

"An Act providing for the issuance of general obligation bonds in the amount of \$4,500,000 for the purpose of paying the cost of the Chena River Flood Control Project; effective date."

COMMITTEE REPORT

HOUSE

3/4/76

Mr. Speaker:

Date _____

The Committee on FINANCE has had HB 748

under consideration. A Majority of the members of the Committee

recommends it DO PASS

recommends it DO NOT PASS

recommends it DO PASS WITH ATTACHED AMENDMENT(S)

recommends it BE REPLACED WITH CS FOR _____ AND THAT

CS FOR _____ DO PASS

"and" recommends it BE REFERRED TO THE _____

COMMITTEE

reports it back WITHOUT RECOMMENDATION

"other"

Members signing the Majority report:

Members NOT concurring in the Majority report:

_____ recommends:

_____ recommends:

_____ recommends:

_____ recommends:

_____ recommends:

Chairman

"An Act providing for the issuance of general obligation bonds in the amount of \$4,500,000 for the purpose of paying the cost of the Chena River Flood Control Project; and providing for an effective date."

COMMITTEE REPORT

2/12/76

HOUSE

FINANCE

Mr. Speaker:

Date 2-26-76

The Committee on STATE AFFAIRS has had HB 748

under consideration. A Majority of the members of the Committee

recommends it DO PASS

recommends it DO NOT PASS

recommends it DO PASS WITH ATTACHED AMENDMENT(S)

recommends it BE REPLACED WITH CS FOR _____ AND THAT

CS FOR _____ DO PASS

"and" recommends it BE REFERRED TO THE _____

COMMITTEE

reports it back WITHOUT RECOMMENDATION

"other"

Members signing the Majority report:

<u>Jim Dalkin</u>	<u>Do Pass</u>	<u>Allen Beirne</u>
<u>W. Kuller</u>	<u>"</u>	<u>Joe McKinnon</u>
<u>Bill Paul</u>	<u>Do Pass</u>	

Members NOT concurring in the Majority report:

_____ recommends:

_____ recommends:

_____ recommends:

_____ recommends:

_____ recommends:

Joe McKinnon Chairman

2162
Bernier

Introduced: 2/12/76
Referred: State Affairs and
Finance

BY WALLIS, BRADNER, BROWN,
COWPER, HACKNEY AND PARR

1 IN THE HOUSE

2 HOUSE BILL NO. 748
3 IN THE LEGISLATURE OF THE STATE OF ALASKA
4 NINTH LEGISLATURE - SECOND SESSION

5 A BILL

6 For an Act entitled: "An Act providing for the issuance of general obliga-
7 tion bonds in the amount of \$4,500,000 for the purpose
8 of paying the cost of the Chena River Flood Control
9 Project; and providing for an effective date."

10 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

11 * Section 1. For the purpose of paying the cost of the Chena River Flood
12 Control Project, general obligation bonds of the state in the principal
13 amount of not more than \$4,500,000 shall be issued and sold. The full faith,
14 credit and resources of the state are pledged to the payment of the principal
15 of and interest and redemption premium, if any, on these bonds. These bonds
16 shall be issued under the provisions of AS 37.15 as those provisions read at
17 the time of issuance.

18 * Sec. 2. If the issuance of these bonds is authorized by the qualified
19 voters of the state, a special fund of the state to be known as the "Chena
20 River Flood Control Project Fund" shall be established, to which shall be
21 credited the proceeds of the sale of the bonds described in sec. 1 of this
22 Act except for the accrued interest and premiums. There is appropriated from
23 the "Chena River Flood Control Project Fund" to the Department of Public
24 Works the amount of \$4,500,000.

25 * Sec. 3. If the issuance of these bonds is authorized by the qualified
26 voters of the state, the amount of \$15,750 or as much of that amount as is
27 found necessary is appropriated from the general fund of the state to the
28 state bond committee to carry out the provisions of this Act and to pay
29 expenses incident to the sale and issuance of the bonds authorized in this

1 Act. The amounts expended from the appropriation authorized by this section
2 shall be reimbursed to the general fund from the proceeds of the sale of the
3 bonds authorized by this Act.

4 * Sec. 4. The question whether the bonds authorized in this Act are to be
5 issued shall be submitted to the qualified voters of the state at the next
6 general election and shall read substantially as follows:

7 Proposition

8 State General Obligation Chena River Flood

9 Control Project Bonds \$4,500,000

10 Shall the State of Alaska issue its general obligation
11 bonds in the principal amount of not more than \$4,500,000
12 for the purpose of paying the cost of the Chena River
13 Flood Control Project?

