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FLOOD DAMAGE REDUCTION PROJECT, MANATEE COUNTY, FLORIDA

COMMUNICATION

FROM

THE ACTING ASSISTANT SECRETARY (CIVIL WORKS) THE DEPARTMENT OF THE ARMY

TRANSMITTING

A REPORT ON A FLOOD DAMAGE REDUCTION PROJECT FOR THE CEDAR HAMMOCK (WARES CREEK) AREA OF MANATEE COUNTY, FLORIDA, PURSUANT TO PUB. L. 104–303, SEC. 101(a)(10)



NOVEMBER 14, 1997.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE

45–276 WASHINGTON : 1998

CONTENTS

	Page
Letter of Transmittal	vii
Comments of the Office of Management and Budget	ix
Comments of the State of Florida	x
Comments of the Department of the Interior	xv
Comments of the Environmental Protection Agency	xvi
Comments of the Department of Housing and Urban Development	xx
Comments of the Federal Emergency Management Agency	xxi
Report of the Chief of Engineers, Department of the Army	1
Report of the District Engineer	5
Syllabus	6
Introduction	7
Authority	7
Purpose and Scope	7
Process	8
Initial Appraisal	8
Reconnaissance Phase	9
Feasibility Phase	9
The Report	10
Other Studies and Projects in the Area	11
Prior Studies and Reports	11
Existing Water Resource Projects	13
Study Participants and Coordination	13
Existing Conditions	14
General Description	14
Watershed Characteristics	14
Wares Creek	15
Cedar Hammock	15
Physiography	19
Geology and Soils	19
Climate	19
Natural Forces	19
Develop and Economy	20
Employment	22
Housing	22
Existing Land Use Conditions	23
Cultural Resources	23
Biological Resources	25
Threatened or Endangered Species	25
Water Quality	26
Hazardous and Toxic Wastes	26
Air Quality and Noise	27
Aesthetic Resources	27
Future Without Project Conditions	28
Problem Identification	29
Problems, Needs and Opportunities	29
Factors Contributing to Flooding	29
Historical Flood Conditions	37
Improvements Desired	41
Plan Formulation	43
Federal Objective	43
National Economic Development Plan	43
Planning Goals and Objectives	43
Planning Constraints	44
Possible Measures	45

Page

Plan Formulation—Continued
Possible Measures—Continued
Nonstructural Measures 45
Structural Measures 46
Initial Evaluation 48
Preliminary Alternative Plans 51
Plan A 51
Plan 2A 52
Formulation 55
Water Quality Analysis 57
Hardened Channel 57
Water Control Structure 57
Retention Basins 58
Bridge Replacement 60
Final Alternative Plans 64
Minimum Plan 64
Plan A—Trapezoidal and Sheet Pile Wall Channel 64
Plan 2A—Trapezoidal Channel 64
One-Bridge Replacement Plan 64
Plan B—Trapezoidal and Sheet Pile Wall Channel with Replacement of 9th Avenue West Bridge 64
Plan 2B—Trapezoidal Channel with Replacement of 9th Avenue West Bridge 64

SEVEN BRIDGE REPLACEMENT PLAN

Plan C—Trapezoidal and Sheet Pile Wall Channel with Replacement of 7 Bridges 65
Plan 2C—Trapezoidal Channel with Replacement of 7 Bridges 65
Assessment and Evaluation 75
Identification of NED Plan 75
Environmental Effects 77
Biological Resources 77
Water Quality 78
Air Quality and Noise 78
Aesthetic Resources 79
The Selected Plan 80
Other Considerations 81
Operation and Maintenance 83
Plan Implementation 84
Institutional Requirements 84
Division of Responsibilities and Cost Sharing 84
Cost Sharing for Flood Damage Reduction 84
Deferred Payment 85
Federal Funding Limit 85
Estimated Cost Sharing for Project 85
Financial Analysis 85
Sponsor Views 86
Local Cooperation Agreement (LCA) 86
Explanation of Cost Sharing Table 86
Coordination and Public Involvement 87
Conclusions 88
Recommendations 89
References 92
Comments of the Division Commander 94
Environmental Assessment 97

LIST OF TABLES

Table:
1. Population in Florida 20
2. Historical and Projected Population, Manatee County 21
3. Historical and Projected Population, City of Bradenton 21
4. Damages Compiled by Manatee County Public Works Department of September 1988 Storm 40
5. Without Project Condition Average Annual Damages 41
6. Identification and Location of Existing Riprap or Retaining Walls 58
7. Drainage Areas Sub-Basins 61

Page

Table—Continued
8. Initial Cost of Retention Areas 62
9. 25-Year Level of Protection Preliminary Benefit/Cost Comparison Without Retention Areas 73
10. 25-Year Level of Protection Preliminary Benefit/Cost Comparison With Retention Areas 74
11. Selected Plan—Summary of Project Costs 82
12. Selected Plan—Annual Benefits and Costs 83
13. Estimated Cost Sharing Selected Plan 87

LIST OF FIGURES

Page

Figure:
1. Location Map 16
2. Cedar Hammock Watershed 17
3. Wares Creek and Cedar Hammock East Branch Sub-Basins 18
4. Plan A 53
5. Plan 2A 54
6. Possible Retention Sites 63
7. Plan A 66
8. Plan 2A 67
9. Plan B 68
10. Plan 2B 69
11. Plan C 70
12. Plan 2C 71
13. Possible Retention Sites Revised 72

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

31 OCT 1997

REPLY TO
ATTENTION OF

Honorable Newt Gingrich
Speaker of the House
of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

Section 101(a)(10) of the Water Resources Development Act of 1996, authorized a flood damage reduction project for the Cedar Hammock (Wares Creek) area of Manatee County, Florida. The Secretary of the Army supports the authorization and plans to implement the project through the normal budget process.

The authorized project is described in the report of the Chief of Engineers dated August 23, 1996, which includes other pertinent reports and comments. These reports are in response to Section 205 of the Flood Control Act of 1948, as amended.

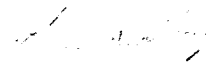
The views of the State of Florida, Manatee County, the Departments of the Interior and Housing and Urban Development, the Federal Emergency Management Agency, and the Environmental Protection Agency are set forth in the enclosed communications.

The authorized project maximizes net national economic development benefits consistent with protecting environmental quality. The plan consist of clearing and snagging about 4,600 feet of the existing channel at the northern portion, or downstream end of Wares Creek. The cleared natural channel would then transition into a grass-lined, 26-foot-wide trapezoidal channel that would extend upstream for about 2,000 feet. To minimize adverse impacts in the dense residential area, a 3,000-foot-long by 40-foot-wide rectangular channel with vertical sheet-pile walls would be constructed upstream of the grass-lined channel. The grass-lined, 26-foot-wide trapezoidal channel would then resume, extending upstream for about an additional 5,000 feet. The project would provide about a 10-year level of flood protection, reducing average flood damages by about 57 percent. No fish and wildlife mitigation measures are required.

In accordance with section 202(a) of the Water Resources Development Act of 1996, the flood damage reduction project for Cedar Hammock (Wares Creek), Manatee County, Florida, is subject to cost sharing consistent with the Water Resources Development Act of 1986. Based on October 1995 price levels, the total first cost of the authorized project is about $13,846,000, of which about $8,900,000 would be Federal, and about $4,946,000 would be non-Federal. In addition, non-Federal interests would be required to implement a flood plain management plan for the Cedar Hammock (Wares Creek) area.

The Office of Management and Budget advises that there is no objection to the submission of the report to the Congress. A copy of its letter is enclosed in the report.

Sincerely,



John H. Zirschky
Acting Assistant Secretary of the Army
(Civil Works)

Enclosure

COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

AUG 1997

The Honorable John H. Zirschky
Acting Assistant Secretary of the
Army for Civil Works
Pentagon - Room 2E570
Washington, D.C. 20310-0108

Dear Dr. Zirschky:

As required by Executive Order 12322, we have completed our review of former Assistant Secretary Lancaster's recommendation for the report of the Cedar Hammock (Wares Creek), Manatee County, Florida.

The recommendation for this project in his letter of November 5, 1996, is consistent with the policies and program of the President. The Office of Management and Budget does not object to submission of this report to Congress.

Sincerely,

Kathleen Peroff
Deputy Associate Director
Energy and Science Division

FLOOD DAMAGE REDUCTION PROJECT, MANATEE COUNTY, FLORIDA

REPORT OF THE CHIEF OF ENGINEERS

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS
EMERGENCY MANAGEMENT • HOUSING AND COMMUNITY DEVELOPMENT • RESOURCE PLANNING AND MANAGEMENT

LAWTON CHILES
Governor

JAMES F. MURLEY
Secretary

July 19, 1996

Mr. David B. Sanford, Jr.
U.S. Army Corps of Engineers
Policy Review Branch
Policy Review and Analysis Division
Attn: CECW-AR (SA)
7701 Telegraph Road
Alexandria, Virginia 22315-3861

RE: Flood Control Projects - Cedar Hammock (Wares Creek) - Final Detailed Project Report and Environmental Assessment - Manatee County, Florida
SAI: FL9205180810CR

Dear Mr. Sanford:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

The Department of Environmental Protection (DEP) indicates that the conclusions and comments contained in its December 12, 1994, letter remain the same. Specifically, the DEP notes that the document does not substantiate the conclusion that the proposed project would result in an insignificant change in water quality. The DEP recommends that changes be made to the applicant's method of analyzing hydraulic delivery time and/or the water quality model simulations in order to verify this conclusion. Complete data and analysis of with-project conditions should be provided to the Southwest Florida Water Management District for consideration during the environmental resource permit review. Please refer to the enclosed DEP comments.

Based on the information contained in the application and the enclosed comments provided by our reviewing agencies, the state has determined that the allocation of federal funds for the above-referenced project is consistent with the Florida Coastal Management Program.

Please attach a copy of this letter and any enclosures to your application facesheet or cover form and forward to the federal funding agency. (If applicable, enter the State Application Identifier (SAI) number, shown above, in box 8A of Standard Form 424 or where appropriate on other cover form.) This action will assure the federal agency of your compliance with Florida's review requirements and reduce the chance of unnecessary delays in processing your application.

If you have any questions regarding this letter, please contact Ms. Keri Akers, Clearinghouse Coordinator, or Ms. Jasmin Raffington, Florida Coastal Management Program, at (904) 922-5438.

Sincerely,

Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/ka
Enclosures

cc: Lynn Griffin, Department of Environmental Protection
Ernest Padgett, Manatee County
Steve Diebenaugh, Office of U.S. Senator Bob Graham

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

16 AUG 1996

Planning Division
East-West Planning Management Branch

Mr. Ralph Cantral
Executive Director
Florida Coastal Management Program
Florida Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Dear Mr. Cantral:

Thank you for your letter of July 19, 1996, and the enclosed Department of Environmental Protection letter dated July 17, 1996. Your letter confirms that the Cedar Hammock-Wares Creek flood control project (SAI: FL9205180810CR) is consistent with the Florida Coastal Management Program.

In reference to the forwarded comments from the Florida Department of Environmental Protection (DEP), the April 1995 Final (revised) Detailed Project Report and Environmental Assessment (EA) did address most of the issues discussed in your December 12, 1994, letter. However, information was dispersed in several Report appendices, as well as Attachment C to the EA.

For clarification, we are enclosing with this letter a copy from the One Dimensional Unsteady Flow Through a Full Network of Open Channels (UNET) output for a 2-year storm event through the Cedar Hammock basin. We have highlighted peak flows for both without-project (existing) and with-project conditions. The increment of time is 0.17 hour which corresponds to 10.2 minutes. It can be seen from this output that the peak occurs at about the same time, within 10.2 minutes, at around 14.5 hours; though the peak under with-project conditions is slightly higher, as expected.

I trust this information is sufficient to substantiate the small change in travel time and addresses the State's water quality concerns. Of course, we will continue coordination during subsequent project development as part of the water quality certification process. Thank you for your comments.

Sincerely,

G. Edward Dickey
Chief, Planning Division
Directorate of Civil Works

Enclosure

Department of Environmental Protection

Lawton Chiles
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Virginia B. Wetherell
Secretary

July 17, 1996

Keri Akers
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Dear Ms. Akers:

Re: Detailed Project Report and Final Environmental Assessment, Cedar Hammock/Wares Creek, SAI FL9205180810CR

The Department has provided comments on this project in the past, most recently on December 12, 1994, in response to the draft project report and environmental assessment. Our conclusions on the project and the final document remain as stated in that letter.

Specifically, we pointed out that the document did not substantiate the conclusion that the project would result in an insignificant change in water quality. The Corps is basing this conclusion on a projected small change in hydraulic delivery time (1 hour) after the project is constructed, but did not include the travel time information in the report. The water quality model simulations still are not calibrated as we had recommended, and, therefore, also are not conclusive. However, further improvements to the water quality model would not be necessary if the small change in travel time is substantiated.

Complete data and analysis of with-project conditions should be provided to the Southwest Florida Water Management District for consideration during the environmental resource permit review. The Department will review this project for consistency with its statutory authorities in the coastal management program in conjunction with the environmental resource permit review.

If you have any questions concerning these comments please contact me at 487-2231 or Kevin Petrus, Water Quality Assessment Section, at 488-0780.

Cordially,

Lynn Griffin
Intergovernmental Programs

LG/kp
cc: Al Bishop

MANATEE COUNTY
BOARD OF COUNTY COMMISSIONERS

July 30, 1996

Ms. Pat Luvender
U.S. Army Corps of Engineers
Directorate of Civil Works
Policy Review and Analysis Division
Alexandria, Virginia 22315-3861

Dear Ms. Luvender:

Manatee County has received and reviewed the Final Detailed Project Report and Environmental Assessment for the Cedar Hammock (Wares Creek) project located in Manatee County, Florida. This project report was initiated under the authority of Section 205 of the Flood Control Act of 1948, as amended. The County has actively pursued individual Congressional Authorization for construction of the project. The County understands that the Corps is supportive of this request and that the Corps has released a draft report of the Chief of Engineers.

The Manatee County Board of County Commissioners supports the Wares Creek Project report and is prepared to proceed with the cost-sharing policies established in the Water Resources Development Act of 1986 of 75% federal and a minimum of 25% non-federal cost shares. The County also understands that the Administration has initiated the development of a new cost sharing policy for flood damage reduction projects and that there is a potential that the Cedar Hammock project currently proposed for authorization may be subject to a new cost sharing policy. In such an event, the Board of County Commissioners reserves the opportunity to re-evaluate its commitment and level of support for the project.

Sincerely,

BOARD OF COUNTY COMMISSIONERS
MANATEE COUNTY, FLORIDA

Stan Stephens

STAN STEPHENS
Chairman

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

ER 96/347

JUL 26 1996

Mr. David B. Sanford, Jr.
Chief, Policy Review and Analysis Division
Policy Review Branch
ATTN: CECW-AR (SA)
7701 Telegraph Road
Alexandria, Virginia 22315-3861

Dear Mr. Sanford:

The Department of the Interior has completed its review of the proposed Chief of Engineers report and other pertinent reports for the Cedar Hammock (Wares Creek) Project, Manatee County, Florida.

We have no comments on these documents and do not object to the proposed project.

Sincerely,

Willie R. Taylor

Willie R. Taylor
Director, Office of Environmental
Policy and Compliance

COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

MAY 3 1 1995

Policy Review Branch
Policy Review and Analysis Division
ATTN: CECW-AR (SA)
7701 Telegraph Road
Alexandria, VA 22315-3861

Subject: Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Cedar Hammock (Wares Creek) East Branch Drainage Canal, Manatee County, FL

Dear Sir:

Pursuant to Section 309 of the Clean Air Act, EPA, Region 4 reviewed the original EA which discussed the various flood control/drainage measures along the east branch of Cedar Hammock and Wares Creek. Recommended structural improvements to expedite water movement through this reach include snagging/clearing, channel realignment and enlargement, and installation of sheet pilings. The excavation associated with this proposal will generate approximately 100,000 cubic yards of material which will be transported to the Manatee County landfill.

From the information in the Detailed Project Report and Appendix A of the EA the noted measures should reduce flood stages within most of the study reach for all rainfall events, with inbank storage for at least the five-year storm episode. Because we believed that impacts to the natural environment of the Manatee River/Tampa Bay system from this and similar type projects would be more significant than depicted in the document, we suggested that the following be examined before the FONSI was signed:

> It appears that Wares Creek and Cedar Hammock are essentially urban culverts within the project reach and do not provide any significant instream biological value(s). This is due to non-point pollutant loadings from development in the adjacent floodplain. This situation resulted and has been exacerbated as the assimilative capacity of the natural flood plain/riverine habitat was incrementally displaced by encroachment of this development. While the biological importance of the urban reach of this watercourse is debatable, degraded flows eventually enter the Manatee River and Tampa Bay which do have important regional amenities. The incremental effects of these adverse impacts are among the reasons why the latter has been placed in the surface water

improvement and management program.

Construction of storm water retention basins could be used to trap the first inch of non-point runoff and lessen some of the perturbations associated with rain events. However, the text states that there is insufficient reasonably available/vacant property in the sub-basin to construct effectively sized structures. Therefore, retention areas were eliminated from the Jacksonville District's selected plan as impractical.

Interestingly, in the "Corps Response to Comments Section" it was mentioned that settling basins could be used by the local sponsor to reduce suspended solids in an effort to address the additional sediment loadings anticipated after project construction. Whether any of these structural measures will be applied remains to be seen given the conclusionary statement that suspended solids have insignificant impact on water quality. We are concerned that the EA makes these kind of declarations throughout the document without developing sufficient basis/discussion.

For example, the statement is made that because the project area is urbanized rather than industrialized "toxins" are probably not present in this reach of the creek. This declaration overlooks the universe of materials prevalent in urban areas. As further substantiation of this restricted viewpoint, the EA observed that populations of flora and fauna do not appear to be stressed. This observation is at variance with previous discussions that because the watershed is urbanized it has a stressed, depauperate resident instream biota.

We continue to share the water quality concerns of the Florida Department of Environmental Protection (DEP) about this project. However, because the current pollutant problem being experienced by Manatee River/Tampa Bay is sufficiently serious, it is not enough just to maintain the status quo. Rather, efforts should be made to reduce loadings. The proposed structural flood control measures will facilitate an increase in stream flow rates thereby decreasing delivery times of pollutants.

Modelling was used to determine the significance of this change on the river/bay system. While modelling results showed only localized water quality problems around the mouth of Wares Creek after project implementation, certain of the model's assumptions may not be precisely geared to address the tidal variations and physical characteristic found in this particular system. Hence, some concerns were raised about the confidence which should be assigned to these results.

Moreover, since the Manatee River/Tampa Bay complex is relatively large, the inputs from Cedar Hammock were viewed as incidental. Nonetheless, enough inputs from a system's

constituent sub-elements can create a significant dilemma. The difficulty of addressing incremental effects, especially in a developing watershed, and how individual actions will affect the long-term health of an overall ecosystem have proven to be very perplexing to evaluate. This is one of the major reasons why dealing with the cumulative effects of individual drainage projects remains a problem and could be a reason why the issues which we raised in this regard were not addressed by the Jacksonville District.

Since providing flood relief within the project area was deemed to a desirable societal goal, we believe that sufficient latitude could be found within the Section 205 Program (Flood Control Act of 1948) to provide cost effective water quality benefits somewhat remote from the project reach, but within the overall watershed. Hence, we continue to urge that before this project receives final processing by your office that efforts be made to secure mitigation measures to lessen non-point pollutant loadings into the bay system.

Thank you for the opportunity to comment again on this action. If we can be of further assistance in this matter, Dr. Gerald Miller (404-347-3555 VM 6853) will serve as initial point of contact.

Sincerely,

Heinz J. Mueller, Chief
Environmental Policy Section
Federal Activities Branch

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

16 AUG 1996

Planning Division
East-West Planning Management Branch

Mr. Heinz J. Mueller
Chief, Environmental Policy Section
Federal Activities Branch, USEPA
345 Courtland Street, Northeast
Atlanta, Georgia 30365

Dear Mr. Mueller:

This is in response to your letter of May 31, 1996, in which you provided the Environmental Protection Agency's (EPA) comments on the Proposed Chief of Engineer's Report and Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Cedar Hammock (Wares Creek) East Branch Drainage Canal in Manatee County, Florida. The Feasibility Report and EA were recently coordinated for a 90-day State and Agency review by the Policy Review Branch, U.S. Army Corps of Engineers. Your letter notes that the Corps did not provide responses to EPA's November 1994 comments on the Draft EA, and repeats those comments.

Your (1994) comments on the Draft EA were considered and responses were prepared. These responses were inadvertently left out of revised Attachment C (Comments and Responses to the Draft EA). We apologize for this oversight. The enclosure to this letter reiterates the EPA comments and the Corps response. Your comments are shown in boldface, with our response in italic. As noted in the enclosed responses, our analysis indicates that the proposed project achieves flood reduction by increasing in-bank storage rather than accelerating flows downstream, therefore, water quality parameters will not change significantly from existing conditions. However, as the project develops, if it appears that project operation is likely to significantly affect water quality, re-coordination would be initiated under NEPA. We trust this answers any remaining questions about the project.

Sincerely,

G. Edward Dickey
Chief, Planning Division
Directorate of Civil Works

Enclosure

COMMENTS OF THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

U.S. Department of Housing and Urban Development
Office of the Area Coordinator
for Central and West-Central Florida
Suite 700, 501 East Polk Street, Tampa FL 33602-3945
Tel: 813 228-2504 Fax: 813 228-2431 TDD: 813 228-2115
Internet: http://www.hud.gov/local/tam/tampa.html

August 2, 1996

Policy Review Branch
Policy Review & Analysis Division
Attn: CECW-AR (SA) 7, Pat Luvender
7701 Telegraph Rd.
Alexandria, VA 22315-3861

Dear Ms. Luvender:

SUBJECT: Cedar Hammock (Wares Creek)

This letter will confirm that the U.S. Department of Housing & Urban Development (HUD) Multifamily Production Branch has reviewed the "Final Detailed Project Report and Environmental Assessment, Section 205 Flood Control, of the Chief of Engineers", and the report of the district engineer on Cedar Hammock (Wares Creek), Manatee County, Florida.

Based on our review, it does not appear that this project will have any adverse effect on HUD-related projects currently proposed or under development in the immediate area. It appears that any effect will be positive, and result in a reduction of the 100-year flood plain. Therefore, we pose no objection to this project.

Sincerely,

George A. Milburn Jr.
Area Coordinator

COMMENTS OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY

FEDERAL EMERGENCY MANAGEMENT AGENCY
REGION IV
1371 PEACHTREE ST, NE, SUITE 735
ATLANTA GA 30309-3108

MT-R4 August 1, 1996

Policy Review Branch
Policy Review and Analysis Division
ATTN: CECW-AR (SA) Ms. Pat Luvender
Department of the Army
U.S. Army Corps of Engineers
7701 Telegraph Road
Alexandria VA 22315-3861

Dear Ms. Pat Luvender:

We have thoroughly reviewed the Final Detailed Project Report and Environmental Assessment for Cedar Hammock (Wares Creek), Manatee County, Florida. We do not have any comments regarding this project. We appreciate the opportunity to review and comment on this project.

If you have any questions or need additional information, please contact me at (404) 853-4434.

Sincerely,

William R. Straw
Environmental Planner

ws/404-853-4434

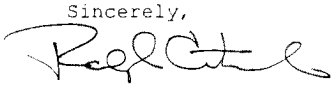
cc: Rick Shivar

Based on the information contained in the application and the enclosed comments provided by our reviewing agencies, the state has determined that the allocation of federal funds for the above-referenced project is consistent with the Florida Coastal Management Program.

Please attach a copy of this letter and any enclosures to your application facesheet or cover form and forward to the federal funding agency. (If applicable, enter the State Application Identifier (SAI) number, shown above, in box 3A of Standard Form 424 or where appropriate on other cover form.) This action will assure the federal agency of your compliance with Florida's review requirements and reduce the chance of unnecessary delays in processing your application.

If you have any questions regarding this letter, please contact Ms. Keri Akers, Clearinghouse Coordinator, or Ms. Jasmin Raffington, Florida Coastal Management Program, at (904) 922-5438.

Sincerely,



Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/ka
Enclosures

cc: Lynn Griffin, Department of Environmental Protection
Ernest Padgett, Manatee County
Steve Diebenaugh, Office of U.S. Senator Bob Graham

COMMENTS OF THE STATE OF FLORIDA

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CECW-PE (10-1-7a) August 23, 1996

SUBJECT: Cedar Hammock (Wares Creek), Manatee County, Florida

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on flood damage reduction measures for the Cedar Hammock and Wares Creek area of Manatee County, Florida. It is accompanied by the report of the district and division engineers. These reports are being submitted in accordance with Section 205 of the Flood Control Act of 1948, as amended (Public Law 80-858) which authorized the Secretary of the Army, acting through the Chief of Engineers, to allot from any appropriations made for flood control for the construction of small projects. At the time this cost shared feasibility study was initiated, the project cost was within the Federal limitation of section 205.

2. The reporting officers recommend a flood damage reduction plan which consists of a channel modification project for the Cedar Hammock (Wares Creek) basin. The recommended plan of improvement consists of clearing and snagging 4600 feet of channel at the northern extreme of the study area, transitioning to an improved, grass-lined, 26-foot-wide trapezoidal channel extending for about 2000 feet. A 3000-foot-long, 40-foot-wide section of vertical sheet piling would follow the grass lined channel. The sheet piling would be located in a section of dense residential development. Improved grass-lined channel would resume following the sheet piling for an additional 5000 feet.

3. No environmental mitigation is required for the recommended plan. A finding of no significant impact statement was signed on April 13, 1995.

4. The recommended plan is the national economic development plan. Based on October 1995 price levels, a 50-year economic project life, and an interest rate of 7-5/8 percent, the project has a first cost of $13,846,000, average annual benefits of $3,861,000, an average annual cost of $1,179,000 (including interest during construction), and a benefit-cost ratio of 3.3.

5. Washington level review indicates that the proposed plan conforms to applicable Federal laws and regulatory requirements, is a complete and functionally adequate project, and is in compliance with other relevant Federal and U.S. Army Corps of Engineers regulations. The report has been coordinated with appropriate Federal, State, local, and public interests. All substantive issues raised during the comment period have been adequately addressed.

6. The Administration has initiated the development of a new cost sharing policy for flood damage reduction projects. I recommend that improvements for flood damage reduction in the Cedar Hammock and Wares Creek area of Manatee County, Florida be authorized subject to cost sharing that is consistent with Administration policy. This recommendation is also subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies, including the following requirements:

a. Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

b. Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project;

c. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government;

d. Grant the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project;

e. Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors;

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs;

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government;

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project;

i. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA;

j. Participate in and comply with applicable Federal floodplain management and flood insurance programs in accordance with Section 402 of Public Law 99-662;

k. Prevent future encroachments on project lands, easements, and rights-of-way which might interfere with the proper functioning of the project;

l. Not less than once each year, inform affected interests of the limitations of the protection afforded by the project;

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

n. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act; and

o. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

8. The recommendations contained herein reflect the information available at this time and current departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as a proposal for authorization and/or implementation funding. However, prior to transmittal to Congress, the sponsor, the Manatee County Government, Manatee County, Florida; interested local and Federal agencies; and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

PAT M. STEVENS IV
Major General, USA
Acting Chief of Engineers

REPORT OF THE DISTRICT ENGINEER

ADDENDUM

CEDAR HAMMOCK (WARES CREEK) MANATEE COUNTY, FLORIDA

DETAILED PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT

NOTICE OF CHANGE IN STUDY AUTHORITY

The Cedar Hammock Detailed Project Report (DPR) was funded and completed under the authority of Section 205 of the Flood Control Act of 1948, as amended. Based on October 1995 price levels, a 50 year economic project life, and an FY 1996 interest rate of 7-5/8%, the project has a construction cost of $13,846,000. The report was approved by HQUSACE on February 21, 1996.

Since the study's completion, the Local Sponsor, Manatee County Government, Manatee County, Florida, has actively pursued individual Congressional Authorization for construction of the flood damage reduction project under the General Investigation program. The approved DPR will remain as the decision document for the proposed authorization.

Under Section 103 of the Water Resources Development Act of 1986 for the General Investigation program, the existing cost sharing policy for flood control is 75% Federal and a minimum of 25% non-Federal. The Federal share of the total project cost is estimated to be $8,782,000. The non-Federal implementation costs include easements, rights-of-way, and reallocations of structures and facilities estimated at $4,371,000 plus 5% of the total project costs estimated as $692,000. The non-Federal share of the total project cost is estimated to be $5,063,000. However, the Administration has initiated the development of a new cost sharing policy for flood damage reduction projects. The recommendation of improvements for flood damage reduction at Wares Creek is being proposed for authorization subject to the cost sharing consistent with the new cost sharing policy.

CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FLORIDA

SECTION 205
DETAILED PROJECT REPORT AND
ENVIRONMENTAL ASSESSMENT

SYLLABUS

The purpose of this study is to determine the feasibility of reducing flood damages and related problems within the East Branch of the Cedar Hammock (Wares Creek) basin in Manatee County, Florida. This study was conducted at the request of the Department of Public Works for Manatee County, Florida. The report was prepared under the authority provided in Section 205 of the 1948 Flood Control Act, as amended. The U.S. Army Corps of Engineers has primary responsibility for conducting the study and preparing this report.

During this study, the most feasible, implementable plan within the funding limits established under Section 205 will be determined. Each potential solution will determine the public support and recommend an appropriate course of action. The plans will be consistent with the Federal guidelines established under Section 205 authority and other applicable statutes, as well as, locally acceptable.

Manatee County is in west central Florida along the Gulf of Mexico. The investigation focused on the East Branch of the Cedar Hammock Drainage Canal, which flows northerly through Manatee County and into the City of Bradenton, where the name changes to Wares Creek, to its outlet at the Manatee River. The drainage area of the East Branch encompasses 6.23 square miles of highly urbanized area. Heavy rains in September 1988 and June 1992 caused extensive flooding to the area and impacted many residential structures. Average annual damages for the existing land use pattern in the study area are estimated to be $6,725,000.

To address these problems, several plans were developed and evaluated to determine their effectiveness in reducing flood damages and their overall economic, environmental, social, and other impacts. As a result of the investigations conducted, a plan was developed which provides for the construction of channel improvements on a 15,500-foot-long section of the East Branch of Cedar Hammock and Wares Creek. The plan reduces flooding in the study area by enlarging the channel section, therefore, lowering potential flood levels. The plan investigated provides a 10-year flood protection and has a favorable benefit-cost ratio. Pertinent economic data for the recommended plan based on 1994 price levels and an interest rate of 8 percent are as follows:

Estimated First Costs	
Federal	$ 4,656,300
Non-Federal	$ 9,189,400
Total	$ 13,845,700
Average Annual Costs	$ 1,232,300
Average Annual Benefits	$ 3,860,700
Benefit-to-Cost Ratio	3.1:1

Based on an analysis of overall economic, environmental, and social impacts, the above plan was found to be in the Federal interest and justified for implementation. Therefore, the plan is recommended for approval for Federal construction.

INTRODUCTION

This report represents the results of investigations into flooding and related problems for the Cedar Hammock (Wares Creek) area in Manatee County, Florida. The report was prepared in response to a request by Manatee County, Florida and the city of Bradenton, Florida, for assistance in reducing flooding in the Cedar Hammock (Wares Creek) area.

AUTHORITY

This report was prepared under the authority of *Section 205 of the Flood Control Act of 1948,* as amended, (Public Law 80-858) which states:

> *"The Secretary of the Army is hereby authorized to allot from any appropriations heretofore or hereafter made for flood control, not to exceed $40,000,000 for any fiscal year, for the construction of small projects for flood control and related purposes not specifically authorized by Congress, which come within the provisions of Section 1 of the Flood Control Act of June 22, 1936, when in the opinion of the Chief of Engineers such work is advisable. The amount allotted under this Section for a project shall be sufficient to complete Federal participation in the project. Not more than $5,000,000 shall be allotted for a project at any single locality. The provisions of local cooperation specified in Section 3 of the Flood Control Act of June 22, 1936 as amended, shall apply. The work shall be complete in itself and not commit the United States to any additional improvements to insure its successful operation, except as may result from the normal procedure applying to projects authorized after submission of preliminary examination and survey reports."*

By letter dated July 21, 1987, Manatee County made formal application for a study of the Cedar Hammock Drainage Canal under the authority cited above. This request was combined with a previous request, dated January 11, 1984, by the city of Bradenton for a study of flooding problems along Wares Creek. An Initial Appraisal Report for Wares Creek was completed in July 1984 and a Reconnaissance report for the combined areas of Cedar Hammock and Wares Creek was completed in March 1990. Both reports recommended further investigations of the area.

PURPOSE AND SCOPE

The overall purpose of this study is to investigate flooding and related problems, determine if feasible means for reducing these problems exist, and recommend the most appropriate course of action within the funding limits established under Section 205. The plans will be consistent with the Federal

guidelines established under Section 205 authority and other applicable statutes, as well as being locally acceptable.

Manatee County identified almost all of the principal drainage channels in the urban areas of the southwest portion of Manatee County as inadequate to carry runoff from the 25-year-frequency rainfall without extensive local flooding. Many are inadequate to convey runoff from a 5-year-frequency rainfall without overflowing their banks. Because of the inherent limitations of the Section 205 program, studies were generally confined to the East Branch of the Cedar Hammock Drainage Canal (hereafter referred to as Cedar Hammock) within Manatee County and the city of Bradenton. Though limited, the investigations were of sufficient detail to identify those problems being experienced, determine probable future changes, identify and evaluate possible plans for addressing these problems, develop detailed plans for possible implementation, and recommend a course of action as appropriate.

PROCESS

Continuing Authority studies follow a staged process which include the four functional planning tasks of problem identification, formulation of alternatives, impact assessment, and evaluation. These tasks are conducted in three phases: an initial appraisal, a reconnaissance phase and a feasibility phase. The initial appraisal and reconnaissance phase are conducted at full Federal expense, while the cost of the feasibility phase is shared equally between the Federal government and a non-Federal sponsor, in this case, Manatee County.

Initial Appraisal

Section 205 provides authority to the Chief of Engineers to construct small flood control projects provided that such work is economically justified, environmentally sound and meets certain conditions and limitations. Flooding problems associated with natural streams or modified natural waterways may be addressed under the Continuing Authorities Program downstream from the point where the flood discharge is greater than 800 cubic feet per second for the one in ten year storm. Drainage areas of less than 1.5 square miles are assumed to lack adequate discharge to meet the above criteria.

An initial appraisal is conducted to ensure that a proposed study meets those criteria. In addition, the Initial Appraisal is designed to quickly identify the problems and needs related to flooding in the study area, investigate potential solutions to those problems identified, and determine if further studies are warranted.

An Initial Appraisal Report for the Wares Creek basin was initiated in January 1984, and completed in July 1984, upon request of the city of Bradenton. It was

determined that Wares Creek did meet the necessary preliminary requirements, and therefore qualified for further detailed study under the Section 205 program. The investigation identified possible solutions to the flooding problems and concluded that further study was warranted.

Reconnaissance Phase

The objectives of the reconnaissance phase were to:

1) describe the identified flood control problems and needs of the area;

2) determine whether there is Federal interest in participating in a solution to the identified problem(s);

3) estimate costs and benefits of viable alternatives; and

4) identify at least one possible solution suitable for U.S. Army Corps of Engineers implementation.

The reconnaissance investigation for Wares Creek was initiated in November 1984. The study for Wares Creek was suspended in 1986 due to U.S. Army Corps of Engineers personnel placed on emergency duty after severe flooding occurred in October 1985 in Puerto Rico. The reconnaissance study was re-initiated in 1987 and was to be completed in February 1987. In the meantime, another request for a Section 205 study for the Cedar Hammock drainage basin had been received by the Jacksonville District, U.S. Army Corps of Engineers. This request came from the Public Works Department of Manatee County. The Cedar Hammock Drainage Canal has three outlets, one of which is Wares Creek. Dependant upon the outcome of the Cedar Hammock study, if any flood control work was to be undertaken, the hydrology of Wares Creek would probably be affected. Therefore, it was decided that the two studies should be combined.

The reconnaissance report for the combined study areas of Cedar Hammock and Wares Creek, completed in March 1990, contains a summary of investigations, results, conclusions, and a recommendation that a detailed feasibility phase study be undertaken. The proposed solutions to the flooding problems are described later in this report.

Feasibility Phase

If the reconnaissance phase identifies and recommends an alternative which has Federal interest and local sponsor support, the study proceeds with the feasibility phase. The objectives of the feasibility phase are to:

1) identify and recommend the optimum flood control project for the study area from a Federal and non-Federal perspective, in accordance with the procedures applicable to specifically authorized studies;

2) evaluate the specific engineering, environmental, and economic effects of the preferred solution; and

3) develop project design as a basis for preparing plans and specifications. The product of the feasibility phase is a Detailed Project Report (DPR), including the appropriate environmental documentation.

