classes were averaged for each year and the yearly percentages were used to weight the average value of a typical car. The average computed value used in the study is $5,547.

It is estimated in the analysis that one foot of depth is required above ground before water gets into a car and causes any appreciable damage. Depth-damage relationships indicate that most vehicles are damaged 10% with one foot of water, 20% with two feet of water, 30% with three feet of water and 80% to 100% when water reaches or exceeds four feet. A one foot elevation between existing ground and the bottom of the car door was used.

Damage to automobiles were computed for each flood event and converted to an average annual equivalent value without and with the proposed project. The inundation reduction benefit is the difference between the average annual equivalent value of the without and with project flooding.

Inundation Reduction Analysis

Without project condition - Average annual equivalent structure and content damage is estimated to be $985,200. Each flood damage condition has been evaluated using six different magnitude floods. Total urban damage in the basin decreases from
$12,620,600 for the 100 year flood event, $2,535,300 for the 10 year flood to $304,900 for the 2 year flood. Future damage potential is identical to existing damage potential. Total flood damages for the without project condition are displayed in table C-2 by frequency and reach for each of the six reaches in the study. The total number of affected structures are shown similarly in table C-3.

Damage potential to automobiles was evaluated for the without project condition similarly to structure and content damage. For this analysis, it was assumed that all automobiles in the basin were located at the owners residence at the time of the flood. The number of automobiles affected by flood depths were estimated for each frequency. The number of automobiles were then multiplied by the potential damage per automobile. Only 25% of the potential damage is used since some of the automobiles would not be in the basin at the time of the flood and sufficient warning time might be available to allow evacuation of the area. Average annual damages are expected to be $40,100 for the 1995 and 2045 land use condition. Table C-4 displays automobile damages by flood frequency and reach for the without project condition.

Proposed Plan - The with project condition is designed to provide approximately 10 year protection by increasing the conveyance of an 11,200 foot segment of the existing Whitaker Bayou Creek. Average annual structure and content damage is estimated to be $321,000. Total urban damage in the basin decreases from $8,787,900 for the 100 year flood event, $4,707,900 for the 50 year flood to $359,500 for the 10 year flood. Damage potential to automobiles was evaluated for the with project condition similarly to the without project condition. Average annual automobile damage is estimated to be $14,200. Future damage potential for both categories is identical to existing damage potential. Total structure and content flood damages for the with project condition and the total number of affected structures are displayed in tables C-5 and C-6 by frequency and reach for each of the six reaches in the study. Total automobile damages are displayed similarly in table C-7.

Inundation reduction benefit - The inundation reduction benefit attributable to this plan is the difference between the without project and with project average annual equivalent flood damage totals. Total average annual flood damage prevented to structure and content is estimated to be $664,200. Total average annual flood damage prevented to automobiles is estimated to be $25,900. The combined average annual equivalent inundation reduction benefit for the proposed plan is estimated to be $690,100.
### Table C-1
Damage Reach Location

<table>
<thead>
<tr>
<th>Reach</th>
<th>Station</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>00+00 - 16+90 Mouth of Whitaker Bayou to US Hwy 41</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>16+90 - 48+90 US Hwy 41 to 27th Street</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>48+90 - 81+80 27th Street to Myrtle Court</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>81+80 -117+00 Myrtle Court to North of 46th Street</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>117+00 -131+00 46th Street to 52nd Street</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Tributary Area Tri-Par Estates Mobile Home Park</td>
<td></td>
</tr>
</tbody>
</table>

C-6
Table C-2
Structure and Content Flood Damages Without Project
By Reach and Flood Frequency
(in $)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reach 1</th>
<th>Reach 2</th>
<th>Reach 3</th>
<th>Reach 4</th>
<th>Reach 5</th>
<th>Reach 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Year</td>
<td>3,489,800</td>
<td>3,343,600</td>
<td>2,616,700</td>
<td>750,000</td>
<td>71,000</td>
<td>2,349,500</td>
<td>12,620,600</td>
</tr>
<tr>
<td>50 Year</td>
<td>1,947,100</td>
<td>1,825,700</td>
<td>2,108,800</td>
<td>623,200</td>
<td>0</td>
<td>1,704,700</td>
<td>8,209,500</td>
</tr>
<tr>
<td>25 Year</td>
<td>1,056,500</td>
<td>1,379,500</td>
<td>1,701,800</td>
<td>516,900</td>
<td>0</td>
<td>931,800</td>
<td>5,586,500</td>
</tr>
<tr>
<td>10 Year</td>
<td>0</td>
<td>723,900</td>
<td>1,118,600</td>
<td>343,600</td>
<td>0</td>
<td>349,200</td>
<td>2,535,300</td>
</tr>
<tr>
<td>5 Year</td>
<td>0</td>
<td>311,500</td>
<td>464,500</td>
<td>175,200</td>
<td>0</td>
<td>123,900</td>
<td>1,075,100</td>
</tr>
<tr>
<td>2 Year</td>
<td>0</td>
<td>12,500</td>
<td>201,300</td>
<td>91,100</td>
<td>0</td>
<td>0</td>
<td>304,900</td>
</tr>
</tbody>
</table>

Total average annual damage = $985,200
### Table C-3
Floodprone Structure Count
Without Project Conditions
By Reach and Flood Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reach 1</th>
<th>Reach 2</th>
<th>Reach 3</th>
<th>Reach 4</th>
<th>Reach 5</th>
<th>Reach 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Year</td>
<td>183</td>
<td>250</td>
<td>186</td>
<td>122</td>
<td>17</td>
<td>606</td>
<td>1,364</td>
</tr>
<tr>
<td>50 Year</td>
<td>87</td>
<td>172</td>
<td>169</td>
<td>102</td>
<td>13</td>
<td>529</td>
<td>1,072</td>
</tr>
<tr>
<td>25 Year</td>
<td>65</td>
<td>122</td>
<td>153</td>
<td>86</td>
<td>6</td>
<td>406</td>
<td>838</td>
</tr>
<tr>
<td>10 Year</td>
<td>36</td>
<td>105</td>
<td>127</td>
<td>66</td>
<td>1</td>
<td>270</td>
<td>605</td>
</tr>
<tr>
<td>5 Year</td>
<td>0</td>
<td>87</td>
<td>79</td>
<td>24</td>
<td>0</td>
<td>159</td>
<td>349</td>
</tr>
<tr>
<td>2 Year</td>
<td>0</td>
<td>28</td>
<td>46</td>
<td>17</td>
<td>0</td>
<td>3</td>
<td>94</td>
</tr>
</tbody>
</table>

1Structures are considered affected or floodprone when flood elevations are greater than topographic elevations. Because damage to structures is not claimed until the water surface elevation exceeds the first floor elevation, and all structures have a finished floor elevation 1 foot greater than each structure's respective topographic elevation, some flood prone structures are shown for an event for which no damage is claimed. Structures in reaches 1 through 5 are primarily single family residential. Structures in reach 6 are primarily mobile homes.
Table C-4
Automobile Flood damages Without Project
By Reach and Flood Frequency
(in $)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reach 1</th>
<th>Reach 2</th>
<th>Reach 3</th>
<th>Reach 4</th>
<th>Reach 5</th>
<th>Reach 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Year</td>
<td>154,400</td>
<td>246,400</td>
<td>156,000</td>
<td>36,200</td>
<td>0</td>
<td>29,000</td>
<td>622,000</td>
</tr>
<tr>
<td>50 Year</td>
<td>80,100</td>
<td>170,800</td>
<td>117,200</td>
<td>28,400</td>
<td>0</td>
<td>20,200</td>
<td>416,700</td>
</tr>
<tr>
<td>25 Year</td>
<td>17,500</td>
<td>74,200</td>
<td>94,400</td>
<td>23,800</td>
<td>0</td>
<td>10,300</td>
<td>220,200</td>
</tr>
<tr>
<td>10 Year</td>
<td>0</td>
<td>23,400</td>
<td>67,400</td>
<td>16,600</td>
<td>0</td>
<td>4,000</td>
<td>111,400</td>
</tr>
<tr>
<td>5 Year</td>
<td>0</td>
<td>6,900</td>
<td>18,700</td>
<td>4,000</td>
<td>0</td>
<td>1,200</td>
<td>30,800</td>
</tr>
<tr>
<td>2 Year</td>
<td>0</td>
<td>100</td>
<td>6,200</td>
<td>1,600</td>
<td>0</td>
<td>0</td>
<td>7,900</td>
</tr>
</tbody>
</table>

Total average annual damage = $40,100
Table C-5
Flood Damages With Project
By Reach and Flood Frequency
(in $)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reach 1</th>
<th>Reach 2</th>
<th>Reach 3</th>
<th>Reach 4</th>
<th>Reach 5</th>
<th>Reach 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Year</td>
<td>3,489,800</td>
<td>3,148,200</td>
<td>1,958,900</td>
<td>191,000</td>
<td>0</td>
<td>0</td>
<td>8,787,900</td>
</tr>
<tr>
<td>50 Year</td>
<td>1,947,100</td>
<td>1,649,700</td>
<td>1,049,400</td>
<td>61,700</td>
<td>0</td>
<td>0</td>
<td>4,707,900</td>
</tr>
<tr>
<td>25 Year</td>
<td>1,056,500</td>
<td>964,100</td>
<td>354,400</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2,375,000</td>
</tr>
<tr>
<td>10 Year</td>
<td>0</td>
<td>273,500</td>
<td>86,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>359,500</td>
</tr>
<tr>
<td>5 Year</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 Year</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total average annual damage = $321,000
Table C-6
Floodprone Structure Count
With Project Conditions
By Reach and Flood Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reach 1</th>
<th>Reach 2</th>
<th>Reach 3</th>
<th>Reach 4</th>
<th>Reach 5</th>
<th>Reach 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Year</td>
<td>183</td>
<td>250</td>
<td>155</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>620</td>
</tr>
<tr>
<td>50 Year</td>
<td>87</td>
<td>134</td>
<td>98</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>329</td>
</tr>
<tr>
<td>25 Year</td>
<td>65</td>
<td>119</td>
<td>49</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>237</td>
</tr>
<tr>
<td>10 Year</td>
<td>36</td>
<td>84</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>148</td>
</tr>
<tr>
<td>5 Year</td>
<td>0</td>
<td>17</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>2 Year</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