14 Bonds Yes []

15 Bonds No []

16 * Sec. 5. This Act takes effect immediately in accordance with AS 01.10.-
17 070(c).

ALASKA STATE LEGISLATURE

NINTEH. Legislature SECOND. Session

HOUSE BILL NO. 748

By HALLIS, BRADNER, BROWN,
COWPER, HACKNEY, PARR

"An Act providing for the issuance of general obligation bonds in the amount of \$4,500,000 for the purpose of paying the cost of the Chena River Flood Control Project; and providing for an effective date."

Chena River Flood Control/Appropr.

Introduced in the House 2/15, 1976

HISTORY IN THE HOUSE

19 76

Feb 12

Read first time and referred to Committee on State Affairs and Finance

Reported back with recommendation that

Read second time and

Read third time and

PASS Effective Date
Yeas Yeas
Nays Nays
Absent Absent
Excused Excused

Reconsideration

PASS Effective Date
Yeas Yeas
Nays Nays
Absent Absent
Excused Excused

Reported correctly engrossed
Signed by Speaker
Sent to Senate

CHIEF CLERK OF THE HOUSE

HISTORY IN THE SENATE

19

Read first time and referred to Committee on

Reported back with recommendation that

Read second time and

Read third time and

PASS Effective Date
Yeas Yeas
Nays Nays
Absent Absent
Excused Excused

Reconsideration

PASS Effective Date
Yeas Yeas
Nays Nays
Absent Absent
Excused Excused

Reported correctly engrossed
Signed by President
Returned to House

SECRETARY OF THE SENATE

HISTORY IN THE HOUSE

19

Received from Senate

Reported correctly enrolled

Sent to Governor

..... By Governor

Filed with Lt. Governor

Chapter No.

Handwritten note: Bill, file

March 2, 1979

Genevieve Hugh Wilson
Chairman, House Finance Committee
Alaska State Legislature
State Capitol - Room 9
Juneau, Alaska 99801

Dear Representative Wilson:

A further review of the bill leads me to suggest that it be amended to facilitate a merger including Chapter 100, the 1979 law on the pre-emption of all (1) (2) (3) (4). These operations have been operating during the current year under the assumption that they would be allowed to take proceeds between corporations. If this authority were removed prior to completion of activities related to Chapter 100, it would probably lead to considerable conflict and the processing of a number of transfers to satisfaction of problems or conditions which might never actually occur. I feel it would be much more orderly to finish operations under Chapter 100 using the current rules and then operate under the new rules for future operating corporations and related projects which arise.

In addition to the above I would like you to consider changing Section 2 of House Bill 1000 to also prohibit transfers between capital projects and between capital and operating corporations. I feel that there have been very few cases where transfers between operating corporations have been approved by members of the legislature. In fact a number of the transfers between corporations which occurred may have been done for the benefit of all and in the interest of members of the legislature. In all cases and they be considered as so long as the structure amendments under the bill are consistent with the law.