A Feasibility Cost Sharing Agreement (FCSA) was executed between the U.S. Army Corps of Engineers, Jacksonville District, and Manatee County, Florida, for the Cedar Hammock (Wares Creek) Feasibility Study on December 17, 1990. The study funds were received and the feasibility phase was initiated in April 1991.

A review of previous reports, interviews with local officials and personal observations were made by study team members during field reconnaissance. The study process concentrated on the formulation and development of detailed plans appropriate to the defined problem, assessment of their impacts, and included hydrology, hydraulic and geotechnical investigations; socio-economic analysis; biological/ecological studies; and recreational and cultural resource evaluations. These analyses and evaluations are discussed in this draft DPR.

After the draft DPR is reviewed by the staff of the South Atlantic Division (SAD), U.S. Army Corps of Engineers, and then reviewed by state and other Federal agencies, the subsequent steps involved with plan implementation are summarized below:

a. Review and approval of the final DPR by the Commander of SAD and the Washington Level Review Center.

b. Allocation of funds by Headquarters, U.S. Army Corps of Engineers (HQUSACE) for preparation of plans and specifications.

c. Approval of the project for construction by the Office of the Assistant Secretary of the Army for Civil Works.

THE REPORT

Results of the study are summarized in this main report and detailed in the technical appendices. The main report is a presentation of the overall study, including

identification of the study area and its problems and needs, assessment and evaluation of those plans, and selection of the recommended plan.

The appendices are a compendium of detailed information regarding the technical analyses including engineering and economic studies.

Appendix A - Hydrology and Hydraulic Analyses
Appendix B - Real Estate Plan
Appendix C - Geotechnical Investigations
Appendix D - Design and Cost Estimate
Appendix E - Economic Analysis and Benefit Evaluation
Appendix F - Water Quality Modeling
Appendix G - Coordination
Appendix H - Local Cooperation and Financial Agreement
Appendix I - Acronyms Used in this Report

Included with the Main Report is the Environmental Assessment (EA), the Coordination Act Report prepared by the U.S. Fish and Wildlife Service (FWS) and a Section 404(b)(1) Evaluation prepared for this project.

OTHER STUDIES AND PROJECTS IN THE AREA

Prior Studies and Reports

The following is a list of studies which have already been conducted for sites near the study area. These studies contained valuable information used in preparation of this report. A brief description of the purpose of each report and a summary of their contents is provided in this section. Detailed recommendations made in these reports are contained in the PLAN FORMULATION chapter.

a. Flood Insurance Study, City of Bradenton, Florida, Manatee County, prepared by the Federal Emergency Management Agency (FEMA), Federal Insurance Administration, December 1, 1980. This study was prepared to investigate the existence and severity of flood hazards in the city of Bradenton and to aid in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

b. Flood Insurance Study, Manatee County, Florida, Unincorporated Areas, prepared by FEMA, dated September 15, 1983. This study was prepared for use by Manatee County to update existing floodplain regulations as part of the regular program of flood insurance by FEMA.

c. Initial Appraisal Report for Wares Creek, Bradenton, Florida, dated July 1984, prepared by the Jacksonville District, U.S. Army Corps of Engineers. This report identified flooding problems within the Wares Creek basin and recommended potential measures for flood damage reduction. The proposed improvements included excavation of the channel to establish a uniform bottom grade and side slopes to improve the hydraulic efficiency of the channel, implementation of erosion control measures (i.e. rip rap), construction of velocity control structures (sheet pile weirs), and replacement of undersized bridges.

d. Master Stormwater Drainage Plan, Area A, Manatee County Government, dated November 1984, prepared by Briley, Wild & Associates, Inc. This report details a master stormwater drainage plan for southwest Manatee County. Hydrologic and hydraulic analyses were performed for each basin and their principal conveyance channels, and the most cost-effective stormwater management plan was recommended. The recommendations for the East Branch Cedar Hammock Drainage Canal included: 1) enlargement of an existing lake to use as a detention basin; 2) construction of a new channel outlet at the detention basin's north end to redirect flow to an existing drainage ditch which flows northeasterly to the main East Branch channel; and 3) construction of a trapezoidal-shaped concrete-lined channel improvement in a portion of the channel in the city of Bradenton.

e. Master Stormwater Drainage Plan, Area B, Manatee County Government, dated April 1986, prepared by Briley, Wild & Associates, Inc. This report details a master stormwater drainage plan for drainage basins in northwest Manatee County, the Wares Creek basin in the city of Bradenton and areas just east. Hydrologic and hydraulic analyses were performed for each basin and their principal conveyance channels, and the most cost-effective stormwater management plan was recommended. This report examined the Wares Creek basin within the city limits as Plan A had included the portion in unincorporated Manatee County. The recommendations for Wares Creek included: 1) channel improvements increasing the width and depth of the channel; 2) replacement of nine existing bridges; and 3) construction of desiltation basins at the channel outlet.

f. Cedar Hammock (Wares Creek) Reconnaissance Report, dated March 1990, prepared by the Jacksonville District, U.S. Army Corps of Engineers. This report identified flooding problems within Wares Creek and the East Branch of the Cedar Hammock Drainage Canal basins. The proposed improvements recommended in the Initial Appraisal Report and Master Stormwater Drainage Plans were examined further and channel modifications and enlargement of an existing detention basin were recommended in the Reconnaissance Report for flood damage reduction. The report concluded that it is economically feasible to implement a flood control project in the study area and recommended that a detailed feasibility phase study be undertaken to develop a plan for flood reduction in the Cedar Hammock (Wares Creek) drainage basin. The two proposed plans included:

Plan A - 1) channel improvements to include widening the stream with an earthen trapezoidal channel section for part of the channel; 2) construction of a sheet pile wall section for part of the channel; 3) enlargement of an existing detention basin; and 4) construction of a new channel outlet at the detention basin's north end to redirect flow to an existing drainage ditch which flows northeasterly to the main East Branch channel.

Plan B - 1) channel improvements to include widening the stream with an earthen trapezoidal channel section; 2) enlargement of an existing detention basin; and 3) construction of a new channel outlet at the detention basin's north end to redirect flow to an existing drainage ditch which flows northeasterly to the main East Branch channel.

g. The City of Bradenton Comprehensive Plan, prepared by the city of Bradenton, adopted July 26, 1989, by the City Council of Bradenton, Florida, and amended by Ordinance 2457 on April 10, 1991. The Plan is designed to be a useful growth management and decision-making tool in areas such as: future land use, public facility expansion and improvement, transportation, natural resources, solid waste, water and wastewater management, and parks and recreation development. Some of the recommendations for the study area include: the pursuance of grant funding for the dredging of Wares Creek, strict enforcement of the flood ordinance for all development within the Wares Creek flood zone, regulation of stormwater runoff from new development, preservation of natural, vegetated shorelines, reduction of pollutant loads reaching waterways from urban stormwater, protection and enhancement of wildlife habitat and vegetation, preservation of wetlands, prevention of flood damage and improvement of surface water quality.

Existing Water Resources Projects

There are currently no Federal water resource projects in the study area and there are no other Federal water resource projects planned for the immediate study area.

STUDY PARTICIPANTS AND COORDINATION

The Jacksonville District, U.S. Army Corps of Engineers, had primary responsibility for coordinating, planning, and organizing this study to produce the report. The Corps also maintained close alliance with the local sponsor, Manatee County, throughout the planning process. When applicable, the Corps also coordinated with the city of Bradenton.

EXISTING CONDITIONS

The following chapter contains a description of the existing conditions and the most probable future conditions without a flood control project for the drainage basin.

GENERAL DESCRIPTION

The study area is the Cedar Hammock (Wares Creek) Drainage Canal located in Bradenton and unincorporated Manatee County on the southwest coast of peninsular Florida as shown on Figure 1. Manatee County occupies approximately 785 square miles; bordered on the north by Hillsborough and Pinellas Counties, on the east by Hardee and De Soto counties, on the south by Sarasota County and on the west by the Gulf of Mexico. Bradenton, located in western Manatee County, is the county seat and largest city.

Bradenton is a rapidly growing community of approximately 40,000 people and is located on the southern bank of the Manatee River, south of Tampa Bay on Florida's Gulf Coast. Bradenton encompasses approximately 13 square miles and represents 21 percent of the County's population. The present city boundaries extend from Perico Island in Palma Sola Bay on the west to about one mile beyond the Braden River on the east, and by the Manatee River on the north. A chain of low islands (Anna Maria Key and part of Longboat Key) form a barrier to the mainland. The southern boundary is highly irregular. Much of the land surrounding the City is urbanized, though unincorporated.

WATERSHED CHARACTERISTICS

The Cedar Hammock watershed, as shown in Figure 2, is made up of three interconnected branches; 1) the East Branch which drains in a northerly direction through unincorporated Manatee County and into the city of Bradenton (where the name changes to Wares Creek) and into Manatee River, which empties into the lower end of Tampa Bay; 2) the West Branch, which drains southerly towards Sarasota Bay from Cortez Road (44th Avenue West) and westerly into Palma Sola Bay from north of Cortez Road; and 3) the South Branch, also known as Bayshore Canal, which drains southerly into Sarasota Bay. The confluence of the three branches is located near 20th Street West and Oneco Road (53rd Avenue West).

The limits of the three basins are set by the high points (ridge lines) in the bottom of the interconnected canal system. For instance, a northeasterly flow via the West Branch of the Canal to Palma Sola Bay is essentially prevented by a high point in the bottom of the West Branch at Cortez Road. However, if a major rainfall

occurred on only one of the basins, runoff from this single basin could conceivably flow out of all of the three outlet canals.

The primary focus of this investigation is centered on the East Branch of the Cedar Hammock. The East Branch (Wares Creek) basin covers a 6.23 square mile area. The Wares Creek portion extends upstream from the Manatee River to 26th Avenue West. The Cedar Hammock portion extends from the 26th Avenue West bridge upstream to the confluence of the three branches.

Wares Creek

Wares Creek is the major outlet for discharge from the basin. The confluence of the creek with the Manatee River is estimated to be approximately 200 feet north of Manatee Avenue at the point where the surface and subsurface movements of waters over the normal tidal range appear to be wholly determined by the stage of the river. The mean tide level for the Manatee River at Bradenton is 1.2 feet NGVD[1] with a diurnal range of 2.3 feet.

Wares Creek is a high-banked meandering stream that drains the central portion of the city of Bradenton. The improved natural watercourse extends approximately 8,000 feet from the confluence with Manatee River to the city limits of Bradenton, near 26th Avenue West. The channel width in the Wares Creek reach ranges from about 290 feet near the Manatee Avenue bridge to 30 to 40 feet at the city limits near 26th Avenue West. Channel depth over the same distance varies from 5 to 10 feet.

Cedar Hammock

The East Branch of the Cedar Hammock is essentially a man-made, trapezoidal shaped channel with two principal tributaries; a west branch and east branch tributary as shown in Figure 3. The west branch tributary collects runoff from the western part of the basin and conveys it southeasterly to the main drainage channel. Runoff from the western portion of the basin makes an approximate 360 degree movement via this west branch and main channel before exiting into Wares Creek. The east branch tributary collects runoff from the southeastern portion of the east branch basin and conveys it northwesterly to the main drainage channel. Near the intersection of Cortez Road and U.S. Highway 41, the Cedar Hammock runs underneath the Cortez Plaza shopping center through a double box culvert.

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[1] All elevations in this report refer to the National Geodetic Vertical Datum of 1929 (NGVD) unless otherwise noted.

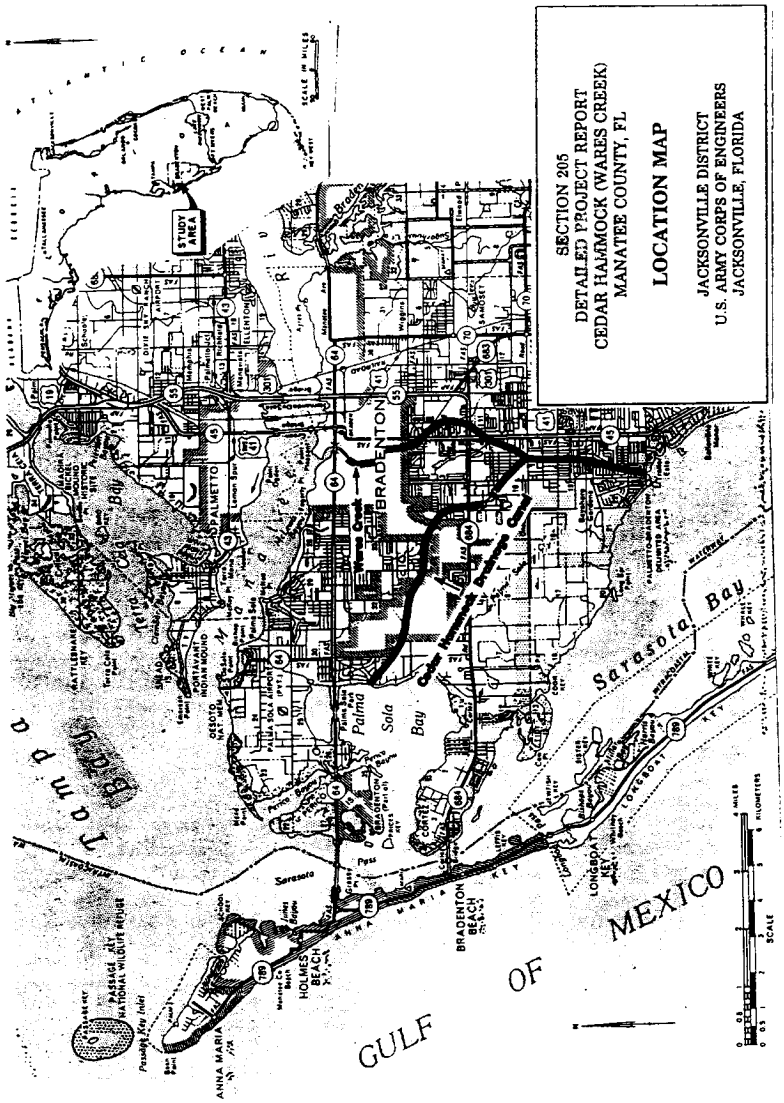

SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
LOCATION MAP
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA
STUDY AREA
BRADENTON
PALMETTO
Palma Sola Bay
Sarasota Bay
GULF OF MEXICO
ANNA MARIA
HOLMES BEACH
BRADENTON BEACH
LONGBOAT KEY
PASSAGE KEY NATIONAL WILDLIFE REFUGE
SCALE

FIGURE 1

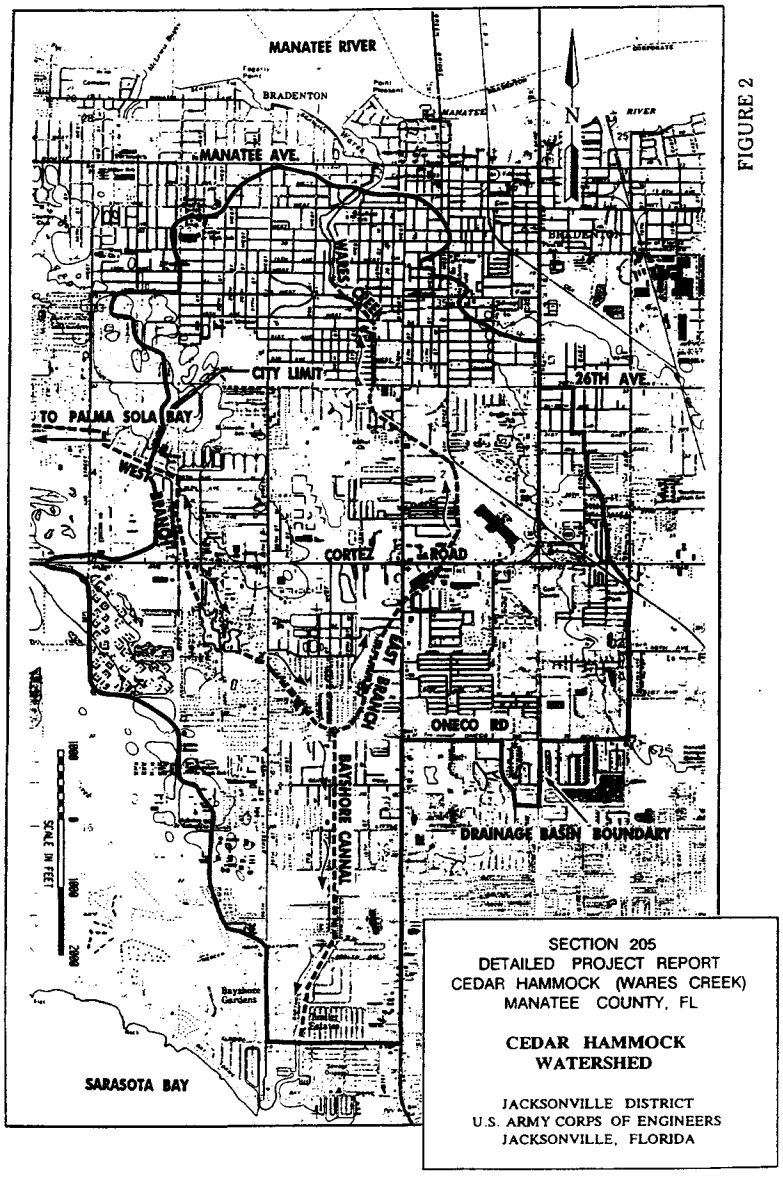

MANATEE RIVER
BRADENTON
MANATEE AVE.
CITY LIMIT
26TH AVE.
TO PALMA SOLA BAY
CORTEZ
ONECO RD
DRAINAGE BASIN BOUNDARY
SARASOTA BAY
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
CEDAR HAMMOCK
WATERSHED
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 2

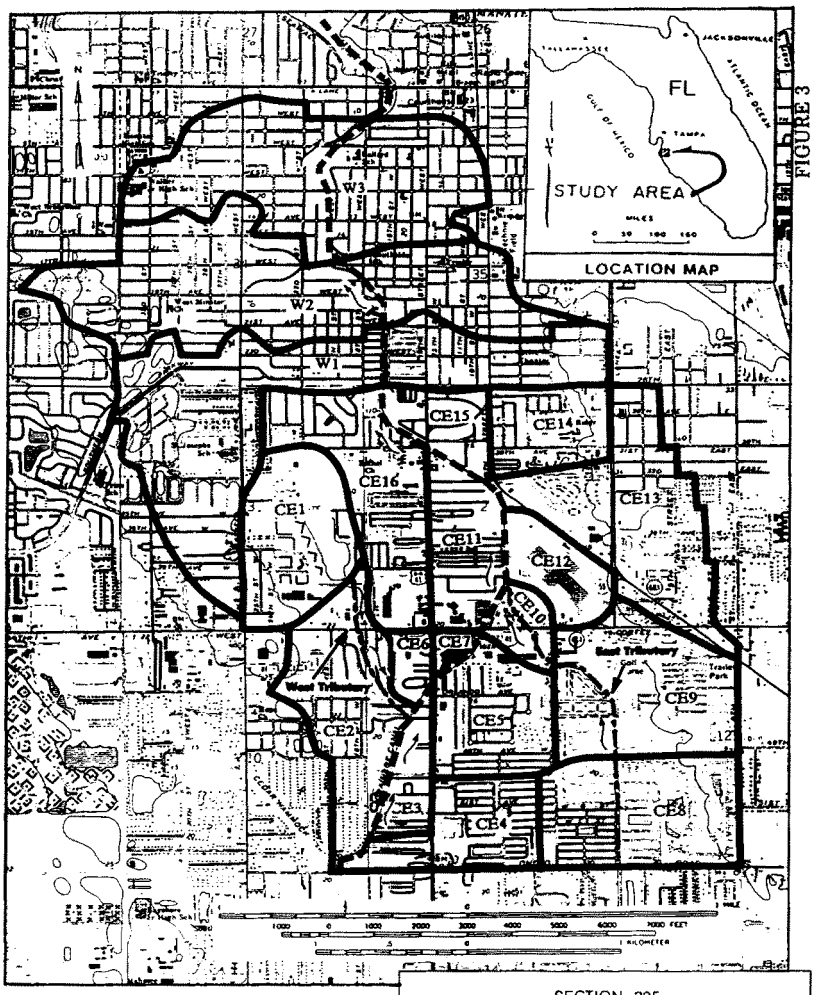


FIGURE 3

SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL

WARES CREEK AND CEDAR HAMMOCK EAST BRANCH SUBBASINS

JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

PHYSIOGRAPHY

Manatee County has gently sloping terrain with relatively flat floodplains. The elevations in Manatee County are varied. The elevations range from sea level along the Gulf Coast to 150 feet in the northeastern end of the county. Also, shallow ponds are intermittently placed throughout the county.

The physical characteristics of the contributory area to the East Branch of Cedar Hammock are quite variable. The western half of the basin which contains the main channel and to its western tributary is quite flat, essentially at an elevation of 20 feet. However, the eastern one-half of the basin is quite steep and slopes in a westerly direction from approximately elevation 40 feet at its eastern boundary to elevation 20 feet at the basin center line; a distance of approximately 1,500 feet, or a slope of over one percent. Elevations of the nearly level to gradually sloping terrain range from near sea level at the mouth of Wares Creek to approximately 35 feet in the southeastern portion of the basin.

GEOLOGY AND SOILS

Soils are sandy and underlain with limestone and the area is considered a very low to no recharge area. Approximately 90 percent of the soil in Manatee County consists of level, somewhat poorly drained sandy soils with organic pan.

CLIMATE

The study area is located in the subtropical climatic zone, which is characterized by mild, dry winters and warm, wet summers. Freezing temperatures are seldom experienced. In the city of Bradenton, the average annual temperature is 72 degrees Fahrenheit and average annual precipitation is approximately 54 inches. Sixty-two percent of the total rainfall occurs during the summer months of June through September. The hurricane risk for the study area is the greatest in June and October, although technically the hurricane season is defined from June 1 through November 30.

NATURAL FORCES

Manatee County is subjected to hurricanes and heavy rainfalls from tropical storms. The two forces coupled together cause extreme flooding in the study area. Manatee County is located on the Gulf Coast and is subjected to tidal surges caused by storms and hurricanes. The wave actions and the winds cause flooding in the low islands and erosion of the coastal areas.

DEVELOPMENT AND ECONOMY

The State of Florida began a period of rapid population growth at World War II. Florida's population increased from 2.8 million to 12.9 million between 1950 and 1990 as shown in Table 1. This growth is attributable primarily to the in-migration of people attracted by the coastal location and subtropical climate. Also during this period, Florida's share of the total United States population increased steadily from 1.8 percent in 1950 to nearly 5.2 percent in 1990. Florida's population is projected to represent over 6% of the nation's population by the year 2035.

TABLE 1

POPULATION IN FLORIDA
[in thousands]

Year	Florida	Percent Change	Percent of U.S. Total
1950	2,771.3	-	1.8
1960	4,951.6	78.7	2.7
1970	6,79 4	37.2	3.3
1980	9,747.0	43.5	4.3
1985	11,287.9	15.8	4.9
1990	12,937.9	14.6	5.2

Source: U.S. Bureau of Census

Over one-quarter of the residents have moved to Florida since 1975. The greatest percentage jump in population came in the 1920's when 4,261 new residents raised the population 86%, from 4,944 to 9,205. The greatest number of people to come to Bradenton during any one decade was 13,609 in the 1980's.

Close proximity to water has always been one of the County's greatest assets. There are approximately 150 miles of land fronting water in the County, including more than fourteen miles of Gulf-front beaches. Other natural advantages include a superb climate, an abundance of land, and soil suitable for agriculture. These factors have allowed Manatee County to maintain a steady economic growth rate through the years. Table 2 shows the historical and projected population of Manatee County. Twenty-one percent of the County's population resides in the city of Bradenton. The historical and projected population of Bradenton is shown in Table 3. The city of Bradenton had a rapid population growth between 1980 and 1990. The population was 30,170 in 1980 and 43,779 in 1990 which represents a 45.1% increase. The

County experienced a growth rate of 42.6 percent over the same time period, increasing from 148,442 to 211,707.

TABLE 2
HISTORICAL AND PROJECTED POPULATION
MANATEE COUNTY

Year	Population
1960	69,200
1970	97,115
1980	148,442
1990	211,707
1995*	217,902
2000*	235,823
2005*	251,407
2015*	283,971
2035*	333,221

*Projected

TABLE 3
HISTORICAL AND PROJECTED POPULATION
CITY OF BRADENTON

Year	Population
1960	19,380
1970	21,040
1980	30,170
1990	43,779
1995*	44,200
2000*	46,900
2010*	52,100

*Projected

The newest settlers of Manatee County are persons 65 or older who find Manatee County a desirable place to relocate. The 1990 census count revealed approximately 28.2 percent of the County's population to be 65 or older; approximately

20.4 percent of the County's population was 45 to 64 years old. Projections indicate that the 65 or older and 45 to 64 years of age are expected to increase to 28.4 percent and 23.8 percent, respectively, in 2000.

These new residents made an impact on the type and pattern of housing, recreation facilities and social services. Many of the developments planned for the next decade are geared towards the retirement community. It is expected that the retirees will continue to be a large market in the coming years.

Employment

The Southwest Region of Florida has diverse employment opportunities which range from manufacturing to tourism. This region is transitioning from being dependent on agriculture and mining to centering attention on tourism and retirees. The agricultural industry's distribution is projected to decrease from 5.7% in 1970 to 3.8% in 2035. However, the agricultural industry is predicted to remain as a mainstay for Manatee County because the soil is conducive to agricultural development. The southwest region has shown a steady increase in the wholesale and services sector. The service industry will remain the largest source of employment for the County in the future.

Housing

Mobile home developments were and still are very prevalent in Manatee County, providing housing primarily for retired individuals. Most mobile home developments include their own recreational facilities, making those developments self-contained communities within the larger community of Manatee County. Condominium apartment complexes are also popular choices of retirees. However, those developments generally include a more diverse mix of residents in terms of age composition.

In 1980, 53 percent of the housing units in Manatee County were single-family units, 25 percent were multi-family, and 22 percent mobile home units. The historical trend has been a decline in the percentage of single-family type housing units, as multi-family units have taken a larger share of the total. Building permit activity in the 1980's indicated a continuing pattern of significant multi-family housing construction in Manatee County. The city of Bradenton had a 46 percent increase in housing units between 1980 and 1990. Bradenton also shifted towards multi-family units. The proportion of multi-family units increased from 25 to 40 percent of the total and single-family dropped from 68 to 54 percent.

EXISTING LAND USE CONDITIONS

The predominant land use in the study area is residential; single-family housing, multi-family housing, condominiums and manufactured housing (mobile homes). Other land use includes retail trade, commercial, manufacturing, recreational and institutional. The highly impervious commercial areas are responsible for contributing a large quantity of runoff into the system. Most commercial development is concentrated along U.S. Highways 41 and 301. Agricultural areas front the basin along the west, south and east boundaries.

CULTURAL RESOURCES

Initial coordination with the Florida Division of Historical Resources indicated that no known archeological or historic properties were recorded in the project area. In letters dated January 19, 1989, and March 28, 1989, the Florida State Historic Preservation Officer recommended that a cultural resources survey be completed to locate and assess the significance of historic properties that could be affected by the proposed project.

A cultural resources survey was conducted by historic preservation staff of the U.S. Army Corps of Engineers on 9-10 March 1992. The survey included archival research and a surface and subsurface inspection of the project area, including alternatives that would affect bridges and residences. At the Manatee County Historical Library, investigators examined ca. 1851 military maps of the project area, 1915 Sanborn Insurance Maps, and a series of aerial photos from 1940, 1951, and 1969. During the inspection of the project area investigators examined potentially significant historic features that were identified from the maps and aerial photos, examined exposed ground surfaces and excavated judgmentally-placed shovel tests searching for intact archeological deposits.

Three bridges crossing Wares Creek at 7th, 9th, and 12th Avenues West (see Photos 1 and 2) and several residential structures north of 30th Avenue West may be historically significant and eligible for inclusion on the National Register of Historic Places. No potentially significant architectural features were identified south of 30th Avenue West, and no significant archeological sites were located within any part of the project area. The three bridges at 7th, 9th, and 12th Avenues and the residential structures north of 30th Avenue West will not be affected by the proposed action.

Based on the results of the survey, the U.S. Army Corps of Engineers determined that this proposed project would have no effect on properties listed on or eligible for listing on the National Register of Historic Places. In a letter from the Florida State Historic Preservation Officer (SHPO) dated October 10, 1991, and in subsequent telephone conversations in April 1992, SHPO concurred with this

determination. If, during construction, it is determined that previously undiscovered historic properties will be adversely affected by the project, a mitigation plan will be developed, in consultation with the SHPO, and completed.

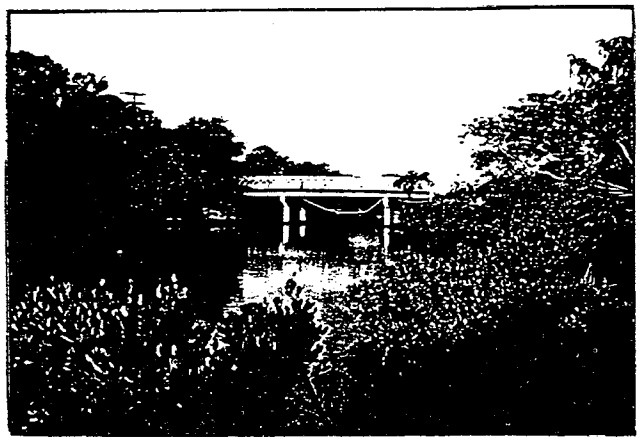


Photo 1. Seventh Avenue Bridge

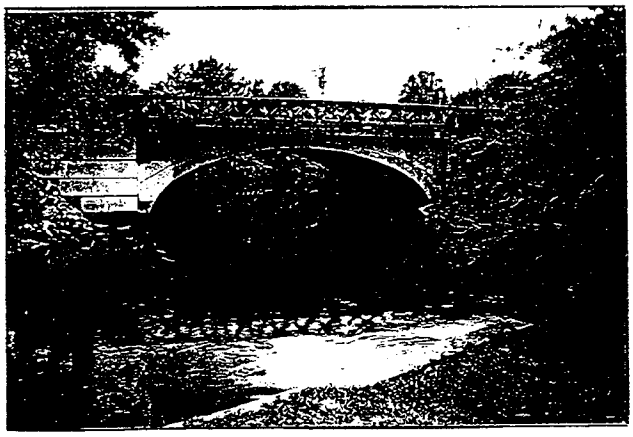


Photo 2. Ninth Avenue Bridge

BIOLOGICAL RESOURCES

Birds are the most notable wildlife resource in the study area. All common species of waders probably visit the stream; white ibis and little blue heron were observed feeding along the stream during biologists' site visits. The State Species of Special Concern (SSC) tricolored heron and snowy and reddish egrets, may sporadically visit the stream and feed on its fish and invertebrate fauna, but no adequate reproductive habitat occurs within the study reach, due to the dense urban surroundings and the inevitable presence of feral and domestic animal predators. A shoal just south of the Manatee Avenue bridge supports a young mixed stand of black and white mangroves. These shrubby trees were frozen to ground level in December, 1989, but have recovered by vigorous sprouting in subsequent years. This small island is a significant refuge and possibly a night roost for wading birds, including tricolored, great and little blue herons. Its isolation in the middle of the stream makes it inaccessible to some urban predators, most notably domestic cats, while the waders find abundant food resources in the small fish and invertebrates that inhabit the stream.

Except in the estuarine reach (downstream of the 9th Avenue bridge), the stream is too shallow and narrow, and its water levels fluctuate too abruptly in response to rainfall-generated runoff, to support a great diversity of aquatic life. The Planning Aid Report (PAR) prepared by FWS lists mosquito fish, soft shelled turtles and other turtles as dominant faunal elements. Other freshwater fauna include diving beetles, insect larvae and small snails. The estuary supports small or juvenile individuals of mullet, needlefish, sand perch, sheepshead and killifish, and may provide some limited developmental habitat for juveniles of other estuarine fish. The fish fauna is essentially washed out of the watershed into the Manatee River during major flood events, re-establishing itself during intervening normal flow periods. The shoreline in the estuarine discharge areas is developed and bulkheaded, which greatly lowers the wading bird and other wildlife usage of the area. Dredge and fill activities have occurred in the estuarine area destroying the original mangrove shorelines.

The only wetlands in the study area are those provided by the artificially created drainage system. Some portions of the channel are overgrown with bushes, vines, and trees, but very few areas of viable littoral zone and wetland vegetation remain. The character of Wares Creek has been significantly altered as a result of extensive and continued urbanization of the basin. These alterations in the natural waterway have drastically limited the biotic habitat and water quality within the channel.

Threatened or Endangered Species

In response to early scoping for environmental issues, the State of Florida Game and Freshwater Fish Commission (FGFWFC) and Department of Natural

Resources (DNR, now part of DEP) identified the following Endangered (E), Threatened (T) or State Species of Special Concern (SSC) as potentially present in the project area: West Indian Manatee (E), wood stork (E), bald eagle (T), southeastern American kestrel (T), eastern indigo snake (T), Sherman's fox squirrel (SSC), American oystercatcher (SSC), snowy egret (SSC), tricolored heron (SSC), reddish egret (SSC), brown pelican (SSC), gopher tortoise (SSC), American alligator (SSC) and common snook (SSC).

Field visits and studies performed during the feasibility phase by the FWS under the Fish and Wildlife Coordination Act (Coordination Act Report) did not find habitat suitable for most of these species in the study reach. Manatee habitat does exist at the mouth of Wares creek with the Manatee River, where deeper water is available; however, the study reach is too shallow to provide habitat for manatee, mature snook, or mature alligators.

In addition to the above species, the FWS and FGFWFC identified the Florida Scrub Jay (E) as potentially present in the undeveloped brush surrounding the proposed upstream detention area along the west tributary to the East Branch of the Cedar Hammock. However, during the feasibility study, it was decided to eliminate the enlargement of the existing detention area as it would not provide flood reduction benefits or water quality enhancement.

Water Quality

Stream velocities in the Cedar Hammock (Wares Creek) are generally moderate with the highest velocities found under the undersized bridges. Velocities in the vicinity of the mouth are quite low. Sediment movement in the creek is controlled by the moderate velocities between the bridges and movement out of the creek is controlled by the low velocities in the vicinity of the mouth.

Hazardous and Toxic Wastes

A preliminary assessment was conducted in March 1994 to address the existence or potential for occurrence of HTW contamination on lands, including structures and submerged lands, in the Cedar Hammock (Wares Creek) study area. The assessment included a project review, site literature/document review, and site reconnaissance. The following potential indicators were looked for: landfills, dumps, disposal areas; burning or burned areas; aboveground or underground tanks; vats, lagoons, ponds or basin sludge pits; excavations (pits, quarries or borrow areas); containers of unidentified substances; spills, seepage, slicks; odors; dead or stressed vegetation (brown, spotted curled or withered leaves); water treatment plants; wells, ditches, trenches, depressions; transport areas (i.e., boat yards, harbors, rail yards, airports, truck terminals); or abandoned buildings. The preliminary assessment report found no indicators of toxic or radiologic waste.

Air Quality and Noise

In general, air quality in the Bradenton area and the rest of Manatee County is good. There are no non-attainment areas within the County. The largest industrial emitters in the County are a large power plant, a phosphate mining operation and a citrus processing plant, all located in the eastern part of the County at a considerable distance from the study reach..

AESTHETIC RESOURCES

Consideration of aesthetic resources within the project study area is required by the National Environmental Policy Act of 1969 (NEPA), as amended and Engineering Regulation ER 1105-2-100. Aesthetic resources are defined as "those natural and cultural features of the environment that elicit a pleasurable response" in the observer, most notably from the predominantly visual sense. Consequently, "aesthetic resources are commonly referred to as visual resources, ... features which can potentially be seen."

The existing aesthetic resources within the project study area are considered to contribute important visual relief to the immediate surroundings and neighborhood character throughout the proposed project. Visual aesthetics of the area surrounding the stream are typical of older single-family residential and small-scale commercial neighborhoods, with rather closely spaced houses, mature landscape trees, many small residential neighborhoods and relatively large expanses of concrete and asphalt in relation to green spaces.

Community aesthetics are greatly urbanized throughout the area with the general exception being the banks of Wares Creek. Somewhat "natural" creek settings are immediately visible from bridges which cross the creek at 9th, 12th, and 14th Avenues West. The creek is almost completely covered by mature tree canopies from 14th to 21st Avenue West which provides a relaxing and cooling experience. From 21st to 23rd Avenues West, the project study area possesses aesthetic value because of the mature native trees on maintained grassed banks. These trees provide the dense residential development with a visual and auditory screen, color, and cooling relief from the otherwise flat, hot urbanized area. Upstream of the fire station bridge a row of mature shade trees screen a residential development from U.S. Highway 41. Channel areas to the south possess spotted mature tree areas with lower aesthetic value due to washed out banks, unmowed wild native perennial grasses, crossbracing, and dense commercial development along U.S. Highway 301.

