AD-A133 586 RECONNAISSANCE REPORT FOR DYVILS DITCH RICHLAND COUNTY SOUTH CAROLINA(U) CORPS OF ENGINEERS CHARLESTON SC CHARLESTON DISTRICT JUL 83 1/1

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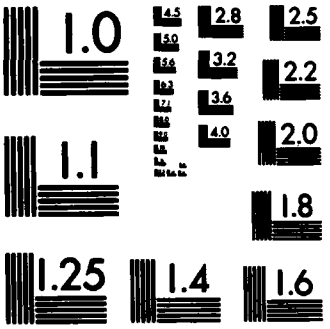

MICROCOPY RESOLUTION TEST CHART
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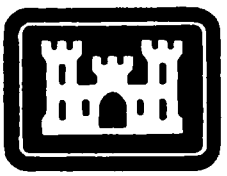
RECONNAISSANCE REPORT
FOR
DEVILS DITCH
RICHLAND COUNTY, S. C.



US Army Corps
of Engineers
Charleston District

SECTION 205
OF THE
1948 FLOOD CONTROL ACT
AS AMENDED

JULY 1983

83 10 12 279

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A133 586	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Devils Ditch Richland County, South Carolina		5. TYPE OF REPORT & PERIOD COVERED Reconnaissance 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Corps of Engineers Charleston District P.O. Box 919, Charleston, S.C.		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Corps of Engineers Office, Chief of Engineers Washington, D.C. 20314		12. REPORT DATE July 1983 13. NUMBER OF PAGES 9
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) U.S. Army Corps of Engineers South Atlantic Division 30 Pryor Street, S.W. Atlanta, Georgia 30303		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release: Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Prepared in cooperation with the Richland County Council, S.C. and the U.S. Fish and Wildlife Service

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Flood Control
Environmental Impact

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Reconnaissance report determines the advisability initiate detail studies. The report recommends approval of further study.

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Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

DEVILS DITCH

RICHLAND COUNTY, SOUTH CAROLINA

Section 205 Reconnaissance Report

Table of Contents

LIST OF TABLES

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 919
CHARLESTON, S.C. 29402

REPLY TO
ATTENTION OF

SACEN-PS

27 July 1983

SUBJECT: Reconnaissance Report, Devils Ditch, Richland County, South Carolina

Commander, South Atlantic Division
ATTN: SADPD-P

AUTHORITY

1. This reconnaissance report was prepared under authority contained in Section 205 of the 1948 Flood Control Act, as amended. Subject report was initiated by letter to SADPD-P dated 25 March 1983, subject: Devils Ditch, Richland County, South Carolina. It was requested by a letter dated 11 March from Richland County Council (See Inclosure 1).

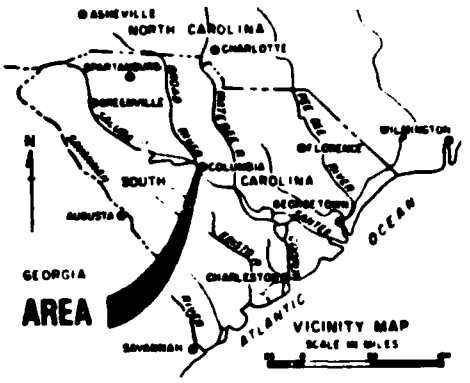
SCOPE OF WORK

2. This report was prepared using readily available data, supplemented where necessary with additional field surveys and in-house studies. The purpose of this report is to determine the magnitude of existing water resource problems and the feasibility of further Federal involvement in formulating solutions to these problems. Due to the nature of this report, information contained herewith is considered preliminary and subject to revision should detailed investigation be authorized.

PRIOR REPORTS

3. There are no previous Corps reports available for the study area.

STUDY AREA DESCRIPTION



Location. Devils Ditch, a ibutary of Gills Creek, is cated in the central portion of th Carolina in Richland County. ils Ditch flows into Gills Creek t below Highway 48 approximately e miles south of Columbia City ts.

Topography. The lower portion of the Devils Ditch Basin is extremely flat swampy. The remaining two thirds of the basin is typical of small basins he Piedmont of South Carolina with slopes varying from moderate to modera- steep. Ground elevations in the basin vary from 105 to 350 feet NGVD. average stream slope is 20 feet per mile.