Sincerely,

A. Gene Wilson
Chairman

GW:WJL

cc - Representative Wilson

2000
Bill
1415 748
x 28 582

3-30-76

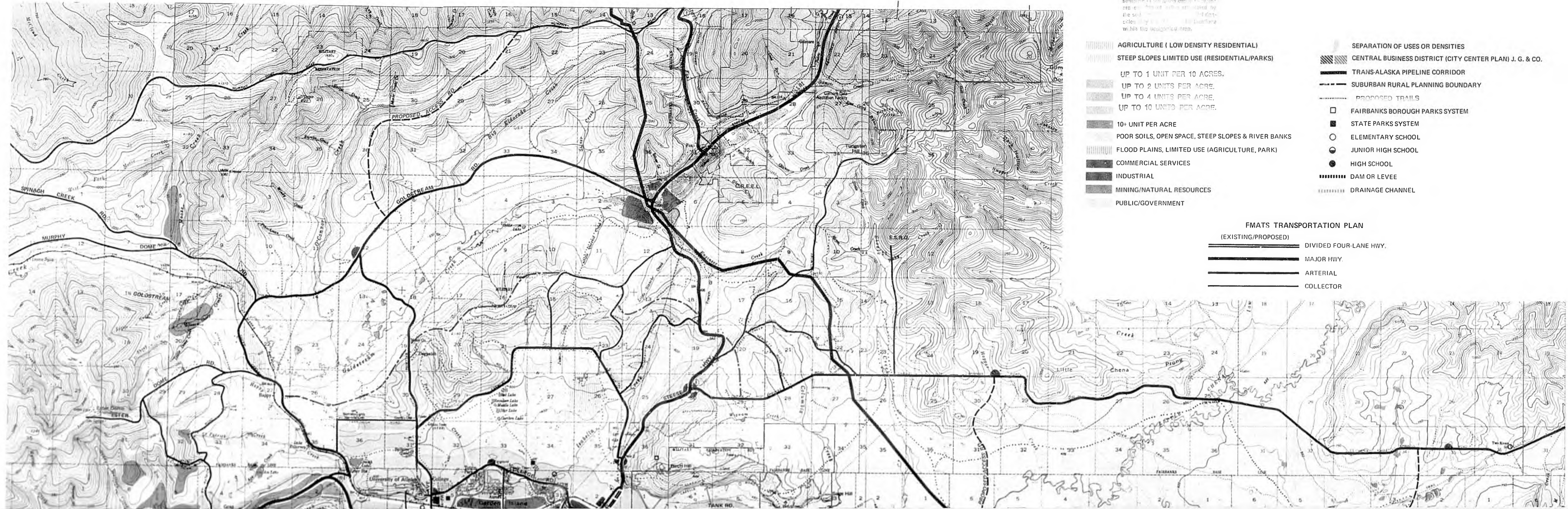
1/21/76

Chena River Flood Control Project

\$ 201,490,000
- 186,000,000
<u>\$ 15,490,000</u>
90%
<u>\$ 13,941,000</u>
- 9,500,000
<u><u>\$ 4,441,000</u></u>

Revised Estimate, Copy of Engineers* 1/1/76, Present Design
 Federal Share
 Non-Federal Share
 As 35.30.010
 State Share
 1972 Bond Funds - Borough Grant Agreement with State of Alaska
 Potential Shortfall

*Project Director, D. Staub
 Design Change on interior drainage will not significantly decrease cost. Other changes have not been approved. Scheduled completion date 1981.



Residential densities shown are representative of the zoning districts and are not intended to be construed as a commitment by the city. The actual densities will be determined by the local government within the designated area.

- AGRICULTURE (LOW DENSITY RESIDENTIAL)
 - STEEP SLOPES LIMITED USE (RESIDENTIAL/PARKS)
 - UP TO 1 UNIT PER 10 ACRES.
 - UP TO 2 UNITS PER ACRE.
 - UP TO 4 UNITS PER ACRE.
 - UP TO 10 UNITS PER ACRE.
 - 10+ UNIT PER ACRE
 - POOR SOILS, OPEN SPACE, STEEP SLOPES & RIVER BANKS
 - FLOOD PLAINS, LIMITED USE (AGRICULTURE, PARK)
 - COMMERCIAL SERVICES
 - INDUSTRIAL
 - MINING/NATURAL RESOURCES
 - PUBLIC/GOVERNMENT
- SEPARATION OF USES OR DENSITIES
 - CENTRAL BUSINESS DISTRICT (CITY CENTER PLAN) J. G. & CO.
 - TRANS-ALASKA PIPELINE CORRIDOR
 - SUBURBAN RURAL PLANNING BOUNDARY
 - PROPOSED TRAILS
 - FAIRBANKS BOROUGH PARKS SYSTEM
 - STATE PARKS SYSTEM
 - ELEMENTARY SCHOOL
 - JUNIOR HIGH SCHOOL
 - HIGH SCHOOL
 - DAM OR LEVEE
 - DRAINAGE CHANNEL

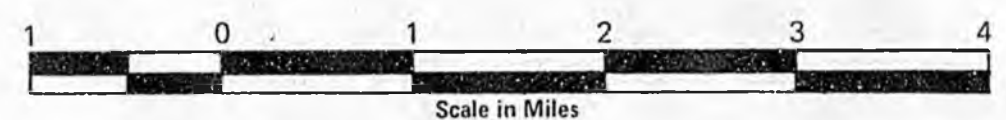
- FMATS TRANSPORTATION PLAN**
(EXISTING/PROPOSED)
- DIVIDED FOUR-LANE HWY.
 - MAJOR HWY.
 - ARTERIAL
 - COLLECTOR



GREATER FAIRBANKS AREA LAND USE PLAN

FAIRBANKS NORTH STAR BOROUGH, ALASKA

**TRYCK
NYMAN
& HAYES**
ENGINEERS / PLANNERS / SURVEYORS



This map is a guide for general planning. Reference to the base documents and site inspection is recommended.