FUTURE "WITHOUT PROJECT" CONDITIONS

Future "without project" conditions are those projected to occur in the absence of Federal action.

The Future Land Use Plan for Manatee County was adopted in 1989. Under the 20-year plan, there is no proposed significant change in land use classification anticipated in the study area. The Land Use Plan identifies the areas currently occupied by manufactured housing as Residential Class 9. This classification allows for the replacement of old manufactured housing units within the same area, with the maximum of nine manufactured housing units per acre. Old residential structures are expected to be replaced with new residential structures of similar type under current County Codes and Standards. This classification can include small retail outlets, short term agriculture, limited recreational structures and water related activities. There are no plans to phase out manufactured housing parks.

Future land use is expected to remain generally as it exists at present. With the area totally developed, and no changes anticipated in future land use, runoff associated from flooding can be expected to remain too large for the existing channel to handle. Therefore, if no flood control project is implemented, the possibility for recurring damages increases. Continued erosion of the non-bulkheaded portions of the existing channel is expected. Due to the swiftly moving water and unpredictability that accompanies flood events, there is also the danger of possible loss of life.

PROBLEM IDENTIFICATION

The following chapter discusses the problems and needs of the study area as they relate to flood control.

PROBLEMS, NEEDS AND OPPORTUNITIES

Factors Contributing to Flooding

Tidal surges from the Gulf of Mexico, caused by hurricanes and tropical storms, are the primary cause of flooding in Manatee County. The Manatee River is a broad estuary, and, under certain conditions, tides generated at its mouth can intrude far upstream. The flatness of the terrain magnifies the storm effects, resulting in surface flooding during heavy rainfall. Backwater conditions within Wares Creek, caused by tidal surge from the Manatee River, contribute to increased surface flooding by inhibiting stormwater drainage within the channel. Rainfall, which usually accompanies hurricanes, can aggravate the tidal flood situation, particularly in areas where the secondary drainage system is poorly developed.

The Cedar Hammock (Wares Creek) drainage basin is located in a highly developed urban area. Extensive development within the floodplain has resulted in reduced channel capacity during flood conditions. It is not uncommon for structures to be located within thirty feet of the bank. These structures experience extensive flood damage during major storms. This problem is particularly severe in the lower reaches where no additional land is available for channel modification without structure relocation. The additional acreage of impervious surface created by continued urbanization has generated an increase in both the peak rate and volume of runoff being discharged to the channel.

Extensive and continued urbanization of the basin has resulted in significant alteration of the floodplain and the surrounding environment. A number of seawalls have been constructed in segments along both sides of the lower channel from the Manatee River upstream to 9th Avenue West. In many areas, the channel is concrete-lined, abutting existing developed properties, and there are virtually no undeveloped areas in the floodplain. Sections that are not bulkheaded are subject to erosion. The system is subject to rapid fluctuations of water levels because of the impervious nature of the surrounding watershed. Such dynamic urban runoff results in further erosion of those sections not bulkheaded.

Bridges and pedestrian crosswalks constructed across the channel are also contributing to constriction of flow. Nine bridges cross the channel within the city limits, seven of which have inadequate span or elevation to properly accommodate

discharges from a 10-year storm. An additional seven bridges or crosswalks in the County portion of the study area. Another problem experienced in this drainage basin is the limited storage capacity.

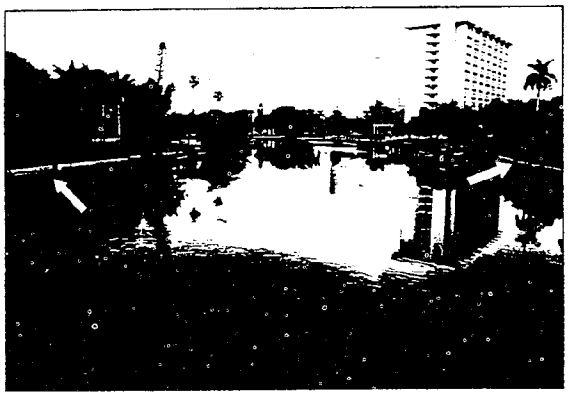


Photo 3. Looking north from Manatee Avenue Bridge



Photo 4. Erosion along bank at 18th Avenue West Bridge



Photo 5. Bridge at 18th Avenue West looking south under normal conditions

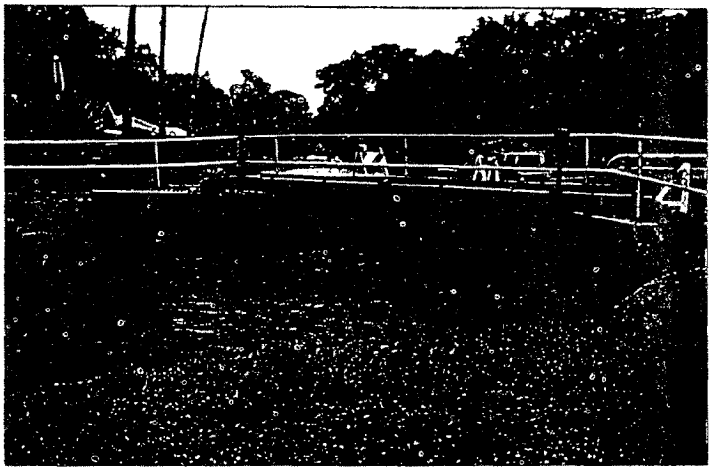


Photo 6. Bridge at 18th Avenue West looking south during June 1992 storm

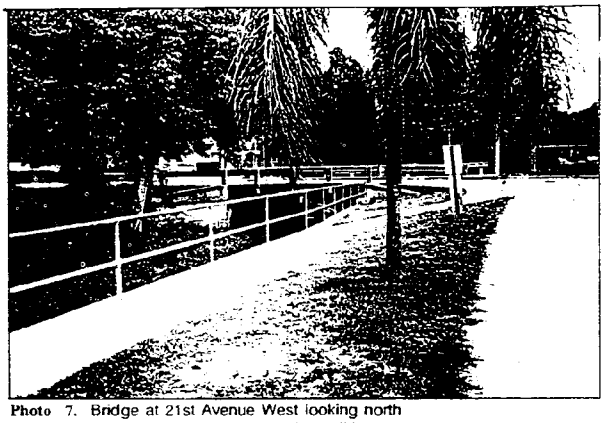


Photo 7. Bridge at 21st Avenue West looking north under normal conditions

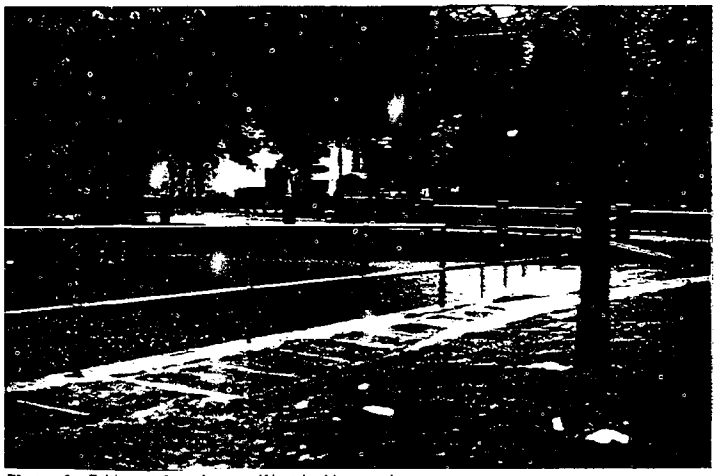


Photo 8. Bridge at 21st Avenue West looking north during June 1992 storm

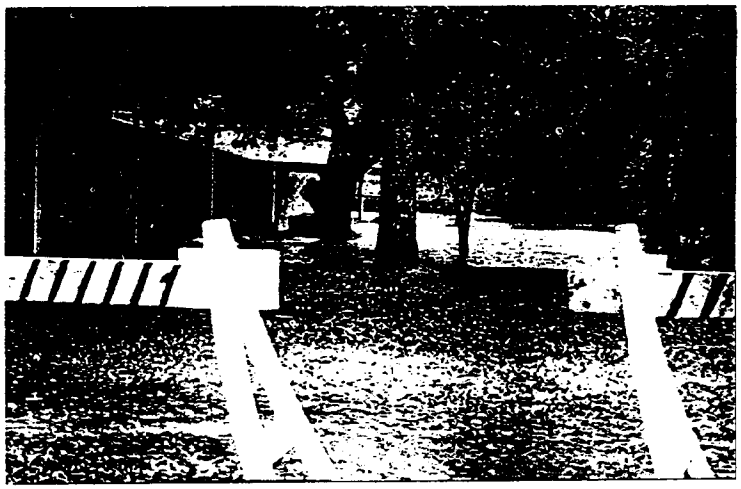


Photo 9. 20th Street West looking north

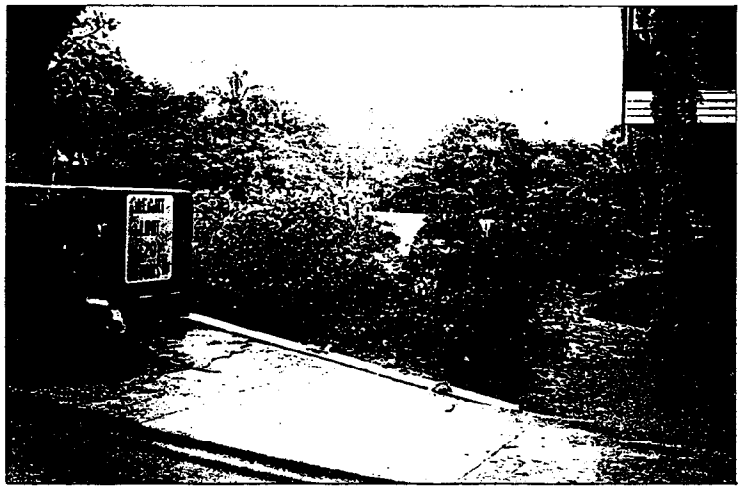


Photo 10. Bridge at 12th Avenue West looking south



Photo 11. Looking west from Bus. 41 and 30th Avenue West under normal conditions

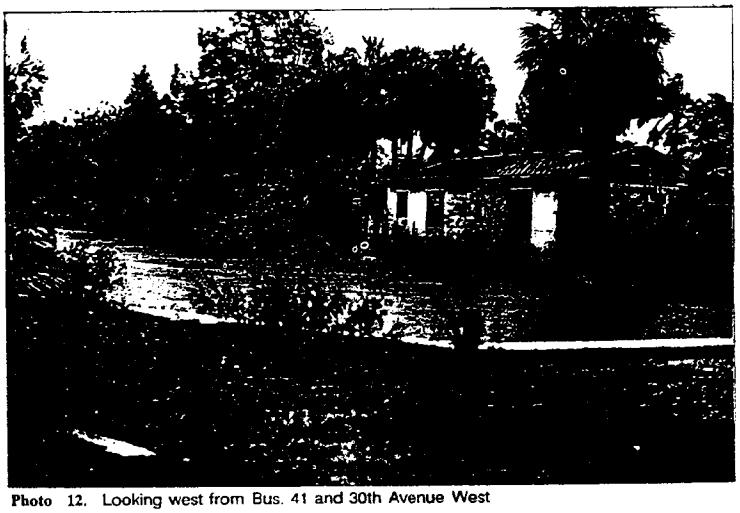


Photo 12. Looking west from Bus. 41 and 30th Avenue West during June 1992 storm



Photo 13. 16th Court West in Bradenton trailer park under normal conditions



Photo 14. 16th Court West in Bradenton trailer park during June 1992 storm

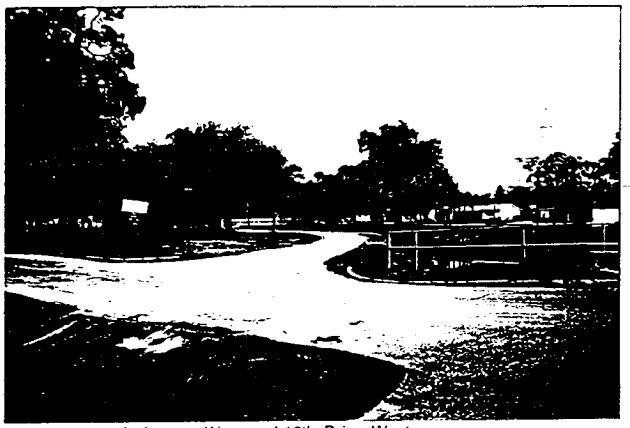


Photo 15. 18th Avenue West and 18th Drive West under normal conditions

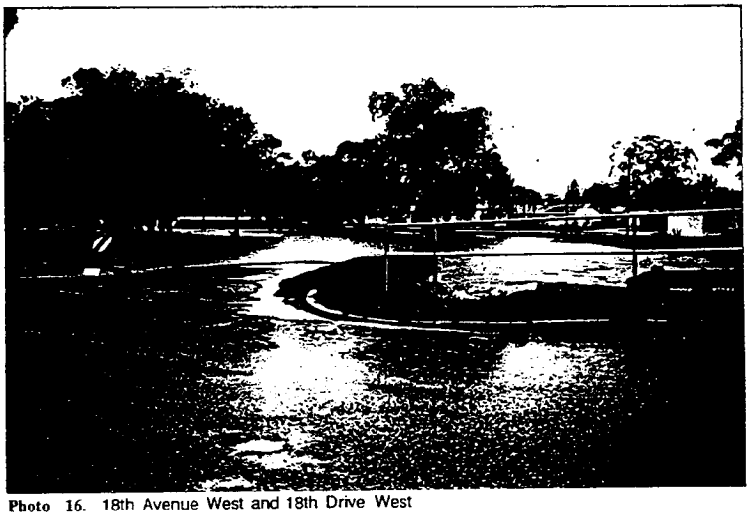


Photo 16. 18th Avenue West and 18th Drive West during June 1992 storm

Historical Flood Conditions

Over the last century, a number of storms have produced major floods with significant damage. Descriptions of these significant tropical storms provide historic information to which riverine and tidal flood hazards and the projected flood depths can be compared.

October 21-31, 1921

The storm, which began in the Caribbean Sea, entered Florida north of Tarpon Springs. The slow forward movement of the storm prolonged the flooding conditions. High tides in Manatee River caused flooding of low-lying areas, property damage, and agricultural losses. The tides covered Anna Maria Key, and water was four to five feet deep. Cortez, a small fishing village near Bradenton, was heavily affected by this storm, with many buildings completely destroyed. This storm caused substantial damage and agricultural losses in Manatee County.

September 11-22, 1926

One of the most destructive storms of this century occurred from September 11 through 22, 1926. The storm originated in the Atlantic Ocean near the Cape Verde Islands and approached the coast of Florida on September 17. The wave action from the storm caused severe erosion problems along Manatee County's coastline, and the city of Bradenton received heavy flooding. Damages from flooding in Bradenton were estimated in 1926 to be $1 million.

September 1, 1950

Hurricane Easy originated over the Caribbean Sea and moved parallel to the Florida coastline. On September 1, 1950, the hurricane struck the western coast of Florida. Tides were estimated to have reached an elevation between six and eight feet NGVD along the central gulf coast. Bradenton experienced tides between three and five feet above normal. Much of Anna Maria Island was flooded. The shoreline receded 15 to 20 feet in some areas, and the beach road on the island was cut through in several places. This increase in tidal elevation reduced the drainage capacity of the channel and surface flooding was intensified throughout the city. Flooding effects from this small hurricane lasted one week.

September 10-11, 1960

Hurricane Donna generated storm tides which caused substantial damage to the coastal areas of Manatee County. This storm was considered the most destructive of all time, in terms of damage to the State of Florida, until Hurricane Andrew. Although precipitation averaged only five to seven inches, ten inches of antecedent

rainfall over the preceding three weeks reduced soil infiltration rates, resulting in severe surface flooding. Storm tides were one to three feet above normal at Bradenton. The heavy rainfall coupled with the rainfall from the hurricane caused considerable flooding in Manatee County.

June 19, 1972

In June 1972, Hurricane Agnes passed 150 miles west of Florida producing a high, damaging tidal surge. Tides were three to six feet above normal in Manatee County. Erosion from wave action and tidal damage to homes, seawalls, revetments, and roads were prevalent in the Bradenton area. Surface flooding was experienced throughout the city. The estimated damages to Manatee County were $2 million.

September 5-7, 1988

Manatee County experienced a major flood in September 1988. Between September 5 and September 7, 1988, 14.75 inches of rain fell. This total, preceded by several weeks of rain over the county (13.8 inches in a 30-day period) created a rainfall/runoff event estimated as a 10 percent chance event. In the 48-hour period from Monday, September 5th to Wednesday, September 7th, the county received the equivalent of 25 percent of the average rainfall for the entire year. Excessive high tides and rain squall winds threatened the gulf coastline. On the afternoon of September 6th, DNR declared a shoreline emergency for Manatee County and other gulf coastal counties. One thousand Manatee County residents were evacuated.

Many roads were closed for a period of one day, including many of the hurricane evacuation routes from the coast. During this heavy rainstorm event, Tropical Storm Florence was brewing in the Gulf of Mexico. Fortunately, Florence turned away from the Manatee County area so that evacuation of the coastal residents was not mandated.

There are approximately eighty bridges under Manatee County jurisdiction, and 35 of these structures are located within the Cedar Hammock (Wares Creek) drainage basin. Thirty-seven of the eighty bridges are known to have had water levels above or close to the bridge deck surface. The threatened bridges have an assessed value of $4.3 million for the structural portion alone.

The Cedar Hammock Fire Station, located on the western side of the Cedar Hammock channel near De Soto Square Mall, also received flood damage. Seven to eight inches of water stood inside the fire station. They were unable to get the fire trucks out of the building, so a staging area was set up nearby. The underground fuel tank received extensive damage and had to be removed. The firemen reported considerable damage to the area at 11th Street south of 30th Avenue. Residents were

evacuated by the fire department since two to three feet of flood waters were present in the area.

Flood waters came within an inch or so of entering the DeSoto Square Mall, a 680,000-square-foot regional shopping mall located at the corner of Cortez Road (44th Avenue West) and U.S. Highway 41. The parking area around the mall was completely inundated, with up to three feet of water in some areas. Car dealerships located in the vicinity of the mall were also adversely impacted by this storm event; sustaining flood damages to autos which they were unable to move from their parking lots.

Several businesses located along U.S. 41, south of Cortez Road (44th Avenue West), reported flood depths of between 1 to 2.5 feet inside the buildings. Many of these businesses lost one to two days of revenue due to clean-up efforts.

Many homes and businesses were flooded during this period. The photo on the cover and photo 19 show some of the heavily flooded areas. One residential dwelling located on 14th Avenue West, which abuts the Cedar Hammock drainage canal, reported three feet of standing water. A condominium unit located on 1st Street West, adjacent to a tributary of Cedar Hammock, also reported flood damages.



The west leg of the Cedar Hammock drain, at the Palma Sola Yacht Basin, suffered erosion problems. A seawall failure was reported on one bank of the drain across from the yacht basin. Erosion of the drain was also a problem near the American Legion Post located on 75th Street West, just north of 22nd Avenue West.

The Manatee County Public Works Department assessed the county's damages from the storm and heavy rainfall. The summary of these damages are shown in Table 4. The damage was due to rainfall only, winds and tidal effects did not occur in the study area.

TABLE 4

DAMAGES COMPILED BY MANATEE COUNTY PUBLIC WORKS DEPARTMENT OF SEPTEMBER 1988 STORM

DAMAGES	ESTIMATED VALUES
TO COUNTY MAINTAINED ROADS	$12,000,000 - 24,000,000
FROM SILTATION & NAVIGABLE CHANNELS	$500,000
TO COUNTY WASTEWATER SYSTEM	$75,000

June 23-29, 1992

On June 23, 1992, portions of southwest Florida began to experience heavy rainfall as a southwesterly wind flow began moving across south and central Florida. On June 25, 1992, a weakly organized tropical depression formed near the southwest coast of Florida, reinforcing the thunderstorm activity and producing more rain. This system brought 35 mph winds and 20 inches of rain in the space of three days. As the tropical depression diminished, lingering storms continued to dump heavy rains on southwest Florida. Major riverine flooding caused extensive damage in Charlotte, DeSoto, Manatee and Sarasota Counties.

Between June 23 and June 29, a record setting rainfall occurred over west Central Florida. According to the National Weather Service the rainfall levels during this seven day period exceeded those expected in the 100-year storm event. Extensive damage was done to homes, businesses and public facilities. Damage to public facilities in Manatee County included roads, streets, bridges and water control facilities in the unincorporated portions of the county. Damages to the study area, specifically, are not available.

Average annual damages for the existing land use pattern in the study area are estimated to be $6,725,000. Total damages in the basin is $40,900 under the 2-year flood. Total damages increases to $22,253,800 under the 10-year flood and to $182,220,800 under the Standard Project Flood (SPF). Flood damages under existing conditions are shown in Table 5.

TABLE 5
WITHOUT PROJECT CONDITION
AVERAGE ANNUAL DAMAGES

TOTAL DAMAGES

Event	Wares Creek	Cedar Hammock	Total Study
SPF	$23,131,200	$160,089,600	$182,220,800
100	8,811,100	64,726,100	73,537,200
50	4,865,600	46,442,200	51,307,800
25	1,517,200	29,488,100	31,005,300
10	1,064,000	21,189,800	22,253,800
5	316,200	4,171,600	4,487,800
2	40,900	0	40,900
Average Annual Damages	$ 556,000	$ 6,169,660	$ 6,725,000

Flood damage reduction measures are needed to alleviate severe flooding in the Wares Creek Basin, and to reduce flood damages to public and private property, economic hardship, and hazards to public health and safety.

Improvements Desired

Because of the extensive urban development along the channel, the lack of available, undeveloped land within the floodplain, and the drastic channelization already imposed on the waterway, there are a limited number of feasible design alternatives which could alleviate the severe flooding experienced throughout the basin. Investigations have identified two design approaches by which flood damages within the basin could be reduced:

- Modification of the channel to improve its efficiency to discharge flood waters.

- Regulation of the rate and volume of runoff at its source prior to discharge into the channel, thereby reducing the demand on channel capacity.

The hydraulic efficiency of the channel must be improved to increase its effectiveness in discharging flood waters. A uniform bottom grade should be established along the channel. In addition, erosion and velocity control measures should be employed. Undersized bridges should be removed to eliminate channel constriction, and channel width in the upper reaches should be made more uniform to facilitate efficient flow. These channel modifications would reduce flood stages by improving channel conveyance.

In addition, regulation of the rate and volume of discharge into the channel could reduce the demand on channel capacity at peak times and improve the quality of runoff entering the channel. This could be accomplished by upland retention and/or detention facilities.

Given the nature and frequency of flooding which causes significant damage and is a threat to human life, there exists a definite need for measures to reduce the flooding or its effect on the area. There also exists a substantial opportunity to enhance the economic status, safety, and general well-being of the community through the reduction of flooding in the area.

PLAN FORMULATION

Plan formulation involves the establishment of goals and objectives, identification of planning constraints and management measures and the formulation and evaluation of alternative plans.

FEDERAL OBJECTIVE

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.

NATIONAL ECONOMIC DEVELOPMENT PLAN

The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies issued on December 28, 1990, (also called the "P&G") specify the rules to be followed by Federal agencies in planning water resources projects. The P&G requires that the "alternative plan with the greatest economic benefit consistent with protecting the Nation's environment (called the national economic development plan or NED plan) is to be selected unless the Secretary of a department or head of an independent agency grants an exception when there is an overriding reason for selecting another plan, based upon other Federal, State, local and international concerns."

The NED plan is selected from the array of alternatives under consideration, and is the plan that reasonably maximizes net national economic development benefits. These monetary benefits are calculated in accordance with the evaluation procedures for specific benefit categories included in the P&G. In most cases, an economic analysis of alternatives' monetary benefits is conducted using the P&G evaluation procedures; the results are then used to identify the NED plan.

PLANNING GOALS AND OBJECTIVES

In order to determine a potential solution to water resource related problems such as those described above, it is necessary to identify the objectives that any such solution should strive to attain. The study should endeavor to develop plans that enhance, or make positive contributions to the national economic development in a manner that is consistent with protection of the environment. For the Cedar

Hammock (Wares Creek) study area this can be refined to objectives which address the specific problems of the area, which include:

a. reduce hazard to life and property due to flooding in the study area;

b. reduce flood damages and other related costs in the Cedar Hammock (Wares Creek) drainage basin;

c. restore, enhance, and/or preserve environmental aspects of the area;

d. protect, preserve or minimize impacts on significant historical and cultural resources of the study area.

PLANNING CONSTRAINTS

While the above planning objectives describe the goals of the study, there are certain limitations which must be considered in evaluating any plan for possible implementation. The primary constraint that must be considered is the overall scope of the study. This investigation is being conducted under the Continuing Authority Program as provided in Section 205 of the 1948 Flood Control Act, as amended. As noted in the authorizing legislation, this program specifically addresses small projects for flood control. Basin-wide or regional studies are beyond the scope and intent of this program. Therefore, any study conducted under this program should be primarily for flood control and be of a more localized and limited nature. Based on this constraint, the study was directed primarily at flood control for the East Branch of the Cedar Hammock (Wares Creek) area. Study investigations were then conducted only to the level of detail necessary to define and quantify the flooding and related problems and identify the most appropriate plan for addressing these problems.

Additional constraints relate to various laws, Executive Orders (E.O.), directives, and regulations which govern the investigation of water resource problems. Of these, two Executive Orders; E.O. 11988 governing Floodplain Development and 11990 concerning conservation of wetlands areas, provide specific criteria which must be addressed by any proposed action. E.O. 11988 requires consideration of four specific criteria:

- Avoid development in the base floodplain (100-year) except where it is the only practical alternative.
- 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 value of the base floodplain.

POSSIBLE MEASURES

It is the policy of the U.S. Army Corps of Engineers to consider in the planning process all practicable and relevant alternatives applicable to sound floodplain management. No one alternative will be pre-judged superior to any other. Consideration is to be given to measures intended to modify flood behavior by reducing the frequency and duration of damaging overflow (structural measures) and those intended to modify damage susceptibility by altering the ways in which people would otherwise occupy and use floodplain lands and waters through corrective and preventive methods (nonstructural measures). The fundamental goal is to develop, define and recommend a solution that has public and institutional support.

To obtain the planning objectives, the U.S. Army Corps of Engineers formulated an array of alternatives during the planning process. Due to the limited funding of Section 205 studies, cost estimates were not performed for all measures. Some alternatives were eliminated based on engineering and economic judgment.

Nonstructural Measures

Nonstructural measures include flood warning, floodproofing, floodplain zoning and floodplain evacuation.

Flood Warning

Flood warning is used primarily to provide residents of flood-prone areas an opportunity to prepare for an impending flood. It is very useful to alert such residents of approaching storms that may generate flooding or on large watersheds, to warn of flood waters that are moving toward a particular area.

Floodproofing

Floodproofing can be used to modify existing floodplain development to make it more compatible with the flood hazard. Generally, this is accomplished by elevating existing structures above flood levels, providing ring levees, or dikes, or waterproofing a structure.

Floodplain Zoning

Floodplain zoning is a legal tool used to reduce the flood damage potential of future construction in the study area. This preventive measure can limit or prohibit

uses that conflict with the capacity of the floodway. Floodplain zoning has limited benefits for current residents in the study area.

Floodplain evacuation

Floodplain evacuation involves the removal of damageable property from the flood-prone area. This can be done by moving the house or structure to another location or by demolishing the existing structure and rebuilding elsewhere. Evacuation thus restores the floodplain to original condition allowing it to function as an overflow storage area.

Structural Measures

These can include retention/detention reservoirs, streamflow diversion, clearing and snagging, channel modifications, bridge replacement, levees, and bulkheads. All such measures reduce the frequency of damaging overflows.

Flood Retention/Detention Reservoirs

Flood retention/detention reservoirs can be used to temporarily store floodwaters above flood-prone areas, thus reducing the downstream flow volumes and flood levels. Later, the floodwaters can be released at a controlled rate to minimize the downstream effect. The usefulness of such reservoirs is very dependent on the physical characteristics of the upper watershed and the status of development with that area.

Stream Flow Diversion

Stream flow diversion redirects potentially damaging floodwaters around a particular area. This precludes their entry into the problem area thereby greatly reducing the flood problems of that area. This is often accomplished by constructing a secondary channel bypass around the problem area to connect at some downstream point or to another drainage course. The effectiveness is therefore very dependent on the physical setting and characteristics of the area. When diverting flow into another channel, one must insure that the diversion channel can handle the additional capacity.

Clearing and Snagging

Clearing and snagging can be used to increase the capacity of the channel by removing obstructions to the flow. Such obstructions retard the streamflow causing a decrease in velocity and an increase in water levels. This measure may also redefine the channel's configuration in areas which have excess vegetation. The overgrowth

of vegetation in a waterway decreases the area which causes a decrease in the velocity and flow rate.

Channel Modifications

Channel modifications can be used to alter the existing stream channel to increase its carrying capacity. This is usually accomplished by excavating to make the stream channel either wider, deeper, or both. This increases the velocity and flow rate of the floodwaters thereby reducing flood levels and the extent of flooding. The magnitude and extent of the effect of channel modification on flooding is directly dependent on the extent of excavation; the larger the channel, the greater the reduction in flood levels.

Bridge Replacement

Bridge replacement is another possible structural measure. There are approximately 22 bridges and 7 pipe crossings and foot bridges in the study area. Many of these structures constrict the natural flow of the channel. Replacing bridges would allow more capacity through the channel.

Levees

Levees generally involve either earthen or concrete walls which block water movement into certain areas. Thus, they reduce the extent of area subject to flooding and the property subject to danger. In this manner, the floodplain is altered to be more compatible with existing or planned development. Occasionally, training levees may be used along either or both sides of the stream to confine flood water to the stream area or floodway. In reducing the extent of flooding and the floodplain, levees also reduce available storage and can cause an increase in flow rate and flood level. Therefore, the usefulness depends a great deal on the topography and other physical characteristics of the area.

Bulkheads

Bulkheads can be used to confine floodwaters to the stream and a selected portion of the floodplain. Bulkheads, like levees, also reduce available storage and can cause an increase in flow rate and flood level. Bulkheads can also be used in those areas that are presently experiencing erosion problems, or as a preventative measure to deter future erosion problems. Presently, there are some locations with vertical bulkheads. Instead of using vertical bulkheads, the bulkheads can be placed at a slope which may improve the environmental and biological attributes of the channel.

Initial Evaluation

Each of the previously described measures were analyzed in order to develop alternative plans. These plans may include a combination of measures so that the maximum benefits can be obtained.

Flood Warning

Flood warning in the study area is based solely on prediction of excessive rainfall. Because of the short lag time there is very little warning of approaching floodwater. Thus, flood prediction is dependent on the accuracy of meteorological forecasts of rainfall volume and intensity. Based on the nature of flooding experienced, this is generally good only for significant atmospheric disturbances such as tropical depressions. Even for these, the residents can only remove themselves and readily transportable belongings to areas of relative safety. Little can be done to protect the houses from the floodwaters. Thus, while this measure is good for protecting life and some property, it is not considered adequate for effectively reducing flood damages in the area. However, this should be continued and enhanced at the local level to protect life in the area and allow the removal of readily movable property, such as cars, from the flood prone area.

Floodproofing

Floodproofing was reviewed based on the physical characteristics of the Cedar Hammock (Wares Creek) study area. The nature of flooding between Manatee Avenue and 44th Avenue West (Cortez Road) is characterized by a large area of inundation. This makes floodproofing by structure raising undesirable due to the inaccessibility of raised structures during periods of prolonged flooding. Also, the need for emergency evacuation may actually increase due to the perceived protection provided which results in people remaining in houses too long and thus becoming trapped. While mobile homes are apparently very suitable for raising, access for the elderly would be extremely difficult and in some cases no longer possible. Considering the large number of structures involved and the characteristic older age of many of the residents, this would create a significant and substantial hardship on those in the floodplain. Also, the apartment complexes and commercial structures are not suitable for raising. Therefore, floodproofing as an alternative was not considered further in the analysis.

Floodplain Zoning

A flood insurance study was conducted on the city of Bradenton and a report prepared by FEMA on December 1, 1980, and for Manatee County, Unincorporated Areas, on September 15, 1983. These enabled the City and Manatee County to update existing floodplain regulations as part of the regular program of flood insurance by

FEMA. However, floodplain zoning has limited benefits for current residents in the study area.

Floodplain evacuation

Floodplain evacuation could be used to remove some of the more flood-prone structures from the area. This would tend to restore the floodplain area to a low or no damage floodway. The current residents would have to be relocated to property elsewhere. Implementation of this measure is potentially feasible for the area, but due to the high cost of implementation (i.e. purchasing the structures and real estate to relocate the residents), the shortage of non-flood prone areas suitable for development, and the negative social impacts to the current residents, it was dropped from further consideration.

Retention/Detention Reservoirs

The use of flood retention/detention reservoirs is normally dependent on the upstream basin size, shape, and other physical characteristics, as well as the volumes of runoff expected. As mentioned earlier in this report, the Master Stormwater Drainage Plan, Area A, Manatee County Government recommended enlargement of an existing lake, located just north of 44th Avenue West (Cortez Road) between 14th Street West (B.R. 41) and 26th Streets West, be increased in size from 22 acres to 37 acres for use as a detention basin. The Cedar Hammock (Wares Creek) Reconnaissance Report, completed in March 1990, further recommended this plan.

Streamflow Diversion

As previously described in the EXISTING CONDITIONS chapter, the Cedar Hammock watershed is made up of three interconnected branches; the East Branch which is the study area under investigation; the West Branch, which drains into Palma Sola Bay; and the South Branch, also known as Bayshore Canal, which drains southerly into Sarasota Bay. Diverting flow into the West or South Branches may induce flooding in those areas. Analyzing flow diversion would be extensive and require additional funding. This alternative could also potentially create adverse impacts on water quality in the Palma Sola Bay or Sarasota Bay, both Outstanding Florida Waters. Therefore, this concept was not considered further.

A more limited streamflow diversion was recommended in the Master Stormwater Drainage Plan, Area A and also in the Cedar Hammock (Wares Creek) Reconnaissance Report. This plan recommends construction of a new channel outlet at the existing detention basin's north end to redirect flow to an existing drainage ditch which flows northeasterly to the main East Branch channel. Also, an earthen plug was proposed just east of 46th Avenue Drive West. This measure would facilitate northerly flow in the tributary which would feed the existing detention basin. This

plug would eliminate the nearly 360 degree change in flow direction which now exists on the eastern tributary.

Clearing and Snagging

Clearing and snagging in the lower reach of Wares Creek is recommended. However, the flood reduction benefits afforded by this measure are not adequate for effectively reducing flood damages for the entire study area. Clearing and snagging may be an effective flood control measure when it is supplemented by upstream improvements.

Channel Modifications

Channel modifications could be used in the study area to modify or enlarge the existing main channel or to construct a new channel through areas where natural or man-made features obstruct flow causing higher flood levels. The entire study area has an existing, although inadequate, drainage canal. Modifications to the existing channel (increasing the channel width or depth, changing the side slopes, or selecting a smoother surface material) or construction of a new channel would greatly increase the conveyance capacity. The Master Stormwater Drainage Plan, Area A proposed construction of a trapezoidal-shaped concrete-lined channel improvement in a portion of the channel in the City of Bradenton. The Cedar Hammock (Wares Creek) Reconnaissance Report recommended a grass-lined trapezoidal-shaped channel.

By increasing the channel carrying capacity, the flooded area can be reduced along with the associated flood damage. In some locations along the channel, modifications would have to be minimal due to the limited right-of-way. The designs will minimize real estate costs and optimize the hydraulic capacity without adversely impacting water quality.

Bridge Replacement

As stated in the PROBLEM IDENTIFICATION chapter, bridges and pedestrian crosswalks constructed across the channel contribute to constriction of flow. The Initial Appraisal Report for Wares Creek, Bradenton, Florida recommended replacement of undersized bridges. The Master Stormwater Drainage Plan, Area B recommended replacement of nine existing bridges. While the replacement of undersized bridges appear to be effective measures for solving the flooding problems within the study area, the Cedar Hammock (Wares Creek) Reconnaissance Report recommended that bridge replacement would be very expensive, due to the numerous bridge crossings along Cedar Hammock and Wares Creek. Therefore, this measure was dropped from consideration.

Levees

Levees can normally be used to channel flood flows around housing areas where topography permits. Along the Cedar Hammock (Wares Creek) drainage canal, the extent and density of development, nature of flooding, and topography preclude the use of levees as a possible measure for reducing flood damages. Therefore, levee construction was not considered for further analysis.

