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COMMISSIONER, FIRST DISTRICT

ED MUNRO
COMMISSIONER, SECOND DISTRICT

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COMMISSIONER, THIRD DISTRICT

KING COUNTY COMMISSIONERS
402 KING COUNTY COURT HOUSE
SEATTLE, WASHINGTON 98104

RALPH R. STENDER
CLERK OF THE BOARD

March 18, 1965

Col. Charles C. Holbrook, District Engineer
U. S. Army Corps of Engineers
Seattle, District
1519 Alaskan Way South
Seattle, Washington

Subject: Flood Control Improvements Sammamish River, Wash.

Dear Col. Holbrook:

Pursuant to instruction containing in O. & M. Manual, Volume I for the above subject, the following action has been taken.

Per 208.10 (2) Sec. 3 of the Act of Congress approved June 22, 1936, as amended and supplemented (49 Stat. 1571; 50 Stat. 877; and 55 Stat. 638; 33 U. S. C. 701c; 701c-1) the following assignment was made March 15, 1965 by the Board of County Commissioners of King County, Washington:

The superintendent of the Sammamish River Flood Control Improvements shall be the King County Engineer.

Very truly yours,



ED MUNRO, Chairman
Board of County Commissioners
King County, Washington

EM
RRS:gj

cc: County Engineer

Barbara Powell
255-2531

**FLOOD CONTROL IMPROVEMENTS
SAMMAMISH RIVER, WASHINGTON**

**OPERATION
AND
MAINTENANCE
MANUAL**

VOLUME I



U. S. ARMY ENGINEER DISTRICT, SEATTLE
CORPS OF ENGINEERS

1505-22 SAMMAMISH RIVER - OPERATION MAINTENANCE MANUAL - Vol 1 - F/C IMPROVEMENTS
If RHA when inactive, PERM

SAMMAMISH RIVER, WASHINGTON
FLOOD CONTROL IMPROVEMENTS
OPERATION AND MAINTENANCE MANUAL

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OPERATION AND MAINTENANCE MANUAL

FLOOD CONTROL IMPROVEMENTS

SAMMAMISH RIVER, WASHINGTON

SECTION I - INTRODUCTION

1.1 AUTHORIZATION. - Channel improvements on the Sammamish River, Washington, were constructed under the authority of the Flood Control Act of 1958, Public Law 85-500 (Appendix I), subject to local cooperation set forth in Section 3 of the Flood Control Act of 1936, Public Law 738 (Appendix II).

1.2 LOCATION. - The Sammamish River rises in Lake Sammamish about 11 miles east of Seattle, Washington, and flows northwesterly 14 miles to Lake Washington which discharges into Puget Sound through the Lake Washington Ship Canal. The Sammamish River and its tributary streams drain a narrow basin, 240 square miles in area, in western King County and southwestern Snohomish County.

1.3 PROTECTION PROVIDED. - The design criteria established for the project requires that the improved river channel carry floods of record which have occurred after 1 March (spring floods) without inundating adjacent farmlands and without causing Lake Sammamish to exceed elevation 29.0 MSL. The design criteria also requires that the low water levels of Lake Sammamish not be altered. The flood of 6 March 1950, is the maximum spring flood of record and has an exceedence frequency after the first of March (as a spring flood) of once in 40 years. The project as designed will protect against this flood and will substantially prevent all spring flood damage. The protected flood plain area consists of 2540 acres of land.

1.4 DESCRIPTION OF PROJECT. - The project is for flood control and major drainage improvement of the Sammamish River Valley. The main river channel was widened and deepened from below Lake Sammamish to Lake Washington. At its upstream end an intake transition section was constructed. In addition, improvements to three tributary creeks were made. There were 22 bridges crossing the Sammamish River and its tributaries at the start of the project. Four Northern Pacific Railway bridges were modified by the Railway under separate agreement with the Government. All other bridges were removed, replaced, or modified by King County to accommodate the channel improvements.