2Structures are considered affected or floodprone when flood elevations are greater than topographic elevations. Because damage to structures is not claimed until the water surface elevation exceeds the first floor elevation, and all structures have a finished floor elevation 1 foot greater than each structure's respective topographic elevation, some flood prone structures are shown for an event for which no damage is claimed. Structures in reaches 1 through 5 are primarily single family residential. Structures in reach 6 are primarily mobile homes.
Table C-7
Automobile Flood Damages With Project
By Reach and Flood Frequency
(in $)

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reach 1</th>
<th>Reach 2</th>
<th>Reach 3</th>
<th>Reach 4</th>
<th>Reach 5</th>
<th>Reach 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Year</td>
<td>154,400</td>
<td>233,100</td>
<td>100,000</td>
<td>4,800</td>
<td>0</td>
<td>0</td>
<td>492,300</td>
</tr>
<tr>
<td>50 Year</td>
<td>80,100</td>
<td>127,300</td>
<td>47,200</td>
<td>600</td>
<td>0</td>
<td>0</td>
<td>255,200</td>
</tr>
<tr>
<td>25 Year</td>
<td>17,500</td>
<td>32,500</td>
<td>12,700</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>62,700</td>
</tr>
<tr>
<td>10 Year</td>
<td>0</td>
<td>2,800</td>
<td>1,600</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4,400</td>
</tr>
<tr>
<td>5 Year</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 Year</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total average annual damage = $14,200
APPENDIX D

REAL ESTATE INPUT
WHITAKER BAYOU
SARASOTA, FLORIDA
SECTION 205
RECONNAISSANCE REEVALUATION REPORT

REAL ESTATE INPUT

PROJECT LOCATION AND DESCRIPTION

Refer to Figure 1, Map of the Study Area and Plate 2, the Proposed Plan of the Main Report.

Whitaker Bayou is in Sarasota County which is located on the central west coast of Florida, approximately 40 miles south of Tampa. The general project area is bordered on the north by the Manatee County line, Tamiami Trail to the west, North Washington Boulevard to the east, and 18th Street to the south.

Whitaker Bayou is a small stream which provides a major outlet for runoff for the northern portion of Sarasota. The main stream originates in Manatee County to the north, flows generally southward, and empties into Sarasota Bay. A minor tributary rises east of the city and joins the main stream just north of Myrtle Street. In all, Whitaker Bayou drains approximately 9.0 square miles. Stream slopes range from an average of 3.9 feet per mile to about 7.0 feet per mile.

Flooding occurs frequently in the Whitaker Bayou Basin. It is most common in the spring and early fall. Flooding occurs from two basic sources in the Sarasota area: local rainfall and tropical disturbances. Whitaker Bayou is also subject to flooding from coastal storm surges. Heavy rains in September 1971, September 1981, and most recently, June 1992, caused extensive flooding to the area and impacted many residential structures.

The general plan investigated in this report includes improvements to a 2.1 mile section of earthen trapezoidal channel, along with a steel sheet pile drop structure. The plan further includes the replacement of nine culvert/embankment bridges and five bridges with piers. Also, the channel's side slopes and bottom widths would be riprapped for approximately 750 feet of the reach.

Channelization will occur along Whitaker Bayou's main stream from the south end of the lakes located adjacent to the southeast of the Sarasota-Bradenton Airport and University Parkway, generally south to Tamiami Trail. From Tamiami Trail west to Sarasota Bay, the existing channel is adequate and requires no additional realty
interests.

GOVERNMENT-OWNED LAND

There is no known Federal Government land in the project area. The City of Sarasota owns an existing right-of-way along the channel. There are two temporary staging areas to be acquired which are also owned by the City of Sarasota.

REAL ESTATE REQUIREMENTS

The entire project area is primarily residential with two significant commercial developments: a race track and a regional airport. There are two small commercial pockets where the main stream intersects Myrtle Street and Tamiami Trail.

Project land requirements include narrow strips along the sides of the main stream of Whitaker Bayou, totalling approximately 7.11 acres which would be acquired as channel improvement easements. The land areas identified by Planning Division as "additional right-of-way" are assumed to be in addition to the city-owned right-of-way currently along the stream. The highest and best use of the affected tracts includes residential and commercial. Two temporary staging areas have been identified along the stream near 32nd Street. They are required for one year as temporary work area easements and consist of approximately .68 of an acre each. There are no improvements affected by proposed plan and no severance damages were assessed.

Though the plan also includes the replacement of nine culvert/embankment bridges and five bridges with piers, temporary roadways for these replacements have not been adequately defined at this level of study. Other support areas for the proposed plan such as disposal/borrow areas and construction easements have also not been delineated. All information presented in this Real Estate Section will be further refined in relation to the recommended plan as it becomes developed during the feasibility phase of this study.

ESTATES

The standard estate descriptions, as are provided in Chapter 5 of ER 405-1-2, were used in this reconnaissance phase of the project. Any further estate description refinement that may be needed will be accomplished in the feasibility stage of the study.

ACQUISITION/ADMINISTRATIVE COSTS

The proposed plan will affect approximately 40 ownership
tracts. No improvements are affected. The estimated Federal and Non-Federal acquisition/administrative costs are as follows:

**Federal**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Planning</td>
<td>$15,000</td>
</tr>
<tr>
<td>Review of Acquisitions ($400 ea)</td>
<td>$16,000</td>
</tr>
<tr>
<td>Review of Appraisals ($250 ea)</td>
<td>$10,000</td>
</tr>
<tr>
<td>Review of Condemnations (est. of 5)</td>
<td>$10,000</td>
</tr>
<tr>
<td>Review of Temporary Permits (ROEs)</td>
<td>$1,000</td>
</tr>
<tr>
<td>Real Estate review of PCA</td>
<td>$2,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$54,000</strong></td>
</tr>
</tbody>
</table>

**Non-Federal**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisitions ($700 ea)</td>
<td>$28,000</td>
</tr>
<tr>
<td>Appraisals ($500 ea)</td>
<td>$20,000</td>
</tr>
<tr>
<td>Condemnations (est. of 5)</td>
<td>$50,000</td>
</tr>
<tr>
<td>Temporary Permits (ROEs)</td>
<td>$3,000</td>
</tr>
<tr>
<td>Damage Claims</td>
<td>$2,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$103,000</strong></td>
</tr>
</tbody>
</table>

**INITIAL REAL ESTATE COST ESTIMATE**

The following is a summary of the initial real estate cost estimate for the plan investigated in the Reconnaissance Reevaluation Report. The costs as presented below were developed for reconnaissance phase purposes only and will be addressed in further detail during the feasibility phase of this study.

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lands:</td>
<td></td>
</tr>
<tr>
<td>Channel Easement (7.11 acres)</td>
<td>$494,000</td>
</tr>
<tr>
<td>Temporary Easement (1.36 acres)</td>
<td>$6,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$500,000</strong></td>
</tr>
<tr>
<td>Improvements</td>
<td>$0</td>
</tr>
<tr>
<td>Severance Damages</td>
<td>$0</td>
</tr>
<tr>
<td>Minerals</td>
<td>$0</td>
</tr>
<tr>
<td><strong>Total Lands and Damages</strong></td>
<td><strong>$500,000</strong></td>
</tr>
</tbody>
</table>
Acquisition/Administrative

Federal $54,000
Non-Federal $103,000
Public Law 91-646 $0

Contingencies* (25%)(RD) $165,000

Total Initial Real Estate Cost Estimate $822,000

*Contingencies of 25% are estimated to cover uncertainties associated with such elements as valuation variance, negotiation latitude, condemnation awards and interest, and refinement of boundary lines during ownership verification.
APPENDIX E

DRAFT FEASIBILITY COST SHARING AGREEMENT, INITIAL PROJECT MANAGEMENT PLAN, AND STUDY NETWORK
AGREEMENT
BETWEEN THE DEPARTMENT OF THE ARMY
AND
SARASOTA COUNTY, FLORIDA
FOR THE WHITAKER BAYOU FEASIBILITY STUDY

THIS AGREEMENT is entered into this day, of ____, 19__,
by and between the Department of the Army (hereinafter the "Government"), represented by the District Engineer executing this Agreement, and SARASOTA COUNTY, FLORIDA (hereinafter the "Sponsor"),

WITNESSETH, that

WHEREAS, the Congress has authorized the CORPS OF ENGINEERS to conduct studies of flood damage pursuant to the authority provided by Section 205 of the Flood Control Act of 1948; and

WHEREAS, the U.S. Army Corps of Engineers has conducted a Reconnaissance Study of flood damage reduction for the Whitaker Bayou basin, located in Sarasota, Florida pursuant to this authority, and has determined that further study in the nature of a "Feasibility Phase Study" (hereinafter the "Study") is required to fulfill the intent of the study authority and to assess the extent of the Federal interest in participating in a solution to the identified problem; and

WHEREAS, Section 105 of the Water Resources Development Act of 1986 (Public Law 99-662, as amended) specifies the cost sharing requirements applicable to the Study;

WHEREAS, the Sponsor has the authority and capability to furnish the cooperation hereinafter set forth and is willing to participate in study cost sharing and financing in accordance with the terms of this Agreement; and

WHEREAS, the Sponsor and the Government understand that entering into this Agreement in no way obligates either party to implement a project and that whether the Government supports a project authorization and budgets it for implementation depends upon, among other things, the outcome of the Study and whether the proposed solution is consistent with the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and with the budget priorities of the Administration;

E-1
NOW THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITIONS

For the purposes of this Agreement:

A. The term "study costs" shall mean all disbursements by the Government pursuant to this Agreement, from Federal appropriations or from funds made available to the Government by the Sponsor, and all Negotiated Costs of work performed by the Sponsor pursuant to this Agreement. Study Costs shall include, but not be limited to: labor charges; direct costs; overhead expenses; supervision and administration costs; the costs of contracts with third parties, including termination or suspension charges; and any termination or suspension costs (ordinarily defined as those costs necessary to terminate ongoing contracts or obligations and to properly safeguard the work already accomplished) associated with this Agreement.