Bulkheads

A number of bulkheads have been constructed in segments along both sides of the lower channel from the Manatee River upstream to 9th Avenue West. In many other areas, the channel is concrete-lined, abutting existing developed properties. Sections that are not bulkheaded are subject to erosion. The system is subject to rapid fluctuations of water levels because of the impervious nature of the surrounding watershed. Such dynamic urban runoff results in further erosion of those sections not bulkheaded. This measure is effective in preventing erosion damage, but not recommended extensively due to environmental reasons. However, when there is limited right-of-way, as in some areas where the channel has eroded to the property line of the homeowners, vertical bulkheads can reduce the channel width needed to carry the same capacity as trapezoidal channels. This option will be considered only where necessary.

Thus, of the possible measures initially considered, flood retention/detention reservoirs, limited streamflow diversion, clearing and snagging, channel modification, and limited bulkhead utilization appear to offer potentially feasible solutions to the flood problems along Cedar Hammock (Wares Creek). The other possible measures were dropped from further consideration.

PRELIMINARY ALTERNATIVE PLANS

Two plans were analyzed in detail which used a combination of the features listed above. Those two plans are described below and shown on Figures 4 and 5.

Plan A

Enlargement of the existing detention basin, which is located north of 44th Avenue West (Cortez Road) between 14th Street West (B.R. 41) and 26th Street West. The surface area of this basin would be increased from 22 to 37 acres through the purchase of 15 acres of adjacent land and excavation to an elevation of 14.5 feet, NGVD.

Northerly flow would be accomplished in the tributary feeding this basin by the construction of an earthen plug just east of 46th Avenue Drive West. This plug would eliminate the nearly 360 degree change in flow direction which now exists on the east tributary. Flow currently proceeds from the basin southeastward into Cedar Hammock, and then northward and northwestward into Wares Creek.

Under the proposed plan, a 600-foot long channel outlet would be constructed at the north end of the detention basin to convey flow to an existing ditch, which would carry the flow northward 1400 feet to 30th Avenue West, and easterly 1000 feet to the main Cedar Hammock Canal.

The proposed plan also includes channel improvements along the Cedar Hammock east drain (Wares Creek) from the Manatee Avenue Bridge upstream to 44th Avenue West (Cortez Road). Channel clean-out and erosion protection would be required for bridges at 23rd Avenue West, 21st Avenue West, 19th Avenue West, 18th Avenue West, and 17th Avenue West.

Channel clearing and snagging with channel re-shaping from Manatee Avenue to 17th Avenue West.

A trapezoidal channel with grassed side slopes and bottom width of 26 feet would be constructed. Side slopes would be 1 vertical : 2 horizontal (1V:2H) from 17th Avenue West to 21st Avenue West.

A vertical sheet-pile wall would be constructed from 21st Avenue West to 14th Street West (B.R. 41), with a bottom width of 40 feet. In this area, the channel runs through a mobile home park and the structures are very near the edge of the existing channel.

Construction of a trapezoidal channel grassed side slopes and bottom width of 26 feet. Side slopes would also return to 1V:2H from 14th Street West (B.R. 41) to 44th Avenue West (Cortez Road).

A final feature of the proposed plan is the construction of a control structure at the detention basin's point of outflow.

Plan 2A

This plan is the same as Plan A except, rather than construction of a vertical wall channel from 21st Avenue West to 14th Street West (B.R. 41), the entire channel improvement would be grass-lined and trapezoidal in shape with 1V:2H side slopes.

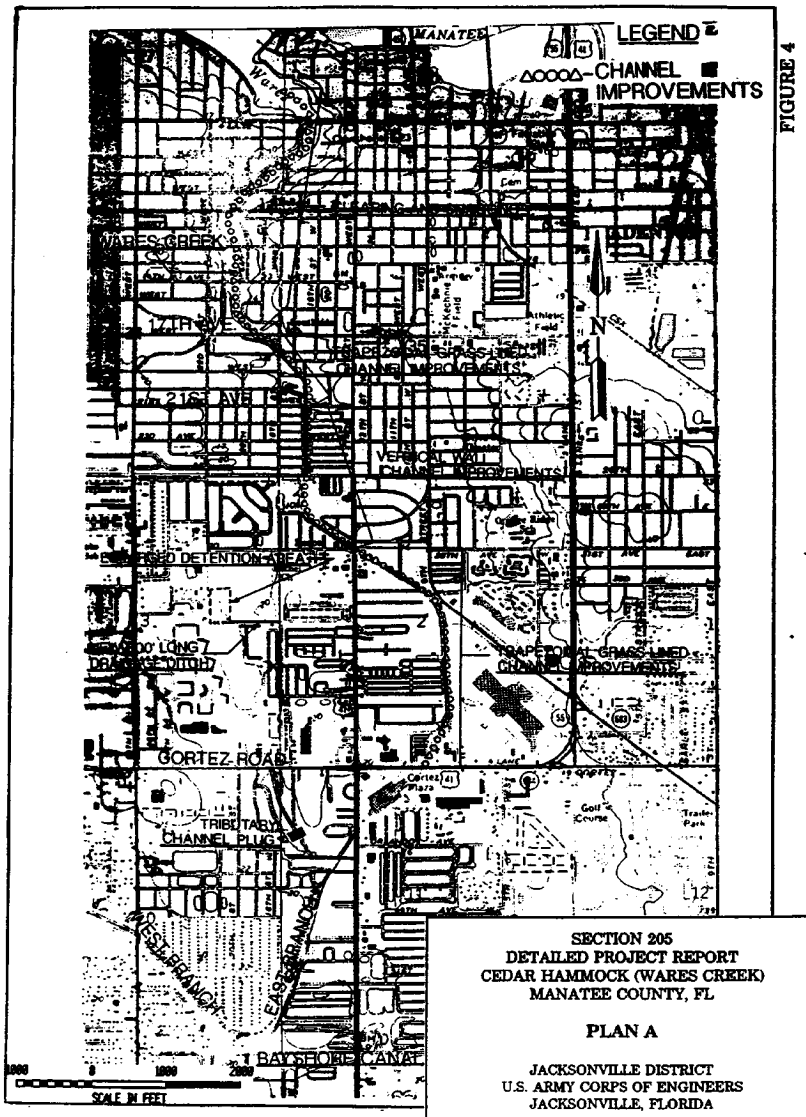

LEGEND
CHANNEL IMPROVEMENTS
MANATEE
WARES CREEK
17TH AVE
21ST AVE
TRAPEZOIDAL GRASS LINED CHANNEL IMPROVEMENTS
VERTICAL WALL CHANNEL IMPROVEMENTS
PROPOSED DETENTION AREAS
GORTEZ ROAD
TRIBUTARY 2 CHANNEL PLUG
WEST BRANCH
EAST BRANCH
BAYSHORE CANAL
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN A
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 4

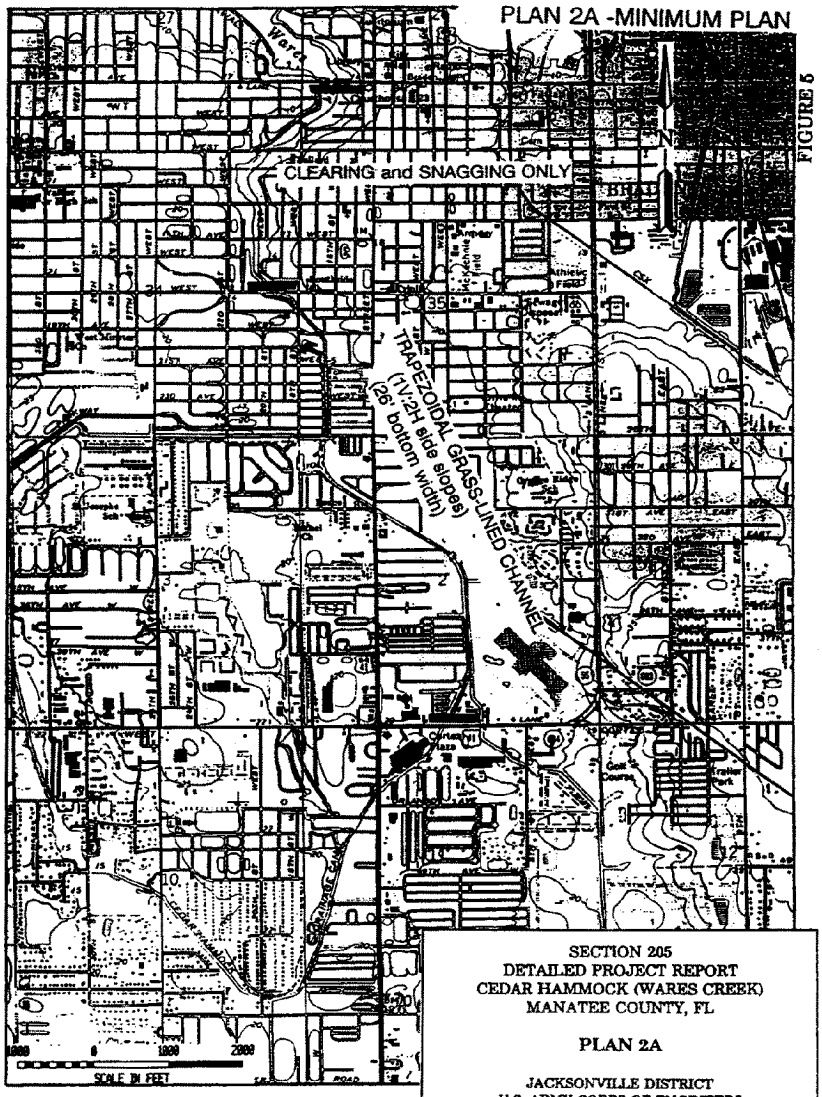


FIGURE 6

SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL

PLAN 2A

JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

An initial scoping letter was mailed to Federal, State and local agencies, as well as other interested parties on September 13, 1991. A combined response from the State of Florida Clearinghouse was received on November 4, 1991. The individual letters may be found in Appendix G. The comments are addressed in the EA, however, the issue raised by the Florida Department of Environmental Regulation (DER) regarding potential water quality degradation of the proposed plan will be elaborated upon in this chapter. In their letter dated October 21, 1991, DER recommended that a detailed study of the watershed be conducted to "investigate alternative stormwater management methods which would not require increasing the hydrologic capacity of the creek. The Corps' study should include an environmental assessment which considers implications aside from flooding, particularly water quality impacts." The proposed activities "would increase the direct discharge of untreated stormwater from Wares Creek to the Manatee River."

Due to the concerns raised by DER, it was determined that a pre-application meeting should be held. A meeting was held in Tallahassee on May 5, 1992, with DER. At this meeting, it was explained that the U.S. Army Corps of Engineers does not have the authority to perform growth management or master drainage basin plans. Options were discussed that could make the proposed plans more environmentally acceptable. One suggestion was that retention/detention areas be increased to retain the first inch of runoff, if possible. After this meeting, the U.S. Army Corps of Engineers and the local sponsor met to reassess the preliminary alternatives.

FORMULATION

A formulation meeting was held on the following day with the local sponsor to "brainstorm" ideas to reduce possible water quality impacts. First, it was decided that the water quality impacts of the proposed plan be modeled to determine whether the proposed modifications would degrade water quality versus the existing conditions.

DER discourages the use of channel lining as it reduces the water quality cleansing and erosion control capacities of natural, vegetated shorelines. DER believe the proposed plan would increase the hardening of the channel. The local sponsor pointed out that much of the channel has already been concrete-lined or riprapped. The local sponsor agreed to survey the site to determine the extent of the existing hard slopes, so that existing conditions can be compared to the proposed Plan 2A. Sloped bulkheads were considered for use in the reach between 21st Avenue West to 14th Street West (B.R. 41) instead of vertical placement. This would allow for more natural re-vegetation and sedimentation in front of the structure. However, the limited right-of-way in the area is the reason that vertical walls were proposed. Rather than use sloped bulkheads it would be better to choose Plan 2A, which allows

for a grass-lined trapezoidal channel through that reach. Therefore, sloped bulkheads were not considered further.

Another recommendation was to review the proposed earthen plug just east of 46th Avenue Drive West. The plug was proposed to eliminate the nearly 360 degree change in flow direction which now exists on the east tributary. The local sponsor was concerned about the proposed location of the plug. Therefore, the location of the plug would be reviewed and, also the possible use of a gated culvert instead. The gated culvert would be preferable to allow minimal flows through the east tributary which would reduce adverse impacts to the habitat downstream of the plug or control structure. There was also concern that the earthen plug could induce flooding in locations which were not presently being flooded.

Much of the development in the study area was done prior to regulations requiring retention or detention ponds. Therefore, placing detention ponds near suspected pollution sources is a viable environmental measure. A retention pond designed to retain the first inch of rainfall will reduce the suspended constituent loads. The retention volume needed to retain the first inch of runoff for each sub-basin would be computed and a search for vacant land in each sub-basin would be conducted. Increasing the size of the already proposed detention basin would be reviewed, as well as determining the feasibility of increasing the size of existing private detention basins. The local sponsor agreed to consider the possibility of placing a retention basin on the property of the De Soto Square Mall. The primary concern with this measure is locating sufficient vacant land which could be used for retention or detention basins.

Placing ditch blocks in the tributaries of Cedar Hammock was considered to provide environmental quality benefits. However, this measure would require extensive rights-of-way for adequate performance. Ditch blocks also may cause sediment build-up over time which may render the structure ineffective. This measure may also adversely impact the water profile causing increased flooding in areas near the ditch blocks. Therefore, this measure was not considered further.

A siltation basin was proposed at the downstream end of the channel. By strategically locating the siltation basin, the amount of sedimentation entering Wares Creek may be decreased. The area near the Ballard School was considered a prime location because of its proximity to the channel. However, further investigations revealed that in-line siltation basins are not efficient. Flood events could cause scouring of the siltation basin, re-suspending the sediments. Therefore, this measure was not considered further.

During the reconnaissance study, bridge replacement was evaluated and eliminated as a possible solution due to the cost of such an option. However, the possibility of bridge replacement combined with a reduced amount of channelization

was not considered. Therefore, an analysis was conducted to determine which bridges cause the most constriction and if replacement of those specific bridges would allow the reduction of channelization.

Therefore, as a result of the formulation meeting, the following analyses would be performed: 1) water quality impacts of the two proposed plans, Plans A and 2A; 2) survey the study area for existing hard slopes; 3) review type of control structure and placement; 3) increasing retention/detention basins; and 4) bridge replacement.

Water Quality Analysis

The search for existing water quality data for the Cedar Hammock (Wares Creek) watershed revealed that no data from directly within the channel was available. A telephone call was held with DER to evaluate the impact of no existing data. The performance of a waste characterization of a rainfall event was considered, but this would be intricate and costly. DER suggested that we continue to pursue obtaining retention or detention areas.

Hardened Channel

The local sponsor conducted a site survey to determine the existing hardened channels. The results are shown in Table 6.

Water Control Structure

The water control structure was analyzed and a determination was made that with-project flood levels upstream of the structure's connection with Cedar Hammock (Wares Creek) would increase. Therefore, the earthen plug and the 600-foot long outlet channel from the proposed enlarged detention basin were eliminated from the proposed plan.

TABLE 6
IDENTIFICATION AND LOCATION OF
EXISTING RIPRAP OR RETAINING WALLS

LOCATION	CONCRETE (LINEAR FEET)		RIPRAP (LINEAR FEET)		PERCENT HARDENED
	EAST SIDE	WEST SIDE	EAST SIDE	WEST SIDE	
44th Ave W (Cortez Rd) to B.R. 41 & 30th Ave W	0	0	0	0	0
B.R. 41 & 30th Ave W to 26th Ave W	75	660	300	300	35
26th Ave W to 17th Ave W	530	70	870	880	39
17th Ave W to 9th Ave W	265		200-300[1]	120	
9th Ave W to Manatee Ave	1660	1740			95
Manatee Ave north to river					100% bulkheaded

[1] Occasional, possibly natural, rock north of 17th Avenue West

Note: These figures do not include bridges, walkways or culverts.

Retention Basins

An analysis was performed to determine the volume of retention needed to retain the first inch of stormwater runoff by sub-basin. The results are shown in Table 7. These sub-basins are shown in Figure 3. A total of 282.6 acre-feet of retention would be needed to retain the first inch of runoff in the Cedar Hammock (Wares Creek) drainage basin. Aerial photos were referred to and a site visit was conducted with the local sponsor to locate potential retention areas. Figure 6 shows vacant land identified from aerial photos.

During the site visit the following observations were made:

Site #A - located north of Manatee Avenue bridge along the right bank at 15th Street West and 3rd Avenue West, approximately 0.75 acre. This site was eliminated as it is downstream of the flooding.

Site #B - located at the corner of Manatee Avenue and 21st Street West, is also downstream of the flooding.

Site #C - located at 26th Street West, between 9th and 10th Avenues West, zoned professional and medical, next door to a large lot with 2 story house. This 0.56-acre site was eliminated due to its location in a residential and professional area. Routing floodwaters to this location would be potentially dangerous.

Site #D - located where 11th Avenue West dead ends at 22nd Street, a 150-foot-deep by 60-foot-wide lot from 11th Avenue West to 13th Avenue West. The city owns this 0.2 acre site adjacent to Wares Creek. This is a good location.

Site #E - located at the Ballard School at 9th Avenue West and 18th Street West is approximately 3.2 acres with access to Wares Creek on its western end, good location.

Site #F - located at 12th Avenue West and 20th Street West, a 0.2-acre vacant lot.

Site #G - located at 18th Street West and 17th Avenue West, Kiwanis Recreation Park, 2.07 acres along creek. This site was underwater during the flooding in 1992, so the area is too low to use as retention.

Site #H - located at 26th Avenue West and 16th Street Court West. This is a swale, approximately 3000 feet long and is city owned. This 2.4 acre site would be in a good location.

Site #I - located at 30th Avenue West and 22nd Street West, this was the existing 22-acre detention basin that was to be enlarged to 37 acres. During this study it was determined that the enlargement of this detention area would not provide any flood reduction benefits. The area adjacent to the detention area experiences no flooding problems from the 25- or 100-year floods. It is also not in a good location to provide water quality benefits. The land surrounding Site #I is not developed, does not flood, so has no ability to provide retention of stormwater runoff. In addition, the FWS and FGFWFC identified the Florida Scrub Jay (E) as potentially present in the undeveloped brush surrounding the site. Therefore, this site was eliminated as a potential retention area.

Site #J - located at 30th Avenue West and 14th Street West (B.R. 41), this area has been obtained by the County for retention needed for the expansion of 14th Street West (B.R. 41), but it might be possible to expand upon the County's plan.

Site #K - located at 34th Avenue West and 19th Street West, this approximately 15-acre existing lake located in Bayshore Condominium community could possibly be enlarged.

Site #L - 0.6-acre site located east of 46th Avenue West at 17th Street West off Highway 41, behind an old nursery, an existing sewer outfall runs to the lake at Site #K.

Site #M - located at 14th Street West at Orlando Avenue, small lake runs through this residential area. The local sponsor recommended dropping the lake level by using a control structure and using this area for a possible retention site. However, getting a new lake schedule would be time prohibitive and possibly outside the realm of a 205 study.

Site #N - located behind Cortez Plaza, drainage runs underneath the plaza, floods during heavy rains, was not considered a good location.

Site #O - located at De Soto Square Mall, vacant areas, totalling approximately 1 acre, surround the mall parking lot. The parking lot currently acts as a retention area during heavy rains. This is a good location for water quality benefits.

Site #P - located at the golf course at 46th Avenue Terrace and 5th Street West adjacent to Burgundy Condominiums. The site currently floods during heavy rains. The site was flooded in 1988 and 1992. This would not be a good location.

Bridge Replacement

A hydraulic analysis with removal of up to seven of the bridges revealed that this measure did not reduce the stage sufficiently to eliminate the widening of the channel. Any consideration to replace the bridge crossing Wares Creek at 9th Avenue West, would require additional coordination with SHPO, as it was determined that it may be historically significant.

TABLE 7
DRAINAGE AREAS SUB-BASINS

CEDAR HAMMOCK DRAINAGE AREAS							
ID	AREA SQ M	DCIA %	RURAL %	LAKE %	URBAN %	RETENTION REQUIRED %	RETENTION VOLUME AF
CE1	0.27	24	29	14	33	57	8.2
CE2	0.37	17	20	0	63	80	15.8
CE3	0.09	19	17.5	0	63.5	83	4.0
CE4	0.27	20	16	0	64	84	12.1
CE5	0.05	35	25	0	40	75	2.0
CE6	0.25	31	11	0	58	89	11.9
CE7	0.03	90	0	0	10	100	1.6
CE8	0.56	22	13	0	65	87	26.0
CE9	0.29	15	29	0	56	71	11.0
CE10	0.08	43	37	0	20	63	2.7
CE11	0.19	26	24	0	50	76	7.7
CE12	0.13	69	31	0	0	69	4.8
CE13	0.39	12	54	0	34	46	9.6
CE14	0.22	24	48	0	28	52	6.1
CE15	0.09	30	10	0	60	90	4.3
CE16	0.37	29	13	0	58	87	17.2
W1	0.87	12	0	0	88	100	46.4
W2	0.82	12	0	0	88	100	43.7
W3	0.89	12	0	0	88	100	47.5

Note: DCIA - Directed Connected Impervious Area

TABLE 8
INITIAL COST OF RETENTION AREAS

Retention Site	Acreage	Real Estate Costs	Construction Costs	Total Costs
Site D	0.3	$32,258.00	$15,600.00	$47,858.00
Site E	2.44	$384,000.00	$16,900.00	$400,900.00
Site F	0.2	$24,063.00	$17,332.00	$41,395.00
Site H	3.0	$288,000.00	$233,500.00	$521,500.00
Site L	0.6	$270,000.00	$82,100.00	$352,100.00
Site O	1.0	$162,000.00	$77,200.00	$239,200.00
Total	7.54	$1,160,321.00	$442,632.00	$1,602,953.00

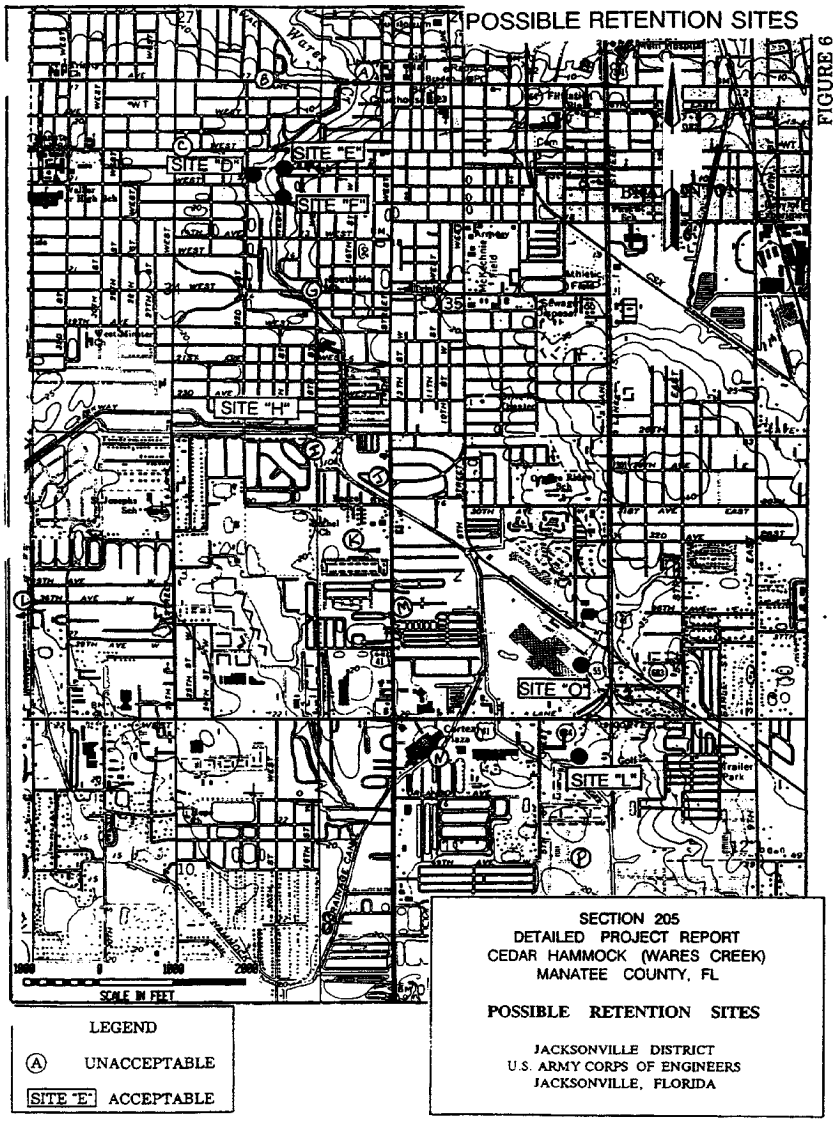

POSSIBLE RETENTION SITES
SITE "D"
SITE "E"
SITE "F"
SITE "H"
SITE "O"
SITE "I"
SCALE IN FEET
LEGEND
Ⓐ UNACCEPTABLE
SITE "E" ACCEPTABLE
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
POSSIBLE RETENTION SITES
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 6

FINAL ALTERNATIVE PLANS

Minimum Plan

Plan A - Trapezoidal and Sheet Pile Wall Channel

Clearing and snagging from approximately 500 feet upstream of Manatee Avenue bridge and extending to 17th Avenue West, then

Trapezoidal grass-lined channel, 1V:2H side slopes, 26-foot-bottom width from 17th Avenue West to 21st Avenue West, then

Vertical Sheet Pile Wall channel from just upstream of 21st Avenue West to 14th Street West (B.R. 41) with a 40-foot-bottom width, then

Trapezoidal grass-lined channel, 1V:2H side slopes, 26-foot-bottom width from upstream of 14th Street West (B.R. 41) and extending to just downstream of 44th Avenue West (Cortez Road) bridge.

Plan 2A - Trapezoidal Channel

Similar to Plan A, except there is no sheet pile wall reach; therefore,

Trapezoidal grass-lined channel, 1V:2H side slopes, 26-foot-bottom width from 17th Avenue West to just downstream of 44th Avenue West (Cortez Road) bridge.

One-Bridge Replacement Plan

Plan B - Trapezoidal and Sheet Pile Wall Channel with Replacement of 9th Avenue West bridge

Similar to Plan A, except that the 9th Avenue West bridge is raised from a low chord elevation of 9.55 feet to 10.7 feet. Also bridge clear span length is increased to allow for realignment of the creek. The design would realign the creek to remove two abrupt direction changes at this location. The east bank would be modified to provide a straight alignment of the creek from one side of the bridge to the other, while the bridge crossing itself would become skewed to the creek.

Plan 2B - Trapezoidal Channel with Replacement of 9th Avenue West bridge

Similar to Plan 2A, except the 9th Avenue West bridge is replaced as in Plan B.

Seven Bridge Replacement Plan

Plan C - Trapezoidal and Sheet Pile Wall Channel with Replacement of 7 Bridges

Similar to Plan B except that six other bridges beside the 9th Avenue West bridge would be raised. These bridges include:

The 17th Avenue bridge would be raised from a low chord elevation of 6.55 feet to a new low chord elevation of 10.4 feet. The low chord is set by a 24-inch pipe-crossing under this bridge, which would have to be raised.

The 18th Avenue bridge would be replaced by a new bridge (clear span length about 75 feet) with a low chord elevation the same as that of the existing bridge.

The 19th Avenue bridge would be replaced be a new bridge (clear span length about 75 feet) with a low chord elevation the same as that of the existing bridge.

The 21st Avenue bridge would be replaced be a new bridge (clear span length about 75 feet) with a low chord elevation the same as that of the existing bridge.

The crosswalk between 21st and 23rd Avenue would be replaced be a new crosswalk (clear span length about 75 feet) with a low chord elevation the same as that of the existing crosswalk, and

The 23rd Avenue West bridge would be replaced be a new bridge (clear span length about 75 feet) with a low chord elevation the same as that of the existing bridge.

Plan 2C - Trapezoidal Channel with Replacement of 7 Bridges

Similar to Plan 2B except that the 9th, 17th, 18th, 19th, 21st, Crosswalk between 21st and 23rd Avenues West, and 23rd Avenue West bridges would be raised or replaced.

It is assumed that the retention basins could be added to any of the plans; therefore the cost of the retention basins was figured as a line item to add to the cost estimate. Two tables were prepared to compare the alternatives; table 9 includes the cost of the retention areas and table 10 excludes the retention area costs.

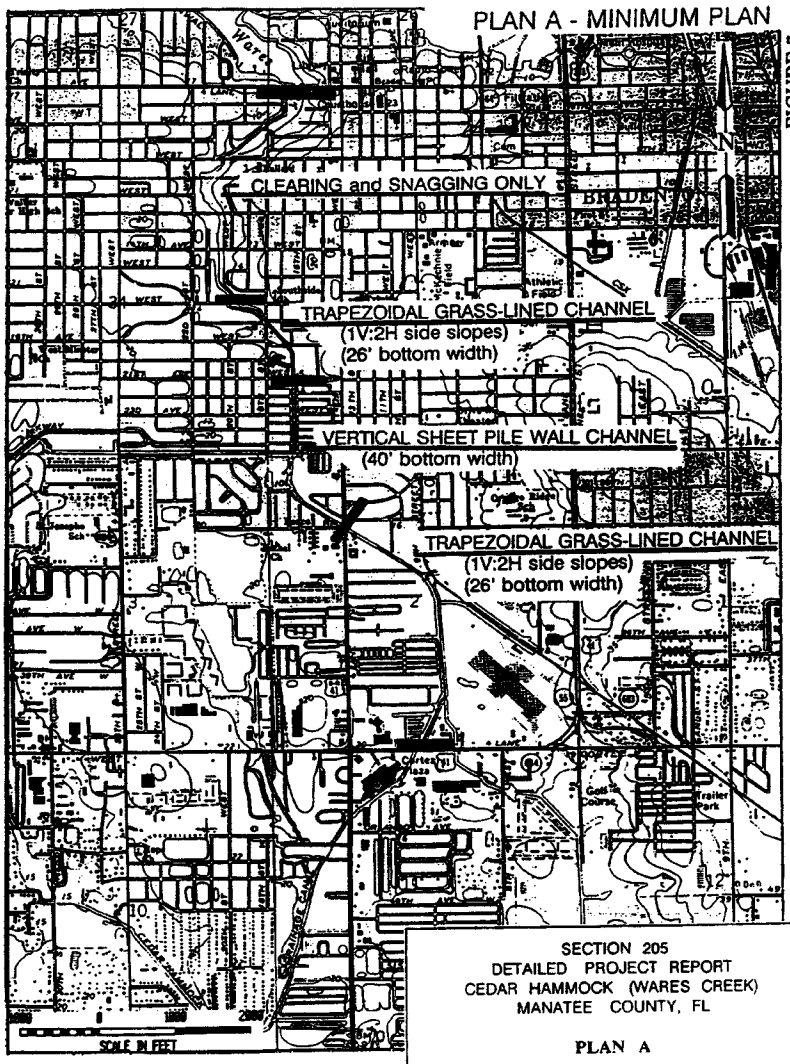
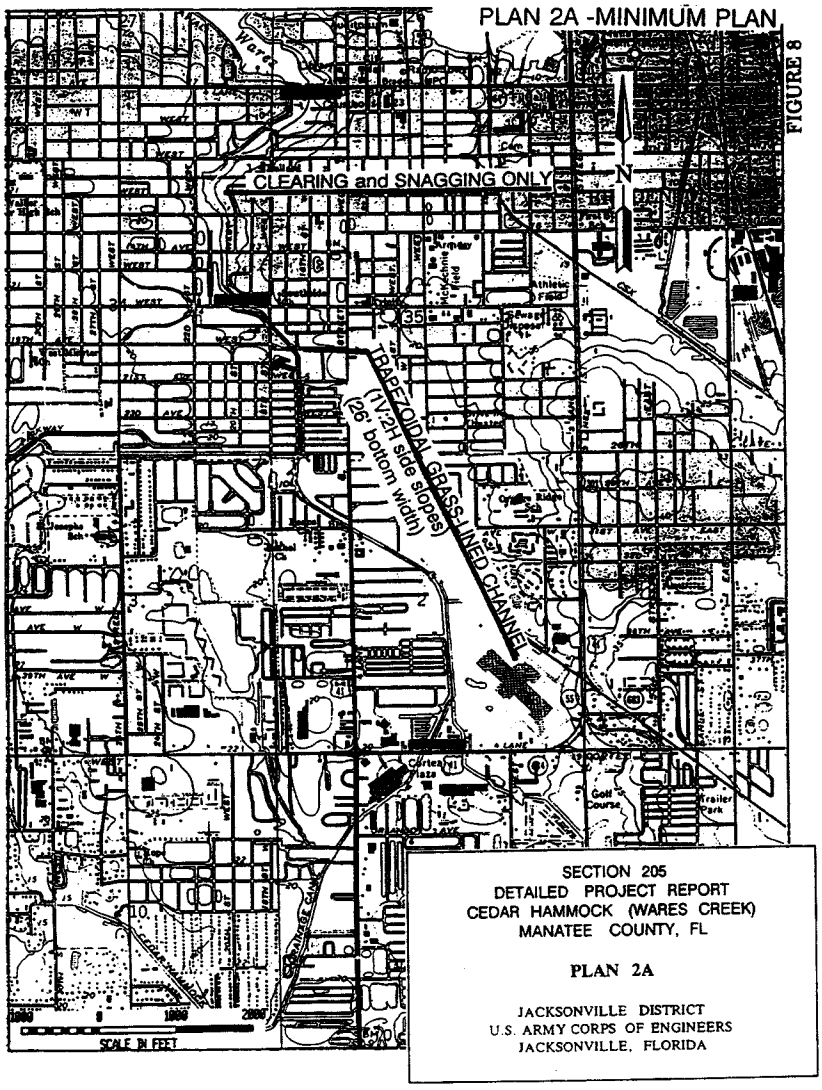

PLAN A - MINIMUM PLAN
CLEARING and SNAGGING ONLY
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
VERTICAL SHEET PILE WALL CHANNEL
(40' bottom width)
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN A
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 7


PLAN 2A -MINIMUM PLAN
FIGURE 8
CLEARING and SNAGGING ONLY
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
N
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN 2A
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

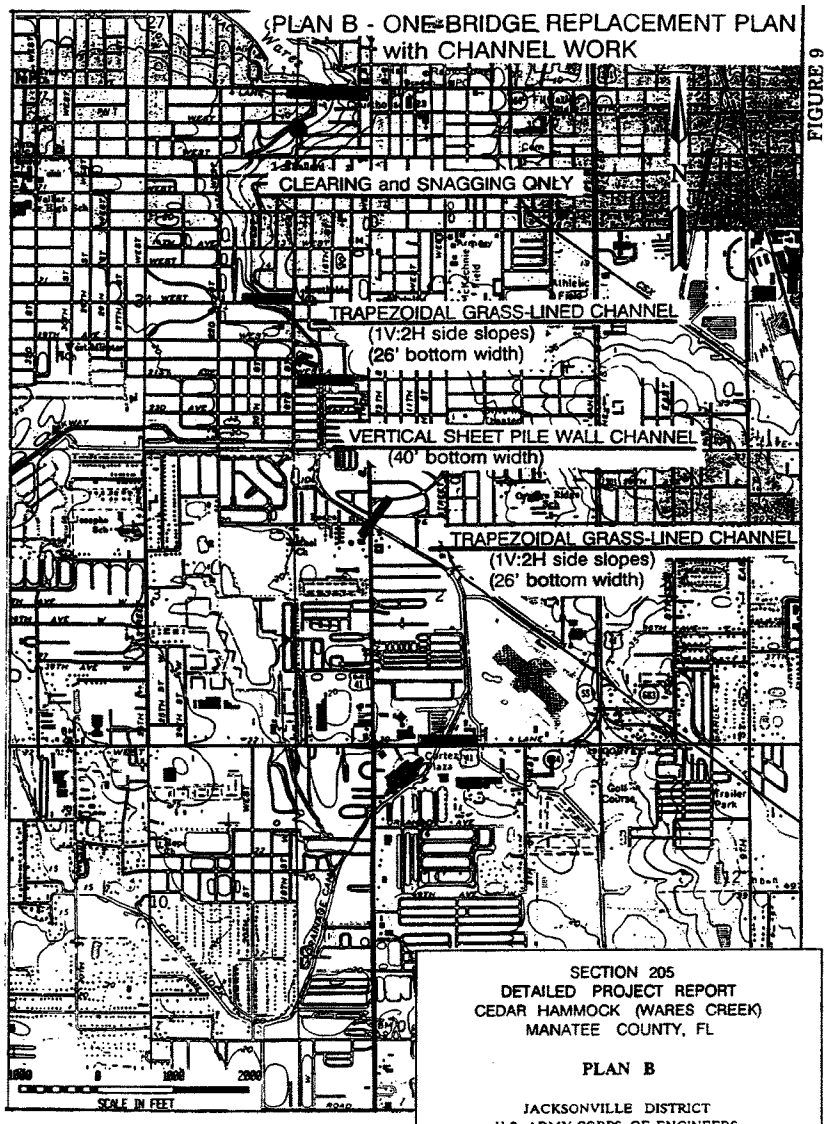

PLAN B - ONE-BRIDGE REPLACEMENT PLAN
with CHANNEL WORK
CLEARING and SNAGGING ONLY
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
VERTICAL SHEET PILE WALL CHANNEL
(40' bottom width)
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN B
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 9