Climate. There are no streamflow or rainfall gages in the basin. There NOAA rainfall gages at the airport (43 years of record) and at the ersity of South Carolina (96 years of record). Columbia experiences mild ers and hot summers. Average temperatures in January are 45°F while the temperatures average about 81°F. The average annual temperature is °F while the average annual rainfall is 46 inches.

Environmental Consideration. A preliminary assessment of environmental erns of the study area is attached as Inclosure 2 to this report. A iminary report from the U. S. Fish and Wildlife Service addressing wild- habitat value of the area is Inclosure 3.

PROBLEMS UNDER CONSIDERATION

Flood Problems. Flooding is caused by the overflow of Devils Ditch which ocated south of the City of Columbia. The flood problems discussed in report are based on information obtained from local officials as to spe- c areas in which they are experiencing problems, topographic mapping with -foot contour intervals, and a field reconnaissance by the Corps' study . Local officials report that flooding is experienced at least once ally.

Residential flooding is the most significant category of damage in the y area. Average annual damage to residential property is estimated to be 000. The 100-year frequency flood will inundate the first floor of at t 60 residential structures. The value of these structures is estimated e $2,396,000 and contents to be $1,198,000. Damage to these properties ng a 100-year frequency event would be about $266,000.

No commercial structures appear to be within the inundated area of the year frequency flood.

No attempt has been made at this time to estimate flood damage to any r category; i.e., roads, bridges, emergency costs, etc.

. Approximately 60 structures are located within the area of the 100-year equency flood plain estimated for this reconnaissance evaluation. rther analysis will require an exact determination of the first floor evations. Detailed hydrologic data will be developed which will provide file information for an array of frequencies and this information will compared with the first floor information and stage-damage relationships develop damage-frequency information.

Hydrologic Analysis. A hydrologic analysis for Devils Ditch was pleted for the Flood Insurance Study for Richland County published in 1981. Devils Ditch was referred to as Tributary G-1 in that report. le 1 lists the discharge-frequency data as used in the Flood Insurance dy for the study reach of Devils Ditch shown in this Reconnaissance Report.

TABLE 1

DISCHARGE FREQUENCY DATA
DEVILS DITCH
RICHLAND COUNTY, SC

ATION	D. A. SQ MI	Recurrence Interval 10-YR (cfs)	50-YR (cfs)	100-YR (cfs)	500-YR (cfs)
S.C.L. RR	2.1	943	1241	1354	2223

STUDY OBJECTIVES

The objectives of this phase of the investigation are to determine the sibility of further Federal involvement in addressing the flooding blems identified along Devils Ditch and to develop a detailed study n. Should further study be needed, the objectives would be to formulate rnative measures to alleviate flood damage and to select the best rse of action to alleviate these problems.

PLANNING CONSTRAINTS

There are no major planning constraints known at this time.

POTENTIAL SOLUTIONS

Several alternative measures to meet the problems and needs of the are possible; however, some of these measures are not practical economical. Possible solutions may be divided into two broad gories of structural and nonstructural. Structural measures are gned to modify floods by altering the natural environment. These

e alternatives which reduce flood elevations, divert
the timing and duration of floods or restrict floods from
flood plain. Nonstructural measures are designed to
mage susceptibility and include modifications to the
nment by adjustment in the pattern and mode of land use,
l policies and by assistance to affected individuals.
tion of structural and nonstructural measures is possible.

NONSTRUCTURAL MEASURES

al measures do not attempt to reduce or eliminate
e designed to regulate the use and development of the
us lessening damaging effects of large floods. Non-
ures consist of subdivision regulations, zoning, building
oofing, evacuation, open-space development and other
ove properties from the flood plain.

STRUCTURAL MEASURES

measures are designed to alleviate flood problems by
stages or by moving damageable properties from the flood
easures include channel modification, dams and reservoirs,
ruction.

Analysis. A structural plan consisting of a channel which
he 10-year flood was formulated to evaluate the desirability
ral participation. Table 2 lists pertinent data.