B. The term "study period" shall mean the time period for conducting the Study, commencing with the release to the U.S. Army Corps of Engineers Jacksonville District of initial Federal feasibility funds following the execution of this Agreement and ending with the Chief of Engineers' acceptance of the study.

C. The term "IPMP" shall mean the Initial Project Management Plan, which is attached to this Agreement and which shall not be considered binding on either party and is subject to change by the Government.

D. The term "negotiated costs" shall mean the costs of in-kind services to be provided by the Sponsor in accordance with the IPMP.

E. The term "contracting officer" shall mean a representative of the Government with the authority to enter into, administer and/or terminate contracts and make related determinations and findings.

F. 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.

ARTICLE II - OBLIGATIONS OF PARTIES

A. The Government, using funds and in-kind services provided by the Sponsor and funds appropriated by the Congress of the United States, shall expeditiously prosecute and complete the Study, in accordance with the provisions of this Agreement and Federal laws,
B. In accordance with this Article and Article III of this Agreement, the Sponsor shall contribute cash and in-kind services equal to fifty (50) percent of total Study Costs. The Sponsor may, consistent with applicable law and regulations, contribute up to 25 percent of total Study Costs through the provision of in-kind services. The in-kind services to be provided by the Sponsor, the estimated negotiated costs for those services, and the estimated schedule under which those services are to be provided are specified in the IPMP. Negotiated Costs shall be subject to an audit by the Government to determine reasonableness, allocability, and allowability.

C. The Sponsor understands that the schedule of work may require the Sponsor to provide cash or in-kind services at a rate that may result in the Sponsor temporarily diverging from the obligations concerning cash and in-kind services specified in paragraph B of this Article. Such temporary divergences shall be identified in the quarterly reports provided for in Article III.A. of this Agreement and shall not alter the obligations concerning costs and services specified in paragraph B of this Article or the obligations concerning payment specified in Article III of this Agreement.

D. If, upon the award of any contract or the performance of any in-house work for the Study by the Government or the Sponsor, cumulative financial obligations of the Government and the Sponsor would exceed $905,395, [TO BE NEGOTIATED, BUT NOT MORE THAN 15 PERCENT ABOVE THE CURRENT ESTIMATE OF TOTAL STUDY COSTS], the Government and the Sponsor agree to defer award of that and all subsequent contracts, and performance of that and all subsequent in-house work, for the Study until the Government and the Sponsor agree to proceed, but in no event shall such a deferral exceed two years.

E. No Federal funds may be used to meet the Sponsor's share of Study Costs unless the Federal granting agency verifies in writing that the expenditure of such funds is expressly authorized by statute.

F. The award and management of any contract with a third party in furtherance of this Agreement which obligates Federal appropriations shall be exclusively within the control of the Government. The award and management of any contract by the Sponsor with a third party in furtherance of this Agreement which obligates funds of the Sponsor and does not obligate Federal
appropriations shall be exclusively within the control of the Sponsor, but shall be subject to applicable Federal laws and regulations.

ARTICLE III - METHOD OF PAYMENT

A. The Government shall maintain current records of contributions provided by the parties, current projections of total Study Costs, and current projections of each party's share of total Study Costs. At least quarterly, the Government shall provide the Sponsor a report setting forth this information. Total Study Costs are currently estimated to be $787,300 and the Sponsor's share of total Study Costs is currently estimated to be $393,650. In order to meet the Sponsor's cash payment requirements, the Sponsor must provide a cash contribution estimated to be $\text{EQUAL TO THE SPONSOR'S SHARE LESS THE VALUE OF IN-KIND SERVICES TO BE PROVIDED BY THE SPONSOR}$. The dollar amounts set forth in this Article are based upon the Government's best estimates, which reflect projected costs, price-level changes, and anticipated inflation. Such cost estimates are subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Sponsor.

B. The Sponsor shall provide its cash contribution required under Article II.B. of this Agreement in accordance with the following provisions:

1. For purposes of budget planning, the Government shall notify the Sponsor by [SPECIFIC DATE] of each year of the estimated funds that will be required from the Sponsor to meet the Sponsor's share of total Study Costs for the upcoming fiscal year.

2. No later than [30-60] calendar days prior to the scheduled date for the Government's issuance of the solicitation for the first contract for the Study or for the Government's anticipated first significant in-house expenditure for the Study, the Government shall notify the Sponsor in writing of the funds the Government determines to be required from the Sponsor to meet its required share of total Study Costs for the first fiscal year of the Study. No later than [HALF THE ABOVE NUMBER] calendar days thereafter, the Sponsor shall [SELECT ONE OF THE FOLLOWING MECHANISMS]: [1] provide the Government the full amount of the required funds by delivering a check payable to "FAO, USAED, Jacksonville District" to the contracting officer representing the Government. [2] verify to the satisfaction of the Government that the Sponsor has deposited the required funds in an escrow or other account acceptable to the Government, with interest accruing to the
3. For the second and subsequent fiscal years of the Study, the Government shall, no later than 60 calendar days prior to the beginning of the fiscal year, notify the Sponsor in writing of the funds the Government determines to be required from the Sponsor to meet its required share of total Study Costs for that fiscal year, taking into account any temporary divergences identified under Article II.C. of this Agreement. No later than 30 calendar days prior to the beginning of the fiscal year, the Sponsor shall make the full amount of the required funds available to the Government through the funding mechanism specified in paragraph B.2. of this Article.

4. The Government shall draw from the [INDICATE MECHANISM: [1] funds [2] escrow or other account [3] letter of credit] provided by the Sponsor such sums as the Government deems necessary to cover the Sponsor's share of contractual and in-house fiscal obligations attributable to the Study as they are incurred.

5. In the event the Government determines that the Sponsor must provide additional funds to meet its share of Study Costs, the Government shall so notify the Sponsor in writing. No later than 60 calendar days after receipt of such notice, the Sponsor shall make the full amount of the additional required funds available through the funding mechanism specified in paragraph B.2. of this Article.

C. Within ninety (90) days after the conclusion of the Study Period or termination of this Agreement, the Government shall conduct a final accounting of Study Costs, including disbursements by the Government of Federal funds, cash contributions by the Sponsor, and credits for the Negotiated Costs of the Sponsor, and shall furnish the Sponsor with the results of this accounting. Within thirty (30) days thereafter, the Government, subject to the availability of funds, shall reimburse the Sponsor for the excess, if any, of cash contributions and credits given over its required share of total Study Costs, or the Sponsor shall provide the Government any cash contributions required for the Sponsor to meet its required share of total Study Costs.

ARTICLE IV - STUDY MANAGEMENT AND COORDINATION

A. To provide for consistent and effective communication, the Sponsor and the Government shall appoint named senior representatives to an Executive Committee. The executive committee
shall consist of the District Engineer, Jacksonville District; Chief of Planning Division, Jacksonville District; and the Manager of the Sarasota County Stormwater Environmental Utility. Thereafter, the Executive Committee shall meet regularly until the end of the Study Period.

B. Until the end of the Study Period, the Executive Committee shall generally oversee the Study consistently with the IPMP.

C. The Executive Committee may make recommendations that it deems warranted to the Government on matters that it oversees, including suggestions to avoid potential sources of dispute. The Government in good faith shall consider such recommendations. The Government has the discretion to accept, reject, or modify the Executive Committee's recommendations.

D. The Executive Committee shall appoint representatives to serve on a Study Management Team. The Study Management Team shall keep the Executive Committee informed of the progress of the Study and of significant pending issues and actions, and shall prepare periodic reports on the progress of all work items identified in the IPMP.

ARTICLE V - DISPUTES

Before a party to this Agreement may bring suit in any court concerning an issue relating to this Agreement, the party must first seek in good faith to resolve the issue through negotiation or other forms of non-binding alternative dispute resolution mutually acceptable to the parties.

ARTICLE VI - MAINTENANCE OF RECORDS

A. Within 60 days of the effective date of this Agreement, the Government and the Sponsor shall develop procedures for keeping books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total Study Costs. 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 Sponsor shall maintain such books, records, documents, and other evidence in accordance with these procedures for a minimum of three years after completion of the Study and resolution of all relevant claims arising therefrom. To the extent
permitted under applicable Federal laws and regulations, the Government and the Sponsor shall each allow the other to inspect such books, documents, records, and other evidence.

B. In accordance with 31 U.S.C. Section 7503, the Government may conduct audits in addition to any audit that the Sponsor is required to conduct under the Single Audit Act of 1984, 31 U.S.C. Sections 7501-7507. 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 shall be included in total Study Costs and shared in accordance with the provisions of this Agreement.

ARTICLE VII - RELATIONSHIP OF PARTIES

The Government and the Sponsor act in independent capacities in the performance of their respective rights and obligations under this Agreement, and neither is to be considered the officer, agent, or employee of the other.

ARTICLE VIII - 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 IX - FEDERAL AND STATE LAWS

In the exercise of the Sponsor's rights and obligations under this Agreement, the Sponsor agrees to comply with all applicable Federal and State laws and regulations, including Section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500.1 issued pursuant thereto and published in 32 C.F.R. Part 300, 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".

ARTICLE X - TERMINATION OR SUSPENSION

A. This Agreement shall terminate at the end of the Study Period; provided, that prior to such time and upon thirty (30) days written notice, either party may terminate or suspend this Agreement. In addition, the Government shall terminate this Agreement immediately upon any failure of the Sponsor to fulfill its obligations under Article III of this Agreement. In the event that either party
elects to terminate this Agreement, both parties shall conclude their activities relating to the Study and proceed to a final accounting in accordance with Article III.C. of this Agreement. Upon termination of this Agreement, all data and information generated as part of the Study shall be made available to both parties.

B. Any termination of this Agreement shall not relieve the parties of liability for any obligations previously incurred, including the costs of closing out or transferring any existing contracts.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the District Engineer for the U.S. Army Corps of Engineers, Jacksonville District.