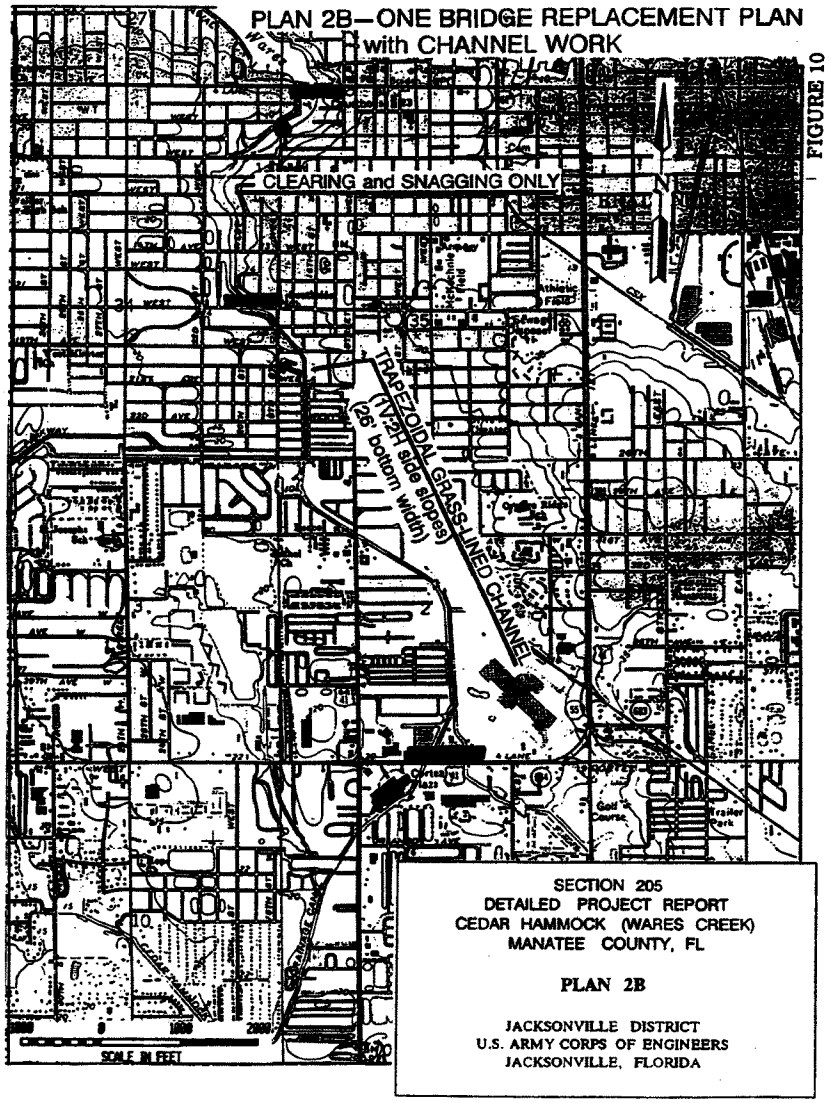

PLAN 2B—ONE BRIDGE REPLACEMENT PLAN
with CHANNEL WORK
CLEARING and SNAGGING ONLY
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN 2B
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 10

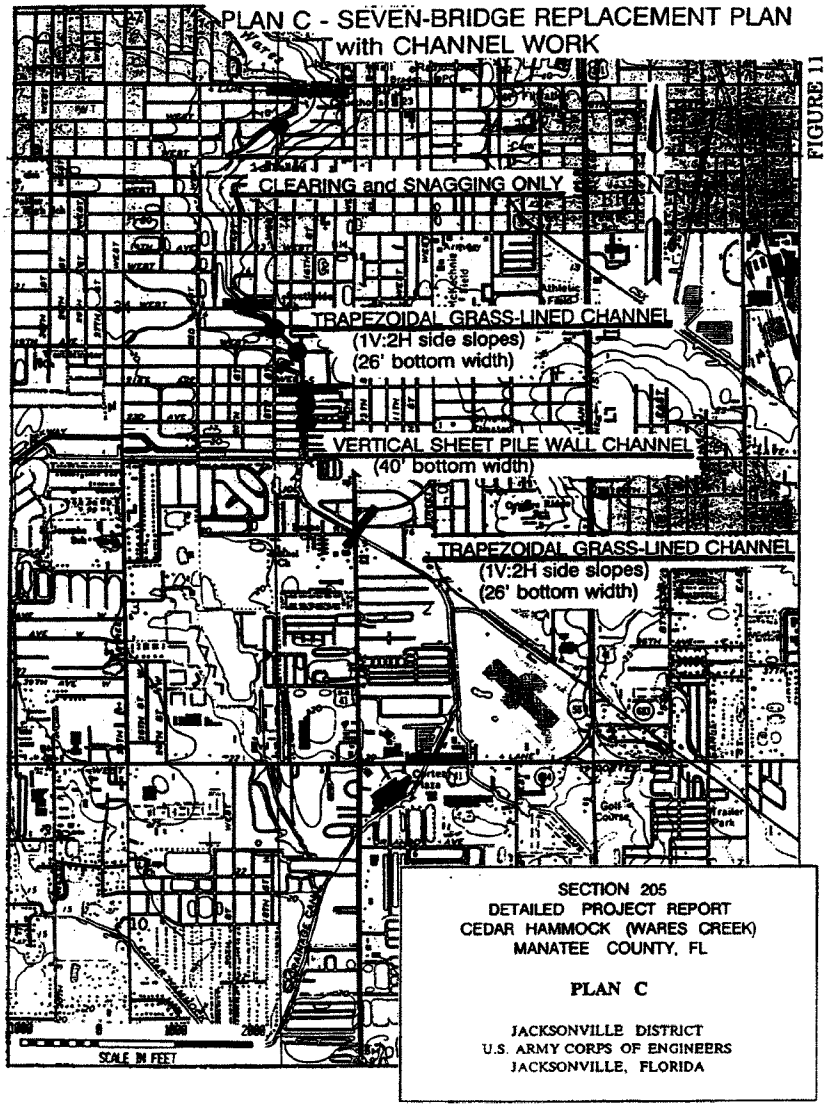

PLAN C - SEVEN-BRIDGE REPLACEMENT PLAN
with CHANNEL WORK
CLEARING and SNAGGING ONLY
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
VERTICAL SHEET PILE WALL CHANNEL
(40' bottom width)
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN C
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 11

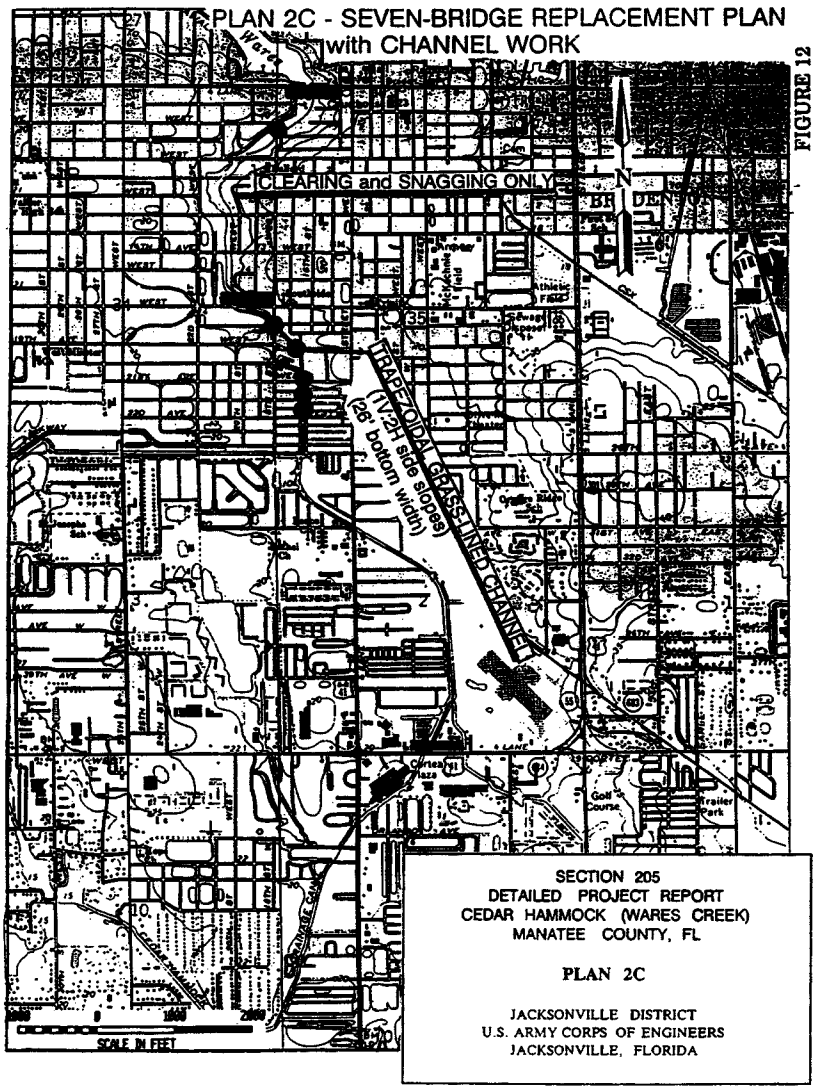

PLAN 2C - SEVEN-BRIDGE REPLACEMENT PLAN
with CHANNEL WORK
CLEARING and SNAGGING ONLY
TRAPEZOIDAL GRASS-LINED CHANNEL
(1V:2H side slopes)
(26' bottom width)
N
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
PLAN 2C
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

FIGURE 12

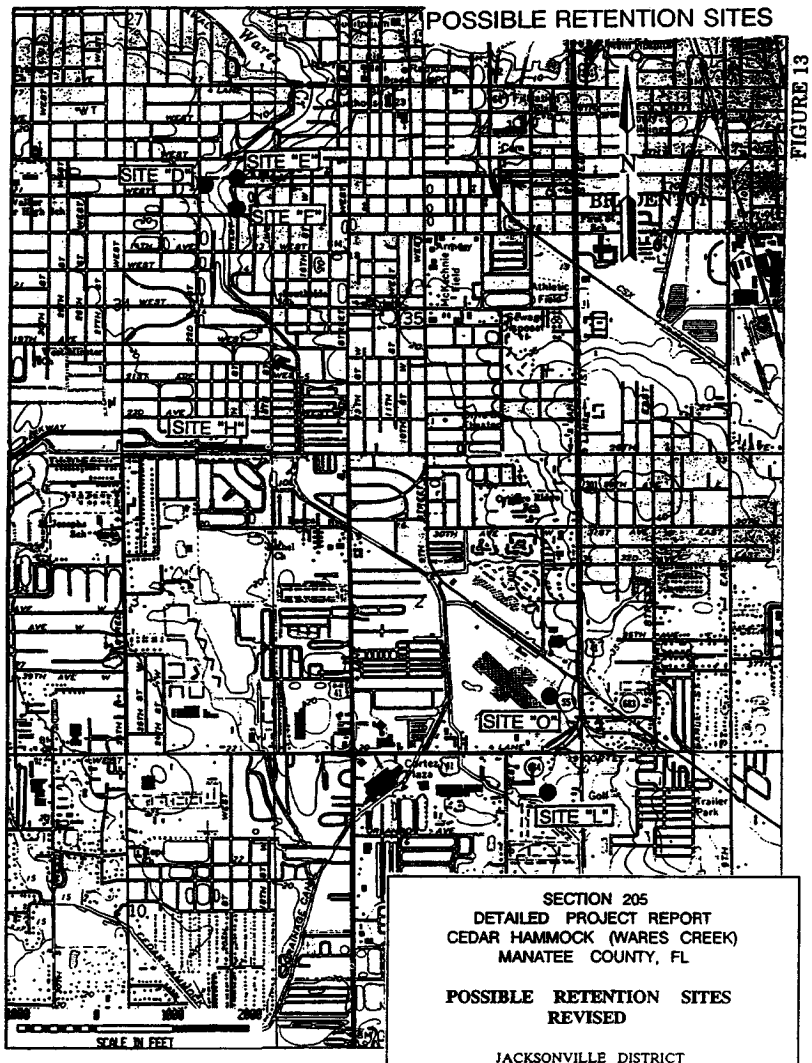

POSSIBLE RETENTION SITES
FIGURE 13
SITE "D"
SITE "E"
SITE "F"
SITE "H"
SITE "O"
SITE "L"
N
SCALE IN FEET
SECTION 205
DETAILED PROJECT REPORT
CEDAR HAMMOCK (WARES CREEK)
MANATEE COUNTY, FL
POSSIBLE RETENTION SITES
REVISED
JACKSONVILLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

TABLE 9

PRELIMINARY BENEFIT/COST COMPARISON[1] WITHOUT RETENTION AREAS

	PLAN A	PLAN 2A	PLAN B	PLAN 2B	PLAN C	PLAN 2C
INITIAL COSTS						
Construction	7,031,000	7,465,000	7,794,000	7,891,000	11,143,000	10,661,000
Lands & Damages	2,068,000	5,302,000	2,068,000	5,302,000	2,068,000	5,302,800
Planning, Engineering & Design	562,000	597,000	623,500	631,000	891,000	853,000
Construction Management	492,000	523,000	545,600	553,000	780,000	746,000
SUBTOTAL	10,153,000	13,887,000	11,031,100	14,377,000	14,882,000	17,562,800
Interest during Construction	817,800	1,118,600	888,400	1,158,100	1,198,700	1,414,700
TOTAL INVESTMENT COST	10,970,800	15,005,600	11,919,500	15,535,100	16,080,700	18,977,500
ANNUAL COSTS						
Annualized Investment Cost	896,800	1,226,600	974,300	1,269,900	1,314,500	1,551,300
Annual O,M,R,R & R	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL ANNUAL COST	896,800	1,226,600	974,300	1,269,900	1,314,500	1,551,300
ANNUAL BENEFITS	3,860,700	3,825,500	3,910,100	3,910,900	4,142,900	4,162,500
NET ANNUAL BENEFITS	2,964,100	2,598,900	2,935,800	2,641,000	2,828,400	2,611,200
BENEFIT-TO-COST RATIO	4.3	3.1	4.0	3.1	3.2	2.7

[1] 1993 Price Levels

TABLE 10

PRELIMINARY BENEFIT/COST COMPARISON[1] WITH RETENTION AREAS

	PLAN A	PLAN 2A	PLAN B	PLAN 2B	PLAN C	PLAN 2C
INITIAL COSTS						
Construction	7,031,000	7,465,000	7,794,000	7,891,000	11,143,000	10,661,000
Lands & Damages	2,068,000	5,302,000	2,068,000	5,302,000	2,068,000	5,302,800
Planning, Engineering & Design	562,000	597,000	623,500	631,000	891,000	853,000
Construction Management	492,000	523,000	545,600	553,000	780,000	746,000
SUBTOTAL	10,153,000	13,887,000	11,031,100	14,377,000	14,882,000	17,562,800
Retention Areas	1,603,000	1,603,000	1,603,000	1,603,000	1,603,000	1,603,000
Interest during Construction	946,900	1,247,700	1,017,700	1,287,200	1,327,900	1,543,800
TOTAL INVESTMENT COST	12,702,900	16,737,700	13,651,800	17,267,200	17,812,900	20,709,600
ANNUAL COSTS						
Annualized Investment Cost	1,038,400	1,368,200	1,115,900	1,411,500	1,456,100	1,692,900
Annual O,M,R,R & R	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL ANNUAL COST	1,038,400	1,368,200	1,115,900	1,411,500	1,456,100	1,692,900
ANNUAL BENEFITS	3,860,700	3,825,400	3,910,100	3,910,900	4,142,900	4,162,500
NET ANNUAL BENEFITS	2,822,300	2,457,200	2,794,200	2,499,400	2,686,800	2,469,600
BENEFIT-TO-COST RATIO	3.7	2.8	3.5	2.8	2.8	2.5

[1] 1993 Price Levels

ASSESSMENT AND EVALUATION

In order to determine the most appropriate plan for implementation in the Cedar Hammock (Wares Creek) area, the detailed plans presented above were evaluated for their overall accomplishments and effects. To facilitate comparison, they were evaluated only in light of the net change to the "without project" conditions. The economic evaluations were based on preliminary cost estimates at 1993 price levels and an interest rate of 8 percent and project life of 50 years.

Identification of NED Plan

As discussed previously, the formulation process in the Reconnaissance report identified two workable alternative plans which were studied intensively in the feasibility study. Both of these plans included a minimum level of protection alternative, A; a moderate level of protection alternative, B; and a maximum level of protection alternative, C. These plans were discussed in detail on pages 65 and 66.

Basin topography is so flat that increases in discharge; which provide increasing levels of protection, to move otherwise low velocity flows through the system; would require extremely large cross-sectional areas along the canal. However, since development has encroached upon the channel and structures are placed within a very short distance of the bank in many locations; providing a much larger channel would be prohibitively expensively. This would also require the relocation and disruption of many of the residents for whom the project is designed to protect. In addition to relocating structures, a substantial infrastructural investment in public utilities located along the channel would have to be relocated.

Plans A and 2A provide the largest possible channel while minimizing land purchases. The moderate alternatives B and 2B, were designed with the largest possible discharge through the system, while minimizing land purchases; but included the replacement of the most constrictive bridge. The hydraulic evaluation determined it would not be effective to attempt to provide higher levels of protection by further widening the channel without replacing additional bridges. Therefore, the maximum alternatives, C and 2C, were developed to provide the highest possible level of protection, included bridge replacement as well as the increase in channel size.

Evaluation of alternatives with lower degrees of protection were not conducted for two reasons. Firstly, fixed project investment costs would not decrease significantly with lower degrees of protection. Costs for rights of entry and exit points for excavation, spoil areas, mobilization and de-mobilization of equipment would not change. Additionally, in the alternatives that propose a sheetpile wall, the length of sheet pile construction utilized to protect structures adjacent to the channel would not change and this cost was 75% of the total construction cost. Secondly, plans smaller than the minimum alternatives are not acceptable to the local sponsor and therefore not implementable.

A preliminary assessment of benefits and costs for the six plans are shown on Table 9. Table 10 provides the benefits and costs for the six plans in addition to the retention areas. Flood damage and damage reduction benefits were calculated for structures, contents and automobiles. The tables show the annual damages and average annual benefits for each of the plans.

When the plans were compared, the larger degree of protection afforded by replacement of the bridges proved to provide lower net benefits, since bridge replacement is so costly. The plan with the highest net annual benefits is shown to be Plan A (with and without the retention areas). Therefore, Plan A was selected as the NED plan. The local sponsor accepted Plan A as their choice.

The retention areas were then considered. Table 7 shows the total volume of retention needed to retain the first inch of runoff is 282.6 acre-feet. The total amount of vacant land feasible to use for retention is approximately 7.54 acres; providing possibly 7 acre-feet of retention. The amount of retention that could be provided is less than 3 percent of that recommended by DER. The costs of the retention area would add over $1.6 million to the cost of the project. These costs included the cost of the land and expected construction costs.

The retention basins were not designed to "tie in" to existing drainage facilities or to provide inlet or outlet structures. The retention basins would only receive rainfall in the immediate area higher than the retention areas. The cost for the retention areas could easily go up to more than $2 million if they are to be incorporated into the existing stormwater drainage system.

Based on the estimated costs of providing these retention basins and the extremely limited water quality enhancement that they could provide, it was determined that the cost of the retention basins far exceeded the benefits that they would provide. Therefore, the retention areas were excluded and Plan A without the retention basins is the selected plan.

This selected plan was presented to DER, now the Department of Environmental Protection (DEP), on April 8, 1993, to explain the efforts the U.S. Army Corps of Engineers and the local sponsor took to provide additional water quality benefits. DEP continued to have concerns relative to the potential adverse water quality impacts. DEP stated that the water quality assessment must show that there will be no increased pollutant loading delivered to Manatee River and into Tampa Bay.

Risk and Uncertainty Analysis

According to the planning guidance letter entitled: Implementation of Risk Analysis on Section 205 Detailed Project Reports, dated April 28,1995, risk analysis must be considered and addressed in final DPRs. Those DPRs already underway when EC 1105-2-205 was issued may use descriptive evaluation when full quantitative Risk Analysis would impose additional cost and time. The guidance letter is dated after the completion of the Cedar Hammock Detailed Project Report. There was literally no funding to support even a qualitative effort. Because of the strong B/C ratio (3.1 for the selected plan) and the high average annual damages, however, it was felt that a risk and uncertainty analysis would not reveal a major variance in data or assumptions, but, if this were the case, the District might elect to conduct a limited risk analysis using the model and existing data to confirm the recommended plan during the Plans and Specifications phase.

Environmental Effects

Biological Resources

Fish and wildlife habitats are minimal due to the urban nature in the study area, consisting of small or transient populations of few species, mostly of small freshwater and estuarine fish and wide-ranging wading birds. Neither the Planning Aid Report (PAR) written during the reconnaissance phase of the study, nor the draft Coordination Act Report (CAR) submitted during feasibility stage studies have identified significant fish and wildlife resources or critical habitats for endangered species. The U.S. Fish and Wildlife Service stated in the CAR that it has no objections to the project as proposed, although it did criticize the small retention areas once considered (during plan formulation), because it feared they might attract wildlife and subject it to unnecessary predation and traffic dangers.

Clearing and snagging, channel widening and bank stabilization during construction will cause temporary adverse effects on wildlife habitat and fish resources; due to noise of heavy machinery, disturbance of the substrate and temporary increases in water turbidity due to excavation. However, creek bottom sediments are fairly coarse (mostly sand-size) and natural settling will quickly restore stream clarity. Furthermore, stabilization of the bank slope will decrease future sedimentation due to rainstorm events.

The only permanent wetland that will be affected on project lands is the stream bottom itself. Temporary removal of bank slope vegetation and stream bottom vegetation will lead to mortality, disturbance or emigration of the stream fauna. After construction is complete the stream cross-sectional area will be widened over its present dimensions, providing additional substrate for in-stream organisms during low flow periods. The stream bottom habitat will restore itself through re-seeding of aquatic plants and re-migration of small fish; but these organisms will continue to be (as at present) susceptible to total or partial wipe-out during heavy runoff events. Extreme flood events will essentially wipe out attached benthic vegetation and

flush out invertebrate and fish fauna, which will then gradually re-establish when the flood has abated.

The mangrove-colonized sand island downstream of the 7th Avenue Bridge exerts no influence on upstream flood levels, and is not proposed for removal. Since no significant wetlands resources will be affected, no specific wetland mitigation measures are proposed.

The proposed location for disposal material is the Manatee County Landfill. It is located on Lena Road south of S.R. 64, approximately 10 miles from the proposed project. A detailed analysis of the environmental effects is provided in the ENVIRONMENTAL ASSESSMENT.

Water Quality

To evaluate potential impacts of structural modifications, the U.S. Army Corps of Engineers' computer model HEC-5Q Simulation of Flood Control and Conservation Systems was employed to simulate the study area. The modeling study and its results are discussed in Appendix F. The model was used to predict the changes that delivery times might produce on selected water quality constituents presumed to be in the channel waters. Visual and statistical comparison of the results showed that the limited increase in delivery time that the modifications to the canal produced caused no significant change in the quality of the water delivered from Cedar Hammock (Wares Creek) to the Manatee River and thus to Tampa Bay. Degraded water moving downstream in the Manatee River is not significantly further degraded by inputs from the drainage canal. Inputs are minor and are detectable only for short distances around the mouth of Wares Creek.

The conclusion, based on the model runs, was that estimated nutrient and pollutant loads of the conventional chemical constituents modeled would be no different under with and without project conditions; that is, there would be no increase in loads to the receiving waters (Manatee River and eventually Tampa Bay) under design flood conditions, as compared to present conditions. Since the total volume, and concurrently, the total load of nutrients will not be affected by the project; the conclusion is that no water quality degradation will be incurred by the construction of this project.

Air Quality and Noise

Some temporary local increase in particulate and hydrocarbon emissions are expected while the project is under construction, due to the movement of heavy equipment (dump trucks) through the neighborhood to the county landfill. However, all applicable air quality regulations will be implemented to minimize these effects. Once the project is built, air quality will be the same as under without-project conditions. The operation of construction machinery will create additional noise that is likely to disturb some residents living immediately adjacent to the creek during daytime hours. All construction activities would be accomplished during normal working hours, and appropriate noise-suppression equipment would be installed on construction vehicles. The noise environment of the study reach would return to normal once the project is built.

Aesthetic Resources

The implementation of the flood control channel improvements would clear the successive native and exotic plant material from the channel and side slopes to increase capacity and flow rate in the "clearing and snagging" area. Aesthetics will be permanently affected by this project component. The trapezoidal grass-lined channel will enlarge the existing channel and take down all trees within the construction easement. Grassing channel side-slopes, where channel bank widening and reshaping will occur, is the recommended construction method for bank stabilization and aesthetic treatment. Vertical sheetpile walls beginning upstream of 21st Avenue West will denude the streambed and construction easement of trees in a community park and the densely developed Bradenton Mobile Home Park. Perpetual underground tie-backs proposed for the sheetpile walls will also require tree removal for installation. Trees within the permanent project easements will be cleared to provide access for channel improvements. Staging areas have been located. However, final details concerning the construction operations are not available at this time. Temporary impact on existing aesthetics are anticipated in these areas. However, no long term adverse aesthetics impacts are anticipated to the project staging areas at this time.

Some mature or specimen-size shade trees will be removed along the channel right-of-way. These trees belong to common native or exotic species used for urban landscaping, and do not constitute significant natural resources. However, they contribute to soften the appearance of the existing channel and provide some wildlife cover. Their removal will change the appearance of the channel and reduce available shade over the water in some reaches. Tree removal will affect the visual aesthetics of the project reach.

In the ENVIRONMENTAL ASSESSMENT, an "Aesthetic Mitigation/ Enhancement Plan" has been proposed. The cost of this plan has not been included in the cost estimate for Plan A. Manatee County has a tree replacement ordinance in the County zoning and planning code. If this proposal meets with the County ordinance, it may be included in Plan A.

The concept of an aesthetic mitigation plan is to restore the aesthetics to their pre-project condition. A tree survey would be performed during the plans and specifications phase so the project can appropriately include existing trees in the final design. Project channel improvements could reflect the existing neighborhood landscape practice by "trimming up" low growing tree limbs instead of clear cutting trees in the "clearing and snagging" phase. The trapezoidal channel work could consider bulkheading trees which fall into the "channel construction" areas. Trees within the construction easement could be preserved, not clear-cut. If low tree limbs deny construction access, they could be properly pruned to maintain natural tree form and healthy tree growth.

Tree replacement is the final and ultimate endeavor which has the greatest chance to restore impacts to aesthetics altered by the channel improvement project. The local sponsor could accomplish tree planting through contracts or volunteer programs similar to the Jacksonville Gator Bowl Tree Planting Project. The benefit of native, southern wildflower seed mix would be realized with the decreased cost of mowing and the increase of aesthetics in the

area. Detailed aesthetic plans and specifications will be developed once a final survey is completed.

THE SELECTED PLAN

The design channel cross-sections were developed to minimize land taking in this highly developed residential area. For this reason, the design channel top width would be limited to a maximum of about 80 feet. The proposed plan for flood control would provide for reduced flood stages for all flood events, with a bankfull capacity greater than the 5-year flood event for most of the project reach. Plates A-5 and A-6 in Appendix A present the with-project condition flooded areas for the 25-year, 100-year, and Standard Project Flood. The 10-year flood would cause some street flooding in the study area, and in the lowest lying area begin to encroach on some homes.

The recommended plan is similar to alternative 5 as presented in the March 1990 Reconnaissance Report. The recommended plan is shown on Plate A-11 in Appendix A, and includes channel improvements as follows:

Manatee Avenue Bridge to 17th Avenue West - starting upstream approximately 500 feet of the Manatee Avenue Bridge modifications will include clearing and snagging only;

17th Avenue West to 21st Avenue West - construction of a trapezoidal grass-lined channel with 1V:2H side slopes, a 26-foot-bottom width and top width varying from 40 to 80-feet-wide. An additional 10 feet on each side will be required for operation and maintenance purposes, requiring a total acquisition of 30 feet on each side of the existing top of bank. This area will be acquired as a perpetual channel improvement easement;

21st Avenue West to 14th Street West (B.R. 41) - construction of a vertical sheet pile wall with a 40 foot bottom width. The sheet pile wall will be anchored with 40-foot-long underground steel tie-back rods. These rods will measure 6 inches in diameter and will be spaced 12 feet apart throughout the length of the sheet pile wall. The tie-back rods will extend underground approximately 40 feet from the proposed wall. As such, a 30 foot perpetual underground bulkhead tie-back easement will be acquired on each side of the channel which will run adjacent to the 10 feet being acquired for operation and maintenance purposes.

14th Street West (B.R. 41) to 44th Avenue West (Cortez Road) Bridge - resume construction of a trapezoidal grass-lined channel (1V:2H side slopes, 26-foot-bottom width, and varying 40 to 80-foot top width) upstream of 14th Street West (B.R. 41) to just downstream of the 44th Avenue West (Cortez Road) Bridge, where project improvements terminate. An additional 10 feet on each side will

be acquired for operation and maintenance purposes. This 30 foot area on each side of the existing top of bank will be acquired as a perpetual channel improvement easement.

Existing inlet structures would be modified to conform to project features. No new inlet structures are planned. The recommended plan of improvements does not call for modifications to any bridges. However, the proposed channel design would modify the approach and getaway at numerous bridges. It was noted that the 9th Avenue bridge especially presents a significant constriction on the existing stream. As part of the recommended plan of improvement, the channel design would call for realigning the creek to remove, as much as possible, the two abrupt direction changes at this location. The east bank would be modified to provide a smoother curve in the alignment of the creek from one side of the bridge to the other.

Two temporary work area easements (staging areas) will also be required. The first area consists of approximately 3.2 acres and is located directly west of the Ballard School located at 20th Street West, east of the channel and south of 9th Avenue West. The second staging area consists of approximately 1.2 acres and is located between the eastern side of the channel and 16th Street West, within the Bradenton Trailer Park. The acquisition of a temporary easement over this area will affect 11 mobile homes.

If the project is authorized, detailed plans and specifications would be prepared for bid solicitation and construction. Construction would be accomplished under contract with supervision by the U.S. Army Corps of Engineers. It is estimated that project construction could be completed within 2 years.

A detailed cost estimate of the selected plan is provided in Appendix D of this report. All work is based on 1994 price levels, utilizing the fiscal year 1994 discount rate of 8 percent to determine an annualized cost. A summary of the detailed project costs is given in Table 11 and the annual benefits and costs are shown in Table 12.

Other Considerations

As noted earlier, E.O. 11988 requires Federal agencies to recognize significant values of floodplains and to consider public benefits that would be realized from restoration or preservation of floodplains. The four criteria cited earlier provide the basis for determining overall plan compliance with the order. The floodplain in the project area has been greatly altered by development. While the proposed plan is within the floodplain, it is considered to be the only practical alternative for implementation. In this regard, its overall effect is to reduce the hazards and risks associated with floods in the urban area of Bradenton and adjacent unincorporated Manatee County and thus minimized the impacts of floods on safety, health, and the general well-being of the area. In view of these effects and finding, the proposed plan is considered to be in full compliance with E.O. 11988. The Environmental Assessment describes the compliance with environment requirements.

TABLE 11

SELECTED PLAN
Summary of Project Costs
(1994 Price Levels)

ACCOUNT	ITEM	ESTIMATED COST	CONTINGENCY	TOTAL COST
02	Relocations	$ 295,400	$ 73,900	$ 369,300
09	Channels and Canals	6,570,000	1,642,500	8,212,500
TOTAL CONSTRUCTION COSTS		6,865,400	1,716,300	8,581,700
01	Lands and Damages	2,964,000	1,038,000	4,002,000
30	Planning, Engineering and Design	469,400	117,400	586,800
31	Construction Management	540,200	135,100	675,300
TOTAL PROJECT COSTS		$10,839,000	$3,006,700	$13,845,700
TOTAL INITIAL COSTS				**$13,845,700**

TABLE 12

SELECTED PLAN
ANNUAL BENEFITS AND COSTS
(1994 Price Levels and 8% Interest)
[Revised April 1996 at 7-5/8%]

ITEM	AMOUNT
Initial Costs	$13,845,700
Interest during Construction	~~$1,115,300~~ $1,107,800
TOTAL PROJECT INVESTMENT	~~$14,961,100~~ $14,953,500
Average Annual Costs	~~$1,223,000~~ $1,169,900
Operation, Maintenance, and Replacements	$9,300
TOTAL ANNUAL COSTS	~~$1,232,300~~ $1,179,200
TOTAL ANNUAL BENEFITS	3,860,700
B/C Ratio	~~3.1~~ 3.3
Net Benefits	~~$2,628,400~~ $2,681,500

Operation and Maintenance

The local sponsor is responsible for operation and maintenance of the improvements proposed in this report upon the completion of the construction contract. Development of an operation and maintenance program must be based on the guidelines found in ER 1110-2-401 (Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual for Projects and Separable Elements Managed by Project Sponsors); and ER 1110-2-1405 (Hydraulic Design For Local Flood Protection Projects).

The estimated annual cost for operation and maintenance is $9,300 which includes regular mowing of the levees and side slopes of the channels. The contractor will be responsible for all maintenance during the construction contract.

PLAN IMPLEMENTATION

INSTITUTIONAL REQUIREMENTS

The draft report was coordinated with the sponsor and other agencies for review and revisions have been made. This final report will be forwarded for further review and approval by the U.S. Army Corps of Engineers. When and if approved, the project would be placed on the national list of projects awaiting funding. When funds become available, plans and specifications would be prepared, local interests would be asked to sign a Local Cooperation Agreement, and a contract then advertised and awarded to perform the work. Once rights-of-way and easements are provided by the sponsor, construction would be commenced under supervision of the U.S. Army Corps of Engineers. Following completion of construction, all project works would be transferred to the sponsor for operation and maintenance.

DIVISION OF RESPONSIBILITIES AND COST SHARING

The implementation of the proposed plan is a joint endeavor by the sponsor and Federal interests. Thus, responsibilities for implementation are shared by each. The Federal Government, through the U.S. Army Corps of Engineers, is the lead agency in plan implementation. As such, the U.S. Army Corps of Engineers is responsible for all design work and engineering, preparation of all necessary contract documents, contract award, supervision of construction, and assuring project completion. However, prior to implementation, local interests must enter into an agreement with the United States in accordance with Section 103(j) of the Water Resources Development Act (WRDA) OF 1986 (PL 99-662).

COST SHARING FOR FLOOD DAMAGE REDUCTION

Costs for preparation of plans and specifications will be initially Federally financed and later recovered from the sponsor during construction as part of the total project (implementation) cost. The cost for plans and specifications is listed in the cost estimate found in Appendix D, Table D-2, as Planning, Engineering and Design.

The final LCA will be approved during the preparation of plans and specifications. The LCA must be executed between the local sponsor and the district commander after HQUSACE project approval and before awarding the initial construction contract for the project. Before construction, non-Federal interests must agree to: pay 5 percent of the project first cost assigned to flood control, in cash, during construction of the project, proportional to the rate of Federal expenditures; and to provide all lands, easements, rights-of-way, including suitable borrow and

dredged material disposal areas, and perform all related necessary relocations (LERRD), including LERRD required for fish and wildlife mitigation.

Deferred Payment

Section 103(a)(4) of WRDA 1986 permits non-Federal interests to defer payment of contributions in excess of 30 percent of the costs assigned to flood control (5 percent cash plus 25 percent LERRD). The excess costs may be paid over a 15 year period, or shorter period, if agreed to by the Secretary and non-Federal interests. Repayment shall begin on the date construction of the project or separable element is completed, and must include interest from the date payments would otherwise have been made, at the interest rate determined pursuant to Section 106 of WRDA 1986.

Federal Funding Limit

Under Section 205 of the 1948 Flood Control Act, as amended, the statutory limit of Federal cost is $5 million for each project. This Federal limit includes the costs incurred for all studies (reconnaissance and feasibility) and project implementation.

Estimated Cost Sharing for Project

Utilizing the cost sharing criteria outlined previously, the breakdown for Federal and non-Federal participation is shown in Table 13.

Financial Analysis

A letter from the local sponsor will be obtained during review of this report to show their financial capability and support. Construction will completed under one contract and the non-Federal share will be provided in advance of construction.