TABLE 2
DEVILS DITCH CHANNEL DESIGNS

n	125+00
	165+00
eet)	4000
e (CFS)	943
	2.5 to 1
	.0050
eet)	10
	5
d	3

PROJECT COSTS

20. The total first cost for constructing the above-described plan would be about $370,000. Cost estimates are based on preliminary data and will be modified as more data becomes available. Annual charges, estimated at $37,000, are based on the prevailing Federal interest rate of 7 7/8% and a project life expectancy of 50 years. The $37,000 annual charge includes $7,000 for annual maintenance.

PROJECT BENEFITS

21. Construction of the previously-described plan would provide direct flood damage reduction benefits in the area adjacent to the channel. Damages would be reduced by approximately $60,000 annually.

22. Flood damage reduction would be afforded to all structures within the 10-year flood plain. First floor inundation would not occur until 50-year frequency levels are exceeded.

BENEFIT/COST COMPARISON

23. The following tabulation illustrates the benefit/cost comparision of the plan evaluated during the reconnaissance investigation. Due to the nature of reconnaissance studies, economic data shown is considered preliminary and subject to change during detailed investigations.

TABLE 3
BENEFIT-COST COMPARISON

Total Annual Flood Reduction Benefits	$ 60,000
Annual Project Costs	$37,000
Benefit-to-Cost Ratio	1.34

FEDERAL RESPONSIBILITIES

24. Project construction cost for flood control measures implemented through Section 205 of the 1948 Flood Control Act, as amended, are apportioned in accordance with traditional cost allocation procedures. In summary, the Federal government should bear the cost of project construction, excluding all costs allocated to bridge or utility modifications and to the acquisition of project-related lands. In addition, the Federal government would bear the cost of preliminary feasibility investigations and under existing regulations the detail design documents. Under the Administrations proposed cost sharing policy, however, the local sponsor

would be required to pay 50% of the detail design studies and a minimum of 35% of construction costs.

NON-FEDERAL RESPONSIBILITIES

25. Section 205 projects are local participation projects and require non-Federal participation for acquisition of project-related lands and for cost allocated to bridge and utility modifications. The following items of local cooperation would be required for implementation of a flood control project on Devils Ditch, Richland County, South Carolina. Local project sponsors would be required to:

a. Provide without cost to the United States all lands, easements, and rights-of-way, including disposal areas as determined by the Chief of Engineers, necessary for project construction;

b. Provide all Federal cost which exceed the statuatory limitations for Federal participation currently established as $4,000,000;

c. Accomplish without cost to the United States all alterations and relocation of buildings, transportation facilities, storm drains, utilities, and other structures made necessary by project construction;

d. Hold and save the United States free from damages due to construction, operations, and maintenance of the project, provided damages are not due to the fault or negligence of the United States or its contractors;

e. Maintain and operate the works after completion in accordance with regulations prescribed by the Secretary of Army;

f. Prescribe and enforce regulations to prevent obstructions or encroachments on the channels or other flood control works which would reduce their flood-carrying capacity or hinder maintenance and operation, and control development in the project areas to prevent unwise development;

g. Periodically inform residents of affected areas that channel improvement will not provide complete flood protection.

WORK PROGRAM

26. Work items considered necessary in preparing an expanded reconnaissance report on flood problems in Devils Ditch are summarized below. The refined studies expected in the Detailed Project Study will also be discussed in this summary. A PB-6 which gives a breakdown of cost for the three stages of study preparation is attached as Inclosure 4.

a. Public Coordination. During the expanded reconnaissance close coordination between planning elements, local governmental representatives and local residents will be maintained. Identification of a local sponsor for the DPS and an indication of willingness and ability to contribute 50% of the cost of that phase will also be accomplished in this study stage. A

late stage plan formulation meeting will be held to obtain local views on alternative plans of improvement before selection of a recommended plan and finalization of the DPS.

b. Environmental Studies. A detailed inventory of the environmental resources present along the flood plain and project impact areas will be prepared. This information will be used to determine what the impacts of various alternatives will be on the environment of the study area and to evaluate ways to enhance the environment and/or ameliorate the adverse effects that potential alternatives could have. Finalization and report write-up will be prepared in the DPS.