1.5 PROJECT DETAILS. - a. Intake Transition. - The intake transition section, 1800 feet in length, begins about 3100 feet from Lake Sammamish and provides an outlet from Lake Sammamish into improved river channel. The transition section allows for the passage of migratory fish and small boats except during low summertime flows. The approach channel from the lake to the transition section was deepened about 5 feet over a width of 40 feet with 1 on 3 side slopes. The transition has a fall of

6.8 feet over a distance of 1450 feet. The inner 12-foot section has a capacity of 40 cubic feet per second. The 100-foot center section has a capacity of 180 cubic feet per second which is seldom exceeded during the summer recreational season. The full transition section, 200 feet wide with a 1 on 3 side slope will pass the design flood of 1500 cubic feet per second. Protection against erosion is provided throughout the width of the intake transition by a 12-inch layer of quarry spalls on a 9-inch gravel bedding. The weir apron was grouted 14 feet upstream and 12 feet downstream from station 709+50. As an aid to navigation, day beacon ranges were placed by the United States Coast Guard to indicate the center channel of the intake transition.

b. Main River Channel. - The improved river channel begins at the downstream end of the intake transition and extends for 12.8 miles on a uniform gradient of one foot per mile to Lake Washington. The main channel will carry the design flood of 1,500 cubic feet per second out of Lake Sammamish plus flow from the three tributaries. The bottom widths are 42 feet to Woodinville-Bear Creek, 46 feet from there to North Creek, and 56 feet for the remaining distance to Lake Washington. At design flow, the depth in the main channel is about 10.5 feet and the average velocity is about 2.5 feet per second. The channel sides are generally 1 on $2\frac{1}{2}$, however, in several locations, the channel side slopes are steepened for short distances to 1 on 2 or 1 on 1.5. The steepened slopes are stabilized with one foot layer of quarry spalls to a height of 7 to 15 feet above the channel bottom. All slopes not otherwise protected with quarry spalls are protected against erosion and wave wash by grass growth. In the few areas where the channel sides are constructed of fill material, a gravel plug was provided.

c. Redmond-Bear Creek. - The capacity of this tributary was increased upstream from the Sammamish River for a distance of slightly more than $\frac{2}{3}$ mile. A new overflow channel 3,500 feet in length was provided instead of widening the existing channel so a row of large poplar trees could be saved. The overflow channel is parallel to the creek, 100 feet distant, and has a 20-foot bottom width with 1 on 4 side slopes. The overflow channel was seeded and remains dry for most of the year. The creek streambed was excavated on a uniform gradient 2400 feet upstream from its mouth in order to meet the lowered grade of the Sammamish River and will carry a design flow of 690 cubic feet per second. The creek has a "v" bottom with 1 on 2 side slopes. Nine inches of gravel bedding, and 12 inches of riprap were provided over the entire length of the streambed improvement. Special zones were provided to slow stream velocities to 4 feet per second or less for fish migration.

d. Woodinville-Bear Creek. - This creek was excavated on a uniform gradient approximately 1000 feet upstream from its mouth in order to meet the lowered grade of the Sammamish River and will carry a design flow of 300 cubic feet per second. It has a V-bottom with 1 on 2 side slopes. Nine inches of gravel bedding, and 12 inches of riprap are provided over the entire length of the improvement. A 500-pound rock was placed every 25 feet along the channel bottom to provide a slower stream velocity for fish migration.

e. North Creek. - A levee about 1,000 feet long was constructed along the left bank of North Creek. This levee will abut a future highway embankment and complete the total levee plan for protection of pasture lands to the east. The levee has 12-foot top width and 1 on 3 side slopes. For 1,600 feet upstream from the mouth of North Creek, the streambed was excavated on a uniform gradient to meet the lowered grade of the Sammamish River and will carry a design flow of 590 cubic feet per second. The first 500 feet upstream from the mouth was constructed with a bottom width of 8 feet. The remainder of the improved creek channel was constructed in "V" shape. Side slopes are 1 on 2. Nine inches of gravel bedding, and 12 inches of riprap were provided over the entire length of the improved channel. Special zones were provided to slow stream velocities to 4 feet per second or less for fish migration.

f. Bridges. - To accommodate the channel improvements, four railroad bridges and one vehicular bridge were modified, two-foot bridges and four vehicular bridges were replaced, four vehicular bridges were removed and seven vehicular bridges required no work.

1.6 CONSTRUCTION HISTORY. - Construction by contract for channel improvement began in July 1963 and was completed in November 1964. The four railway bridges were modified by the Railway Company in accordance with a separate relocation agreement. All other bridges were modified by King County as an item of local cooperation.

Cost 2,552,439 (Federal Funds)

3,269,648 (including repairs, maintenance, etc.)