Sponsor Views

The sponsor, Manatee County, has been contacted on numerous occasions and was given the opportunity to review the draft report in detail. A copy of the letter requesting the study from the sponsor is included in Appendix G of this report.

Local Cooperation Agreement (LCA)

A draft Local Cooperation Agreement utilizing the form LCA for Section 205 Continuing Authority flood control project is located in Appendix H.

Explanation of Cost Sharing Table

Total construction costs include the cost of channels and canals; Planning, Engineering and Design; and Construction Management (S&I). These costs are summarized on Table 13 and may be found in detail in the cost estimate included Appendix D, Table D-2.

While there is no limit on the total cost of a project implemented under the Continuing Authority Program, the statutory federal limit is $5 million which includes the costs incurred for all studies.

Statutory Federal Limit:	$5,000,000
Initial Appraisal	28,700
Reconnaissance Study	60,000
Detailed Project Report (Federal)	255,000
Total Federal study costs	343,700
Total Remaining Federal Limit	$4,656,300
NON-FEDERAL	
Total Project Cost	$13,845,700
Less Federal Share	$4,656,300
Non-Federal Share	$9,189,400

TABLE 13
Estimated Cost Sharing[1]
Selected Plan

ITEM	TOTAL $	FEDERAL $	NON-FEDERAL $
CONSTRUCTION			
Channels and Canals	8,212,500		
PED	586,800		
Construction Management (S&I)	675,300		
TOTAL CONSTRUCTION COSTS	9,474,600	5,231,585	4,243,015
RELOCATIONS	369,100		369,100
REAL ESTATE[2]	3,504,000		3,504,000
REAL ESTATE ACQUISITION/ ADMINISTRATION COSTS	498,000	117,000	381,000
SUBTOTAL	13,845,700	5,348,585	8,497,115
5% CASH CONTRIBUTION		(692,285)	692,285
SUBTOTAL		4,656,300	9,189,400
ADJUSTMENT FOR MAX/MIN CONTRIBUTION		0	0
SUBTOTAL		4,656,300	9,189,400
TOTAL	13,845,700	4,656,300	9,189,400

[1] A more detailed cost sharing breakout will be completed in the executed LCA.

[2] Includes PL 91-646 Payments and 35% Contingency

Coordination and Public Involvement

Throughout preparation of this report close coordination has been maintained with the representative for the local sponsor, the Manatee County Public Services Department, with the city of Bradenton, and with other governmental offices, elected officials, special interest groups and individual citizens. A public meeting was held on November 29, 1994, in Bradenton, Florida, in cooperation with the Manatee County Board of County Commissioners.

CONCLUSIONS

The six alternatives selected for study were evaluated on the basis of costs, benefits achieved, environmental impacts, and project goals met. Under these analyses; Plans B and 2B, and Plans C and 2C were eliminated on the grounds that they produced less economic benefits in excess of costs. Plan A was determined to be the plan producing the greatest economic benefits in excess of costs while protecting the environment and existing cultural resources, as required under Federal guidelines for water resources development. Plan A, therefore, was designated the National Economic Development (NED) Plan.

Plan A includes clearing and snagging the lower reach of Cedar Hammock (Wares Creek) starting upstream of Manatee Avenue bridge and extending to 17th Avenue West. Then the existing channel will be widened to a trapezoidal grass-lined channel with 2H:1V side slopes, and a 26 foot bottom width extending from 17th Avenue West to 21st Avenue West. A vertical sheet pile wall channel will be constructed from just upstream of 21st Avenue West to B.R. 41 with a 40 foot bottom width. Then the trapezoidal grass-lined channel (2H:1V side slopes, a 26 foot bottom width) will be resumed upstream of U.S. Highway 41 and extending to just downstream of the 44th Avenue West (Cortez Road) bridge, where project improvements terminate. The design channel top width of the trapezoidal channel would be limited to a maximum of about 80 feet.

The proposed plan for flood control would provide for reduced flood stages for all flood events, with a bankfull capacity between the 5-year and 10-year flood event, depending on the project reach; providing a 10 year level of protection, with minor nuisance flooding in some areas. The recommended plan of improvements does not call for modifications to any bridges. However, the proposed channel design would modify the approach and getaway at numerous bridges. The channel design at the 9th Avenue West Bridge includes realigning the creek to remove, as much as possible, the two abrupt direction changes at this location. The east bank would be modified to provide a smoother curve in the alignment of the creek from one side of the bridge to the other.

This plan appears to be in the best overall public interest and is the most feasible plan for implementation. This plan meets the designated criteria for participation by the Federal Government in improvements for flood control. It also conforms to the guidelines for Federal water resource project development as provided under the Principles and Guidelines. There are no more economical plans identified that address the primary study objectives and achieve a significant reduction in flood damages for the area. The impacts of the proposed plan are deemed beneficial overall and the plan is considered to be in full compliance with all pertinent environmental statutes as well as other Federal laws and directives regarding water resource project development.

Pertinent economic data for the recommended plan based on 1994 price levels and an interest rate of 7-5/8 percent (revised April 1996) are as follows:

Estimated First costs	
Federal	$ 4,656,300
Non-Federal	9,189,400
Total	$13,845,700
Average Annual Costs	$ 1,169,900
Average Annual Benefits	$ 3,860,700
Benefit-to-Cost Ratio	3.3:1

Based on an analysis of overall economic, environmental, and social impacts, the above plan was found to be in the Federal interest and justified for implementation. Therefore, this flood protection plan is recommended for approval for Federal construction.

RECOMMENDATIONS

The Administration has initiated the development of a new cost sharing policy for flood damage reduction projects. I recommend that improvements for flood damage reduction in the Cedar Hammock (Wares Creek) Basin be authorized subject to cost sharing that is consistent with Administration policy. This recommendation is also subject to the non-Federal sponsor agreeing to comply with applicable Federal laws and policies, including the following requirements:

a. Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

b. Provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project;

c. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Government, in accordance with applicable Federal and State laws and any specific directions prescribed by the Government;

d. Grant the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project;

e. Hold and save the Government free from all damages arising for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors;

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs;

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act

way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government;

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project;

i. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA;

j. Participate in and comply with applicable Federal floodplain management and flood insurance programs in accordance with section 402 of Public Law 99-662;

k. Prevent future encroachments on project lands, easements, and rights-of-way which might interfere with the proper functioning of the project;

l. Not less than once each year, inform affected interests of the limitations of the protection afforded by the project;

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

n. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

o. Comply with all applicable Federal and Commonwealth laws and regulations, including section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

o. Comply with all applicable Federal and Commonwealth laws and regulations, including section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, Manatee County Government, Florida; interested Federal agencies; and other parties will be advised of any modifications and will be afforded an opportunity to comment further.



TERRY L. RICE
Colonel, Corps of Engineers
Commanding

REFERENCES

1. Flood Insurance Study, City of Bradenton, Florida, Manatee County, prepared by the Federal Emergency Management Agency (FEMA), Federal Insurance Administration, December 1, 1980.

2. Flood Insurance Study, Manatee County, Florida, Unincorporated Areas, prepared by FEMA, dated September 15, 1983.

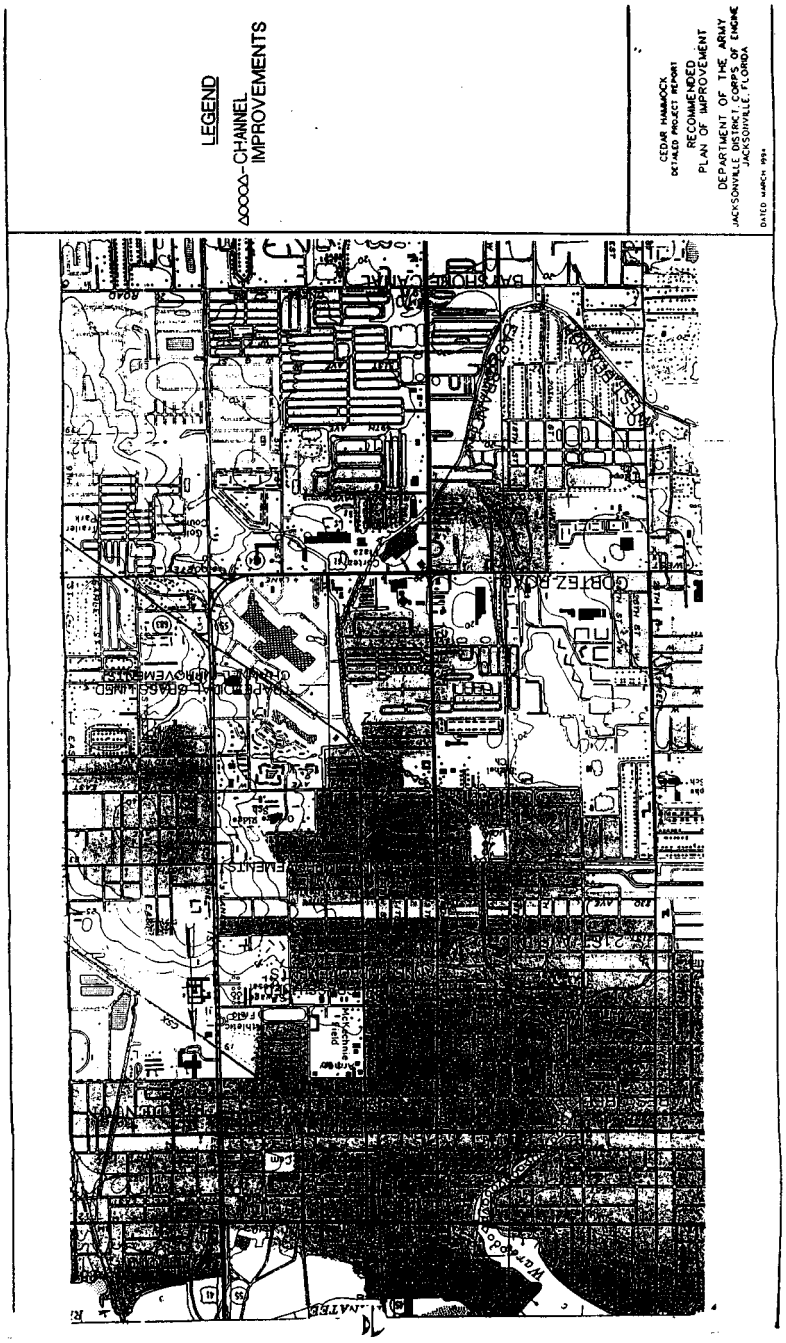
3. Initial Appraisal Report for Wares Creek, Bradenton, Florida, dated July 1984, prepared by the Jacksonville District, U.S. Army Corps of Engineers.

4. Master Stormwater Drainage Plan, Area A, Manatee County Government, dated November 1984, prepared by Briley, Wild & Associates, Inc.

5. Master Stormwater Drainage Plan, Area B, Manatee County Government, dated April 1986, prepared by Briley, Wild & Associates, Inc.

6. Cedar Hammock (Wares Creek) Reconnaissance Report, dated March 1990, prepared by the Jacksonville District, U.S. Army Corps of Engineers.

7. The City of Bradenton Comprehensive Plan, prepared by the City of Bradenton, adopted July 26, 1989, by the City Council of Bradenton, Florida, and amended by Ordinance 2457 April 10, 1991.


LEGEND
CHANNEL IMPROVEMENTS
CEDAR HAMMOCK
DETAILED PROJECT REPORT
RECOMMENDED
PLAN OF IMPROVEMENT
DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA
DATED MARCH 1994

[First Endorsement]

CESAD-ET-PL (CESAJ-PD-PF/17 Apr 96) (10-1-7a)
Mr. Meyer/bg/404-331-4326
SUBJECT: Cedar Hammock (Wares Creek) Feasibility Report and Environmental Assessment

Commander, South Atlantic Division, U.S. Army Corps of Engineers, Room 322, 77 Forsyth Street, SW., Atlanta, Georgia 30303-3490
09 MAY 1996

FOR CHIEF, POLICY REVIEW AND ANALYSIS DIVISION, ATTN: CECW-AR, 7701 TELEGRAPH ROAD, ALEXANDRIA, VIRGINIA 22315-3861

I concur in the recommendation of the District Engineer in the provision of flood damage reduction measures for Cedar Hammock (Wares Creek) in Bradenton, Manatee County, Florida.

Encl

R. L. VanAntwerp
Brigadier General, USA
Commanding

TABLE OF CONTENTS

Title	Page
1.00 SUMMARY	97
2.00 INTRODUCTION: PURPOSE OF AND NEED FOR ACTION	98
3.00 PROPOSED ACTION AND ALTERNATIVES ANALYSIS	98
4.00 AFFECTED ENVIRONMENT	99
4.01 Air Quality and Noise	99
4.02 Water Quality	99
4.03 Cultural Resources	100
4.04 Aesthetic Resources	100
4.05 Wildlife Resources	101
4.06 Fish Resources	102
4.07 Hazardous, Toxic or Radiologic Wastes	102
5.00 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION	102
5.01 Unavoidable adverse effects	102
5.02 Relationship between Short Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity	103
5.03 Irreversible or Irretrievable Commitments of Resources	103
5.04 Relationship between the Proposed Action and Federal, regional, State and Local Land Use, Plans, Policies and Controls	103
5.05 Community Growth, Cohesion and Displacement of People and Businesses	104
5.06 Air Quality and Noise	104
5.07 Water Quality	104
5.08 Cultural Resources	105
5.09 Aesthetics	105
5.10 Fish and Wildlife Resources	106
5.11 Property Values	106
5.12 Cumulative effects	107
6.00 COMMITMENTS	107

Title	Page
7.00 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS	107
7.01 Clean Air Act	107
7.02 Clean Water Act	107
7.03 Coastal Zone Management Act	107
7.04 Endangered Species Act	107
7.05 Estuary Protection Act	108
7.06 Fish and Wildlife Coordination Act	108
7.07 National Historic Preservation Act	108
7.08 National Environmental Policy Act (NEPA)	108
7.09 Resource Conservation and Recovery Act	108
8.00 COORDINATION	108
9.00 LIST OF PREPARERS	109
10.00 REFERENCES	109

ATTACHMENTS

A. CLEAN WATER ACT SECT. 404 (B) (1) EVALUATION	111
B. COASTAL ZONE CONSISTENCY DETERMINATION	116
C. COMMENTS AND RESPONSES	121

ENVIRONMENTAL ASSESSMENT

1.00 SUMMARY. This Environmental Assessment has been prepared by the Jacksonville District, U.S. Army Corps of Engineers (Corps) to document feasibility phase investigations of flood damage reduction measures along the east branch of Cedar Hammock drainage canal and Wares Creek, in the City of Bradenton and unincorporated Manatee County, Florida. Authorization for the study is contained in Section 205 of the 1948 Flood Control Act, as amended. Co-sponsor of the project is Manatee County. Flood damage reduction measures recommended are shown on Figures 1 and 2 and Plate 11. Proposed improvements would begin near the mouth of Wares Creek, on the south side of Manatee Avenue (S.R. 64), in Bradenton, and end on the north side of Cortez Road (44th Avenue West). Recommended improvements include the following: (1) snagging and clearing along lower Wares Creek, beginning south of the Manatee Avenue Bridge and extending upstream to 17th Avenue West, with some minor stream realignment recommended around the 9th Avenue West bridge; all of the snagging and clearing work to be accomplished within the existing channel; (2) Channel improvements beginning at 17th Avenue West and extending upstream to the north side of 21st Avenue West, consisting of a trapezoidal earthen channel with a 26 foot bottom width, 2 horizontal on 1 vertical side slopes and variable top width; (3) Channel improvements beginning at the south side of 21st Avenue West and extending through 30th Avenue West, ending at the 14th Street West intersection, consisting of a 40 foot wide, vertical walled, sheet pile lined channel; (4) Beginning at the intersection of 30th Avenue West and 14th Street West, extending upstream to the north side of Cortez Road (44th Avenue West) channel improvements consisting of a trapezoidal, earthen walled channel with 2 horizontal on 1 vertical side slopes and a 26 foot bottom width. Clearing and snagging and the channel improvements will generate about 100,000 cubic yards of excavated material, which will be removed to an upland disposal site (Manatee County landfill). An evaluation was made of the existing environmental resources and the probable environmental effects of implementing the alternatives discussed in the Detailed Project Report (DPR). Information on natural and man-made resources of the study area was obtained from existing sources, scoping responses from State and Federal resource agencies, studies performed under contract to the Corps, and provided by cooperating agencies and the co-sponsor. After consultation with the State Historic Preservation Officer, the U.S. Fish and Wildlife Service, Southwest Florida Water Management District and interested resource agencies and parties, the Corps has determined that no significant impacts to natural or man-made resources would result from implementation of the recommended plan. A preliminary Finding of No Significant Impact (FONSI) is attached to this Environmental Assessment (EA).

2.00 INTRODUCTION: THE PURPOSE OF AND NEED FOR THE PROPOSED ACTION. Cedar Hammock east branch and Wares Creek are upper and lower reaches of the same stream. Wares Creek is the name attached to the downstream reach, which is mostly within the city limits of Bradenton. The Cedar Hammock part of the stream is a partly hardened urban drainage waterway that empties into Wares Creek, which in turn

enters the Manatee River in Bradenton. The entire stream system covers about 6 square miles and drains densely populated residential and commercial areas of Manatee County. Residential lots crowd particularly close along both banks of Wares Creek (between 9th Avenue West and 26th Avenue West). Two large shopping malls near the upstream end of the study area (Cortez Mall and De Soto Mall) contribute significant amounts of runoff from hardened roofs and parking areas. This urban drainage basin was mostly built up prior to current State and Water Management District regulations requiring retention of storm runoff, and lacks adequate storm water retention areas. Minor flooding occurs frequently all along the lower canal and Creek, and major rainfall events such as the well-documented flood of 1988 cause extensive property damage and disruption of traffic and normal business activities along Highways (Business) 41 and US 301. Refer to the Main Report and Appendix A (Hydrology and Hydraulic Analysis) for documentation of prior floods.

3.00 PROPOSED ACTION AND ALTERNATIVES ANALYSIS. The proposed plan (Plate 11) is a combination of clearing and snagging (along most of Wares Creek) and channel widening and other improvements (between 17th Avenue West and Cortez Road). Improvements are designed to reduce flood stages for all flood events, with a bank-full capacity greater than the 5 year flood event for most of the study reach.

Proposed improvements would begin near the mouth of Wares Creek, on the south side of Manatee Avenue (S.R. 64), in Bradenton, and end on the north side of Cortez Road (44th Avenue West). Recommended improvements include the following: (1) snagging and clearing along lower Wares Creek, beginning at the South side of the Manatee Avenue Bridge and extending upstream to 17th Avenue West, with some minor stream realignment recommended around the 9th Avenue bridge; all of the snagging and clearing work would be accomplished within the existing channel; (2) Channel improvements beginning at 17th Avenue West and extending upstream to the north side of 21st Avenue West, consisting of a trapezoidal earthen channel with a 26 foot bottom width, 2H on 1V side slopes and variable top width; (3) Channel improvements beginning at the south side of 21st Avenue West and extending through 30th Avenue West, ending at the 14th Street West intersection, consisting of a 40 foot wide, vertical walled, sheet pile lined channel; (4) Beginning at the intersection of 30th Avenue West and 14th Street West, extending upstream to the north side of Cortez Road (44th Avenue West) channel improvements consisting of a trapezoidal, earthen walled channel with 2H on 1V side slopes and a 26 foot bottom width. All materials excavated would be removed and trucked to an off site upland disposal area, the Manatee County landfill.

Other alternative courses of action evaluated but not recommended as effective include no action, upstream flood retention, re-routing of one tributary, various combinations of downstream bridge removals, evacuation of residents, further widening and/or deepening of the Cedar Hammock east drainage system, and other types of flood protection, including flood-proofing. Removal of a larger number of residences would not be cost-effective, due to the extremely dense development of surrounding neighborhoods and prevailing high real estate values in the Bradenton Metropolitan area. While upstream retention might have

offered an effective solution many years ago, at present the parts of the watershed most in need of retention areas are built out into medium or high density residential and commercial property and a diligent search during the feasibility phase of the study did not identify sufficient undeveloped lands to retain a significant proportion of the runoff in most sub-watersheds. The vacant lot that had been identified in the Reconnaissance Report (located near the head of the western tributary of the Cedar Hammock East Branch) would not have contributed significantly to flood reduction, since this sub-watershed already has sufficient retention areas. Re-routing of part of the western tributary was likewise evaluated and not recommended, since it was found to worsen flood stages upstream along the eastern tributary, where flood problems were most severe. Greater widening of the east sub-tributary of the Cedar Hammock Canal was considered but not recommended because the cost would have far exceeded Federal cost limitations under the Section 205 (Continuing Authorities) program. Raising of one or more downstream bridges would have provided additional flood relief, but, as in the case of greater channel widening, the additional costs would have been borne by the non-Federal partner, who opted not to endorse this action. Likewise, flood-proofing structures by raising the general ground level would be enormously costly at this late stage in watershed development. It was determined that the proposed plan, in combination with all applicable non-structural alternatives, including a program of vigorous and regular channel cleaning and debris removal, was the only effective medium-term solution to the flooding and water quality problems in the study area.

4.00 AFFECTED ENVIRONMENT. The watershed of Cedar Hammock East Branch/Wares Creek covers about 6 square miles. Topography is nearly flat in the western part of the watershed and steeper in the eastern tributary branch. The lower watershed includes mostly single family residential structures, including a large number of manufactured homes (mobile homes). Residents of a widespread area are affected by the largest flood events. Homes, schools, churches, commercial and industrial properties and urban infrastructure elements, including sanitary sewers, are affected. Under existing conditions even a 50% ("2 year") recurrence flood causes significant interruption of commerce and daily life.

4.01 Air quality and Noise. In general, air quality in the Bradenton area and the rest of Manatee County is good. There are no non-attainment areas within the County. The largest industrial emitters in the County are a large power plant, a phosphate mining operation and a citrus processing plant, all located in the eastern part of the County at a considerable distance from the study reach. The urban environment is fairly noisy in the daytime, especially near Manatee Avenue and along the Cedar Hammock East Branch reach that runs close to Business 41.

4.02 Water quality. There are no permanent water quality stations along Wares Creek or Cedar Hammock East Branch. Water quality data for this part of the Cedar Hammock basin is taken sporadically and little published information is available. Except during high rainfall periods the predominant source of flow is groundwater exfiltration and the stream supports small fish and invertebrates as well as the wading birds that feed on them (refer to

Paragraphs 4.05 and 4.06). Due to the impervious nature of a substantial part of the watershed and the lack of on-site retention, urban and primarily residential storm runoff arrives at the stream with most of its conventional pollutant load in solution or suspension. The stream does not appear to be affected adversely by existing storm water flow as it supports healthy populations of biota as mentioned above.

4.03 **Cultural resources.** Initial coordination with the Florida Division of Historical Resources indicated that no known archeological or historic properties were recorded in the project area. In letters dated January 19, 1989 and March 28, 1989 the Florida State Historic Preservation Officer recommended that a cultural resources survey be completed to locate and assess the significance of historic properties that could be affected by the proposed project. A cultural resources survey was conducted by historic preservation staff of the U.S. Army Corps of Engineers on 9-10 March 1992. The survey included archival research and a surface and subsurface inspection of the project area, including alternatives that would affect bridges and residences. At the Manatee County Historical Library investigators examined ca. 1851 military maps of the project area, 1915 Sanborn Insurance Maps, and a series of aerial photos from 1940, 1951, and 1969. During the inspection of the project area investigators examined potentially significant historic features that were identified from the maps and aerial photos, examined exposed ground surfaces and excavated judgmentally placed shovel tests searching for intact archeological deposits. Three bridges crossing Wares Creek at 7th, 9th, and 12th Avenues and several residential structures north of 30th Avenue may be historically significant and eligible for inclusion on the National Register of Historic Places. No potentially significant architectural features were identified south of 30th Avenue, and no significant archeological sites were located within any part of the project area.

4.04 **Aesthetic resources.** Aesthetic resources are defined as "those natural and cultural features of the environment that elicit a pleasurable response" in the observer, most notably from the predominantly visual sense. Consequently, "aesthetic resources are commonly referred to as visual resources, ... features which can potentially be seen."

The existing aesthetic resources within the study area are considered to contribute important visual relief to the immediate surroundings and neighborhood character throughout the proposed project. Visual aesthetics of the area surrounding the stream are typical of older single-family residential and small scale commercial neighborhoods, with rather closely-spaced houses, mature landscape trees, many small residential neighborhoods and relatively large expanses of concrete and asphalt in relation to green spaces. The general exception is constituted by the banks of Wares Creek. Somewhat more "natural" creek settings are immediately visible from the many small bridges that cross the creek; examples would be bridges at 9th, 12th, and 14th Avenues. The creek is almost completely shaded by mature tree canopies from 14th to 21st Avenue; the tree cover provides a relaxing and cooling experience. From 21st to 23rd Avenues the project study area possesses aesthetic value because of the mature native trees on maintained grassed banks. These trees provide the dense residential development with a visual and auditory screen, color, and cooling relief

from the otherwise flat urbanized area. Upstream of the fire station bridge, a row of mature shade trees screen a residential development from the heavy traffic of Business 41. Channel areas to the south possess patchy mature tree areas with lower aesthetic value due to washed out banks, unmowed wild native perennial grasses, cross bracing, and dense commercial development along Highway 301.

4.05 **Wildlife resources.** Field visits and consultation with the U.S. Fish and Wildlife Service Vero Beach Field office (FWS) did not lead to identification of any critical populations or habitat resources in the area of the project. In response to early scoping for environmental issues, the State of Florida Game and Freshwater Fish Commission (FGFWFC) identified the following Endangered (E), Threatened (T), or State Species of Special Concern (SSC) as potentially present in the project area: West Indian manatee (E), wood stork (E) bald eagle (T), southeastern American kestrel (T), eastern indigo snake (T), Sherman's fox squirrel (SSC), American oystercatcher (SSC), snowy egret (SSC), tricolored heron (SSC), reddish egret (SSC), brown pelican (SSC), gopher tortoise (SSC), American alligator (SSC) and common snook (SSC). However, studies performed by U.S. FWS under the Fish and Wildlife Coordination Act (Coordination Act Report) did not find significant populations or even habitat suitable for these species in the study reach. Wading birds, including the snowy egret and wood stork, may sporadically visit the stream and feed on its fish and invertebrate fauna, but no adequate reproductive habitat occurs within the study reach, due to the dense urban surroundings and the inevitable presence of feral and domestic animal predators. Manatee habitat does exist at the mouth of Wares creek with the Manatee River, where deeper water is available; however, the study reach is too shallow to provide habitat for manatee, mature snook, or mature alligators. In addition to the above species, FWS and FGFWFC identified the Florida Scrub Jay (E) as potentially present in the undeveloped brush surrounding the upstream detention area along the west tributary to Cedar Hammock East Branch. However, as part of a Planning Aid study undertaken during the project's Reconnaissance phase, this area was inspected by Service biologists with negative results. Both FWS reports, which are reproduced in the Coordination Appendix, conclude that none of the above listed species are regularly present in the study reach, and no significant habitat for these species is present.

Birds are the most notable wildlife resource in the drainage basin. All common species of waders probably visit the stream; in addition to the species listed above, white ibis and little blue heron were observed feeding along the stream during biologists' site visits. A midstream shoal island just south of the Manatee Avenue bridge supports a young mixed stand of black and white mangroves. These shrubby trees were frozen to ground level in December, 1989, but have recovered by vigorous sprouting in subsequent years. During initial project planning the Corps was requested to consider removal of the shoal, but hydraulic studies showed that it does not contribute to upstream flooding, and its removal is not part of the presently proposed project. This small island is a significant refuge and possibly a night roost for wading birds, including tricolored, great and little blue herons. Its isolation in the middle of the stream makes it inaccessible to some urban predators, most

notably domestic cats, while the waders find abundant food resources in the small fish and invertebrates that inhabit the stream.

4.06 **Fish resources.** Except in the estuarine reach (generally, downstream of the 9th Avenue bridge in Bradenton), the stream is too shallow and narrow, and its water levels fluctuate too abruptly in response to rainfall-generated runoff, to support a great diversity of aquatic life. The Planning Aid Report (PAR) prepared by FWS lists mosquito fish, soft shelled turtles and other turtles as dominant faunal elements. Other freshwater fauna include diving beetles, insect larvae and small snails. The estuary supports small or juvenile individuals of mullet, needlefish, sand perch, sheepshead and killifish, and may provide some limited developmental habitat for juveniles of other estuarine fish. The fish fauna is essentially washed out of the watershed into the Manatee River during major flood events, re-establishing itself during intervening normal flow periods. Due to regular bank clearing by the County and city public works crews, creek bank habitat is moderately to severely limited.

4.07 **Hazardous, toxic and radiologic waste.** A preliminary assessment was conducted in March 1994 to address the existence or potential for occurrence of HTW contamination on lands, including structures and submerged lands, in the Cedar Hammock/Wares Creek study area. The assessment included a project review, site literature/document review, and site reconnaissance. During the reconnaissance, the following potential indicators were looked for: Landfills, dumps, disposal areas; burning or burned areas; aboveground or underground tanks; vats, lagoons, ponds or basin sludge pits; excavations (pits, quarries or borrow areas); containers of unidentified substances; spills, seepage, slicks; odors; dead or stressed vegetation (brown, spotted curled or withered leaves); water treatment plants; wells, ditches, trenches, depressions; transport areas (i.e., boat yards, harbors, rail yards, airports, truck terminals); abandoned buildings. The preliminary assessment report found no indicators of toxic or radiologic waste.

5.00 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION.

5.01 **Unavoidable adverse effects.** Clearing and snagging at the mouth of Wares Creek will cause temporary adverse effects on wildlife habitat and fish resources due to noise of heavy machinery, disturbance of the substrate and temporary increases in water turbidity due to excavation. However, creek bottom sediments are fairly coarse (mostly sand-size) and natural settling will quickly restore stream clarity. Furthermore, stabilization of the bank slope will decrease future sedimentation due to rainstorm events. The only permanent wetland that will be affected on project lands is the stream bottom itself. The stream cross-sectional area will be widened over its present dimensions, providing additional substrate for in-stream organisms during low flow periods. However, as at present, extreme flood events will essentially wipe out attached benthic vegetation and flush out invertebrate and fish fauna, which will then gradually re-establish when the flood has abated. The mangrove-colonized sand island downstream of the 7th Avenue Bridge, once proposed for dredging by the co-

sponsor, exerts no influence on upstream flood levels, and is not proposed for removal. Since no significant wetlands resources will be affected, no specific wetland mitigation measures are proposed.

Some mature or specimen size shade trees will be removed along the channel right-of-way. These trees belong to common native or exotic species used for urban landscaping, and do not constitute significant natural resources. However, they contribute to soften the appearance of the existing channel and provide some wildlife cover. Their removal will change the appearance of the channel and reduce available shade over the water in some reaches. Tree removal will affect the visual esthetics of the project reach, and replacement plantings are recommended (refer also to Paragraph 5.09).

5.02 **Relationship between short term uses of the environment and maintenance and enhancement of long term productivity.** The human environment is already committed to long term residential use. The project discussed in this EA is designed to sustain and improve the quality of the existing human-dominated environment and increase business productivity by reducing the risk and frequency of flooding. No significant or highly productive natural habitats have been identified on the watershed in the study reach; furthermore, water quality modeling indicated that no change in the quality or contaminant levels in the receiving waters (the mouth of the creek) would be induced by project construction. Therefore, no trade-offs of long term productivity for short-term use can be identified in relation to the proposed project.

5.03 **Irreversible or irretrievable commitments of resources.** No new irreversible commitments would be made by the proposed project. No additional natural areas would be committed or converted to urban use by the proposed project. The stream reach proposed for installation of vertical sheet pile reinforced channel walls already has a vertical or near-vertical cross-section, and most of it is now bulkheaded on one or both sides with concrete. Most commitments of resources have already been made in the study area. Almost the entire stream drainage is now committed to urban residential and commercial use, and this status is unlikely to change in the foreseeable future.

5.04 **Relationship between the proposed action and Federal, State and local land use policies, plans and controls.** The proposed flood control project is consistent with improvements recommended in prior flood control studies performed for Manatee County and the City of Bradenton, although it is smaller in scope than many prior proposals, since it does not include bridge removal or rerouting of the western tributary of Cedar Hammock East Branch. During plan formulation a number of potential sites for additional storm water retention were identified, but these sites were determined to offer inadequate capacity to significantly reduce flooding or contaminant loading, while at the same time greatly increasing project cost. Bridge removal options were considered but not recommended due to their extremely high cost in relation to the flood reduction benefits they potentially would have generated. Rerouting of the western East Branch tributary was dropped from further

consideration when hydraulic studies indicated that this alternative would actually worsen flooding conditions upstream.

The proposed project has also been evaluated for consistency with the Florida Coastal Zone Program and determined to be consistent. It would not cause adverse impacts on water quality or significant marine or estuarine resources; it would contribute to reduce sedimentation of lower Wares Creek, by providing armoring for those sections of the stream that would experience high water velocities, while providing a grass-lined bank with stable side slopes for the rest of the project reach. Relationship between the proposed action and Federal, State and local land use policies, plans and controls.

5.05 **Effects on community growth, cohesion and the displacement of people and businesses.** An estimated 11 mobile homes, located in the Bradenton Trailer Park, would need to be removed in order to allow staging and permanent maintenance access to the vertical-walled section of Cedar Hammock. No other residences or businesses would be displaced. Clearing and grubbing along the Wares Creek segment will be accomplished by placing equipment within the banks, thereby avoiding unnecessary takings of or disturbance to private properties. Access and permanent right-of-way easements have been minimized there as well as throughout the rest of the project. There will be no other permanent effects on community cohesion. No businesses would be displaced. Since the communities surrounding the study reach are already densely developed, and the purpose of the recommended plan was to avoid unnecessary and costly taking of properties along the stream, implementation of the plan, while it would not stimulate new growth, will not interfere with existing infrastructure, buildings or commerce.

5.06 **Air quality and noise effects.** Some temporary local increase in particulate and hydrocarbon emissions are expected while the project is under construction, due to the movement of heavy equipment (dump trucks) through the neighborhood to the county landfill. However, all applicable air quality regulations will be implemented to minimize these effects. Once the project is built air quality will be the same as under without-project conditions. The operation of construction machinery will create additional noise that is likely to disturb some residents living immediately adjacent to the creek during daytime hours. All construction activities would be accomplished during normal working hours, and appropriate noise-suppression equipment would be installed on construction vehicles. The noise environment of the study reach would return to normal once the project is built.

5.07 **Water quality effects.** The Florida Department of Environmental Protection (DEP) and the Southwest Florida Water Management District (SWFWMD) recommended a modeling study of storm water runoff under with-and-without project conditions, to determine if the proposed improvements would worsen water quality over existing conditions at the downstream end of the proposed project. The model chosen was the Corps water quality model HEC-5Q. The modeling study and its results are discussed in Appendix F. The conclusion, based on the model runs, was that estimated nutrient and pollutant loads of the conventional chemical constituents modeled would be no different under with-and-without

project conditions; that is, there would be no increase in loads to the receiving waters (Manatee River and eventually Tampa Bay) under design flood conditions, as compared to present conditions. This was due primarily to the short retention times in the system. There would also be no net overall increase in loading, specifically nutrients and selected other constituents, to the receiving waters. The long-term water quality effects of the project are neutral.

5.08 **Effects on cultural resources.** The three bridges crossing Wares Creek at 7th, 9th, and 12th Avenues and the residential structures north of 30th Avenue which may be eligible for inclusion on the National Register of Historic Places will not be affected by the proposed action. As documented during the cultural resources survey completed in 1992, no other potentially significant historic properties are located within the project area. Based on the results of the survey, and in compliance with the National Historic Preservation Act of 1966, as amended (PL 89-655) and its implementing regulation 36 CFR Part 800, the U.S. Army Corps of Engineers determined that this proposed project would have no effect on properties listed on or eligible for listing on the National Register of Historic Places. In a letter from the Florida State Historic Preservation Officer (SHPO) dated October 10, 1991, and in subsequent telephone conversations in April 1992, the SHPO concurred with this determination. If, during construction, it is determined that previously undiscovered historic properties will be adversely affected by the project, a mitigation plan will be developed, in consultation with the SHPO, and completed. All work will be conducted in compliance with the National Historic Preservation Act of 1966, as amended (PL 89-655) and the Archeological and Historic Preservation Act, as amended (PL 93-291).