DEPARTMENT OF THE ARMY          SARASOTA COUNTY, FLORIDA

BY                     BY
Terry L. Rice          Robert LaSala
Colonel, Corps of Engineers        Deputy County Administrator
District Engineer                Sarasota County, Florida
Jacksonville District

Attachment A - Certification Regarding Lobbying
Attachment B - Initial Project Management Plan
Attachment C - Study Network
ATTACHMENT A

CERTIFICATION REGARDING LOBBYING

FOR

WHITAKER BAYOU FEASIBILITY STUDY

SARASOTA, FLORIDA
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.

DATE: ____________________________

Robert Lasala
Deputy County Administrator
Sarasota County, Florida
SECTION I: SCOPE

1.1 General. The work required for this study consists of office and field work necessary to complete the feasibility study of flooding problems in the Whitaker Bayou basin in Sarasota, Florida. The work shall generally follow guidelines set forth by:


e. "Project Management System," Division Regulation DR 5-1-1, Department of the Army, Corps of Engineers, South Atlantic Division, Atlanta, GA, 21 December 1990.

The end document will be a Detailed Project Report including the appropriate NEPA (National Environmental Policy Act) document and supporting technical appendices for the study of Whitaker Bayou, Sarasota, Florida.

1.2 Basic Requirements. The work to be performed shall consist of reviewing the flooding problems in the Whitaker Bayou basin and the preliminary alternatives identified in the reconnaissance phase of study; analyzing the existing drainage system; identifying problem areas;
defining the study area by determining the structural alternatives based upon identified needs and physical constraints; identifying environmental, fish and wildlife, and cultural resources in the study area; determining environmental opportunities for management; defining studies required; developing nonstructural alternatives wherever possible; preparing construction and operation and maintenance cost estimates for the investigated alternatives; computing annual benefits for the various alternatives; developing annual costs for all alternatives considered; evaluating the engineering and economic feasibility of each alternative; assessing environmental impacts of the selected alternative(s) including impacts on biological resources, socio-economic resources, cultural resources, and land use; determining possible mitigation measures; developing associated costs for the recommended alternative; and preparing the required documentation to present studies, findings, and recommendations. The studies and investigations conducted shall provide the basis for determining the economic and engineering feasibility of providing flood protection improvements for the Whitaker Bayou basin. The end product will be a report describing, in detail, the problems identified, the plans formulated, the engineering and economic feasibility of each alternative, and the social and environmental constraints and impacts for each alternative.

1.3 Baseline Information. Both the original Reconnaissance Report on Whitaker Bayou, Sarasota, Florida, dated March of 1982, along with the Reevaluation Report, dated October of 1994, will be used as a base from which to continue the required planning studies. Information in the Reconnaissance Report will be expanded and updated as required to reflect current problems and opportunities and desires of the public, to establish final planning criteria and planning objectives to be used to formulate plans, to identify additional measures to meet the final planning objectives, and to formulate the first array of alternatives to be evaluated.

SECTION II: GENERAL OR SPECIAL STUDIES

2.1 Plan Formulation. This work is to be performed by the Government. This is the process whereby project measures (specific project features) are conceived and developed to satisfy specific objectives, and then combinations of measures are coordinated to develop comprehensive alternatives. These alternatives shall be systematically formulated. An alternative shall consist of a system of structural and/or nonstructural measures, strategies, or programs formulated to alleviate the urban flooding problems. Tentative alternatives shall be investigated for an alternative which reasonably maximizes net national economic development benefits. This alternative shall be identified as the National Economic Development (NED) plan. Alternatives, including the NED plan, shall be formulated in consideration of four criteria: completeness, effectiveness, efficiency, and acceptability. Completeness is the extent to which a given alternative provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. Effectiveness is the extent to which an alternative solves the specific problems and achieves the specified opportunities. Efficiency is the extent to which an alternative is the most cost effective means of solving the flooding and drainage problem and
realizing opportunities consistent with protecting the nation's environment. Acceptability is the workability of the alternative with respect to acceptance by state and local entities and the public and compatibility with existing laws, regulations, and public policies. Each alternative shall include measures to mitigate effects on environmental resources, if necessary. It is anticipated that one plan with three levels of protection will be evaluated. The anticipated plan will be a channelization plan that will increase the capacity of the existing stream. The probable levels of protection will be 5-, 10-, and 25-year.

2.2 Coordination and Public Involvement. A public meeting will be held near the end of the study to formally present the results of the study. The public meeting will be conducted jointly by the Government and Sponsor. Fact sheets and information papers will be prepared by the Government and/or the Sponsor as needed.

2.3 Implementation Studies. This work is to be performed by both the Government and Sponsor. The Sponsor will provide a statement of financial capability and a financing plan in the form of a letter to provide the local share of project implementation. The Government will prepare an assessment of the Sponsor's financial capability which will be included in the Findings and Conclusions section of the Detailed Project Report.

2.4 Cultural Resource Studies. This work will be performed by the Government. A cultural resources reconnaissance will be performed to identify and locate any potentially significant archeological sites and/or historic structures in the proposed project area. This work will consist of the following:

a. Archival/literature search.

b. Interviews with local informants/experts.

c. Limited subsurface testing, where possible.

d. Inventory of pre-1940's structures.

The report resulting from this research will be reviewed by the Corps, the State Historic Preservation Office (SHPO), and the National Park Service. If potentially significant sites are identified, a cultural resources survey will be conducted to evaluate these resources and assess their eligibility for nomination to the National Register of Historic Places (NRHP). Attempts will be made to avoid any NRHP sites. If this is not feasible, the Corps will develop mitigation plans, in consultation with the SHPO, and mitigation will be completed prior to construction.

All cultural resources work will be performed by a qualified archeologist/architectural
historian, as specified in 36 CFR 66, and will be conducted in compliance with the National Historic Preservation Act of 1966, as amended (PL 89-665); the Archeological and Historic Preservation Act, as amended (PL 93-291); and Executive Order 11593.

2.5 Aesthetics Studies. This work is to be performed by the Government. An aesthetic resources assessment will require that an aesthetics resources analysis will be completed for the Detailed Project Report for Whitaker Bayou, Sarasota, Florida. This will include a) a discussion of existing conditions, b) a comparative resource analysis of the impacts of the alternative proposed floodwater control project and associated development, c) a delineation of any mitigative design measures if needed. All work will conform to the requirements of the National Environmental Policy Act of 1969 (NEPA) PL 91-190, as amended.

2.6 Environmental Studies. This work will be performed by the Government. The work will consist of the following:

a. Plan evaluation and assessment of impacts on significant resources based on detailed plans will be done. An environmental assessment will be made.

b. The considered action and alternatives will be coordinated with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under Section 7 of the Endangered Species Act of 1973, as amended, and with appropriate Federal, State, and local agencies and individuals under the National Environmental Policy Act (NEPA).

c. Water Quality Certification (WQC) Permit Application. The application for water quality certification will be completed and submitted to the Florida Department of Environmental Protection. Extensive modeling shall be performed to quantify existing and with project conditions, so that any adverse impacts caused by channel modification might be mitigated for. This will be done in accordance with Section 401 of the Clean Water Act, as amended.

d. An aesthetic evaluation of potential impacts of the proposed project will be conducted to (1) identify and assess existing resources, and (2) determine the impacts of proposed Corps activities. Based on this evaluation, a mitigation, and/or enhancement plan will be developed, where appropriate. This work will be conducted in compliance with the National Environmental Policy Act of 1969 (PL 91-190), and in accordance with Corps guidance.

2.7 Fish and Wildlife Studies. This work is to be performed by the Government. The considered action and alternatives will be coordinated with the U.S. Fish and Wildlife Service and National Marine Fisheries Service under Section 7 of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1958. A Fish and Wildlife
Coordination Act Report will be prepared by the Fish and Wildlife Service.

2.8 Economic Studies. This work is to be performed by the Government. Economic studies include demographic studies, land use distribution studies, flood control studies and technical analysis. A description of each type of study is listed below:

a. Demographic Studies - This work is to be performed by the Government. The demographic studies will provide a general description of economic conditions in the geographic county region of the proposed project. Area demographic data shall be assembled which describe existing and future projections of the population, existing estimates of employment, personal income, and manufacturing. Additional socio-economic characteristics dealing with migration, educational attainment, housing conditions, family income, and household size may be analyzed and discussed.

b. Land Use Distribution Studies - Land use distribution studies will include the verification of the existing land use pattern. The projected land use distribution in the project area will also be determined if, in the best judgement of the planner, the anticipated results will significantly affect project justification. If a future land use study is deemed necessary, quantity projections for each land use classification shall be based on projections developed in the area’s economic studies. Location criteria may include soil capability, flood zoning restrictions and infrastructural advantages. Growth management concepts accepted by local governments and historical trends in permits for construction will be reviewed. The land use distribution studies shall distinguish between single family and multi-family residential, mobile homes, and various commercial and institutional land use classifications to the degree deemed necessary by the planner to insure an accurate analysis. Depth damage relationships for residential property shall be determined by using depth damage relationships developed for Florida by the Federal Emergency Management Agency. Depth damage relationships for other urban property shall be determined by using depth-damage relationships developed by the U.S. Army Corps of Engineers’ Galveston District. Additional work may be undertaken to produce refined estimates of personal property values (content values) of residential and commercial structures, and structure and content damage relationships. Duration-damage relationships for the evaluation of damage to lawns, pavements, shrubs, and streets will also be prepared if it is determined that this category contributes significantly to project justification.

c. Flood Control Studies - The flood control work will include the delineation of the economic and hydrologic study area and the delineation of the largest flood prone area in the hydrologic study area. The first floor elevations of structures within the flood prone area will be determined. The information collected from the land use distribution studies and flood control studies will be utilized to refine estimates of average annual damage for the existing condition and for various proposed alternative plans. Data collected in the field and provided
by the local sponsor will serve as the basis for the economic analysis. The level of accuracy will be appropriate for a technical report. Where necessary, information shall be recorded in such a way as to protect the confidentiality of the individuals providing information.