SECTION II - LOCAL COOPERATION REQUIREMENTS

2.1 APPLICABLE PORTIONS OF FLOOD CONTROL ACTS. - Requirements of local cooperation are contained in Section 3 of the Flood Control Act, approved 22 June 1936 (Public Law 738) and made applicable to the Sammamish River Project. The applicable portions of Public Law 738 are quoted in Appendix II.

2.2 RESPONSIBILITY OF LOCAL INTERESTS. - Local interests were required to furnish without cost to the United States, all lands, easements and rights-of-way; and are obligated to maintain and operate the project after completion in accordance with regulations prescribed by the Secretary of the Army. The County Commissioners of King County, Washington, by Resolution No. 25095, dated 26 November 1962, Appendix III, agreed to comply with the required items of local cooperation. The names, titles, and addresses of the principal representatives of King County, Washington, responsible for fulfillment of local cooperation are:

Ed Munro, Chairman, Board of County Commissioners;

Scott Wallace, Member, Board of County Commissioners;

John O'Brien, Member, Board of County Commissioners;

Walter Winters, King County Engineer.

All representatives may be addressed: King County Court House, Seattle, Washington.

SECTION III - GENERAL PROCEDURES

3.1 APPROVED REGULATIONS. - Regulations for operation and maintenance of local flood control projects which have been prescribed by the Secretary of War in accordance with authority contained in Section 3 of the Flood Control Act of 22 June 1936, Public Law No. 738, Seventy-fourth Congress, as amended and supplemented, were entered in the Federal Register as F.R. Document 44-12285, on 16 August 1944, and published 17 August 1944. These War Department Flood Control Regulations are hereinafter referred to as the "Regulations," a copy of which is bound in this manual as Appendix IV. The sections of the "Regulations" applicable to the Sammamish River project are as follows:

- a. General
- b. Levees
- g. Channel and floodways
- h. Miscellaneous facilities

3.2 DESCRIPTION OF TERMS. - All quotations in this manual containing the words "Secretary of War" shall mean "Secretary of the Army" and the "War Department" shall mean "Department of the Army" in accordance with Section 205 of the National Security Act of 1947, approved 26 July 1947. Public Law No. 253, 80th Congress.

3.3 PURPOSE OF MANUAL. - (Ref. 208.10(a)(1) of Appendix IV.) The purpose of this operations and maintenance manual is to present detailed information to be used as a guide in complying with the "Regulations." In executing assurances of local cooperation, King County Commissioners have agreed to operate and maintain the completed works in accordance with the "Regulations."

3.4 GENERAL RULES AND PROCEDURES. - The general rules for maintenance and operation of local flood control works are given in detail in subparagraph 208.10(a) of the "Regulations" (Appendix IV). Most of the duties outlined in this paragraph are self-explanatory. There are, however, certain features that require clarification as covered by the following paragraphs.

3.5 DUTIES OF SUPERINTENDENT. - (Ref. 208.10(a)(2) of Appendix IV.) The King County Commissioners shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall have charge of the operation and maintenance of the project. Details of the superintendent's duties are developed in other portions of this manual. The superintendent's general duties include the training of key personnel to handle all possible conditions that might arise. The superintendent should have addresses and telephone numbers of all his key men and a reasonable number of substitutes therefor. These key men should in turn, have similar information on all the men who will assist them. The District Engineer, U. S. Army Engineer District, Seattle, Washington, should be kept advised of the names of the superintendent and his committeemen at all times. The key men should include the following:

a. An assistant superintendent to act in cases of absence of the superintendent.

b. A sufficient number of foremen who can adequately lead maintenance work and patrol of the project during any flood fighting operations. The superintendent shall ascertain that all of his key men have read the portions of this manual pertaining to their duties.

3.6 TRESPASS ON RIGHTS-OF-WAY. - (Ref. 208.10(a)(4) of Appendix IV). No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project will be permitted upon the right-of-way by the superintendent. If, however, the construction of facilities such as boat basins causes encroachment on the right-of-way so that operation and maintenance procedures are affected, additional right-of-way must be acquired. King County must secure any additional right-of-way in a form satisfactory to the Government.