5.09 **Aesthetic effects.** The implementation of the flood control channel improvements would clear the young native and exotic plant material from the channel and side slopes to increase capacity and flow rate in the "clearing and snagging" area. Aesthetics will be permanently affected by this project component. The trapezoidal grass-lined channel will enlarge the existing channel and take down all trees within the construction easement. Grassing channel side-slopes, where channel bank widening and reshaping will occur, is the recommended construction method for bank stabilization and aesthetic treatment. Vertical sheet pile walls beginning "just upstream of 21st Avenue" will denude the stream bed and construction easement of trees in a community park and the densely developed Bradenton Mobile Home Park. Perpetual underground tie-backs proposed for the sheet pile walls will also require tree removal for installation. Trees within the permanent project easements will be cleared to provide access for channel improvements. Staging areas have been located. Temporary impact on existing aesthetics are anticipated in these areas. However no long term adverse aesthetic impacts are anticipated to the project staging areas at this time.

The concept of an aesthetic mitigation plan is to restore the aesthetics to their pre-project condition. A tree survey is recommended as part of the plans and specifications study phase so the project can appropriately include existing trees in the final design. Project channel improvements could reflect the existing neighborhood landscape practice by "trimming up" low growing tree limbs instead of clear cutting trees in the "clearing and

snagging" phase. The trapezoidal channel work could consider bulkheading trees which fall into the "channel construction" areas. Trees within the construction easement could be preserved, not clear-cut. If low tree limbs deny construction access, they could be properly pruned to maintain natural tree form and healthy tree growth.

Manatee County has a tree replacement ordinance in the County zoning and planning code. Tree replacement is the final and ultimate endeavor which has the greatest chance to restore impacts to aesthetics altered by the channel improvement project. The local sponsor could accomplish tree planting through contracts or volunteer programs similar to the Jacksonville Gator Bowl Tree Planting Project. The benefit of native, southern wildflower seed mix would be realized with the decreased cost of mowing and the increase of aesthetics in the area. Detailed aesthetic plans and specifications will be developed once a final survey is completed. A $50,000 budget for tree replacement would adequately fund the planting of three gallon sized native trees by volunteers, based on the tree plantings at the Gator Bowl interchange in Jacksonville, Florida.

5.10 **Effects on fish and wildlife resources.** Clearing and grubbing, channel widening and bank stabilization during construction will cause temporary removal of bank slope vegetation and stream bottom vegetation, leading to mortality, disturbance or emigration of the stream fauna. After construction is complete stream bottom habitat will restore itself through re-seeding of aquatic plants and re-migration of small fish; but these organisms will continue to be (as at present) susceptible to total or partial wipe-out during heavy runoff events. Removal of trees inside the 10' wide maintenance right of way on each side of the channel will reduce shading of the channel bottom and may slightly increase daytime water temperatures in affected reaches. This factor is not expected to significantly affect overall water quality, because long stretches of the stream are already cleared of overhanging vegetation. Fish and wildlife resources of the study reach are minimal, consisting of small or transient populations of few species, mostly of small freshwater and estuarine fish and wide-ranging wading birds. Neither the Planning Aid Report (PAR) written during the reconnaissance phase of the study, nor the draft Coordination Act Report (CAR) submitted during feasibility stage studies have identified significant fish and wildlife resources. The U.S. Fish and Wildlife Service stated in the CAR that it has no objections to the project as proposed, although it did criticize the small detention areas once considered (during plan formulation), because it feared they might attract wildlife and subject it to unnecessary predation and traffic dangers.

5.11 **Effects on property values.** The proposed project would not cause severance of significant areas of property from parent tracts. Most of the proposed channel maintenance easements take small portions of the rear of tracts: "back yards". No effect is expected on the value of the remainder of affected tracts. Property values of tracts adjacent to Cedar Hammock/Wares Creek may now be lower than those of similar properties outside the flood zone (because of their susceptibility to frequent flooding). These existing residential and commercial properties adjacent to the study reach may increase in value if the project is built and flood frequency is reduced.

5.12 **Cumulative effects.** There are no additional Corps projects in the Wares Creek watershed. All of the presently foreseen project impacts are accounted for in this environmental document. Construction and operation of the proposed channel improvements for flood control will increase the cumulative urbanization of the watershed through further human-induced alterations of the Wares Creek channel; but this process is already so far advanced that impacts on natural resources would be minimal or insignificant.

6.00 COMMITMENTS.

Since no significant natural or cultural resources have been identified inside the proposed project reach, no mitigation commitments have been made to date. Should evidence of such resources be discovered during later stages of project development, consultation with the appropriate resource agencies would be re-initiated and appropriate mitigation would be considered and/or implemented as appropriate.

7.00 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS.

7.01 **Clean Air Act.** The project will comply with the Clean Air Act. Coordination with DEP and the Manatee County Department of Public Works indicated that the project is sited inside an attainment area. The project is not expected to cause any significant new atmospheric emissions. Applicable air quality regulations will be strictly followed.

7.02 **Clean Water Act.** An evaluation of the water quality effects produced by proposed modifications to the waterway has been completed as required under the Clean Water Act. This evaluation is reproduced as Attachment A. The project is specified as complying with the Act. A Water Quality Certificate from the State of Florida certifying that State water quality standards will be not be exceeded will be applied for. Tampa Bay, to the north, and Sarasota Bay, to the south, are National Estuary Program sites under the Clean Water Act. None of the improvements proposed in this study would affect water quality in these estuaries.

7.03 **Coastal Zone Management Act.** This study and project are in compliance with the policies of the Coastal Zone Management Program of Florida. The Consistency Evaluation is found as Attachment B of this Environmental Assessment.

7.04 **Endangered Species Act.** No species designated under this act occur in the area. No resting, feeding or reproductive habitat of any designated species occurs in the area. Informal consultation under Section 7 of the Act was concluded during the reconnaissance phase of the study (Attachment C). The Coordination Act Report (CAR) reconfirmed the absence of Federally designated endangered or threatened species or other significant wildlife populations. The CAR is reproduced in Appendix G (Coordination).

7.05 **Estuary Protection Act.** This Law provides for Federal designation of Estuaries of National Significance, and consultation with the Secretary of the Interior for projects that may impact such estuaries. The Wares Creek estuary is not part of such a designated area.

7.06 **Fish and Wildlife Coordination Act.** The proposed project has been coordinated with the Vero Beach Field office, U.S. Fish and Wildlife Service; a Coordination Act Report (CAR) is included in Appendix G. The CAR states that no significant fish or wildlife resources occur along the proposed project alignment. Nevertheless, they recommend stream "rejuvenation" measures for fish and wildlife habitat enhancement along lower Wares Creek (widening meanders, creation of riffles, etc) that would require a much wider real estate footprint than the current clearing and snagging proposed by the Corps, and would require extensive additional land acquisition through densely developed residential neighborhoods. Since this proposed "rejuvenation" is for the purposes of enhancing stream habitat quality, it does not consider flood retention capacity, nor the probable effects of existing frequent floods on such a "rejuvenated" floodplain, if it were built. The proposal was not further considered, because the CAR states that no significant habitat will be impacted by the recommended project; therefore there is no justification for the improvements proposed.

7.07 **National Historic Preservation Act.** This law requires Federal agencies to take into consideration the effects of their undertakings on historic properties, and to afford the Advisory Council on Historic Preservation or the State Historic Preservation Officer the opportunity to comment on the effects of the undertaking. This project is in full compliance with the National Historic Preservation Act.

7.08 **National Environmental Policy Act (NEPA).** An Environmental Assessment (EA) of the potential effects of the proposed snagging and clearing has been conducted. The draft document has been coordinated for public comment and comments received. Based on the results of the EA and comments from various state and federal agencies as well as nonprofit and private parties, the NEPA process will be finalized.

7.09 **Resource Conservation and Recovery Act.** A preliminary (Level 1) assessment was carried out in October, 1993 to detect the possible presence of toxic, hazardous or radiologic waste. No indicators of toxic or radiologic waste were observed.

7.00 COORDINATION. Interagency coordination of the Cedar Hammock/Wares Creek flood control studies began in 1987 when a letter was received from Manatee County requesting assistance in a study of the Cedar Hammock East Branch. This request was combined with a previous request, dated January 11, 1984, by the city of Bradenton for a study of flooding problems along Wares Creek. A Reconnaissance Report was published in March 1990. The Reconnaissance study was coordinated with the Florida State Historic Preservation Officer, the Department of Environmental Regulation, the Department of Community Affairs and Department of Natural Resources. Early scoping for the feasibility phase study was completed in 1991 and early 1992. Potential environmental issues that surfaced during early scoping included: potential effects on threatened, endangered, or State

species of special concern; potential adverse effects of further hardening and channeling on downstream water quality; potential water quality effects on outstanding Florida waters; compatibility with the SWIM Plan for Tampa Bay, and basin-wide stormwater modeling. (Refer to Main Report Appendix F). These issues have been discussed where applicable in the Detailed Project Report and this Environmental Assessment.

All substantial comments received during public coordination of the draft Detailed Project Report and Environmental Assessment are compiled as Attachment C of this EA. Please refer to Attachment C for responses to pertinent comments.

9.00 LIST OF PREPARERS. The following persons were substantially responsible for the contents of this Environmental Assessment: Barbara Cintrón, Biologist (principal compiler); Kimberly Koelsch, Biologist; Jim McAdams, Environmental Engineer; David McCullough, Archeologist; Paul Stevenson, Landscape Architect; Priscilla Trigg, Civil Engineer.

10.00 REFERENCES.

U.S. Army Corps of Engineers 1990. Reconnaissance Report. Cedar Hammock (Wares Creek), Manatee County, Florida. Flood Control Section 205 Study. Planning Division, Jacksonville District U.S. Army Engineer Division, Jacksonville Florida. 23 pp, Plates, Appends.

Carroll, J. 1989. Planning Aid Report, Cedar Hammock, Bradenton, Manatee County. U.S. Fish and Wildlife Service, Vero Beach Field Office, Vero Beach, Fl. 3. pp.

Gallagher, J., 1993. Draft Fish and Wildlife Coordination Act Report, Wares Creek/Cedar Hammock Flood Reduction Project, Bradenton, Manatee County. October, 1993. U.S. Fish and Wildlife Service, Vero Beach Field Office, Vero Beach, Fl. 9 pp, figures.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

FINDING OF NO SIGNIFICANT IMPACT
PROPOSED FLOOD REDUCTION MEASURES
CEDAR HAMMOCK EAST DRAINAGE CANAL AND WARES CREEK
BRADENTON, FLORIDA

I have reviewed the Environmental Assessment (EA) for the proposed action. Based on information analyzed in the EA, reflecting pertinent information obtained from other agencies and special interest groups having jurisdiction by law and/or special expertise, I conclude that the proposed action will have no significant impact on the quality of the human environment. Reasons for this conclusion are, in summary:

1. The study area is densely urban. It encompasses parts of the city of Bradenton and adjoining Manatee County. Significant or potentially significant cultural resources have been identified in the general study area; however, none will be affected by the proposed works. The State Historic Preservation Officer has concurred with this determination.

2. Fish and Wildlife habitats on the project are minimal due to the urban nature of the environment and current poor stream water quality. A Coordination Act Report provided by the U.S. Fish and Wildlife Service (FWS) did not identify significant fish or wildlife habitats requiring mitigation actions. The Florida Game and Freshwater Fish Commission concurred with the findings of FWS.

3. As a result of informal consultation under Section 7 of the U.S. Endangered Species Act, no threatened or endangered species or their habitat were identified on project lands according to the report cited in the preceding paragraph. Therefore, the project is in compliance with the Act.

4. Hydrologic and storm-water modeling performed as required by the Florida Department of Environmental Protection (DEP) indicated that construction of the proposed improvements would not lead to deterioration of surface water quality in lower Wares Creek nor increase the pollutant load to the Manatee River.

5. The proposed project has been determined to be consistent with the Florida Coastal Management Program.

6. Excess dredged materials will be deposited in the Manatee County landfill. There will be no discharge of dredged materials to waters of the United States.

7. A level 1 survey did not identify any areas likely to contain hazardous, toxic or radiologic waste along the proposed project area.

In consideration of the information summarized, I find that the proposed actions described in the Report and Environmental Assessment will not significantly affect the human environment and do not require the preparation and circulation of an Environmental Impact Statement.

13 Apr 95
Date

TERRY L. RICE
Colonel, Corps of Engineers
Commanding

ATTACHMENT A
CLEAN WATER ACT
SECTION 404(B)(1) EVALUATION

CEDAR HAMMOCK/WARES CREEK
FLOOD CONTROL STUDY
SECTION 404(B)(1) EVALUATION REPORT

I. Project Description

A. Location. Cedar Hammock East Canal drains into Wares Creek in Manatee County and Bradenton, Florida. The canal/creek system discharges into the Manatee River.

B. General description. To improve flood flows in the study reach, a combination of snagging and clearing and channel improvements are proposed. Sand, rock and weedy vegetation will be removed from the banks of Wares creek in Bradenton, beginning on the south side of the Manatee Avenue Bridge and continuing south to 17th Avenue west. Channel widening will occur between 17th Avenue West and the end of the project at the north side of Cortez road, in Manatee County. A section of channel between 21st Avenue West and 30th Avenue West will be vertical walled and lined with sheet pile. The remaining channel walls will be trapezoidal in section. Rip-rap armoring will protect high-velocity reaches of the trapezoidal channel from erosion and sedimentation.

C. Authority and Purpose. The study leading to the recommendations contained in the Report and Environmental Assessment (EA) was authorized under Section 205 of the Flood Control Act of 1948, as amended. The purpose of the works is to provide partial flood protection to parts of the city of Bradenton and unincorporated Manatee County, Florida.

D. General description of Dredged or Fill material. Material to be grubbed and dredged consists of sandy sediments and overlying vegetation. Material to be dredged includes sandy sediments, smaller amounts of silt and clay and some limestone rock (refer to Appendix C, Geotechnical Investigations).

(1) Characteristics of material. Materials in the upper strata of the channel banks are quartz sands. They are underlain, at varying depths, by hard limestone. Between the sands and the limestone is a thin weathered layer of limestone, clays and silts. Splitting of the limestone will be required in some areas; blasting is not expected to be necessary.

(2) Quantities of material.

- About 101,640 cubic yards of sediments will be removed from the channel by dredging; an additional 14,500 cubic yards of stone will be removed after drilling and splitting. All 116,140 cubic yards will be removed from the project area and disposed of in the Manatee County landfill, an upland disposal site.

- About 106,810 square feet of steel sheet piling will be emplaced in the channel to create the vertical walled center section of the project. This sheet piling will be tied back with 494 soil anchors.

- Transition areas of the channel will be reinforced with 1,790 tons of bedding stone covered by 4,130 tons of riprap.

(3) Source of Material. Materials will be grubbed or dredged from the bottom of Wares Creek and Cedar Hammock East Branch.

E. Description of the Proposed Discharge Site.

(1) Location. The Cedar Hammock East Branch/Wares Creek stream system begins in unincorporated Manatee County. The East Branch drainage canal initially flows toward the east, makes a sharp turn to the north and empties into Wares Creek, which in turn is a tributary of the Manatee River.

(2) Size. The drainage covers about 6 square miles of nearly flat to gently sloping lands south of the Manatee River. "Cedar Hammock" east branch is basically a man-made urban drainage ditch. Lands are covered densely with residential and commercial structures.

(3) Type of site. Directly impacted wetlands types include: estuarine open water (lower Wares Creek, up to approximately the 9th Avenue bridge) and riparian (stream bottom and stream bank). About 12 acres of stream habitat will be affected by the proposed improvements.

(4) Type of habitat. The estuarine open water area is habitat for small sized individuals of estuarine fish, including mullet, killifish, sheepshead and sand perch, as well as insects and small crustaceans. Wading birds feed and rest along the banks and on offshore islands, which will not be affected by the proposed project. The upstream, freshwater reaches of the stream are almost devoid of fish fauna. Banks in this section are near-vertical or undercut. Frequent clearing by county maintenance personnel and shallow water depths limit the habitat formation in the upstream reaches. Fauna includes diving beetles, insect larvae and small snails.

(5) Timing and duration of discharge. Discharge of materials into the stream (sheet pile and riprap) will occur during construction, which is expected to take about two years. Fauna living attached to the stream bottom will be removed by clearing and dredging during construction, but are expected to re-populate the reach once construction is finished.

F. Description of disposal method. High capacity earth moving equipment such as bulldozers, dump trucks and front-end loaders will be used. All grubbed and dredged materials will be carted off site to an upland disposal area. Only materials to reinforce the channel walls will be discharged into waters of Cedar Hammock/Wares creek.

II. Factual determinations.

A. Physical Substrate Determinations.

(1) Substrate elevation and slope. The slope of the stream bottom is very gradual in the study area. Stream depth varies from over 3 feet at the downstream (Manatee Avenue Bridge) end of the project to less than one inch at Cortez Road.

(2) Sediment type. Stream bottom sediments consist of medium to fine quartz sands overlying hard limestone rock.

(3) Fill material movement. No unconsolidated fill will be discharged into the channel. There will be no fill movement.

(4) Physical effects on benthos. Benthos at dredging and grubbing sites will be removed. The effects of grubbing and dredging will be similar to the present effects of severe flooding, which scours the bottom of the channel and washes benthos out into the Manatee river.

B. Water Circulation, Fluctuation and Salinity Determination.

(1) Water Column effects. There will be a temporary increase in water turbidity during grubbing and dredging, but this effect is expected to be limited to the immediate work area, due to the coarseness of the sediments. Long-term, suspended sediment loads of the channel system should decrease, since erodible banks will be armored to prevent further sedimentation of the channel.

(2) Current Patterns and Circulation. The proposed project will not significantly affect current patterns or water circulation.

(3) Normal Water Level Fluctuations and Salinity Gradients. The estuarine part of the Creek will not be deepened. There will be no change in normal water level fluctuations or salinity gradients.

C. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes at the Disposal Site. Suspended particles from levee construction will temporarily increase water turbidity during dredging, construction of the sheet pile walls and emplacement of bedding stone and riprap. These effects will not persist once construction is complete, because normal flows will not be of high velocity, and erodible areas will be armored. Finished trapezoidal stream banks will be grassed to stabilize side slopes and avoid sedimentation of water bodies.

(2) Effects on chemical and physical properties of the water column.

(a) Light penetration. Will be reduced during elevated turbidity periods immediately during construction. Will quickly return to normal.

(b) Dissolved oxygen. No effect due to immediate construction. The stream is so shallow that light penetrates to the bottom.

(c) Toxic metals, organics and pathogens. No toxic levels of metals or organic materials are known or expected, based on a level-1 survey to detect potential sources of toxic or hazardous waste in the project area performed as part of the study. No changes will occur in other conventional pollutants or pollutant loading to the Manatee River.

(d) Aesthetics. In the downstream section to be cleared and grubbed, machinery will work within the existing stream banks. Very little visual effect is expected. Upstream channel improvements will include removal of existing undermined sheet pile walls, undercut and sedimented areas. A few mature trees will be removed in the trapezoidal channel reach.

(3) Effects on biota.

(a) Primary productivity and photosynthesis. Due to the disturbed, urban nature of the environment and to frequent clearing of stream banks for flood control, no significant impacts on primary productivity of the project reach are expected. Existing vegetation consists of grasses and low bushes.

(b) Suspension/filter feeders. No populations of this biotic group were identified in the project reach. This stream floods frequently enough that it is expected that flood-induced scouring regularly removes attached suspension/filter feeders from the stream bottom and sides.

(c) Sight feeders. Mobile aquatic forms will be able to move away from clearing and grubbing and dredge areas. Land crabs will be displaced.

D. Contaminant Determinations. No contaminants have been identified after a preliminary survey for indications of hazardous, toxic or radiologic waste.

(1) Endangered or Threatened Species. None inhabit the area where disposal will occur. FWS has concurred with this determination.

E. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards. The proposed clearing and grubbing will comply with applicable water quality standards of the State of Florida and the Southwest Florida Water Management District.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. Surface waters in the Cedar Hammock east/Wares Creek subsystem are not suitable for potable water supply.

(b) Recreational and commercial fisheries. There will be no effect on recreational fisheries--basically limited to the Creek mouth and the area near the Manatee Avenue bridge. The rest of the system is too shallow to support any but very tiny fish.

(c) Water Related Recreation. No effect.

(d) Aesthetics. No effect.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and similar preserves. No such preserves exist in the project reach.

F. Determination of Cumulative Effects on the Aquatic Ecosystem. There will be no cumulative effects that result in major impairments of water quality.

Findings of Compliance or Non-compliance with the Restrictions of Discharge.

A. No significant adaptations of the guidelines were made relative to this evaluation.

B. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States.

C. The discharge of fill materials will not cause or contribute to violations of any applicable State water quality standards. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. The placement of fill material will not jeopardize the continued existence of and listed species or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended.

E. The placement of fill materials will not result in significant adverse effects on human health and welfare, municipal and private water supplies, recreational and commercial fishing plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity; productivity and stability; and recreational, aesthetic and economic values will not occur.

F. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems included selecting the plan with the least real impact on the aquatic environment.

G. The proposed clearing and grubbing site is specified as complying with the requirements of these guidelines. The disposal site (Manatee County landfill) is an upland site not subject to these guidelines.

ATTACHMENT B

STATE OF FLORIDA COASTAL ZONE MANAGEMENT PROGRAM

FEDERAL CONSISTENCY EVALUATION

1. Chapter 161, Beach and Shore Preservation.

The intent of the coastal construction permit program established by this Chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: This statute is not applicable to the Cedar Hammock-Wares Creek Project.

2. Chapters 186 and 187, State and Regional Planning.

These Chapters establish the State Comprehensive Plan which sets goals that articulate a strategic vision of the State's future. Its purpose is to define, in a broad sense, goals and policies that provide decision-makers directions for the future, and provide long-range guidance for an orderly social, economic and physical growth.

Response: This project has been developed at the request of Manatee County and the City of Bradenton to address a long-term problem identified in regional planning documents. The small flood control project described in the accompanying Report and Environmental Assessment will significantly relieve local flooding and cause no significant adverse effects on the human or natural environment, terrestrial or aquatic. The study was coordinated with the State Clearinghouse at the beginning of its Feasibility Phase and found consistent. The attached report and environmental assessment will be coordinated again with State agencies prior to receiving approval.

3. Chapter 252, Disaster Preparation, Response and Mitigation.

This Chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: Clearing, grubbing and channel improvements in Cedar Hammock East Branch/Wares Creek will reduce the frequency and severity of overbank flooding in affected neighborhoods, lowering the risk of personal injury, property damage and interruption of normal business activities; therefore the proposed project is in compliance with this Chapter.

4. Chapter 253, State Lands.

This Chapter governs the management of submerged state lands and resources within state lands. this includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities;

swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: No significant submerged natural resources have been identified in the reaches of Wares Creek and Cedar Hammock East drainage canal proposed for improvements. There is a small intertidal sand island in the center of the channel south of the Manatee Avenue Bridge that has a cover of young mangroves. This island will not be grubbed or removed, as its presence has no effect on upstream hydraulics or flooding. Stream banks in the reach to be improved are covered with grass and low bushes. The channel is regularly scoured by flood flows in its existing condition, resulting in conveyance of sandy sediments downstream and their deposition in the upper estuary. After construction of the channel improvements, this sedimentation of the estuary will stop or be greatly retarded. Therefore, the work should aid in maintaining significant submerged resources in lower Wares Creek and the Manatee River, and will be consistent with the goals of this chapter.

5. Chapters 253, 259, 260 and 375, Land Acquisition.

This Chapter authorizes the State to acquire land to protect environmentally sensitive areas.

Response: The project does not include environmentally sensitive lands. No encumbrance of the State's rights under this chapter is established under the project.

6. Chapter 258, State Parks and Aquatic Preserves.

This Chapter authorizes the State to manage State parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed work would not affect any State parks or aquatic preserves.

7. Chapter 267, Historic Preservation.

This Chapter establishes the procedures for implementing the Florida Historic Resources Act.

Response: The project has been coordinated with the Florida State Historic Preservation Officer. No eligible resources will be affected by the project. Historic preservation compliance will be completed to meet all responsibilities under Chapter 267.

8. Chapter 288, Economic Development and Tourism.

This Chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: Contribution from the project area to the State's tourism economy will not be compromised by the project.

9. Chapters 334 and 339, Public Transportation.

This Chapter authorizes the planning and development of a safe, balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project. Flooding would be reduced in frequency and severity on Business 41, improving traffic flow.

10. Chapter 370, Saltwater Living Resources.

This Chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in State waters, to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the State engaged in the taking of such resources within or without State water; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and to conduct scientific, economic, and other studies and research.

Response: The proposed project would occur in freshwater and the uppermost part of the Wares Creek estuary, a highly urbanized reach. Any effects from clearing and snagging in the upper estuary would be minor and transitory. There is no evidence that upper Wares Creek presently serves a significant nursery function for saltwater or migratory species; but even if this were the case, the natural environment will recover quickly. Widening of the freshwater channel reaches and riprap armoring of erodible zones will lead to an overall reduction in sedimentation in the Wares Creek estuary. Therefore the project is in compliance with this Chapter.

11. Chapter 372, Living Land and Freshwater Resources.

This Chapter establishes the Game and Fresh Water Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions which provide sustained ecological, recreational, scientific, educational, aesthetic and economic benefits.

Response: According to the Planning Aid and Coordination Act Reports prepared for the study by the U.S. Fish and Wildlife Service (FWS), no significant freshwater aquatic life or wild animal life will be affected by the project. Although FWS suggested adoption of an alternate plan to "rejuvenate" lower Wares Creek, it stated that the plan recommended in this Report and Environmental Assessment would not significantly impact living resources in the

project area. The alternate plan proposed by FWS would have required the acquisition of many established residences along lower Wares Creek and significant widening of the waterway; its potential cost would have been far beyond the range authorized under Section 205 of the Flood Control Act and would likely have caused major controversy among affected residents. The Florida Game and Freshwater Fish Commission was consulted during early development of the study; species identified as present or likely to be present in the project area were considered or searched for by FWS. None were found to have significant habitat or populations in the study reaches. The Report and EA will be re-coordinated with G & FWF through the State Clearinghouse. Therefore, the project is in compliance with this Chapter.

12. Chapter 373, Water Resources.

This Chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project is under coordination with the Southwest Florida Water Management District (SWFWMD), the State agency responsible for implementing this statute. Modeling performed to determine the hydraulic performance of the project predicted insignificant changes in peak flood flow delivery times to receiving waters, and therefore no effect on resources protected under this Statute.

13. Chapter 376. Pollutant Spill Prevention and Control.

This Chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: A concern raised by State water resources and pollution control agencies has been the potential for the project to increase instantaneous loads of pollutants or nutrients to the receiving waters (Manatee River) in comparison to existing conditions. The quality of water in the Manatee River and eventually Tampa Bay were suspected to be affected by stormwater whose quality might be degraded by operation of the proposed flood control project. Therefore, a computer simulation of the stream was run, using the "HEC-5Q" simulation model. Results indicated that there would be no significant change in water quality in the Manatee River. Therefore the project is in compliance with this Chapter.

14. Oil and Gas Exploration and Production.

This Chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum projects.

Response: The project does not involve exploration for/production of petroleum products.

15. Chapter 380. Environmental Land and Water Management.

This Chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact of proposed large-scale development.

Response: The study and proposed project are local and small scale, rather than of a regional nature, but do not involve development decisions. All of the area within the flood control project is already developed to near-maximum density; therefore, no development decisions will be affected, either positively or adversely, by the project.

16. Chapter 388. Arthropod Control.

This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project will not involve construction of structures or water bodies likely to induce the propagation of arthropod pests; nor does it incorporate pest control measures or strategies. Therefore it is in compliance with this Chapter.

17. Chapter 403. Environmental control.

This Chapter authorizes the regulation of pollution of the air and waters of the State by the Department of Environmental Protection.

Response: All regulations to prevent pollution will be complied with. Permits will be acquired as required under this statute and under the Federal Clean Water Act. As explained in Paragraph 13, above, this project's potential to increase pollutant loading of the receiving waters was simulated, with a finding of no significant increase of nutrients or conventional pollutants.

18. Chapter 582. Soil and Water Conservation.

This Chapter establishes policy for the conservation of the State's soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop and utilize soil and water resources both on site or in adjoining properties affected by the project. Particular attention will be given to project on or near agricultural lands.

Response: No agricultural lands adjoin the project reaches. Some erosion of soil from the banks of Cedar Hammock/Wares creek is occurring under existing conditions, because the banks are undercut and unprotected. The grassed trapezoidal channels, riprap and sheet pile armoring will reduce soil erosion and sedimentation of the estuary, in comparison to present conditions, and therefore would be in compliance with this Chapter.

ATTACHMENT C

COMMENTS AND RESPONSES TO COORDINATION OF THE DRAFT DETAILED PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

December 13, 1994

RE: Flood Control Projects - Section 205 - Draft Detailed Project Report and Environmental Assessment (EA) - Cedar Hammock (Wares Creek) - Manatee County, Florida
SAI: FL#20518081OCR

Dear Mr. Salem:

Pursuant to the National Environmental Policy Act, 42 U.S.C. sections 4321, 4331-4335, 4341-4347, as amended, the Coastal Zone Management Act, 16 U.S.C. sections 1451-1464, as amended, Presidential Executive Order 12372 and Gubernatorial Executive Order 93-194, the State of Florida has completed its review of the above referenced Draft Detailed Project Report and Environmental Assessment (EA).

The Department of Community Affairs, designated as the state coastal management agency pursuant to section 306(c) of the federal Coastal Zone Management Act of 1972, as amended, and section 380.22, Florida Statutes (F.S.), hereby notifies the Army Corps of Engineers (COE) that the state agrees that the project, at this stage of development, is consistent with the Florida Coastal Management Program (FCMP).

Notwithstanding this determination of consistency, several of the reviewing agencies have raised concerns which must be addressed by the COE in the EA before it is finalized. The Department of Environmental Protection (DEP) identified two major concerns regarding water quality degradation in the receiving waters. The DEP's concerns have been the subject of ongoing discussions between the COE and DEP. The concerns are referenced in our enclosed December 6, 1994 letter to the COE, and are

:rther detailed in the DEP's December 12, 1994 letter, which is :so enclosed for your review.

The DEP's December 12th letter outlines the concerns and eficiencies which remain despite the lengthy discussions with :e COE. The DEP notes that:

1. The main factor in defining the scope of work to perform a water quality evaluation is the change in the creek's hydraulics due to the channel modifications. The COE, in the Draft Detailed Project Report and Environmental Assessment submitted on November 9, 1994, addressed the changes in delivery times of water and indicated that the delivery time was one hour less with the channel modifications for a two year rainfall event. From the discharge hydrographs sent to the state, the one hour time difference and the channel location for these hydrographs could not be identified. If this delivery time difference can be substantiated, this small change in delivery times would result in insignificant changes in water quality and pollutant loading.

2a. The HEC-5Q water quality model was modified based on previous state comments. However, the COE should reconcile the following discrepancies between the input data and the node points in the model:

The model input data files show model node point 9 beginning at the upstream reach and decreasing to node point 1 at the mouth of Wares Creek. The input data numbering system for the channel cross section geometry and water quality input values are reversed from this model node arrangement.

b. There are differences in the number of node points for observed water quality (8 node points), subwatershed inflow (7 node points), and subwatershed water quality concentrations (8 node points). Therefore, it is not known where each set of input values is located in the model.

c. Inflow data is absent for model node points 2 and 6 in the HEC-5Q input data files although the hydraulic model configuration indicates that these two nodes receive inflow from subwatersheds.

CORPS RESPONSE TO COMMENTS:

1. **RESPONSE:** The HEC-5Q program showed a relative difference of two hours; however, the model was not calibrated with hydrologic data. A comparison in the differences in peak times of ten minutes is shown in the hydrologic portion of the report.

2a. **RESPONSE.** There were several typos in the data sets and the initial conditions for the "dummy" reservoir needed rework. This data was changed, new graphs run and the new data sets were sent to Kevin Petrus, PDEP, on 12/3/94. Descriptions of the locations of all the parts of the input deck are shown in Appendix F of the Final Environmental Assessment.

2b. **RESPONSE:** The model included a "dummy reservoir" and eight model nodes. The locations of the nodes geographically did not correspond to the location of the samples taken and the last sample was taken below the area modeled. The maps in Appendix F of the Final Environmental Assessment provide the extra information needed.

2c. **RESPONSE:** This is provided on attachment 1 of Appendix F of the Final Environmental Assessment.

For each of the 9 model nodes, all input data should be identified and clearly labeled in the report. This would include the observed water quality data and subwatershed inflow and water quality concentrations. In addition, the channel cross section geometry for each node and the location of each node in Wares Creek should be identified.

The Southwest Florida Water Management District has also expressed concern regarding potential water quality impacts. While the District indicates that these concerns can be addressed in part through the District's permitting process, the COE is encouraged to address these at the earliest possible time. The District indicates that:

1. Rainfall distribution should be based on the Florida Modified Type II Rainfall distribution, which is consistent with the district's permitting requirements.

2. Since the mean high tide elevation is 1.6, the water surface profile for 2, 5, and 10-year events should use a minimum starting water surface elevation of 1.6 for each.

3. Figures A-1, A-2, A-5, and A-7 do not provide inundations durations (i.e., 1 day, 3 day, 7 day inundation) for the 25-year, 100-year, and SPF floods.

4. Based on the supplemental analysis, most of the pollutant concentrations after the improvements do not appear to be significant except for total suspended solids (TSS). The TSS increases about 20% when the low flow conditions are considered. This increase in TSS is significant. Therefore, some form of mitigation may be required. All impacts associated with changes in pollutant concentrations should be evaluated based on the existing ecosystems in the Creek and at the outfall.

5. Due to the urban development between 21st Avenue West and 14th Street West, there may not be a uniform 12 foot center-to-center tie rod spacing for PZ27 sheet piling.

6. Detailed sediment analyses must be conducted to identify pollutants and/or toxins existing within the sediments which will be dredged. This may significantly affect the extent of dredging and

CORPS RESPONSE TO COMMENTS:

1. **RESPONSE:** A balanced storm distribution, which preserves the storm frequency throughout the storm, was chosen for the economic evaluation of the project and presented in the report. The peak flows estimated by the Florida Modified Type II rainfall distribution were used to compare with the peak flows presented in the report. The Florida Modified Type II rainfall distribution under estimates the 50% flood event at the mouth by 6.8% and over estimates the 10% and 100% events by 0.3% and 2.9%, respectively.

2. **RESPONSE:** THe water surface elevations initially used were considered reasonable for the analyses and designs. However, hydraulic model designs were rerun with an initial elevation of 1.6 feet, NGVD, for the 2,5, and 10 year profiles. The resulting water surface profiles showed thhat the higher starting water surface elevation (1.6 feet, NGVD) didnot change water surface profiles upstream of 9th avenue.

3. **RESPONSE:** The Cedar Hammock serves a small urban drainage basin with critical basin response time of less than 12 hours. Therefore, the analysis was limited to a 24 hour period.

4. **RESPONSE:** While the changes in TSS appear to be significant they may be affected by settling basins or other methods to reduce suspended solids which may be totally under the control of the local sponsor. Further methods to refine reduction of TSS will be resolved during the next phase of the project. Also while TSS may cause siltation there are no established water quality standards for protection of the environment, and its effects on the quality of the water are insignificant .

5. **RESPONSE:** The final design of the PZ27 steel sheet piling and tie rods will be revised during the preparation of the Plans and Specifications, after all detailed field information and surveys have been obtained.

6. **RESPONSE:** The Corps will budget for sediment quality testing to be accomplished in the next phase of work. We do not expect however for this area to have significant amounts of toxins as the populations of flora and fauna existing in the area do not appear to be stressed and the watershed is primarily urban rather than industrial. The Corps will coordinate with the SWFWMD on this matter.

dredging methodologies which must be utilized to prevent adverse environmental impacts resulting from the re-suspension of toxins in the water column. Additionally, this sediment analysis will also dictate which upland disposal sites or landfills will be acceptable for the appropriate disposal of dredged material.

The Florida Game and Fresh Water Fish Commission (GFWFC) indicates that its previous comments regarding impacts to threatened and endangered species and their habitat remain applicable for this project. Please refer to the GFWFC's enclosed November 1, 1994 letter and the previous letters which outline the GFWFC's specific concerns.

The Department of State (DOS) indicates that the archaeological and historical survey conducted for this project has not yet been reviewed by the State Historic Preservation Officer. The COE should submit the survey report to the DOS for review as soon as possible and fully comply with any conditions specified by the DOS following its review.

All subsequent environmental documents prepared for this project will be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of the critical environmental protection and water quality issues identified during this and earlier reviews. We appreciate the opportunity to continue working with you to resolve the issues outlined above.