The preparation of this map was financed in part through a Comprehensive Urban Planning Grant from the U. S. Department of Housing and Urban Development under the provisions of Section 701 of the Housing Act of 1954, as amended.

BASE MAP SOURCES-USGS

NO! THERE'S THE LAND. HAVE YOU SEEN IT?
 IT'S THE CUSEDEST LAND THAT I KNOW,
 FROM THE BIG, DIZZY MOUNTAINS THAT SCREEN IT
 TO THE DEEP, DEATHLIKE VALLEYS BELOW.
 SOME SAY GOD WAS TIRED WHEN HE MADE IT;
 SOME SAY IT'S A FINE LAND TO SHOW;
 MAYBE; BUT THERE'S SOME AS WOULD TRADE IT
 FOR NO LAND ON EARTH - AND I'M ONE.

1

*Excerpt from the Spell of the Yukon
 By Robert W. Service*

Land Use Element Fairbanks North Star Borough COMPREHENSIVE DEVELOPMENT PLAN

INTRODUCTION

A LAND USE PLAN is intended to be a graphic policy document, created to guide the long range development of a community. The plan is based upon physical, social, and economic realities which exist in the community, and upon the generally accepted short range goals and objectives set forth by the community. In operation the plan provides visual relationships to support processes and priorities, established to utilize the community's most valuable asset - its LAND - to meet its CITIZENS' needs and desires for improving the quality of their life.

A LAND USE PLAN is often interpreted as a zoning plan, and to this extent it may be considered as a negative element in the community's political process. But in fact, a LAND USE PLAN is not created to be a zoning plan nor does it function like zoning to definitively set forth what can and cannot be done with land. Rather, a LAND USE PLAN is intended to portray a comprehensive picture of desirable land use relationships in the community to which such implementation measures as zoning can be directed.

Essential to the effectiveness of the LAND USE PLAN is the requirement that it be structured in such a way as to meet the changing requirements of the people living in the area. The process under which the plan is created then becomes a key element in forming the basic foundation upon which future changes can be measured. The FAIRBANKS NORTH STAR BOROUGH LAND USE PLAN was created from an extensive public hearing process reflected against a background of the existing physical, social and environmental qualities of the area. Base maps for the study area containing color coded existing land usage were prepared from earlier Fairbanks Metropolitan Area Transportation Studies and existing mapping, updated through the use of aerial photography, assessor's records, and windshield surveys. The study area was then divided into geographical neighborhoods, and overlays were prepared depicting the major physical characteristics of the area and existing and proposed improvements.

From an analysis of this combined information, and with certain preliminary assumptions as to the degree of change anticipated to occur in the Borough during the planning period, a draft land use plan was prepared for each neighborhood. The plans were presented by the Planning and Zoning Commission to the general public at neighborhood meetings, held in the following areas: EAST FARMERS LOOP/CHENA HOT SPRINGS WEST FARMERS LOOP/SHEEP CREEK CHENA RIDGE/INTERNATIONAL AIRPORT NORTH POLE EAST GOLD STREAM/FOX WEST GOLD STREAM/ESTER FAIRBANKS TWO RIVERS SALCHA

Following the conclusion of the neighborhood meetings, the Planning Commission reviewed the transcripts of all meetings and made many changes to the preliminary plan. At the same time the Planning and Zoning Commission prepared and adopted a series of GOALS AND POLICY STATEMENTS covering land use, and growth and development of the study area. This information, together with a revised LAND USE PLAN combining all of the neighborhood plans, was then presented to the public at four community public hearings, held in the following areas: EAST GOLD STREAM WEST GOLD STREAM NORTH POLE/SALCHA FAIRBANKS. Following these hearings the Planning Commission again reviewed the public testimony and made the final revisions to the LAND USE PLAN.

CONCLUSIONS & RECOMMENDATIONS

The history of the effectiveness of 20 year period plans is not inspiring. Society is so dynamic, mobile and evolutionary, that planning periods must be considerably shorter to be effective. The plans must also have built-in flexibility to respond to changing conditions. In the FAIRBANKS LAND USE PLAN, the flexibility is represented by broad, multiple-use categories describing ranges of densities and intensities of land use. To allow for plan continuity beyond the short-range initial growth impact expected by construction of the Trans-Alaska Pipeline, as well as to establish guidelines for long range considerations envisioning a stabilizing population and economy, the LAND USE PLAN sets forth criteria relating both to the physical characteristics of land in the planning area which should be considered in the evaluation of a proposed use, and to social-economic forces indelibly evident as factors to be recognized in the determination of land use in Alaska.