A cultural resources reconnaissance will be made of the study area with primary emphasis along the immediate project impact area. This will serve to identify either known or possible archeological and historical sites within the study area. The study will be done in the expanded reconnaissance report.

c. Fish and Wildlife Studies. In accordance with the agreement between the Corps of Engineers and the United States Fish and Wildlife Service, Department of the Interior (USFWS), the Fish and Wildlife Service will conduct appropriate studies to furnish the required Coordination Act Report.

d. Hydrology and Hydraulic Studies. Hydrology and hydraulic studies will be conducted in sufficient detail in the expanded reconnaissance report to identify flood prone areas and delineate the flood plain. Flood profiles for existing conditions and for various plans of improvement will be developed for the appropriate recurrence interval events and the SPF utilizing computed flows and the HEC 2 backwater computer program. Design details for the selected plan will be completed in the Detailed Project Study at which time the H & H appendix will be finalized.

e. Economic Studies. Economic analyses will include comparison of cost and benefits of alternative plans. Engineering surveys will be conducted to determine the first-floor elevation of approximately 60 structures located within the flood plain. Field interviews and questionnaires will be used to determine historical and potential flood damages. The nature and extent of flood damages will be determined for residential and commercial property, roads and bridges, business inventories, and emergency costs. Real estate studies will be conducted to determine the value of damageable property. Damages will also be estimated for the future "Do Nothing" alternative.

Any reasonable alternative for correcting the flood problem will be analyzed and displayed in order to determine the most desirable plan of action. This will include both nonstructural and structural alternatives.

Economic studies of existing and base year conditions will be completed in the expanded reconnaissance as will the initial screening of an array of alternatives based on a preliminary appraisal of costs, benefits, and environmental impacts. DPS evaluations will deal with refining

assessments of outputs of alternatives remaining or developed beyond the preliminary appraisal.

f. Project Management. The Project Manager will be responsible for overseeing the overall study process and coordinating the efforts of the various study disciplines.

g. Design and Cost Estimates. During the expanded reconnaissance studies design and cost estimates for all alternative plans will be made in sufficient detail to enable the formulation of a best plan of action. In the DPS additional design efforts and refined cost estimates will be made for the selected plan.

h. Surveys. For the expanded reconnaissance study cross sectional surveys will be obtained at each bridge crossing, 50 feet upstream and downstream of each bridge crossing, and every 400 feet between bridges.

i. Foundation and Material Investigations. Jet probings would be obtained at specified intervals to determine type of material to be excavated. These investigations will be done during the DPS stage.

j. Real Estate Studies. Real estate studies will be made by Savannah District. The expanded reconnaissance study will require estimates of the value of the structures in the flood prone area. Refined lands costs will be needed in the DPS stage.

k. Project Formulation. Plan formulation in the expanded reconnaissance study will include working with study team members to formulate a reasonable array of viable alternatives and evaluating the impact of these alternatives in order to select the EQ, NED, and recommended plans of improvement. In the DPS stage, this array will be refined and possibly added to in order to develop the best plan possible to meet Federal and local objectives.

l. Preparation of Report. The expanded reconnaissance report will be in sufficient detail to lead the reader to an understanding of the various alternatives screened and to show justification for the recommended detailed studies. The DPS report will cover the complete decision process and will contain necessary appendixes to explain in detail the results of the various elements.