Very truly yours,

Linda Loomis Shelley
Secretary

LLS/rk
Enclosures
cc: Mark D. Phelps, Southwest Florida Water Management District
Lynn Griffin, Department of Environmental Protection
George W. Percy, Department of State
Norman E. Feder, Department of Transportation
Bradley J. Hartman, Game and Fresh Water Fish Commission
Estus Whitfield, Executive Office of the Governor, Office of Planning and Budget

CORPS RESPONSE TO COMMENTS:

1. **RESPONSE:** Neither the Planning Aid Report (PAD) nor the Coordination Act Report (CAR) prepared by the USFWS identified any significant fish and wildlife resources. The COE requested the USFWS to investigate the presence of endangered and threatened species noted in the GFWFC's letter of October 10, 1991. Following site investigations, the USFWS concluded that no threatenbed or endangered species use the currently ditched area and stated that the project would not likely cause any adverse impacts to listed species. For this reason we respectfully disagree with your comment. Please refer to the Coordination Act Report (Attachment D) of the Environmental Assessment for further clarification of this issue.

2. **RESPONSE:** The cultural resources survey conducted for this project has been informally coordinated with the Florida State Historic Preservation Officer (SHPO). In a letter dated February 15, 1995, a copy of the cultural resources survey report was provided to the SHPO for review. The COE will fully comply with any conditions specified by the SHPO following their review.

...ated Decem' r 13, 1994. All comments were addre 1 in the onsolidate etter.

Department of
Environmental Protection

Lawton Chiles
Governor

Mariory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Virginia B. Wetherell
Secretary

December 13, 1994

Deborah Tucker
Executive Office of the Governor
Office of Planning and Budgeting
The Capitol
Tallahassee, Florida 32399-0001

Dear Ms. Tucker:

Re: Detailed Project Report and
Draft Environmental Assessment (EA)
Cedar Hammock/Wares Creek
SAI FL9205190810CR

The Corps of Engineers has evaluated the proposed Cedar Hammock/Wares Creek drainage project in the referenced draft EA. The primary environmental concern for this project is whether it will result in water quality degradation in receiving waters, which are included in the Tampa Bay National Estuary Program. Since July, Department staff have met with the Corps, the Southwest Florida Water Management District (SWFWMD), and Manatee County to discuss and evaluate the water quality modeling presented in the document. The Department's Point Source Evaluation Section (PSES) provided preliminary comments on the original draft EA and requested supplemental information to address deficiencies in the HEC-5Q water quality modeling evaluation. The Corps provided a supplement to the draft EA on November 9 specifically addressing staff concerns. On review of this information, PSES staff contacted the Corps by telephone in an attempt to receive further information to complete our review. The following comments address the concerns we continue to have and are based on all information we received from the Corps since the November 9, 1994 submittal. These deficiencies should be addressed in the EA before it is finalized.

1. The main factor is defining the scope of work to perform a water quality evaluation is the change in the creek's hydraulics due to the channel modifications. The Corps, in the November 9 submittal, addressed the changes in delivery times of water and indicated the delivery time was 1 hour less with the channel modifications for a two year rainfall

We appreciate the opportunity to comment on this document. If you have any questions or require further information, please contact me at 487-2231. Questions concerning the technical comments in this letter may be directed to Kevin Petrus at 488-0780.

Cordially,

Lynn Griffin
Intergovernmental Programs

LG/kp
cc: Virginia Wetherell
Pam McVety
Al Bishop

Ms. Tucker
December 13, 1994
Page Two

event. From the discharge hydrographs sent to us, the 1 hour time difference and the channel location for these hydrographs could not be identified. If this delivery time difference can be substantiated, this small change in delivery times would result in insignificant changes in water quality and pollutant loadings.

2. The HEC-5Q water quality model was modified based on our previous comments, however we have identified discrepancies between input data and the node points in the model:

*The model input data files show model node point 9 beginning at the upstream reach and decreasing to node point 1 at the mouth of Wares Creek. The input data numbering system for the channel cross section geometry and water quality input values are reversed from this model node arrangement.

*There are differences in the number of node points for observed water quality (8 node points), subwatershed inflow (7 node points) and subwatershed water quality concentrations (8 node points). Therefore, it is not known where each set of input values are located in the model.

*Inflow data is absent for model node points 2 and 5 in the HEC-5Q input data files, however within the hydraulic model configuration these two nodes receive inflow from subwatersheds.

*For each of the 9 model nodes all input data should be identified and clearly labeled in the report. This would include the observed water quality data and subwatershed inflow and water quality concentrations. Also the channel cross section geometry for each node and the location of each node in Wares Creek should be identified.

Although the Corps still has not provided complete data and information to fully document the conclusion that there will be no change in water quality after project completion, based on the information available at this time, Department staff are satisfied that the project is unlikely to result in significant water quality degradation. Accordingly, the Department does not object to this project under its authorities in the Florida Coastal Management Program. A final consistency review of this project will be conducted in conjunction with the wetland resource permit evaluation by SWFWMD.

ıceu December 13, 1994. All comments were addres[illegible] in the
ɔnsolidate[illegible]tter.

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

2740 CENTERVIEW DRIVE • TALLAHASSEE, FLORIDA 32399-2100

LAWTON CHILES
Governor

LINDA LOOMIS SHELLEY
Secretary

December 6, 1994

Mr. A. J. Salem
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Flood Control Projects - Section 205 - Draft Detailed Project Report (DPR) and Environmental Assessment (EA) - Cedar Hammock (Wares Creek) - Manatee County, Florida
SAI : FL9205180810CR

Dear Mr. Salem:

The following represents a confirmation of the commitments made by your staff to provide the State of Florida with the information and data previously requested by the state.

As you are aware, the draft DPR and EA submitted to the state on October 10, 1994 lacked the modeling information required to determine the project's water quality impacts. Without this information, the State of Florida will be unable to determine the project's consistency with the state's water quality permitting criteria. The necessity of this information, and the data to be included in the modeling, were the subject of considerable discussion at meetings held on July 19 and September 7, 1994. Staff of both the Department of Environmental Protection (DEP) and the Southwest Water Management District consulted closely with your technical staff to identify and fill data gaps in the Corps' modeling analyses. A July 28, 1994 letter (enclosed) summarized the information to be included in the analysis.

On November 15, 1994, the state received a supplement to the draft DPR/EA which included modeling results. However, some of the previously identified data and information were missing from the model. Over the last week, technical staff from the DEP have discussed the data deficiencies with your staff and identified the following items to be provided to the state:

1. The units of inflow used in the HEC-5Q model.

EMERGENCY MANAGEMENT • HOUSING AND COMMUNITY DEVELOPMENT • RESOURCE PLANNING AND MANAGEMENT

2. Correct the absence of observed water quality values in the upstream model reach.

3. Reconcile the discrepancy between sample points in the creek and node points in the model.

4. Rerun the model flow scenarios to simulate water quality further upstream at sample location 2.

5. Confirm that the calibration mode setting was operating properly.

6. Supply model flow values and loadings of total nitrogen, total phosphorus and total suspended solids for the model node at sample location 2.

Although your staff agreed to provide the above stated information to the state by the close of business on Friday, December 2, 1994, we are unable to confirm receipt of all of the information at this time. Some of the information has been received and the state has been informed that additional information was to have been sent on Monday, December 5, 1994.

As per the Corps' news release which requested comments by December 12, 1994, the Corps is advised that the state will be unable to complete its analysis of the modeling results until the agreed-upon information has been received and analyzed by our reviewing agencies. We will make every effort to provide you with our determination in a timely manner. We appreciate your staff's efforts to supply the required information. If you have questions concerning these comments, please contact Cynthia Morani at 904/488-8551.

Very truly yours,

Linda Loomis Shelley
Secretary

LLS/jr

Enclosures

cc: Lynn Griffin, Department of Environmental Protection
Al Bishop, Department of Environmental Protection
Paul O'Neil, Southwest Florida Water Management District

Enclosure to the Florida Department of Community Affairs Letter dated December 13, 1994. All comments were addressed in the consolidated letter.

Department of
Environmental Protection

Lawton Chiles
Governor

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Virginia B. Wetherell
Secretary

December 1, 1994

Deborah Tucker
Executive Office of the Governor
Office of Planning and Budgeting
The Capitol
Tallahassee, Florida 32399-0001

Dear Ms. Tucker:

Re: Draft Detailed Project Report and Environmental Assessment, Cedar Hammock/Horse Creek
SAI FL 920512001OCA

The Department of Environmental Protection has been conducting a review of the referenced document and the supplemental modeling information received on November 18, 1994. As a result of this review, we have several questions and concerns which need to be addressed by the Corps before we can complete our assessment of water quality impacts. In a conversation today with Corps staff, we requested the following information. The Corps agreed to supply this information by December 2, 1994.

1. The units of inflow used in the RIC-SQ model.
2. Correct the absence of observed water quality values in the upstream model reach.
3. Reconcile the discrepancy between sample points in the creek and node points in the model.
4. Rerun the model flow scenarios to simulate water quality further upstream at sample location 2.
5. Confirmation that the calibration mode setting was operating properly.
6. Supply modal flow values and loadings of total nitrogen, total phosphorous and total suspended solids for the modal node at sample location 2.

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

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Ms. Tucker
December 1, 1994
Page Two

Following receipt of this information, we will complete a modeling analysis and determine whether our results confirm the water quality conclusions of the Corps' modeling. We expect to complete this review and provide comments next week.

If you have any questions, please contact me at 487-2231.

Cordially,

Lynn Griffin
Environmental Manager
Office of Intergovernmental Programs

/l
cc: Pam Novat
Kevin Petrus

Enclosure to the Florida Department of [illegible]
dated Dec[illegible]r 13, 1994. All comments were addre[illegible]d in the
consolidat[illegible] letter.

Florida Department of
Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

July 26, 1994

RECEIVED
AUG 1 1994
OFFICE OF
Intergovernmental Programs

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

Dear Mr. Salem:

The Point Source Evaluation Section has reviewed the draft water quality modeling document for the Cedar Hammock/Ware's Creek Flood Control Project at the request of ODE personnel during a meeting with the DEP held on July 18, 1994. The following are our comments.

1. The model used for the simulation, HEC-2, represented the creek channel as a series of one dimensional horizontal elements. A portion of Ware's Creek is tidal, and modeling of any tidal areas would need to account for changes in direction of flow. If the HEC-2 model cannot adequately simulate the hydrodynamics of this system, an alternative model would have to be applied.

2. Since the Ware's Creek model was not calibrated it is unknown if channel flow or water quality was adequately simulated. Monitoring of the creek needs to be performed so that a calibrated model can be developed. The monitoring should include the following parameters.

Flow	NO_2 and NO_3 Nitrogen
Temperature	NH_3 Nitrogen
Dissolved oxygen	Total Phosphorus
pH	PO_4 Phosphorus
Conductivity	$CBOD_5$
Total Kjeldahl Nitrogen	

The number of sites monitored in the creek should be selected based on the locations of significant points of inflow. Two synoptic monitoring surveys should be performed under different flow conditions to account for water quality variability.

Mr. Ed Salem
July 26, 1994
Page Two

3. Since a main objective of the modeling is to predict changes in delivery times of water and corresponding water quality to the Manatee River, for the design flood, the model should be run for a shorter time period to predict loadings. Model results should include predicted flows for the design flood hydrograph with the channel modifications and for the current channel configuration. The model results for flows and water quality should then be used to calculate the estimated loadings of total nitrogen and total phosphorus leaving Ware's Creek under the two channel configurations.

If we can be of further assistance, you may contact me or Kevin Petrus at 904/488-0780.

Sincerely,

Al Bishop, P.E.
Administrator
Point Source Evaluation Section

AB/kp

cc: Lynn Griffin

Enclosure to the Florida Department of Community Affairs Letter
dated December 13, 1994. All comments were addressed in the
consolidated letter.

Southwest Florida
Water Management District
2379 Broad Street • Brooksville, Florida 34609-6899 • 1-800-423-1476 (Florida Only) or
(904) 796-7211 • SUNCOM 628-4150 • T.D.D. Number Only (Florida Only): 1-800-231-6103

Jos L. Davis, Jr.
Chairman, Wauchula
Roy B. Harrell, Jr.
Chairman, St. Petersburg
Sally Thompson
Secretary, Tampa
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Treasurer, St. Petersburg
Charles A. Black
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Land O' Lakes

Peter G. Hubbell
Executive Director
Mark D. Farrell
Assistant Executive Director
Edward B. Helvenston
General Counsel

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DEC 12 1994
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Management Program

December 7, 1994

Ms. Susanne Traub-Metlay
State Clearinghouse
Executive Office of the Governor
Room 1603, The Capitol
Tallahassee, Florida 32399-0001

Subject: Cedar Hammock (Wares Creek) Project Report and Environmental Assessment
SAIF: FL9205180810CR

Dear Ms. Traub-Metlay:

The staff of the Southwest Florida Water Management District (District) has conducted a consistency evaluation for the project referenced above. Consistency findings are divided into four categories and are based solely on the information provided in the subject application.

FINDING	CATEGORY
	Consistent/No Comment
X	Consistent/Comments Attached
	Inconsistent/Comments Attached
	Not Applicable

This review does not constitute permit approval under Chapter 373, Florida Statutes, or any rules promulgated thereunder, nor does it stand in lieu of normal permitting procedures in accordance with Florida Statutes and District rules.

If you have any questions or if I can be of further assistance, please contact me in the District's Planning Department.

Sincerely,

Rand Trahm / for MDP

Mark D. Phelps, AICP
Development Review Coordinator

MDP
cc: Ralph Cantral, DCA
Paul Desmoires, SWFWMD
Paul O'Neil, SWFWMD
Priscilla Trigg, USACOE
Lynn Griffin, FDEP

SWFWMD STAFF COMMENTS
CEDAR HAMMOCK ENVIRONMENTAL ASSESSMENT
December 7, 1994

Background

The purpose of the Cedar Hammock (Wares Creek) Environmental Assessment is to determine the economic feasibility and potential environmental impacts of reducing flood damages and related problems within the East Branch of the Cedar Hammock basin in Manatee County, Florida. This study was conducted at the request of Manatee County and prepared by the U.S. Army Corps of Engineers (USACOE) under the authority provided in Section 205 of the 1984 Flood Control Act.

The drainage area of the East Branch of the Cedar Hammock Drainage Canal encompasses 6.23 square miles in a highly urbanized area in and around the City of Bradenton. Heavy rains in September 1988 and June 1992 caused extensive flooding to the area. Annual average flood damages in the area are estimated at $6,725,000. The selected plan would provide reduced flood stages for all flood events, with a bankfull capacity greater than the five-year flood event for most of the project reach. The 10-year flood would cause some street flooding and begin to encroach on residential structures in the lowest lying area.

Preliminary Finding of No Significant Impact

District staff concurs with the USACOE's Preliminary Finding of No Significant Impact in that preparation of an Environmental Impact Statement is not necessary. The District does have some concerns regarding potential water quality impacts. These impacts can be addressed in part through the District's permitting process. Also, it should be acknowledged that project costs may increase if required water quality treatment measures extend beyond the scope of the current proposal.

Nonstructural Considerations

The District believes that nonstructural measures, such as planning, zoning and land acquisition, can help reduce property damage caused by flooding. The expenditure of federal, state, and or local dollars for this project, which offers only partial relief, should be contingent upon local government planning and zoning measures designed to control further development of this area.

Purchasing structures within the floodplain should also be considered, since modifying the channel will cost in excess of $13,000,000 and will only provide protection from the 10-year flood event. Public ownership and management of the flood-prone lands offers a more permanent solution and could be implemented over a long period of time.

Detailed Comments on the Project Report

1. Rainfall distribution should be based on the Florida Modified Type II Rainfall distribution, consistent with SWFWMD permitting requirements.

2. Since the mean high tide elevation is 1.6, the water surface profile for 2, 5, and 10-year events should use a minimum starting water surface elevation of 1.6 instead of elevations 0.8, 1.2, and 1.5, respectively (see page A-7).

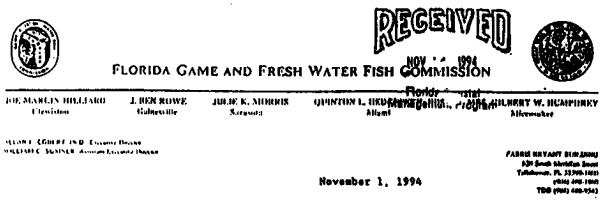
3. Figures A-1, A-2, A-5, and A-7 do not provide inundation durations (i.e., 1 day, 3 day, 7 day inundation) for the 25-year, 100-year, and SPF floods.

4. Based on the supplemental analysis, most of the pollutant concentrations after the improvements do not appear to be significant except the total suspended solids (TSS). The TSS increases about 20% when the low flow condition is considered. This increase in TSS is significant and some type of mitigation should be required. All impacts associated with changes in pollutant concentrations should be evaluated based on the existing ecosystems in the Creek and at the outfall.

5. Due to the urban development between 21st Avenue West and 14th Street West, there may not be a uniform 12 foot center-to-center tie rod spacing for PZ27 sheet piling.

6. Detailed sediment analyses must be conducted to identify pollutants and/or toxins existing within the sediments which will be dredged. This may significantly affect the extent of dredging and dredging methodologies which must be utilized to prevent adverse environmental impacts resulting from the re-suspension of these toxins in the water column. Additionally, this sediment analysis will also dictate which upland disposal sites or landfills will be acceptable for appropriate disposal of dredged material.

Enclosure to the Florida Department of Community Affairs Letter dated December 13, 1994. All comments were addressed in the consolidated letter.



November 1, 1994

Ms. Janice L. Hatter, Director
Florida State Clearinghouse
Executive Office of the Governor
Office of Planning and Budgeting
The Capitol
Tallahassee, Florida 32399-0001

RE: SAI #FL9205180810CR, Manatee County, U.S. Army Corps of Engineers, Cedar Hammock (Wares Creek), Section 205 Flood Control Study

Dear Ms. Hatter:

The Office of Environmental Services of the Florida Game and Fresh Water Fish Commission has reviewed the referenced document, and offers the following comments. Our enclosed letters of June 22, 1992, to the Florida State Clearinghouse and November 19, 1992, to the Florida Department of Environmental Regulation, remain applicable for this project.

Sincerely,

Bradley J. Hartman, Director
Office of Environmental Services

BJH/JWB3/lav
ENV 1-3-2
Enclosures
cedarham.sai

... of the Florida Department of Community Affairs Letter dated Dec[illegible]ber 13, 1994. All comments were addr[illegible]ed in the consolida[illegible] letter.

FLORIDA GAME AND FRESH WATER FISH COMMISSION

QUINTON L. HEDGEPETH, DDS Miami — MRS. GILBERT W. HUMPHREY Wilmington — JOE MARLIN HILLIARD Clewiston — BEN ROWE Gainesville — JULIE K. MORRIS Sarasota

ROBERT M. BRANTLY, Executive Director
ALLAN L. EGBERT, Ph.D., Assistant Executive Director

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32399-1600
(904) 488-3600

November 19, 1992

Ms. Carol Browner
Secretary
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: DER #411880519, Manatee County Public Works Department, Cedar Hammock

Dear Ms. Browner:

The Office of Environmental Services of the Florida Game and Fresh Water Fish Commission has reviewed this permit application received from the Department of Environmental Regulation, dated September 28, 1992. A copy of this letter will be sent to the U.S. Army Corps of Engineers, Jacksonville District, in compliance with the Fish and Wildlife Coordination Act.

The applicant proposes to dredge and expand an existing channel originally dredged in 1985 (DER #411034683). A new seawall with rip-rap would be constructed on both banks of the channel. Backfill would be placed landward of the retention walls. This project is part of a proposed flood control project reviewed by the Florida State Clearinghouse as SAI #FL9109190439C and SAI #FL9205180810C. We commented that this would have negative impacts on the remaining wildlife habitat, water quality, and fishery habitat in this relatively urbanized part of coastal Manatee County in the enclosed correspondence dated June 22, 1992, and October 4, 1991, and these comments remain applicable.

Sincerely,

Bradley J. Hartman

Bradley J. Hartman, Director
Office of Environmental Services

Ms. Carol Browner
November 19, 1992
Page 2

BJH/jwbj/rs
ENV 1-2-2
cedarhan.der
cc: Mr. Sia Mollenazer
Manatee County Public Works
Engineering Division
315 75th Street West
Bradenton, Florida 34209

nclosure to the Florida Department of Community Affairs Letter ated December 13, 1994. All comments were addressed in the onsolidated letter.

FLORIDA GAME AND FRESH WATER FISH COMMISSION

DON WRIGHT Orlando | QUINTON L. HEDGEPETH, DDS Miami | MRS. GILBERT W. HUMPHREY Milwaukee | JOE MARLIN HILLIARD Clewiston | BEN BOWE Gainesville

ROBERT M. BRANTLY, Executive Director
ALLAN L. EGBERT, Ph.D., Assistant Executive Director

FARRIS BRYANT BUILDING
620 South Meridian Street
Tallahassee, Florida 32299-1600
(904) 488-1960

June 22, 1992

Ms. Janice L. Alcott, Director
Florida State Clearinghouse
Executive Office of the Governor
Office of Planning and Budgeting
The Capitol
Tallahassee, Florida 32399-0001

RE: SAI #FL9205180810C, Manatee County; Cedar Hammock (Warea Creek), USACOE Reconnaissance Report, Control Section 205

Dear Ms. Alcott:

The Office of Environmental Services of the Florida Game and Fresh Water Fish Commission reviewed the proposed project, and find that our comments remain as stated in our letter (enclosed) of October 4, 1991.

Sincerely,

Bradley J. Hartman, Director
Office of Environmental Services

BJH/JWB3/rs
ENV 1-3-2
Enclosure
cc: Mr. A.J. Salem, Chief
Planning Division
U.S. Army Corp of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Enclosure to the Florida Department of Community Affairs Letter dated December 13, 1994. All comments were addressed in the consolidated letter.

FLORIDA GAME AND FRESH WATER FISH COMMISSION

FILE

[illegible] | [illegible] | MRS. GILBERT W. HUMPHREY, Merwinder | JOE MARTIN HILLIARD, Clewiston | [illegible], Gainesville

[illegible], Executive Director
[illegible], Assistant Executive Director

FARRIS BRYANT BUILDING
[illegible] Street
[illegible], Florida [illegible]
[illegible]

October 4, 1991

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JUN 22 [illegible]
OFFICE OF
ENVIRONMENTAL SERVICES

Ms. Janice L. Alcott, Director
Florida State Clearinghouse
Executive Office of the Governor
Office of Planning and Budgeting
The Capitol
Tallahassee, Florida 32399-0001

RE: SAI #FL9109190439C, Cedar Hammock/Wares Creek Flood Damage Reduction Study, USACOE, Manatee County

Dear Ms. Alcott:

The Office of Environmental Services of the Florida Game and Fresh Water Fish Commission has reviewed the referenced document, and offers the following comments.

The Jacksonville District of the U.S. Army Corps of Engineers has begun a feasibility study to develop a detailed project report for flood damage reduction measures in the Cedar Hammock/Wares Creek basin in Manatee County. Flood protection measures include channel alterations along the east branch of the Cedar Hammock Canal, enlargement of an existing upstream detention basin, re-routing the flow from the detention basin to a more direct route to the Cedar Hammock Canal, blocking an existing tributary channel, and clearing and snagging of the Wares Creek segment. In the middle reaches of the project, from 21st Avenue to 30th Avenue, two alternative plans are under consideration. Plan 1 consists of a vertical concrete wall channel. Plan 2 consists of a grass-lined, channel with 1:2 side slopes.

The following endangered (E), threatened (T), and species of special concern (SSC) animal species are present, or have the potential to be present, in the project area: West Indian manatee (E), wood stork (E), bald eagle (T), southeastern American kestrel (T), eastern indigo snake (T), Sherman's fox squirrel (SSC), American oystercatcher (SSC), snowy egret (SSC), tricolored heron (SSC), little blue heron (SSC), reddish egret (SSC), brown pelican (SSC), gopher tortoise (SSC), American alligator (SSC), and common snook (SSC).

Ms. Janice L. Alcott
October 4, 1991
Page 2

The clearing, snagging, bulkheading, and channel profile changes proposed on Wares Creek and Cedar Hammock have a strong potential to eliminate the remaining wildlife habitat in this relatively urbanized part of Manatee County. In coastal Manatee County, the loss of relatively small acreages of upland and wetland forest constitutes proportionally large losses of the total remaining habitat.

The proposed project is not consistent with the water quality and fishery habitat goals of the Agency On Bay Management and the Tampa Bay Surface Water Improvement and Management (SWIM) program. The channelization and hardening of tributary streams and the elimination of upland buffers in tributary floodplains will both accelerate the non-point source pollutant loading of Terra Ceia Bay Aquatic Preserve, thus negatively impacting fish and wildlife values on a regional basis. There is a disturbing trend of channelization and hardening of natural and partially impacted waterways of the Tampa Bay region. This is contrary to our scientific understanding of pollution abatement, estuarine management, and fisheries conservation.

Impacts to wildlife species in wetlands and uplands in the project alignment should be addressed in project design. We recommend that the hardening of the new creek profile be eliminated or minimized to the greatest extent possible. Alternative creek profile designs, including littoral shelves, areas for emergent macrophyte growth, riparian buffers, and internal meanders, should be reviewed in the proposed study document. We recommend against Plan 1 for the middle reaches of the project.

It is possible to provide sound water management in an urban setting without complete destruction of the habitat values of natural waterbodies. We would be happy to work with the Corps in attaining this goal. Please call me or
Mr. Jim Beever (813-639-3515) if we can be of assistance.

Sincerely,

Bradley J. Hartman, Director
Office of Environmental Services

BJH/JWB3/rs
ENV 1-3-2
cc: Mr. A.J. Salem
Chief, Planning Division
Department of the Army
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Enclosure to the Florida Department of Community Affairs Letter dated December 13, 1994. All comments were addressed in the consolidated letter.

RECEIVED
NOV 21 1994
Florida Coastal Management Pr... am

FLORIDA DEPARTMENT OF STATE
Jim Smith
Secretary of State
DIVISION OF HISTORICAL RESOURCES
R.A. Gray Building
500 South Bronough
Tallahassee, Florida 32399-0250
Director's Office (904) 488-1480
Telecopier Number (FAX) (904) 488-3353

November 15, 1994

Ms. Janice L. Hatter, Director
State Clearinghouse
Executive Office of the Governor
Room 1603, The Capitol
Tallahassee, Florida 32399-0001

In Reply Refer To:
Frank J. Keel
Historic Sites
Specialist
(904) 487-2333
Project File No. 943547

RE: Cultural Resource Assessment Request
SAI#, FL9205180810CR
Cedar Hammock (Wares Creek) Draft Detailed Project Report
Environmental Assessment
Manatee County, Florida

Dear Ms. Hatter:

In accordance with the provisions of Florida's Coastal Zone Management Act and Chapter 267, Florida Statutes, as well as the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced project(s) for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places, or otherwise of historical or architectural value.

We note that an archaeological and historical survey was conducted was performed based on recommendations from this office. The project report indicates that several historic buildings and bridges were identified. However, our records indicate that we never received this report.

If you have any questions concerning our comments, please do not hesitate to contact us. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

George W. Percy, Director
Division of Historical Resources
and
State Historic Preservation Officer

GWP/KFK
Archaeological (904) 487-2...

Florida Folklife Programs (904) 487-2073
Historic Preservation (904) 487-2333
Museum of Florida History (904) 488-1484

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL POLICY AND COMPLIANCE
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

November 25, 1994

ER-94/827

Mr. A.J. Salem, Chief
Planning Division
Jacksonville District
U.S. Army Corps of Engineers
Attn: CESAJ-PD-PF
Jacksonville, Florida 32232-0019

Dear Mr. Salem:

The Department of the Interior has reviewed the draft Detailed Project Report and Environmental Assessment for Cedar Hammock (Wares Creek) East Branch Drainage Canal in Manatee County, FL, as requested.

The Fish and Wildlife Service (Service) provided a Planning Aid Report for the Wares Creek/Cedar Hammock Flood Reduction Project in October, 1993. This report contained information on the environmental impacts of the proposed project from small detention ponds, channeling, clearing, and snagging in the basin. Basically, the City of Bradenton's urban stormwater runoff and urbanized area has minimized the value of the basin to fish and wildlife resources, and although the Service does not oppose the project, a stream rejuvenation component for Wares Creek is strongly recommended. We favor elimination of the proposed channeling, clearing, and snagging aspects of the project and establishing more natural stream features such as meanders, pools, riffles, rock cribs, weirs, and shoreline vegetation.

The elements put forward by the Service do not appear to be discussed or considered in the project report or environmental assessment. We believe serious consideration is due to restoring more natural stream conditions in aid of flood control. We have ample cases, including the Everglades, where Federal attention is focused on unchannelizing areas in acute biodiversity crisis. We recommend using this opportunity in the Wares Creek/Cedar Hammock basin to be environmentally proactive while providing flood control to Bradenton.

We appreciate the opportunity to comment on the draft Project Report and EA. If you have questions regarding the comments, you may contact Mr. Dave Farrell at 407/562-3909.

Sincerely yours,

James H. Lee
Regional Environmental Officer

CORPS RESPONSE TO COMMENTS:

The proposed project has been coordinated with the Vero Beach office, U.S. Fish and Wildlife Service. The Coordination Act Report (CAR) provided to us by this office summarized the impacts to fish and wildlife species as a result of the implementation of this project. The CAR states that no significant fish and wildlife resources occur along the proposed project alignment. Despite this fact, the Service recommends "stream rejuvenation" measures for fish and wildlife enhancement along lower Wares Creek. Enlarging the footprint of the project by adding meanders, riffles, rock beds, etc. would require extensive additional land aquisition through densely developed residential neighborhoods. Because the CAR states that no significant habitat will be impacted by the project, there is no justification for additional enhancements or improvements as proposed by the USFWS.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

JUL 14 1994

District Engineer, Jacksonville
P.O. Box 4970
Jacksonville, FL 32232

Attn: Mr. A.J. Salem

Subject: Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Cedar Hammock (Wares Creek) East Branch Drainage Canal, Manatee County, FL

Dear Sir:

Pursuant to Section 309 of the Clean Air Act, EPA, Region 4 has reviewed the subject document which discusses the various flood control/drainage measures along the east branch of Cedar Hammock and Wares Creek. Recommended structural improvements to expedite water movement through this reach include snagging/clearing, channel realignment and enlargement, and installation of sheet piling. The excavation associated with this proposal will generate approximately 100,000 cubic yards of material which will be transported to the Manatee County landfill.

From the information in the Detailed Project Report and Appendix A of the EA the noted measures should reduce flood stages for all rainfall events, with inbank storage for at least the five-year storm episode for most of the study reach. However, we are less confident that the impacts to the natural environment are as nominal as stated.

We suggest that the following be examined before the "Finding of No Significant Impact" for this project is finalized:

Wares Creek and Cedar Hammock are essentially urban culverts within the project reach and do not provide any significant instream biological value(s) due to non-point pollutant loadings from development in the adjacent floodplain. This situation was exacerbated as the assimilative capacity of the natural flood plain/riverine habitat was incrementally displaced by encroachment of this development. While the biological importance of the urban reach of this watercourse may be discounted, degraded flows eventually enter the Manatee River and Tampa Bay which do have important regional amenities. The incremental effect of these adverse impacts is the reason why the latter has been placed in the surface water improvement and management program.

Stormwater retention basins could be used to trap the first inch of non-point runoff and lessen the perturbations associated with rain events. Unfortunately, there is insufficient reasonably available/vacant property in the sub-basin to construct effectively sized structures. Therefore, retention areas were eliminated from the selected plan.

We share the water quality concerns of the Department of Environmental Protection (DEP) about this project, i.e., pollutant loadings to Manatee River/Tampa Bay should not be increased. In this instance proposed structural measures will facilitate an increase in stream flow rates thereby decreasing delivery times of pollutants. Modelling was used to determine the significance of this change on the river/bay system. We understand that the HEC-5Q modeling results showed only localized water quality problems around the mouth of Wares Creek after project implementation.

However, this model is not precisely geared to address the tidal variations and physical characteristic found in this particular system. Hence, DEP has raised some concerns about the confidence which should be assigned to these results. Moreover, the Manatee River/Tampa Bay complex is relatively large; therefore, the input from Cedar Hammock appears incidental. Nonetheless, enough inputs from a system's constituent sub-elements can create a significant dilemma. The difficulty of addressing incremental effects and how individual actions affect an overall ecosystem have proven to be very perplexing to evaluate. This is one of the major reasons why dealing with the cumulative effects of individual drainage projects remains a problem.

Since providing flood relief within the project area is such a desirable societal goal, we believe that sufficient latitude could be found within the Section 205 Program (Flood Control Act of 1948) to provide cost effective water quality benefits remote from the project reach, but within the overall watershed. Efforts should be made in this regard prior to construction. The results of these investigations should be communicated/coordinated with the pertinent resource agencies.

Thank you for the opportunity to comment on this action. If we can be of further assistance in this matter, Dr. Gerald Miller (404-347-3776) will serve as initial point of contact.

Sincerely,

Heinz J. Mueller, Chief
Environmental Policy Section
Federal Activities Branch

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

November 10, 1994

Colonel Terry Rice
District Engineer, Jacksonville District
Department of the Army, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Colonel Rice:

This responds to your letter, dated October 7, 1994, requesting comments regarding the Draft Detailed Project Report and Environmental Assessment (EA) for Cedar Hammock (Wares Creek) East Branch Drainage Canal in Manatee County, Florida.

The National Marine Fisheries Service (NMFS) has reviewed the subject documents. The documents adequately describe the affected environments and consequences of the investigated alternatives. The preferred plan (Plan A) involves trapezoidal grass lined channel improvements, vertical wall channel improvements and clearing and snagging of the existing channel. The NMFS recommends alternative 2A with retention ponds as the final plan. This plan would construct approximately 7 acres of retention ponds and replace vertical bulkhead with sloped, vegetated shoreline in the center portion of the project. Vegetated shorelines and retention ponds assist in the enhancement of water quality by assimilating pollutants and sediments from up-stream sources. The additional measures in Plan 2A could reduce the amount of polluted water entering the Tampa Bay ecosystem and thereby enhance the quality of habitat to living marine resources which utilize this important estuary.

Although the added benefits of Plan 2A may be minor it is our opinion that they should not be dismissed as too costly. We strongly recommend that the Corps of Engineers (COE) pursue alternatives which promote improving the quality of the environment. Section 1135 of the Water Resources Development Act provides a funding mechanism for environmental improvements of areas affected by COE projects. The COE should attempt to maximize the environmental benefits of this and future civil works projects.

Please direct related comments or questions to Mr. David N. Dale of our St. Petersburg Area Office. He may be contacted at 813/570-5317.

Sincerely,

Andreas Mager, Jr.
Assistant Regional Director
Habitat Conservation Division

cc:
Mr. A. J. Salem
Chief, Planning Division
Department of the Army, Corps of Engineers
Flood Control and Flood Plain Management
P.O. Box 4970
Jacksonville, Florida 32232-0019

EPA,ATL
DEP,TALL
GFWFC,TALL
GMFMC,TAMPA
FWS,VERO
F/SE02
F/SE023-ST PETE

CORPS RESPONSE TO COMMENTS:

The lands and damages costs associated with Alternate Plan 2A (over 5 milion dollars) are 2.5 times greater than the selected plan. For this reason and due to its low Benefit-To-Cost Ratio, Plan 2A was not selected for project implementation.

Tampa Bay Regional Planning Council

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October 20, 1994

Mr. A. J. Salem, Chief
Planning Division
Flood Control & Flood Plain Management Section
Department of the Army
Jacksonville District Corps of Engineers
P. O. Box 4970
Jacksonville, Florida 32232-0019

Subject: IC&R #264-94, Cedar Hammock Drainage Canal Flood Measures, Manatee County

Dear Mr. Salem:

This letter constitutes acknowledgement and preliminary assessment of an application for the above-captioned project submitted under the provisions of Florida's Intergovernmental Coordination and Review (IC&R) process.

While the submitted proposal is regionally significant, initial in-house review does not indicate the necessity for action by the Council. All member local governments will be notified for any comments concerning local significance. Should any local issues regarding this project arise, you will be contacted directly by the concerned local government office.

In accordance with staff findings, and subject to concurrence of the Tampa Bay Regional Planning Council's (TBRPC) Clearinghouse Review Committee and TBRPC's full policy board, this project is considered to have met the requirement of Florida's IC&R and no further review will be required. This letter constitutes compliance with IC&R only and does not preclude the applicant from complying with other applicable review/permit requirements or regulations.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Jan McGovern/bj

Janet Vorhees McGovern, Project Manager
Intergovernmental Coordination & Review

JVMcG/bj

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

ATLANTA OFFICE
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303-3388

October 18, 1994

Mr. A. J. Salem
Chief, Planning Division
Department of the Army
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Salem:

This refers to your memorandum dated October 7, 1994, transmitting the Draft Detailed Project Report and Environmental Assessment for the Cedar Hammock (Wares Creek) flood control project in Manatee County, Florida.

Our review indicates there will be no significant adverse impact on any HUD programs as a result of this project.

Thank you for the opportunity to review and comment on your proposed project.

Very sincerely yours,

Frederick A. Russell
Acting Senior Environmental Advisor