d. Technical Analysis - Technical analysis for the study will include determination of the number of structures affected by flooding and computation of flood damages for each of seven different magnitude floods for the without project condition. Flood frequencies utilized for these evaluations will include the 500-year, the 100-year flood, the 50-year flood, the 25-year flood, the 10-year flood, the 5-year flood, and the 2-year flood. The study area shall be divided into major damage reaches determined by the study team and if necessary, average annual damages shall be computed for each reach along with average annual damages for the entire study area. This procedure will be repeated for the existing land use pattern at the end of the project life to account for the increased value and damage susceptibility of residential contents. The increasing value of contents are produced by increased per-capita income over the project life. Flood damages to new development will be determined if, in the best judgement of the planner, the anticipated results will significantly affect project justification. If damage potential to new development is evaluated, it shall be assumed that new construction within the 100-year flood plain will comply with the Flood Insurance Act standards that the first floor must be at or above the 100-year flood elevation. Future impacts will be discounted and converted to an average annual equivalent. Existing and appropriate future flood damage impacts shall be detailed in tables to be included in the report. Historical flood information will be investigated and any damage information that is available will be compared to results from the existing without project condition.

e. Evaluation of Alternative Plans - The technical evaluation of the study will also include the evaluation of alternative plans. It is anticipated that one alternative at three (3) different levels of protection will be evaluated. For each evaluation, the number of structures affected by flooding and flood damages will be computed for each of seven (7) different magnitude floods. The methods used to evaluate the with project condition will be similar to the methods used to evaluate the without project condition. The information shall be detailed in tables to be included in the report. The evaluation will also include a section on the maximization of net benefits.

f. Risk Analysis - A risk-based analysis framework will be developed for the study in accordance with draft EC 1105-2-205, Risk Analysis Framework for Evaluation of Hydrology/Hydraulics and Economics in Flood Damage Reduction Studies, 31 July, 1992. This analysis shall include development of probability distributions of the underlying variables, parameters, and components; and shall combine these distributions into higher level measures of overall economic and engineering performance and reliability. At a minimum, the following economic variables will be explicitly incorporated into the risk-based analysis framework: first
floor elevations, content value, and structure value. In addition, uncertainty identified by hydrologic and hydraulic engineering studies for stage-frequency functions will be incorporated into the risk analysis framework.

g. Reporting Requirement - A narrative report of the economic studies shall be prepared, and the economic evaluation discussed above shall be described in an objective manner. An objective style of writing shall be used. Each line item of benefits and supporting methodologies shall be discussed in the report.

2.9 Surveys and Mapping. All surveying work shall be performed by the Government or Government's contracted survey. This work includes picture pointing the location and obtaining elevations for approximately fifty cross sections, details of twenty-five bridges/culverts, establishing vertical controls and some minor topography. All survey data shall include both horizontal and vertical control.

2.10 Hydrology and Hydraulic Studies. This work is to be performed by the Government. These studies shall consist of the following items of work:

a. Hydrologic Studies - Conduct field inspection and review of the Whitaker Bayou basin, analysis and estimate of future hydrologic conditions, research rainfall data from historic meteorologic records, review previous studies, research historic flood information, develop and calibrate existing and improved conditions models, prepare without-project analysis for the 500-year flood, the 100-year flood, the 50-year flood, the 25-year flood, the 10-year flood, the 5-year flood, and the 2-year flood, prepare hydrologic write-up including plates and tables.

b. Hydraulics Studies - Coordinate survey data collection, compile existing condition models from survey data, calibrate and run existing models and compile existing flood mapping for 2-year through SPF flooding, plot existing conditions floods for economic analyses, investigate one channelization alternative with three different levels of flood protection (5-year, 10-year, and 25-year) for NED comparison, plot maps (2-year through SPF) for post project residual flooding, analyze bridges, design grade control structure, design inlet culverts for local drainage to project channels, develop an erosion protection plan, provide stage/frequency data for economic evaluation, and prepare plates, tables and text for the report.

2.11 Geotechnical Studies. These studies are to be performed by the Government. The main channel will require field sampling for soil type evaluation and analysis. Core borings will be taken every 1000 feet along the alignment of the proposed channel improvement, at each culvert/embankment crossing, at each proposed new bridge site, and at the site of any proposed drop structure. Upon completion of the field investigations, the data will be compiled and utilized in analysis of the slope stability, bearing capacity, sheetpile design and erosion
protection through lab test and office analysis. The results and recommendations based on these analyses will be forwarded in report form for inclusion in the Detailed Project Report.

2.12 **Design.** This work is to be performed by the Government. Work under this item includes the request for surveys and coordination of core boring and foundation data. All flood control features (possible detention basin, channel improvements, bank protection, and control structures) would be designed and analyzed for the feasibility report. Structural stability and design analysis will be performed for the drop structure proposed for Station 85+88 and for possible detention basin. All bridges (as many as 25) and utilities will be checked to verify the need for replacement or modifications. In addition, construction activities around bridges and utilities will be evaluated to minimize affecting these features. Also, side drainage (local inflow) will be evaluated with design project features.

2.13 **Cost Estimates.** This work is to be performed by the Government. Cost estimates will be developed in accordance with ER 1110-2-1302, Civil Works Construction Cost Estimating, to provide breakdown for each feature and sub-feature showing quantities and unit costs, contingencies, engineering and design, and supervision and administration for both Federal and non-Federal costs. Average annual costs for each alternative will also be developed following current Corps of Engineers’ criteria. The total project investment will be amortized over a 50-year period of analysis using the discount rate to be specified by the Corps of Engineers at the time of calculation. The average annual costs will include operation and maintenance costs. All cost estimates will utilize Micro Computer-Aided Cost Estimate System (MCACES) -type estimates and will be displayed and documented so that future updates can be easily made.

2.14 **Real Estate Studies.** This work is to be performed by the Government and the non-Federal Sponsor and includes the following:

a. The non-Federal Sponsor will be advised by the Government of the real estate requirements for each alternative plan and the Non-Federal Sponsor shall provide the following:

1) tax maps of the areas upon which project features are under consideration for construction; public right-of-way maps;
2) a list of owners of the property upon which project features are under consideration;
3) provide tax roll information (value, structure, type, etc.) regarding each parcel potentially affected by the placement of project features;
4) provide zoning information regarding each parcel potentially affected by the placement of project features;
5) provide the last search of records for each parcel potentially affected by the placement of project features;
6) provide information on any anticipated mineral extraction in the project area and
determine if any such activity is permitted by law;
7) identify all structures potentially affected by contemplated project works that are occupied that will be removed due to project implementation;
8) identify all known public utilities located within the proposed project area that will be affected or relocated;
9) identify the local acquisition costs and local real estate administrative costs associated with implementation of each alternative plan; and
10) provide location maps (City or County map) of local area upon which proposed features may be constructed, including material disposal areas.

b. The non-Federal Sponsor shall obtain rights-of-entry into project areas whereby surveys, core-borings, cultural resource evaluations and other investigations may occur.

c. The Government shall assist in the coordination efforts with the non-Federal Sponsor as needed.

d. The Government shall prepare an Attorney’s Opinion of Compensability for all public roads and utilities being relocated as a result of the proposed project.

e. The Government shall prepare a Replacement Housing Survey for persons displaced as a result of the proposed project.

f. The Government shall prepare a Gross Appraisal on the selected plan which will include:

1) A total estimated value for fee and easement estates, including improvements, minerals and severance damages;
2) A breakdown of fee and easement estates by acreage and dollar amounts;
   (a) length/duration of temporary easements;
   (b) discussion of the restrictions of the easements or use of the residual.
3) Additional detail or refinement (from that performed for the Initial Real Estate Cost Estimate during Reconnaissance) of:
   (a) The location and description of the area;
   (b) The special features (i.e. timber, minerals, water rights, etc.);
   (c) environmental concerns including potential HTRW, or lack thereof;
   (d) existing encumbrances;
   (e) The highest and best use(s) involved;
   (f) The assumptions and limiting conditions.
4) A discussion of the relationships between the comparable data and the subject area;
5) The verified market data utilized to support the valuation;
6) A discussion of the relationships (support and analysis) between the market data and the subject area;
7) A discussion of any differences between local, state and federal appraisal rules and the effect on the interests to be acquired;
8) A breakdown of the land required for facility relocation, if any;
9) An identification of and the reasons for any contingency on the lands and damages valuation;
10) A copy of the mapping used for the Gross Appraisal;
11) General photographs of the project area;
12) Photographs and maps of the comparable properties;
13) Appropriate certifications;
14) Appraiser qualifications;
15) Appropriate review and/or approval.

The Gross Appraisal must be of sufficient detail to provide an accurate cost estimate which will be sufficient for authorization considering the cost growth limits of Section 902 of Public Law 99-662.

g. The Government shall prepare a Real Estate Appendix describing the minimum real estate requirements for the recommended plan. The appendix will include:

1) A general description of the area and total acreage to be acquired. The total acreage will be broken down as to fee and the various types of easements required and the reasons therefore;

   (a) If any federally owned land is within the area, the appendix should indicate the federal estate, degree of interest required for project purposes, and view of the local representative of the controlling agency as to use for project purposes;

   (b) A thorough discussion of the applicability of the navigation servitude and the extent of land within the navigation servitude, a discussion of the applicability of the navigation servitude to fulfill Real Estate requirements for the project, particularly the ability to fulfill the non-Federal sponsor’s requirement on cost shared projects;

   (c) If any non-Federal Sponsor owned land is within the area, the appendix should indicate the non-Federal Sponsor’s estate and degree of interest required for project purposes.
2) An indication of the number and cost of Public Law 91-646 relocations including the number of persons, farms and businesses to be displaced and information regarding the availability of replacement housing;

3) An assessment of the non-Federal Sponsor’s land acquisition experience and ability to acquire;

4) A Baseline Cost Estimate for Real Estate, including contingencies, should be included as an exhibit;

5) A map showing the project area delineating the lands over which specified estates are to be acquired, property lines, utilities and facilities to be relocated, and any known or potential HTRW lands;

6) A statement on the present or anticipated mineral activity in the vicinity of the project which may affect the operation thereof and a recommendation regarding the acquisition of the mineral, if any;

7) A copy of proposed estates to include a discussion and justification of estates;

8) A detailed schedule (prepared jointly by the non-Federal Sponsor, Real Estate Technical Manager and the Project Manager) of all real estate acquisition activities or milestones;

9) A determination of what facilities must be relocated, including roads, railroads, pipeline, utilities, bridges, and cemeteries and whether or not Section 111 of 72 Stat. 303, as amended, applies. An Attorney’s Opinion of Compensability must be made by Real Estate Division. A statement of the cost of relocations must be included. Real Estate will include the value of the land and associated costs for facility relocations in the Baseline Cost Estimate for Real Estate. The costs associated with the performance or construction of the relocation will be provided by Engineering Division. In addition, the appendix should include a statement as to whether the Government, the non-Federal sponsor, if applicable, or the owners will be responsible for the relocation and acquisition of new rights-of-way and the costs for relocation and land to be acquired allocated to each entity;

10) A statement on the presence of potential HTRW or other environmental contaminates on land within the project area; and any cultural resources that maybe present within the project area;

11) A discussion of the attitude of the landowners; and
12) Any other relevant real estate information appropriate for the project.