CONCLUSIONS

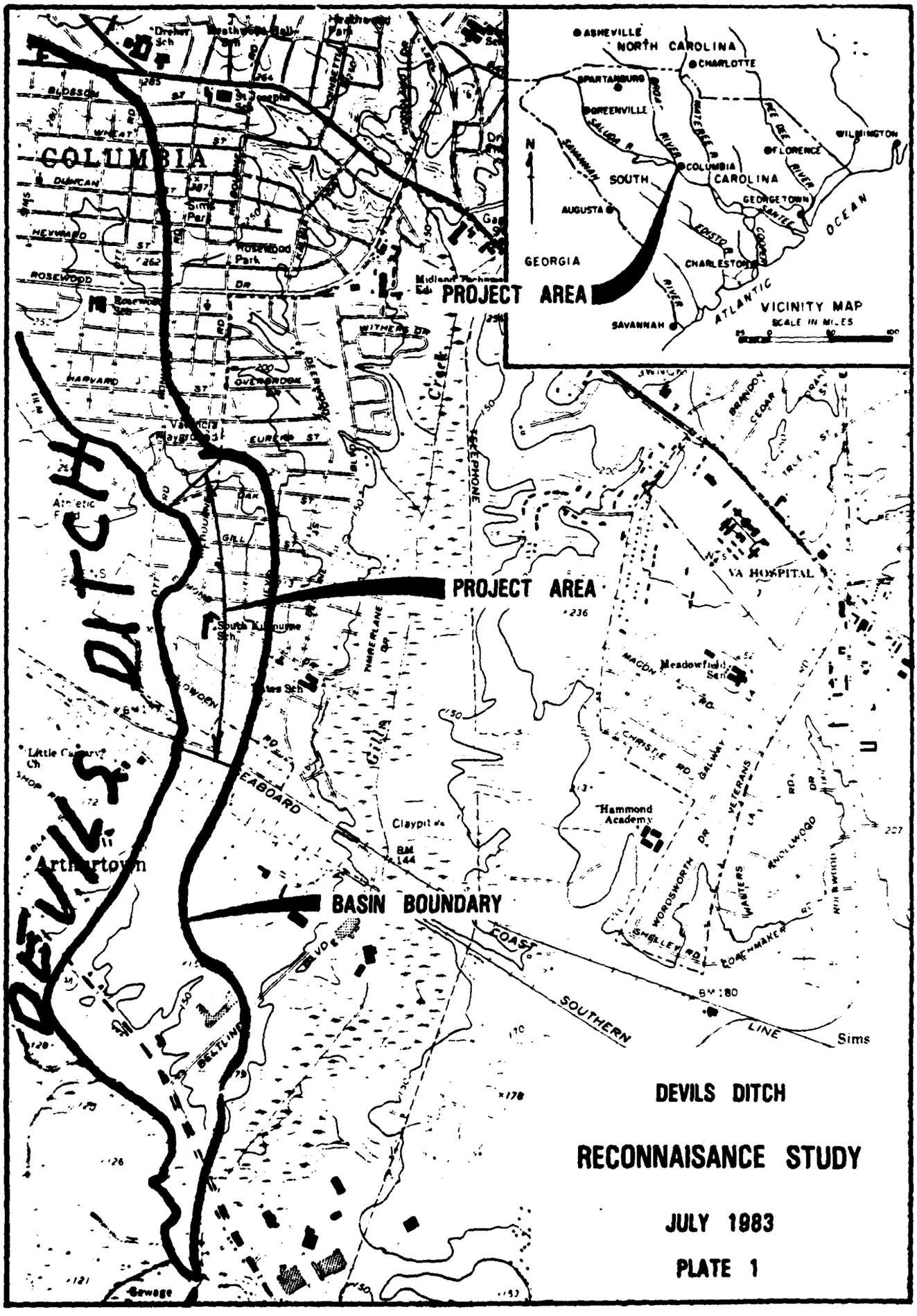
27. The flood problems identified and potential alternatives to these problems are within the scope of the Section 205 program. The estimated cost of completing a detailed investigation of the flood prone area is $120,000 for the expanded reconnaissance reports and $71,000 for the Detailed Project Study. It will take 6 to 8 months to complete the expanded reconnaissance work.

RECOMMENDATIONS

28. Based upon information presented in this report, it is recommended that further study of flood problems in Devils Ditch be authorized. Estimated study cost for completion of an expanded reconnaissance report is $120,000. It is recommended that funds in this amount be allocated to Charleston District as soon as practical in order that the subject study may be pursued. Costs for preparation of this reconnaissance report were approximately $7,500. Request for reimbursement of these funds will be made by separate correspondence after final approval of this report.