For the initial short term planning period, the FAIRBANKS LAND USE PLAN is based upon generally recognized social attitudes of the population reflected in the following preliminary assumptions: The lifestyle which people find desirable in the Fairbanks area will continue to be a major element in determining the use of land. This attitude will be maintained and enhanced through immediate and future public and private policy decisions. Local government activities will remain reflective of local lifestyle attitudes, and will be a reactive, not leading, factor in the use and development of land during the short term period. The availability of large acreages of good land in the study area plus technological features such as dependable transportation, utilities, and other public services, will cause a continual dispersion of population from the Fairbanks city area. The state of existing federal, state, and local controls governing the overall use of land in the area are such that future restrictions to plan objectives and their enforcement will be difficult to define or guide desirable land use relationships. The most immediate period of change related to the use of land is currently underway, particularly in developing suburban areas, as a result of the recent approval to construct the Trans-Alaska Pipeline. Historical, and practical physical and economic considerations which have informally reversed land use in the study area will be significantly altered during this initial 5 year period of pipeline construction activity.

GOALS AND POLICY STATEMENTS Community goals serve an important function in providing long range and philosophic aspirations for the Community. Policy statements, on the other hand, establish realistic guidelines which the community can utilize in the pursuit of improving their lifestyle. The community goals and policy statements relating to land use for the Fairbanks Borough study area were prepared as a result of testimony given at neighborhood public hearings. The testimony stressed a need for broad policy statements which would set forth the intent of the Planning Commission in formulating land use relationships, and also serve as a guide for future decision making on land use matters, both public and private.

The public hearings brought forth testimony on the problems besetting Fairbanks, including increasing land values, suburban sprawl, and environmental degradation, and while applying differently to each neighborhood, the overall impact was interpreted as a devaluation of the quality of life for everyone living in the area. The Planning Commission, in formulating the Goals and Policy Statements, attempted to balance the expressed desires of the individual with the overall needs and requirements of the community, in a flexible series of statements intended to function within the parameters of the existing governmental and economic system. The Goals and Policy statements stress the theme of protecting and enhancing both the lifestyle and the environment while providing for orderly growth in the Borough.

GOAL STATEMENTS To protect and enhance the quality of the lifestyle in the Fairbanks North Star Borough. To protect and enhance the natural features of the landscape and the purity of the environment. To provide for a variety of choice in lifestyle, housing, transportation and recreation. To establish and maintain land use relationships consistent with the dynamic and well-being of all segments of the community.

POLICY STATEMENTS DENSITY AND INTENSITY OF USE To encourage the highest density and intensity of use in and around the City of Fairbanks, diminishing accordingly with distance from the city center. Residential densities higher than one unit per acre should be contained within the Fairbanks Bowl area and the City of North Pole.

RESIDENTIAL To encourage a variety of residential use areas in the Borough which provide and enhance urban, suburban and rural living styles. These areas should be appropriately located with respect to user demand and ultimate development trends, and protected from encroachment of high densities or incompatible uses.

COMMERCIAL To encourage the Fairbanks City Center to be the focal point for all major commercial and financial activities in the Borough. Commercial services developed in suburban areas should not dilute the effectiveness of the city center.

INDUSTRIAL To encourage industrial development, first, north of the City where there are sufficient utilities and transportation routes available; second, south of the new Richardson Highway between Fort Wainwright and North Pole. Locating industrial uses in areas where they may contribute to the overall air, ground or noise pollution is to be discouraged, as is the encroachment of such uses upon established or desirable residential areas. Natural resource extraction is to be encouraged in areas where it has been determined to be compatible with surrounding uses. However, such use of land should be strictly controlled to prevent undue degradation of the environment, and insure that the land is returned to a usable form.

TRANSPORTATION To encourage the development and implementation of an overall transportation plan which will supplement the FMATS plan, serve as a guide in evaluating various land use proposals, and create an effective overall transportation network in the Borough. Such a plan should give extensive consideration to all modes of travel. Land use plans which are based upon requirements for extensive travel between living and working areas should be closely evaluated in terms of energy limitations as well as pollution factors. Land use plans adjacent to or abutting lands controlled by the Alaska National or the Fairbanks International Airport should complement these primary transportation facilities and not limit or hamper their efficiency.

UTILITIES To encourage full development of lands now served by public utilities prior to extending service into outlying areas. Subdivision and land use considerations should include the long term eventuality that public water and sewer service will be provided to all lands within the Fairbanks Bowl area. Special consideration should be given to highway oriented community centers like Fox and Ester to assist them in securing public water and sewer facilities, to avoid undesirable dispersion of commercial growth, and to eliminate problems in ground pollution and related public health hazards.