2.15 Study Management. This work will be performed by the Government and Sponsor representatives to the Study Management Team. Study management shall include scheduling and organizing all studies to be performed by the Government, regular periodic meetings with technical elements to review progress; preparation of project related correspondence; preparing budget documentation and monitoring and managing all funds being spent; coordination with all Federal, State and local agencies to ensure that all have been informed of all proposed plans of improvement as well as the progress of the study; government participation in all Study Management Team meetings and Executive Committee Meetings; and providing further guidance and support as required to insure that all questions have been answered and all problems have been solved from the start of the study to the review and approval of the final report at higher levels.

a. Study team meetings will be held periodically with the participation of study management and technical specialists working on study items. Progress and problems shall be discussed to facilitate actions by management to allot resources, coordinate issues, or seek additional advise or expertise so as to maintain study progress and to address all relevant issues.

b. Project related correspondence shall be prepared as necessary. This shall include responses to all public, government, special interest groups, Congressional, or other inquiries directly or indirectly relating to study activities or the study area.

c. Study budgeting and accounting shall require preparation of annual budget documentation and monitoring of study expenditures. Budget documentation shall consist of the project cost estimates, benefit estimate, and study cost estimates and related project information sheets needed to support budget requests. Budget documents shall be updated periodically during each year in support of budget reviews and to reflect changing interest rates or cost estimates. Monitoring and managing of study funds shall require preparation of annual obligation and expenditure schedules and monthly fund obligation projections; regular continuing review of progress relative to expenditures; monthly review and reconciliation of Finance and Accounting System status report with actual and planned charges against the study; coordination of progress on funds obligations and expenditures with reviewing headquarters; and negotiations, transfer of funds, and monitoring expenditures for U.S. Fish and Wildlife Service studies. At the end of each fiscal year, an accounting of the funds expended in each study activity shall be prepared and submitted to the study management team for review.

d. Contract negotiation and administration shall require some or all of the following for each study element performed for the Government by a contractor:
1) Preparation of a scope of work and Government cost estimate.

2) Selection of a contractor.

3) Negotiation.

4) Monitoring progress of the work.

5) Review completed product.

e. Coordination with other agencies shall require on-site visits and/or correspondence with Federal, State, and local government agencies; institutions; businesses or groups with expertise, responsibilities, or resources related to drainage, flood control, transportation, highway, environmental resources, or other areas of interest in this study.

2.16 Project Management. This work is to be performed by the Government. Monthly reporting will be conducted on this project through the District Project Review Board by the Program Manager. Budget requests and scheduling will be coordinated with other District work elements to ensure completion of study milestones and progress of the project. The Program Manager will also be involved with coordination of the Local Cooperation Agreement near the end of the feasibility phase of study. The Program Manager’s duties will run throughout the feasibility phase.

2.17 Report Preparation. This work is to be performed by the Government. The Detailed Project Report for Whitaker Bayou, Sarasota, Florida, shall consist of the Main Report, NEPA document, and appendices and will be prepared in compliance with the Requirements of the Planning Guidance Notebook. The report shall be a complete decision-making document and as such shall include a complete presentation of plan formulation. The report shall be based on all studies and investigations conducted and from published reports applicable to the study area. The main report shall be direct, concise, and written in an easy-to-understand style using ample graphics, illustrations, and photographs. The Main Report shall also include the study findings and recommendations.


b. The appendices shall be technical reports written for technical reviewers. The length and detail of the appendices shall be sufficient to cover all aspects of the subject. Graphics and other illustrations shall be used to facilitate the presentation.
2.18 **Review Contingency.** This work is to be performed by both the Government and the Sponsor as required. After completion of the final Detailed Project Report, the report shall be processed through Corps of Engineers channels to Headquarters, U.S. Army Corps of Engineers (HQUSACE) for review and approval.

The report shall be reviewed by the Division Commander and the Chief of Engineers. Upon submission of the report to the Chief of Engineers, the Division Commander shall release a public notice on the Division Commanders recommendations on the study. The Division Commander may request funds for plans and specifications when (1) HQUSACE has approved the DPR and the Sponsor agrees with its findings and recommendations and (2) the Local Cooperation Agreement will be approved by the Division Commander under delegated approval authority, or is under review in HQUSACE. HQUSACE will notify the Division Commander in writing when plans and specifications funding has been approved. This processing shall require preparation for and participation by Corps of Engineers and Sponsor personnel in meetings and presentations, responses to all review and coordination comments received, and development of all data necessary to ensure that the report is processed to completion. The amount of work required from the Jacksonville District Corps of Engineers and Sponsor personnel during review is determined by the number and nature of review comments and cannot be predetermined; therefore, this work item is considered a contingency. A line item in the amount of the lesser of five percent of the study cost or $18,000 has been included in the study cost estimate to provide for this contingency. Actual Corps of Engineers and Sponsor costs, up to the limit described above, will be substituted for this line item in the final accounting of study costs.

Table B-1 shows the estimated costs for the Whitaker Bayou Feasibility Study.
### WHITAKER BAYOU

#### FEASIBILITY STUDY PHASE BUDGETED COSTS

(in thousands)

| TASK                              | TOTAL COST | GOVERNMT. COST | TOTAL SPONSOR COST | SPONSOR COST
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IN-KIND</td>
</tr>
<tr>
<td>2.1 Plan Formulation</td>
<td>6.0</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>2.2 Public Involvement</td>
<td>6.0</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>2.3 Implementation Studies</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>2.4 Cultural Resource Studies</td>
<td>33.0</td>
<td>16.5</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>2.5 Aesthetics Studies</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>2.6 Environmental Studies</td>
<td>71.5</td>
<td>35.75</td>
<td>35.75</td>
<td></td>
</tr>
<tr>
<td>2.7 Fish &amp; Wildlife Studies</td>
<td>6.0</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>2.8 Economic Studies</td>
<td>64.0</td>
<td>32.0</td>
<td>32.0</td>
<td></td>
</tr>
<tr>
<td>2.9 Surveys &amp; Mapping</td>
<td>100.0</td>
<td>50.0</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>2.10 Hydrology &amp; Hydraulics</td>
<td>92.3</td>
<td>46.15</td>
<td>46.15</td>
<td></td>
</tr>
<tr>
<td>2.11 Geotechnical Studies</td>
<td>182.0</td>
<td>91.0</td>
<td>91.0</td>
<td></td>
</tr>
<tr>
<td>2.12 Design</td>
<td>65.0</td>
<td>32.5</td>
<td>32.5</td>
<td></td>
</tr>
<tr>
<td>2.13 Cost Estimates</td>
<td>8.0</td>
<td>4.0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>2.14 Real Estate Studies</td>
<td>26.0</td>
<td>13.0</td>
<td>13.0</td>
<td></td>
</tr>
<tr>
<td>2.15 Study Management</td>
<td>60.0</td>
<td>30.0</td>
<td>30.0</td>
<td></td>
</tr>
<tr>
<td>2.16 Project Management</td>
<td>4.0</td>
<td>2.0</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>2.17 Report Preparation</td>
<td>20.0</td>
<td>10.0</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>2.18 Study Contingency (5%)</td>
<td>37.5</td>
<td>18.75</td>
<td>18.75</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL EXPENDITURES</strong></td>
<td>787.3</td>
<td>393.65</td>
<td>393.65</td>
<td></td>
</tr>
</tbody>
</table>
ATTACHMENT C

STUDY NETWORK
FOR

WHITAKER BAYOU FEASIBILITY STUDY

SARASOTA, FLORIDA
WHITAKER BAYOU SECT 205, FEASIBILITY PHA

09/12/94
09:13:45
Page 1

Critical
Nanock
Non-Critical
Duney

- Study Management - PD-PF ($35,500)
- Negotiate FCSA - PD-PF ($1,500)
- Add approval of FCSA - SAD ($5,000)
- Execute FCSA - PD-PF ($1,500)

Implementation Studies - PD-PF ($3,000)
APPENDIX F

PERTINENT CORRESPONDENCE

F-1  . . . . . . . . . . . . Original Report Coordination - DER
F-2  . . . . . . . . . . . . Original Report Coordination - Fish & Wildlife
F-4  . . . . . . . . . . . . Original Report Coordination - SWFWMD
F-6  . . . . . . . . . . . . Original Report Coordination - Archives, History, and Records Management
F-9  . . . . . . . . . . . . Reevaluation Report COE Position Statement - DEP
F-11 . . . . . . . . . . . . . . . . . . . . DEP Response
F-13 . . . . . . . . . . . . Letter of Support - Local Residents
June 22, 1983

Mr. Robert Rehkopf
U.S. Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32201

Dear Mr. Rehkopf:

Section 205 Reconnaissance Report, Whitaker Bayou

The Dredge & Fill Section concurs with the need for flood alleviation in the Whitaker Bayou Basin although it is difficult to make positive/negative comments on the aforementioned report since it contains no engineering plans as to existing vs. proposed cross sections, does not reference summer time water table levels and does not specifically locate the areas of proposed widening and deepening.