F. L. SMITH, JR.
LTC, Corps of Engineers
Commanding

4 Incl.
as


COLUMBIA
PROJECT AREA
PROJECT AREA
BASIN BOUNDARY
DEVILS DITCH
VICINITY MAP
SCALE IN MILES
ASHEVILLE
NORTH CAROLINA
CHARLOTTE
SPARTANBURG
GREENVILLE
COLUMBIA
SOUTH CAROLINA
AUGUSTA
GEORGIA
FLORENCE
WILMINGTON
GEORGETOWN
CHARLESTON
SAVANNAH
ATLANTIC OCEAN
VA HOSPITAL
Meadowfield Sch
Hammond Academy
Arthurtown
Claypit
SEABOARD
COAST
SOUTHERN
LINE
Sims
DEVILS DITCH
RECONNAISANCE STUDY
JULY 1983
PLATE 1

THE COUNTY COUNCIL FOR RICHLAND COUNTY

1701 Main Street Post Office Box 192 Columbia, South Carolina 29202

March 11, 1983

Lt. Col. B. E. Stalmann, P.E.
District Engineer
U. S. Army Engineer District, Charleston
Post Office Box 919
Charleston, SC 29402

Re: Flood Control Project

Dear Col. Stalmann:

On behalf of concerned citizens of Richland County, South Carolina, who are interested in obtaining assistance in controlling localize flooding problems, the County Council requests the Corps of Engin rs to undertake a study under Section 205 of the 1948 Flood Control Act s amended, to determine the nature, costs, and justification of nec ary flood control and protection measures for the below listed stream A brief description of each is provided together with location maps r your information.

1. Devils Ditch: This creek is located in a residential area ac cent to the City of Columbia as shown on the attached location ma: At a point near the upper end of the creek, the watershed conta approximately 986 acres comprised almost entirely of urban a: suburban land uses. Flooding is a fairly frequent occurrenc ong most of its length, occurring on the average of once a year a involving approximately 12 residences.

2. Smith's Branch: This creek is located in a residential area adjacent to the City of Columbia as shown on the attached locat ion map. The watershed at the point where it crossed South Carolina Highway 555 contains approximately 995 acres. Flooding occurs along this creek on an average of about once a year and affects approximately 8 homes as well as the public housing project on the east side of South Carolina Highway 277.

3. Stoop Creek: This creek is located in a residential area northwest of the City of Columbia as shown on the attached location map. At a point downstream from Piney Woods Road, the watershed contains approximately 1094 acres and is comprised of mostly suburban land uses together with some undeveloped land. Flooding occurs on an average of once a year and affects approximately 45 single family homes in the Bonny Forest Subdivision as well as an apartment complex and condominium project on Beatty Road. It is believed

that a possible alternative for reducing the flooding along a portion of this stream would be the utilization of an abandoned oxidation lagoon for stormwater detention. The location of this lagoon is shown on the location map.

It is understood that this study must be sponsored by a legally-constituted public body fully authorized under state laws to provide all required local cooperation, and to execute an agreement to this effect with the Secretary of the Army under the provisions of Section 221 of the Flood Control Act of 1970. Richland County is familiar with the general requirements of local cooperation and is willing to agree to them if the project plan developed in initial planning is of the nature and scope acceptable to the County and within its financial means.