COMMUNITY FACILITIES Land use planning considerations should include provisions for the immediate or eventual location of public facilities and quasi-public facilities in various areas and neighborhoods of the Borough, where they may provide the best opportunity for residents to utilize their services.

LAND USE AND GEOGRAPHY To encourage land use plans which recognize and enhance the natural features of the land and minimize physical degradation of the environment. To disapprove the use of land which is characterized as undesirable for permanent construction and long term habitation. To promote programs which will equitably remove such land from the market and encourage its public use for parks, open space, trails and the like. To encourage the protection and enhancement of natural features and scenic vistas. Some features, such as rivers, contain multiple use capabilities, and provision should be made to allow the best use of these lands consistent with the long term community interests.

TOURISM To consider in land use plans and programs the needs and desires of the permanent residents, and the tourist and transient population. Seasonal uses of land, and access to the historical, natural features and unspoiled environments should be encouraged. Architectural themes and aesthetic guidelines should be encouraged along scenic routes and vistas.

ALTERNATIVES TO GROWTH To recognize and understand the factors which dictate trends in future growth and development of the Borough, and the conflicts these factors present with respect to the intensity of land use and quality of life style desired and enjoyed by Fairbanksians. To devise contemporary land use policies and programs which will effectively allow the Borough to grow in an orderly manner while retaining the qualities of living and environment which the community desires.

LAND USE PLAN

The recommendations contained in the FAIRBANKS LAND USE PLAN result from the correlation and evaluation of research on the physical characteristics of the area, social and economic considerations, and public testimony. This is the basis of the planning process, and forms a framework for all land use proposals. The PLAN consists of two elements - the Physical Characteristics Plan, and the Land Use Plan. These two elements constitute the basic decision-making tools by which the Borough can plan for the future.

PHYSICAL CHARACTERISTICS PLAN The Physical Characteristics Plan graphically depicts general information concerning the relationship of the natural and man-made environment. The plan was developed to provide a basis for determining usable land within the planning area. Physical features were discovered to offer natural boundaries to measure density and intensity of uses anticipated within the planning period. Analysis of public testimony then determined final value judgments on implied social and economic aspects.

When combined graphically, the Physical Characteristics Plan shows how identified historical trends in development, and Fairbanksians' inherent respect for nature, specifically, areas where environmental conditions have and should continue to prohibit man's intensive use of the land, and correspondingly where such conditions appear areas ideally suited for future growth and development. A primary recommendation of the LAND USE PLAN is that proper recognition of undesirable physical and environmental conditions existing in the area be continued for the benefit of present and future generations. Recognition of the natural physical characteristics and capabilities of the land does not imply that the land cannot be altered for man's intensive use, but rather serves to identify where such problem areas exist and what costs and benefits are to be considered in altering the system for future use.

LAND USE PLAN The Land Use Plan refines the relationship between the natural features and the urban/rural settlement patterns already developed through historical, social and economic activities, and proceeds to set forth in broad general terms, anticipated patterns of use projected from current attitudes.

OPEN SPACE Open space is an essential element in any interface between man and his environment. In terms of land use, open space defines the boundaries of urban and rural use areas, as well as the limits of the physical systems not suited for such use. By recognizing and combining the systems with historical, social and cultural areas, a rational and functional open space system is created. Such a system becomes the basis from which other relative land use decisions can be derived concerning density and intensity of projected activities. Open space is a key ingredient in the lifestyle enjoyed by Fairbanksians. However, it is an ingredient accepted without thought, for to date, open space is an effect created by a small population dispersed over a large land area. This effect may eventually cease to exist without proper recognition as population increases and economic values, in an interrelated state, determine the future ownership and use of land.

DEVELOPMENT FORM Open space defines the form of overall land use patterns. In determining the nature and extent of land use relationships in the Fairbanks area, the following considerations were included in the decision-making process: 1) The relationship between the proposed use and the community goals and policy statements on land use. 2) The natural capability of the land to support the proposed use. 3) Physical characteristics were measured against public input, the overall economic values of the community, and the value related to public or private investments. In certain cases where the proximity of the land to the land's undesirable physical characteristics in terms of value to the community, it will be necessary to develop criteria and standards for providing the optimum value at a minimum of incompatibility to the area. This is especially important in considering the ambient air quality problem but applies as well to the use of marginal land areas. The criteria and standards become the tools protecting and enhancing the community's values relating to natural resources and ecological systems. 4) The absence and limited effectiveness of local land use controls during the anticipated economic growth ("boom") conditions resulting, in part, from the Trans-Alaska pipeline construction activity. This became an undesirable but essentially unavoidable determinant supporting the dispersion of land use. Also, the increasing reliability of transportation systems and transportation routes gave additional support to this concept. In essence, these considerations reflect the strong "lifestyle" sought by people living in the community as well as a "comfort" in living style which technological improvements provide. These are population generators which distinctly involve the use of large amounts of land. 5) The extent to which the community could be expected to provide public services and facilities, as well as the capability of the land to support usage became determinants of projected densities or intensities of use.