Assuming that most property damaging flooding will occur during the summer and a high tidal stage, any excavation below +1.0' MSL and much excavation below the water table level will be superfluous since these strata will already be inundated by tides and basal flow respectively. Additionally, excavation below +1.0' MSL will enhance salt water intrusion. Unnecessary deepening will also serve to unnaturally dewater the surrounding uplands.

Section 31 on page 9 disclaims the need for channel modification in the lower end of the bayou. In light of this and the documented water quality/biota problems associated with box cut drainage ways, this agency recommends that only widening, not deepening, occur in the mid and upper reaches of the main stream and tributary A. The creation of 4H:1V side slopes from -1.0' OWL to +1.0' OWL and 3:1 submerged side slopes are suggested in lieu of the proposed 2:1.

Sincerely,

William Kutash
Dredge & Fill Supervisor

WK/mh
August 4, 1982

District Engineer
U.S. Army Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232

Dear Sir:

This letter is furnished in response to a request from the Chief of your Planning Division (SAJPD-F), dated June 7, 1982, for our comments on your Flood Control Reconnaissance Report for Whitaker Bayou, Sarasota, Sarasota County, Florida. Our comments are submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

We have reviewed your draft as requested and offer the following comments:

The draft appears to favor channelization as the most promising alternative for flood control for this basin. We generally look upon channelization of streams with disfavor because it usually results in an adverse impact upon fish and wildlife resources and offers no inducement for fish and wildlife benefits. Bank vegetation associated with flood plains such as this deters runoff, filters out pollutants, stabilizes banks and provides habitat and refuge for fish and wildlife.

Removal of the bank vegetation prevents these and allows strong, accelerated flows, scouring, bank erosion, turbidity, salinity changes, removal of habitat and water quality problems in the stream itself and downstream estuary.

A more satisfactory arrangement from the fish and wildlife point of view would be a series of re-regulating pools or detention ponds with accompanying wetlands providing fish and wildlife habitat where water could be metered out slowly as required.

We realize this is an urban area, therefore, if channelization is the selected alternative, we recommend that banks be grassed, sodded, and seeded with species for wildlife food, cover and for erosion control.

It should be noted that the endangered West Indian manatee may occur in Sarasota Bay and Whitaker Bayou. Construction activities or changes in the delivery of fresh water potentially may impact any animals which use the area. You should be aware of requirements imposed by Section 7 of the Endangered Species Act. Please contact the Jacksonville Endangered Species Field Office (15 N. Laura St., Jacksonville, Florida 32232) or Mr. David Smith (FTS 350-7276) should you have any questions concerning threatened or endangered species.
We appreciate the opportunity to comment on the reconnaissance report draft. We look forward to future coordination.

Sincerely yours,

[Signature]

Joseph D. Carroll, Jr.
Field Supervisor

cc:
EPA, Atlanta, Ga.
FG&FWFC, Tallahassee, Fla.
FG&FWFC, Vero Beach, Fla.
NMFS, St. Petersburg, Fla.
July 8, 1982

A. J. Salem
Planning Division
Department of the Army
Jacksonville District, Corps of Engineers
Post Office Box 4970
Jacksonville, FL 32232

SUBJECT: SAJPD-F

Dear Mr. Salem:

The staff of the Southwest Florida Water Management District has reviewed the above referenced Reconnaissance Report. In general, this report represents a good effort of describing the existing condition in and around Whitaker Bayou, Sarasota. The alternatives sited, Channel Modification and Floodplain Evaluation, are two viable solutions, provided the environmental issues are addressed. Please consider the following comments relative to Channel Modification:

(1) While channel improvement will reduce upstream flooding by alleviating backwater, this will probably increase downstream flood peaks by reducing the natural reservoir action of the floodplain. Staff suggests clarifying this issue in the Phase II report.

(2) In addition, does this channel design include replacing the natural channel with a larger prismatic channel on a straight alignment to reduce debris buildup?

(3) If not, are regular channel maintenance cost included in the cost estimate?

(4) Restructuring of the natural channel could have potential long-range environmental impacts, especially to Whitaker Bayou. Staff suggest inclusion of detailed environmental study for both the Bayou and the stream during Phase II.

(5) In the following statement, "The environmental impacts of the alternative would be adverse, though not significant," the terms "adverse" and "significant" are misleading. Staff suggests defining these terms as they are used interchangeably in various rules and regulations.
July 8, 1982
A. J. Salem
Page Two

Thank you for this opportunity to comment. If I can be of further assistance, please feel free to contact me.

Sincerely,

[Signature]

ALISON ADAMS, E.I.
Environmental Engineer
Planning & Program Development Division

AA: kag

cc: Linda R. Cannon
    Dorothea P. Cole
August 13, 1984

Mr. A.J. Salem, Chief
Planning Division
U.S. Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232

RE: Your Letter of July 24, 1984
Cultural Resource Assessment Request
Four Proposed Flood Control Projects:
1) Wares Creek Basin, Manatee County;
2) Alligator Creek Basin, Pinellas County;
3) Bear Creek Basin, Pinellas County; and
4) Whitaker Bayou Basin, Sarasota County;
All located in State of Florida.

Dear Mr. Salem:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Procedures for the Protection of Historic and Cultural Properties"), we have reviewed the above referenced project for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the National Register of Historic Places. The authorities for these procedures are the National Historic Preservation Act of 1966 (Public Law 89-665) as amended by P.L. 91-243, P.L. 93-54, P.L. 94-422, P.L. 94-458 and P.L. 96-515, and Presidential Executive Order 11593 ("Protection and Enhancement of the Cultural Environment").

A review of the Florida Master Site File indicates that no archaeological or historic sites are recorded for the Wares Creek Basin, Alligator Creek Basin and Bear Creek Basin project areas. Furthermore, because of the location of the projects, it is considered highly unlikely that any significant, unrecorded sites exist in their vicinities. Therefore, it is the opinion of this office that these three proposed projects will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state or local significance.
Our review also indicates that four archaeological sites, 8So36 through 8So38 and 8So92, are recorded within the Whitaker Bayou Basin project area (see enclosed map). However, it is the opinion of this office that, due to the amount of disturbance to the site areas, sites 8So37, 8So38 and 8So92 do not appear to meet the criteria of eligibility for listing in the National Register of Historic Places. On the other hand, it is also the opinion of this office that site 8So36 (Calvert Mound) is potentially eligible for listing in the National Register of Historic Places. This assessment is based on the relatively undisturbed nature of the site and its potential for yielding significant data on the prehistory of the region.

Therefore, it is the opinion of this office that, if site 8So36 is avoided during project activities, the proposed Whitaker Bayou Basin project will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state or local significance. However, if site 8So36 cannot be avoided during project activities and alteration to the site area is anticipated, then it is the recommendation of this office that the site area be subjected to archaeological salvage excavation. The resultant report should be forwarded to this agency in order to complete the process of reviewing the impact of this project on archaeological and historic resources. With the exception of the 8So36 site area, proposed project activities at Whitaker Bayou Basin may proceed without further involvement with this office.

If you have any questions concerning our comments, please do not hesitate to contact us.

Your interest and cooperation in helping to protect Florida's archaeological and historical resources are appreciated.

Sincerely,

George W. Percy
State Historic Preservation Officer

GWP/Gkp

Enclosure
OF FLORIDA

Light
July 28, 1994

Planning Division
Flood Control and Flood
Plain Management Section

Mr. Michael S. Hickey, P.E.
Water Facilities Administrator
Southwest District
Department of Environmental Protection
3804 Coconut Palm Drive
Tampa, Florida 33619

Dear Mr. Hickey,

Before further work is performed on the Whitaker Bayou Flood Control Study it is important that the position and responsibilities of the U.S. Army Corps of Engineers (Corps) are clearly defined.

The Corps will provide mitigation for adverse impacts caused by any selected plan for the purpose of flood control. However, the Corps does not have the authority to provide mitigation for existing adverse conditions within the drainage basin of a proposed study area. Mitigation for existing condition impacts are solely the responsibility of the Local Sponsor. Water Quality Certification for any Corps project should be based on the merits of the project itself, along with previously mentioned mitigation for any adverse impacts caused by the project. For this particular project, Water Quality Certification will be granted by the Florida Department of Environmental Protection (DEP) instead of the Southwest Florida Water Management District, since there exists point source waste water treatment discharge into the Bayou or its tributaries.

Currently we are updating the Reconnaissance Study. If this study is favorable, the Corps will consider computer water quality modeling of the basin as part of the Detailed Project Report. The software will be mutually agreed upon by the Corps and DEP. The modeling chosen will be used to quantify pollutant loadings as they exist in Whitaker Bayou, and to predict what effect a proposed plan might have.
Please acknowledge concurrence of above points in writing to this office as soon as possible.

Sincerely,

A. J. Salem
Chief, Planning Division

Copies Furnished:
Peter Krottje, DEP, Tallahassee, Florida 32399-2400
Pat Fricano, DEP, SW. District Office, Tampa, Florida 33619
J. P. Marchand, P.E., Sarasota County Stormwater Environmental Utility, Sarasota, Florida 34232
Mr. A. J. Salem
Chief, Planning Division
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Whitaker Bayou Flood Control Plan

Dear Mr. Salem:

The environmental resource permitting group of this district office will be processing the permit on the subject project. We concur that the applicant must provide mitigation for adverse impacts caused by the selected plan for purposes of flood control. The adverse impacts would include loss of habitat, loss of nursery area, loss of treatment and loss of travel time provided by the existing stream. As a bottom line the planned project must at least mimic the existing environmental functions and water quality in the existing stream, Whitaker Bayou and the receiving Sarasota Bay. Preferably the mitigation for the adverse impacts caused by the selected plan must occur within the affected waterbody.

However, when significantly impracticable those impacts can be mitigated within the water shed between the source and the affected waterbodies. For example, it is preferable that the travel time and treatment provided by the existing stream remain in the existing stream. However, when impractical that treatment and travel time which was adversely impacted by the selected plan can be moved back into the water shed.