3.7 IMPROVEMENTS OR ALTERATIONS. - (Ref. 208.10(a)(5) of Appendix IV). No improvements or alterations affecting the flood protective works shall be made without prior approval of the District Engineer, U. S. Army Engineer District, Seattle, Washington. Drawings or prints of proposed changes shall be submitted to the District Engineer sufficiently in advance of the proposed construction to permit adequate time for study and consideration of the work. If approved, drawings, or prints, in duplicate, showing improvements or alterations as finally constructed, shall be furnished the District Engineer after the work is completed. Prior approval of the District Engineer must be obtained for the construction of boat basins; however, no special navigation permit will be required.

3.8 SEMI-ANNUAL REPORT. - (Ref. 208.10(a)(6) of Appendix IV). Submission of a semi-annual report is required. This report shall be submitted to the District Engineer, U. S. Army Engineer District, Seattle, Washington covering inspection, maintenance and operation of the protective works including a chronological log of all operations and dated copies of inspection check lists made during the period of the report. An outline of the semi-annual report of the superintendent to the District Engineer is shown in Appendix V. The nature and date of repairs shall be included in this report. Other items and suggestions relative to public sentiment on the project, its effectiveness and other allied subjects, are considered desirable data for inclusion in the report.

3.9 PERIODIC INSPECTIONS. - (Ref. 208.10(b)(1), (g)(1), and (h)(1) of Appendix IV). Periodic inspections are required and shall be made by the superintendent at the following times:

- a. Immediately prior to the beginning of a major flood season.
- b. Immediately following each major high-water period.
- c. At periods not exceeding 90 days.

d. Intermediate times as necessary

3.10 CHECK LISTS. - The superintendent shall prepare check lists covering all features of the project for use on each inspection to insure that no feature of the protective system is overlooked. Items requiring maintenance shall be noted thereon. If items are satisfactory, they may be so indicated by a check mark.

3.11 SEQUENCE OF OPERATION. - The maximum discharge of the Sammamish River occurs in the winter and spring months. Floods may be expected at any time during the months of November through April. During these months, the superintendent shall conduct inspections of personnel, equipment, and materials; and shall hold practice drills as necessary to insure immediate and efficient flood fighting operations as outlined in Sections IV and V. Periods of low flow during the summer and early fall months shall be utilized to the fullest extent to inspect the channel banks and levees for possible flood damages and to accomplish necessary repairs and maintenance work.

SECTION IV - PROJECT FEATURES

4.1 PROJECT PLANS. - Location, sections and details of the Sammamish River project are shown on the drawings of Appendix VII, Volume II. These are contract drawings revised to "As-Built".

4.2 GENERAL NOTES ON MAINTENANCE. - a. The need for thorough inspection before each flood season and after each flood is very important. Repairs if needed, shall be made as soon as possible to prevent accelerated damage during the next high river stage. Debris which may impede the flow in the channel shall be removed. The growth of trees and brush along the channel banks and levee face shall be prevented, as it can result in the displacement of bank stabilization, impede inspection and access to the channel banks and levee face, and impair hydraulic capacity of the channel. Particular attention shall be paid to the intake transition. The transition shall be repaired immediately if found deficient, as the characteristics of the transition are critical to flow.

b. The Redmond-Bear Creek overflow channel shall be kept clear of trees, brush, and undergrowth by periodic removal in order to maintain its function.

c. The superintendent shall inspect the tops of the levees each year to determine if settlement has occurred. Any part of the levee which is below grade shall be raised to the required height as given by the profiles shown in Appendix VII. All elevations are based on MSL, 1929 General Adjustment, and 1947 Supplemental Adjustment.

d. There are 18 bridges crossing the channel in this project. These bridges shall be inspected to insure the openings are not being restricted by shoaling, new supports being added such as piling, drift hanging up on the structure, or additional material being dumped at the abutments.

e. Facilities such as drainage ditches and culverts draining into the project shall be checked to see that they are functioning properly so that drainage is discharged at the proper outfall.

f. The location of water, sewer, and gas lines within the project shall be determined before any maintenance measures or repairs are made.

g. Improvements shall be inspected to see that all construction is in accordance with standard engineering practice. The construction of fences which will extend down the slopes below flood is prohibited. Keys to all locked gates shall be made available to the superintendent. Each key shall be tagged to identify the corresponding gate and shall be deposited in such a place that it may be available at any time.

h. Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

4.3 EMERGENCY REPAIRS. - Emergency repairs as described in the following paragraphs may be required during high water stages. These repairs are independent of those which may be required as a result of routine inspections referred to in subparagraphs (a)(2), (b)(1), (g)(1), and (h)(1) of the "Regulations."