DENSITY AND INTENSITY OF USE FAIRBANKS BOWL The geological features of the area plus the characteristics of existing development give boundaries to the urban form of the Fairbanks Bowl. The Bowl is generally defined by Chena Ridge and the University lands on the west; the ridge line lying north of Farmers Loop Road and McGrath Road; the ridge line east of Steese Highway and Ft. Mainwright; and the Tanana River to the south. It is in this area where most of the urban-suburban expansion should be contained and where the community can best direct its capital investment efforts for providing full community services, particularly public transportation, housing, and air and ground pollution control.

RURAL AREAS Outside the urban-suburban Bowl, the density and intensity of development should reflect the capabilities of the land to support long term habitation, and the extent to which the community is willing and capable of providing utilities, community facilities and services.

SUB-COMMUNITIES North Pole, Moose Creek, Ester, Fox, Two Rivers, and Salcha are small population centers along major transportation routes which function as "bedroom communities" for Fairbanks, in addition to serving local and transient needs for commercial convenience services. These communities should be encouraged to develop concentrated boundaries within which such services and utilities can be provided on an economic basis. Dispersion of growth from these community centers should then be contained as above.

LAND USE PLANNING AREAS

PLANNING AREAS Following are outline descriptions of each of the community planning areas studied, certain physical characteristics found to define and determine development trends, suggested land use by area, and factors to consider in evaluating future land use proposals. Detailed studies should be conducted in each neighborhood or sub-planning area to determine the proper land use relationship. More information on the soils of each area can be found in the Soil Conservation Service booklet on the "Fairbanks Area Soils".

ESTER The Ester Planning Area covers approximately 75 square miles of land north and west of Fairbanks. The area has a rich history dating back to the early gold mining days. The physical characteristics of the planning area include the steep slopes of Ester Dome as well as the two relatively wide valleys of Sheep Creek and Cripple Creek. Chena Ridge is a long promontory separating Cripple Creek from the Chena River. The principal soils in the area include the Fairbanks, Gilmore, Minto, Ester and Gold Stream series, of which the latter three are considered the least desirable for development purposes. Existing development is sparse, concentrating in Ester, on the south slopes of Chena Ridge, and along the Fairbanks-Nenana Highway. Land use for four suggested sub-planning areas is proposed as follows: **SHEEP CREEK** Very low density rural residential development on suitable soils; agricultural uses on the valley lands. **ESTER DOME** Major (active/passive) recreational area with secondary use combination of very low density residential and weekend-recreational homes; continuation and enhancement of existing mine structures and operations, relative to tourism and economic activity. Institutional and technical uses as appropriate. **ESTER** Concentrated tourist-oriented community service center on local utility system. Some mining or tourist oriented mining activities, and certain industrial uses, along the Fairbanks-Nenana Highway corridor. Very low density residential uses on suitable soils and slopes in foothills surrounding community. **CHENA RIDGE** Suburban low density uses on north end of ridge, particularly the southeast facing slopes, on an extension of the Fairbanks public utility system. Density decreasing to the south and west of Ridge Road to very low on south ridge overlooking Tanana River. Steep slope areas retained as open space.

The following recommendations should be considered in evaluating land use proposals for the Ester Planning Area: 1) Community or public water and sewer systems should be a pre-requisite to all concentrated development. 2) Strict air pollution controls should be applied to all uses proposed for valley areas. 3) Development of steep slope lands should be subject to special hillside building regulations. 4) The development of lands known to have marginal soil conditions should be prohibited or withheld until lands with suitable soils are fully developed. 5) Allowing development of hinterland areas should be carefully related to the community's ability to provide services.