As the applicant you are responsible for providing the reasonable assurance required for a permit approval. In addition, as the applicant you are responsible to assure that the project will be constructed in accordance with the approved application. The details of who pays for what is between you and the other sponsors. The Department’s concern solely resides with an approvable application for construction and ultimately the execution of that plan.
Mr. A. J. Salem  
RE: Whitaker Bayou Flood Control Plan  
Page Two  

We concur that the modeling chosen will be used to quantify the pollutant loading as it exists in Whitaker Bayou, the other portions of the stream affected by the plan and the receiving waters of Sarasota Bay. In addition, the model must adequately predict the affects of the proposed plan on those same water bodies. The choosing of the model and the protocol and its use must be coordinated with our Point Source Evaluation Section in the Water Facilities Division at 2600 Blair Stone Road, Tallahassee, Florida 32399, (813) 904 488-0780, attention: Al Bishop.

Since this project requires a permit from our environmental resources program I have assigned Ken Huntington to coordinate this effort. Please feel free to contact him at this office at extension 330.

Very truly yours,  

[Signature]  
Richard D. Garrity, Ph.D.  
Director of District Management  
Southwest District

RDG/mhl

cc: Richard Garrity  
Richard Harvey  
Roxanne Dow  
Lynn Griffin  
Al Bishop  
Ed Snipes  
Judy Richtar  
Eric Livingston  
Ken Huntington
August 30, 1994

Russell Rote
Planning Division Project Manager
Army Corps of Engineers 205 Project
P.O. Box 4970
Jacksonville, FL 32232-0019

Dear Mr. Rote:

We the undersigned residents of the neighborhood bounded by 39th Street, 42nd Street, Coconut Avenue and Central Avenue (a portion of the subdivision platted as Palm Grove of Sarasota Florida) wish to express our enthusiasm for and support of the Corps' current investigation of solutions to this area's persistent flooding.

It is our belief, supported by documents, photographs and direct experience, that this section of the Whitaker Bayou has inflicted on its neighbors the most frequent and severe flooding within the city of Sarasota. In light of this we urge the Corps to seek resolution to this recurring flooding. The undersigned will support the solution proposed by the Corps whether this solution involves the re-engineering of the downstream portion of the bayou or, the buy-out of affected properties.

With regard to a potential property buy-out, it is our opinion that this would present the most satisfactory solution to this problem. The flood prone area we inhabit has, since pre-habitation, been an area of seasonal sheet flow drainage. The presence of typical lowland hammock in this area (elm, maple, live oak and laurel oak) supports this contention. The ditching of Whitaker Bayou and its watershed has alleviated flooding in the upland portions of the watershed, but has created in our neighborhood a situation unfit for habitation. A buy-out and subsequent return of this land to seasonal flooding would benefit the community and Sarasota Bay as well, by creating a large retention area for stormwater run-off (a difficult task to implement anywhere else within this drainage system). A large pond to collect stormwater run-off and sediment
deposit in the area of 39th and 40th Streets would be surrounded by a natural flood zone that could function as a beautiful park when not inundated.

We appreciate your time and your efforts in determining the most practical and successful solution to this flooding problem.

Sincerely,

Bill Hartman
Nancy Hartman
1325 41st Street
Sarasota, FL 34234  (813)355-8723

Becky Close
Becky Close
1380 42nd Street
Sarasota, FL 34234  (813)351-2205

Myrtabelle S. Hudson
Myrtabelle S. Hudson
1394 42nd Street  (813)355-8903

Robert E. Rhoades
Robert E. Rhoades
1335 40th Street  (813)355-3553

Bill E. Remora Young
Bill and Muna Young
1386 40th Street  (813)355-8371

Martha Hartman
Martha Hartman
1393 40th Street
Sarasota, FL 34234  (813)355-4037

cc Tom Shoopman
Flood Stormwater Management
APPENDIX G

Cost Estimate
Whitaker Bayou Basin
Flood Control Project
Recon Report Update
Sarasota County, Florida
10 Year Protection

Designed By: Jacksonville District Office
Estimated By: M Fascher

Prepared By: M Fascher

Date: 03/03/94
This estimate is for a Recon level of report based on quantities developed Sep 1984 and on information in original Feb 82 estimate. All work will be accomplished using landbased equipment with a nearby upland disposal area yet to be determined. An access road will be constructed where necessary to work from the channel where land access is not available from the bank.

E & D and S & A costs are percentages as directed by the Study Manager.

Contingencies are 25% for all items due to the recon level of the report and the lack of current design or quantity information.
TABLE OF CONTENTS

SUMMARY REPORTS

PROJECT OWNER SUMMARY - LEVEL 6..............................................1

No Detailed Estimate...

No Backup Reports...

** ** END TABLE OF CONTENTS ** **
### U.S. Army Corps of Engineers

**Project Name:** Whitaker Bayou Basin - Flood Control Project

**Project Type:** 10 Year Design

**Project Owner Summary - Level 6**

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>UOM</th>
<th>CONTRACT</th>
<th>CONTING</th>
<th>TOTAL COST</th>
<th>UNIT</th>
</tr>
</thead>
</table>

#### 01 Contract 01

| 01 A Construction Cost
| 01 A/02 Relocations
| 01 A/02.01 Roads, Construction Activities

| 01 A/02.01.01 Mob, Demob and Preparatory Work
| 01 A/02.01.01/01 Mob, Demob and Preparatory Work |

| 01 A/02.01.99 Associated General Items
| 01 A/02.01.99/01 US 41 (Riprap) |
| 01 A/02.01.99/02 27th St (Riprap) |
| 01 A/02.01.99/03 Riverside Dr. (Replace Existing) |
| 01 A/02.01.99/04 32nd St (Riprap) |
| 01 A/02.01.99/05 Myrtle St (Replace Existing) |
| 01 A/02.01.99/06 38th St (Replace Existing) |
| 01 A/02.01.99/07 40th St (Replace Existing) |
| 01 A/02.01.99/08 46th St (Replace Existing) |
| 01 A/02.01.99/09 Mecca Dr (Replace Existing) |
| 01 A/02.01.99/10 Dog Track (Replace Existing) |
| 01 A/02.01.99/11 Conc Footbrid (Replace Existing) |
| 01 A/02.01.99/12 Dog Track (Replace Existing) |
| 01 A/02.01.99/13 Conc Footbrid (Replace Existing) |
| 01 A/02.01.99/14 Dog Track (Replace Existing) |
| 01 A/02.01.99/15 Conc Footbrid (Replace Existing) |
| 01 A/02.01.99/16 Desoto Rd (Replace Existing) |
| 01 A/02.01.99/17 Drop Structure |
| 01 A/02.01.99/18 SCL RR Bridge (Replace) |

| Associated General Items |
| Roads, Construction Activities |
| Relocations |

| LABOR ID: MANAVL |
| EQUIP ID: R00392 |
| CREW ID: NAT92A |
| LRP ID: NAT92 |

**Currency:** DOLLARS
### U.S. Army Corps of Engineers

**PROJECT WBF401: Whitaker Bayou Basin - Flood Control Project**

**10 Year Design**

**PROJECT OWNER SUMMARY - LEVEL 6**

**SUMMARY PAGE**

<table>
<thead>
<tr>
<th>Quantities</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mob, Demob &amp; Preparatory Work</td>
<td>50,888</td>
<td>12,722</td>
<td>63,610</td>
<td></td>
</tr>
</tbody>
</table>

01- A/09.02.99 Associated General Items

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>01- A/09.02.99/02 Excavation - from bank</td>
<td>260,000.00</td>
<td>CY</td>
<td>766,023</td>
<td>191,506</td>
<td>957,529</td>
<td>3</td>
</tr>
<tr>
<td>01- A/09.02.99/03 Riprap</td>
<td>6,240.00</td>
<td>TNS</td>
<td>361,315</td>
<td>90,329</td>
<td>451,643</td>
<td>72</td>
</tr>
<tr>
<td>01- A/09.02.99/04 Clearing and Grubbing</td>
<td>10.00</td>
<td>ACR</td>
<td>23,677</td>
<td>5,919</td>
<td>29,596</td>
<td>2959</td>
</tr>
<tr>
<td>01- A/09.02.99/05 Grassing</td>
<td>10.00</td>
<td>ACR</td>
<td>30,248</td>
<td>7,562</td>
<td>37,810</td>
<td>3781</td>
</tr>
<tr>
<td>01- A/09.02.99/06 Haul Road</td>
<td>14,080.00</td>
<td>SY</td>
<td>21,756</td>
<td>5,439</td>
<td>27,196</td>
<td>1</td>
</tr>
</tbody>
</table>

**Associated General Items**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mob, Demob &amp; Preparatory Work</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Canals**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Channels and Canals**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channels and Canals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Construction Cost**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**01- B Non-Construction Cost**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning, Engineering and Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Planning, Engineering and Design**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning, Engineering and Design</td>
<td>292,690</td>
<td>73,173</td>
<td>365,863</td>
<td></td>
</tr>
</tbody>
</table>

**01- 8/31 Construction Management (S&I)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Management (S&amp;I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Construction Management (S&I)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Management (S&amp;I)</td>
<td>365,860</td>
<td>91,665</td>
<td>457,525</td>
<td></td>
</tr>
</tbody>
</table>

**Non-Construction Cost**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Construction Cost</td>
<td>658,550</td>
<td>164,638</td>
<td>823,188</td>
<td></td>
</tr>
</tbody>
</table>

**Contract 01**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract 01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Whitaker Bayou Basin**

<table>
<thead>
<tr>
<th>Description</th>
<th>Contract</th>
<th>Contract</th>
<th>Total Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whitaker Bayou Basin</td>
<td>4,381,273</td>
<td>1,095,318</td>
<td>5,476,591</td>
<td></td>
</tr>
</tbody>
</table>

**LABOR ID: MANA94**

**EQUIP ID: RG0392**

**Currency in DOLLARS**

**CREW ID: NAT92A**

**UPB ID: NAT92A**
No errors detected...

*** END OF ERROR REPORT ***