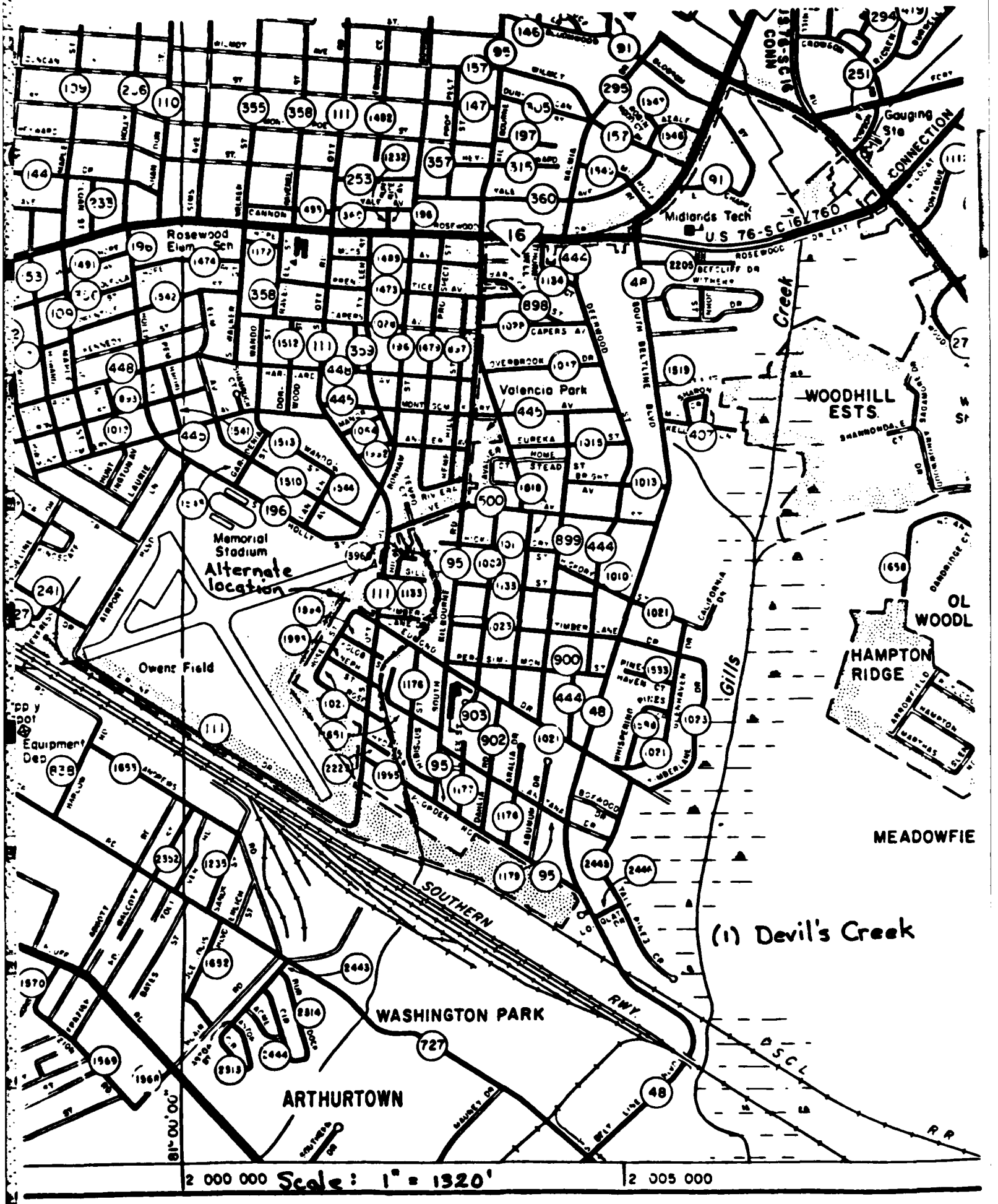
Your prompt attention to this request will be greatly appreciated. If additional information is required regarding the above listed streams, our County Engineer, Mr. Ralph Pearson, is at your disposal. He can be contacted at (803) 786-6572.

Sincerely,

James C. Leventis
Chairman

JCL/mew

Attachments


Rosewood Elem Sch
Midlands Tech
U.S. 76-SC 16/760
Gauging Sta
CONNECTION
Creek
Valencia Park
WOODHILL ESTS.
Memorial Stadium
Alternate location
Owens Field
Equipment Dep
HAMPTON RIDGE
Gills
MEADOWFIE
(1) Devil's Creek
SOUTHERN RWY.
WASHINGTON PARK
ARTHURTOWN
DSCL
RR
81°00'00"
2 000 000
Scale: 1" = 1320'
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ENVIRONMENTAL CONSIDERATIONS

General Descriptions. The Devils Ditch study area is located in Richland County, South Carolina. Devils Ditch is a small, 4- to 8-foot wide tributary of Gills Creek which empties into the Congaree River on the southeast side of the City of Columbia. The lower portion of the Devils creek basin is very flat and swampy. The remaining two-thirds of the basin is typical of small basins in the Piedmont region of South Carolina.

The area is composed mainly of residential development with a few scattered commercial establishments.

Flora. Vegetation in the study area is typical of lower Piedmont flora. Overstory species predominating include sweetgum, willow, poplar, sycamore, loblolly pine, long leaf pine, and various oaks. Understory and ground cover species predominating include dogwood, privet, alder, ironwood, honeysuckle, poison ivy, Virginia creeper, elderberry, rushes, and plantains. Various lawn grasses and cultivated shrubs are growing around houses in the subdivisions.