a. Degradation. - The greatest threat of any levee or bank failure would be from high water, causing erosion or sloughing. Stream velocities are always low. In the event of any bank or levee erosion, the use of quarry spalls or coarse gravel is recommended to prevent further damage. If at a later date, it is determined that the emergency repairs are not adequate for bank stabilization, permanent repairs should be made using material more adequate in size.

b. Seepage. - Seepage is not expected to be a problem.

c. Overtopping. - Formation of bars may raise the flood profile in places so that levee grades and channel banks must be raised to maintain adequate protection. Topping may be accomplished by an earth and sack topping as in Sketch No. 1, Appendix VI. A temporary sandbag closure will be made at drain inlets to raise the elevation of the inlet to the adjacent channel banks. The sandbag closure is shown in Sketch No. 2, Appendix VI. All pipe culverts shall be temporarily plugged as necessary to prevent flooding.

LEVEES

4.4 DESCRIPTION. - The North Creek levee cross-section consists of common fill with a 12-foot top width and 1 on 3 side slopes. The Gold Creek Canal levee (Station 364+00 to Station 369+40) consists of impervious fill with a 30-foot top width and 1 on 2½ side slopes.

4.5 MAINTENANCE. - Applicable portions of Section 208.10(b)(1) of the "Regulations" are quoted below.

"(1) Maintenance. - The superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine . . . removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. . . Periodic inspections shall be made by the superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(1) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(vii) No action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod;

(xi) There is no unauthorized grazing or vehicular traffic on the levee;

(xii) Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days, and such intermediate times as may be necessary to insure the best possible care of the levee. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the superintendent."

4.6 OPERATION. - Applicable portions of subparagraph 208.10(b)(2) of the "Regulations" are quoted below:

"(2) Operation. - During flood periods the levee shall be patrolled continuously. . . to be certain that: . . .

- (ii) No wash or scouring action is occurring;
- (iii) No low reaches of levee exist which may be overtopped;
- (iv) No other conditions exist which might endanger the structure.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section."

CHANNELS AND FLOODWAYS

4.7 DESCRIPTION. - a. Channel. - The channel consists of the main river channel including the intake transition, Redmond-Bear Creek, Woodinville-Bear Creek, and North Creek.

b. Floodway. - The floodway consists of an overflow channel for Redmond-Bear Creek.

4.8 MAINTENANCE. - Applicable portions of Section 208.10(g)(1) of the "Regulations" are quoted below.

"(1) Maintenance. - Periodic inspections of improved channels and floodways shall be made by the superintendent to be certain that:

(i) The channel or floodway is clear of debris, weeds and wild growth;

(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;

(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

(v) Riprap sections. . . and walls are in good condition;

(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections. Measures will be taken by the superintendent to promote the growth of grass on bank slopes . . ." (This also includes promotion of the growth of grass in the Redmond-Bear Creek overflow channel.)

4.9 OPERATION. - Applicable portions of Section 208.10(g)(2) of the "Regulations" are quoted below:

"(2) Operation. - Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or wave wash. Appropriate measures shall be taken to prevent the formation of jams of . . . debris. Large objects which become lodged against the banks shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major highwater period. As soon as practicable

thereafter, all snags and other debris shall be removed and all damage to banks, riprap, . . . walls, drainage outlets, or other flood control structures repaired."

MISCELLANEOUS FACILITIES

4.10 DESCRIPTION. - Miscellaneous facilities consist of all structures and facilities which are parts of this project not included in levees or channels and floodways.

4.11 MAINTENANCE. - Applicable portions of Section 208.10(h)(1) of the "Regulations" are quoted below.

"(1) Maintenance. - Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the superintendent and appropriate maintenance measures taken . . . The superintendent shall take proper steps to prevent restriction of bridge openings. . ."

4.12 OPERATION. - Applicable portions of Section 208.10(h)(2) of the "Regulations" are quoted below.

"(2) Operation. - Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water . . ."

SECTION V - SPECIAL REQUIREMENTS DURING HIGH WATER PERIODS

5.1 GENERAL. - This part of the manual is supplementary in nature and presents principles and procedures which are particularly applicable during high water periods with a view to emphasizing the importance of certain procedures covered elsewhere in the manual.