Fauna. Most wildlife species associated with bottomland flora in a suburban setting can be expected to occur in the Devils Ditch study area. No unusual or critical terrestrial habitat is likely or known to exist in the study area.

Fish. Devils Ditch is a narrow, shallow stream with an insignificant fishery.

Threatened and Endangered Species. There are no known endangered or threatened species in the study area. Furthermore there does not appear to be any potential for adversely affecting any endangered or threatened species. There is no cirtical habitat in the study area for any endangered or threatened species.

Cultural Resources. The National Register of Historic Sites does not list any sites within the study area. There are no known archeological sites within the study area. An inspection of the area by members of the study team did not reveal any significant cultural resources. A cultural resources reconnaissance will be included in any further study.

Encl 2

United States Department of the Interior

FISH AND WILDLIFE SERVICE

P.O. BOX 12559

217 FORT JOHNSON ROAD

CHARLESTON, SOUTH CAROLINA 29412

July 20, 1983

Lt. Colonel F. Lee Smith
District Engineer
Charleston District,
U.S. Army Corps of Engineers
P.O. Box 919
Charleston, S.C. 29402

Re: Devils Branch Reconnaissance Study, Richland County, SC

Dear Colonel Smith:

This report is provided in partial fulfillment of our responsibilities pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Prescott Brownell of my staff visited the study area with Jim Woody on June 7, 1983, to conduct an initial survey of fish and wildlife resources.

Devil's Branch is a small tributary of Gills Creek originating near the center of Columbia and flowing approximately 4 miles to a juncture with Gills Creek below State road 48. The upper two miles of the stream floodplain is entirely occupied by high density residential and commercial development. This portion of the stream is highly altered and presently provides very little habitat value for fish and wildlife species. Below S.C. Highway 48 the lower 1 to 2 miles of the stream and floodplain area much less altered and some significant habitat value for fish and wildlife species remains.

It is our understanding that flooding problems as well as potential flood control work will most likely be confined to the upper portion of the floodplain and channel above the SCL railroad right-of-way. If that is the case it is unlikely that significant fish and wildlife resources would be affected by flood control measures.

At this time our estimate of transfer funds required to adequately address fish and wildlife resources in Devils Branch includes the following cost items.

Work Items	Biologist Days
Field Surveys	2
Coordination	2
Report Preparation (FWCA)	4
Total	8

Biologist Day Cost: $275

Total Funding: $2200

We look forward to participation with your study team during planning efforts on Devils Branch.

Sincerely Yours,

Roger Banks

Roger L. Banks
Field Supervisor

STUDY COST ESTIMATE (FB-6) (6600) For use of this form, see ER 11-2-220	APPROPRIATION TITLE: General Investigations	NAME OF STUDY: Devils Ditch Richland County, SC
	CATEGORY: FLOOD CONTROL	
	CLASS: Local Protection	SUBCLASS: Section 205

LINE NO.	SUBACCOUNT		CURRENT FEDERAL COST ESTIMATE				PREVIOUS FEDERAL COST ESTIMATE AND DATE APPROVED ( )	REMARKS
			ACCOUNT			TOTAL		
	NUMBER	TITLE	RECON	EXPANDED RECON	D.P.S.			
	a	b	c	d	e	f	g	h
1		Public Coordination	0.5	6.0	6.0	12.5		
2		Environmental Studies	1.0	3.5	1.0	5.5		
3		F & W Services	-	2.5	-	2.5		
4		H & H Studies	1.0	40.0	17.5	58.5		
5		Economic Studies	1.0	24.0	7.0	32.0		
6		Project Management	0.5	10.0	6.0	16.5		
7		Design & Cost Estimates	1.0	3.0	2.0	6.0		
8		Surveys		6.0	2.0	8.0		
9		Foundation and Material		-	4.0	4.0		
10		Real Estate		1.5	0.5	2.0		
11		Project Formulation	0.5	2.5	2.5	5.5		
12		Preparation of Report	1.0	8.0	14.0	23.0		
13		Contingency	1.0	13.0	8.5	22.5		
14		TOTAL	7.5	120.0	71.0	198.5		

DATE PREPARED	DIVISION / DISTRICT: SOUTH ATLANTIC CHARLESTON	REGION / BASIN: SOUTH ATLANTIC - GULF	Page 1 of 1

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