5.2 PROCEDURES TO BE FOLLOWED AT FLOOD STAGE. - Water surface observations shall normally be made during flood flows and shall be correlated with U. S. Geological Survey gaging records of river flow. For the convenience of making observations of water surface elevations, points of established mean sea level elevations known as "profile points" were located along the river at location shown on the project drawings. Detailed description of these points and their elevations are on file in the Survey Branch of the U. S. Army Engineer District, Seattle, Washington.

There are two U.S.G.S. gaging stations on the Sammamish River. One is located at Bridge No. 10 (Station 403+51), and the other is located at Bridge No. 12 (Station 510+26). There is also a staff gage located at the northwest end of Lake Sammamish near the outlet to the Sammamish River. When this gage reads 4.86 indicating elevation 28.9 MSL and a discharge of 1200 cubic feet per second and/or the gage at Bridge No. 12 reads 1,500 cubic feet per second and either are expected to continue rising, the superintendent shall initiate the following steps:

- a. Assign men on a 24-hour duty to patrol the channel banks and the levee. Initially these men shall make a detailed inspection and report the condition of the project. The superintendent shall then notify the Water Control Section, U. S. Army Engineer District, Seattle, Washington, MJtual 2-2700, Extension 476.
- b. Locate necessary tools and materials (quarry spalls, gravel, sand bags, etc.) and distribute and store them where active maintenance is anticipated.
- c. Locate earth moving equipment and trucks that can be made available.
- d. Make needed repairs as quickly as possible.

SECTION VI - ACKNOWLEDGEMENT

This manual was made under the general direction of Colonel Charles C. Holbrook, District Engineer; Mr. Sydney Steinborn, Chief, Engineering Division; Mr. Edwin Derrick, Chief, Design Branch. Detailed supervision was by Messrs. Anwar Haddad and Dale Schuler. This manual was prepared by John Welch with the assistance of the following:

Soils: Glen Butterfield

Hydraulics: Richard Regan

APPENDIX I

FLOOD CONTROL ACT OF 1958

Public Law 85-500; 72 Stat. 297

An Act authorizing the construction, repair, and preservation of certain public works on rivers and harbors for navigation, flood control, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that:

TITLE II - Flood Control

Section 203. The following works of improvement for the benefit of navigation and the control of destructive flood waters and other purposes are hereby adopted and authorized to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of Engineers in accordance with the plans in the respective reports hereinafter designated and subject to the conditions set forth therein: . . .

SAMMAMISH RIVER BASIN

The project for flood protection and related purposes on the Sammamish River, Washington, is hereby authorized substantially as recommended by the Chief of Engineers in House Document Numbered 157, Eighty-fourth Congress, at an estimated cost of \$825,000.

APPENDIX II

PUBLIC LAW 738
APPLICABLE PORTIONS RELATED TO LOCAL COOPERATION

74TH CONGRESS. SESS. II. CH. 688. JUNE 22, 1936.

SEC. 3. That hereafter no money appropriated under authority of this Act shall be expended on the construction of any project until States, political subdivisions thereof, or other responsible local agencies have given assurances satisfactorily to the Secretary of War that they will (a) provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the project, except as otherwise provided herein; (b) hold and save the United States free from damages due to the construction works; (c) maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of War: Provided, That the construction of any dam authorized herein may be undertaken without delay when the dam site has been acquired and the assurances prescribed herein have been furnished, without awaiting the acquisition of the easements and rights-of-way required for the reservoir area: And provided further, That whenever expenditures for lands, easements, and rights-of-way by States, political subdivisions thereof, or responsible local agencies for any individual project or useful part thereof shall have exceeded the present estimated construction cost therefor, the local agency concerned may be reimbursed one-half of its excess expenditures over said estimated construction cost: And provided further, That when benefits of any project or useful part thereof accrue to lands and property outside of the State in which said project or part thereof is located, the Secretary of War with the consent of the State wherein the same are located may acquire the necessary lands, easements, and rights-of-way for said project or part thereof after he has received from the States, political subdivisions thereof, or responsible local agencies benefited the present estimated cost of said lands, easements, and rights-of-way,

State, etc., cooperation required.

Easements, etc.

Liability for damages.

Maintenance of works after completion.

Provisos.

Construction of dams.

Where expenditures for lands, etc., exceed estimates.

Benefits accruing to property outside State where project located.