FOX The Fox Planning Area covers approximately 50 square miles of the Gold Stream Valley. The area has historical significance dating back to the early gold mining days. Physical characteristics of the planning area are dominated by the wide Gold Stream Creek Valley with its drainage area and diverse soil structure. Soils in the area include the Fairbanks, Gilmore, Minto, Ester, Salcha, and Lomita classifications, the latter four being the least desirable for development purposes. Mine tailing areas are also present. Existing development is concentrated along the Steese and Elliott Highways, and the Gold Stream Road. The Gilmore Data Acquisition Facility is in the northeast corner of the planning area.

Land use proposed for three suggested sub-planning areas is described as follows: **GOLD STREAM WEST** Very low density rural residential development on suitable soils and slopes, generally close to transportation routes. **LITTLE QUEENIE CREEK** Very low density rural residential development on suitable soils and slopes. Development trends may include a spill-over from higher density development on the Farmers Loop ridge line; if so, such density will require water and sewer systems. Commercial and industrial service facilities are proposed for the intersection of Steese and Gold Stream Road. Short term storage uses will also occur relating to pipeline construction activities. **FOX** Concentrated community development on water and sewer systems at the intersection of Steese and Elliott Highway, including commercial service facilities. Low density residential development on tailing piles along highway corridor. Very low density rural residential development on suitable soils and slopes in surrounding hills.

The following recommendations should be considered in evaluating land use proposals for the Fox Planning Area: 1) Water and sewer systems should be required for any concentrated community development. 2) Commercial and/or industrial development should be concentrated in described areas and not allowed to hinder the effectiveness of the Steese, Elliott or Gold Stream Highways. 3) Development of hinterland areas should be carefully related to the Community's ability to provide services.

FARMERS LOOP The Farmers Loop Planning Area covers approximately 30 square miles immediately north of Fairbanks. The area forms the northern portion of the Fairbanks Bowl. Physical characteristics of the area consist of a curving east/west ridge line surrounding the northern portion of a large, poorly drained area called Kramer's Field. The ridge line is broken into several drainage areas. Slopes in the area are generally suitable for development. Soils include the Fairbanks, Gilmore, Minto, Ester, and Gold Stream series of which the latter three are considered the least desirable for development purposes. The Farmers Loop area is rapidly being developed as a suburban-rural residential area serving Fairbanks and the University. Development has thus far been contained to the general area along major transportation routes.

Land use proposed for three suggested sub-planning areas is described as follows: **COUNTRY CLUB** Low to medium density suburban residential development along primary access routes, on public/community water and sewer systems. Density should decrease to rural density levels per distance from main transportation routes, on suitable soils and slopes. A continuous Open Space-Trail System should be created as land is subdivided, utilizing primarily lands with poor soils and steep slopes, creeks and drainage areas. **WEST FARMERS LOOP** Low to medium density suburban residential development on public/community water and sewer systems along Farmers Loop. Density should decrease on both sides of the road per distance from the Loop Road, on suitable soils and slopes. A continuation of the Open space-trail system, with appropriate extensions over the ridge, and to Kramer's Field. **EAST FARMERS LOOP** Low to medium density suburban residential development on public water and sewer systems along major transportation routes, decreasing in density as development extends to interior lands. A continuation of the Open space-trail system.

The following recommendations should be considered in evaluating land use proposals for the Farmers Loop Planning Area: The recommended plan for extending public water and sewer systems along Farmers Loop Road should be implemented to properly regulate the density and intensity of development in the area. The efficiency of Farmers Loop Road as a major transportation route should be maintained and enhanced by limiting access to the Road from abutting lands. The use and development of lands south of Farmers Loop Road should be strictly controlled due to marginal soil conditions in the area. Agricultural uses should be protected from intrusion by strictly residential uses. Innovative development concepts should be considered, based upon public or private water and sewer systems, which promote the concentration of living units yet provide sufficient open space so that the overall density range is equal to or less than that of two to four units per acre. A definitive Open Space-Trail System plan should be prepared along with programs for implementation. The subdivision of lands along the trail system should involve dedicating or setting aside appropriate land areas. Development of lands having steep slopes should be subject to regulations especially created for hillside development. The development of hinterlands should be carefully related to the community's ability to provide services.

STEESE HIGHWAY The Steese Highway Planning Area covers approximately 22 square miles, northeast of Fairbanks. The area forms the northeastern portion of the Fairbanks Bowl. Physical characteristics of the area include the eastern half of the relatively wide Isabella Creek drainage area and a series of hills and valleys generally running north/northeast from the Birch Hills Bluffs to Engineer Creek. Soils in the area include the Salcha, Fairbanks, Minto and Gold Stream series, of which the last is considered the least desirable for development purposes. Existing development is generally concentrated along the Steese Highway and secondary transportation routes.

Land use proposed for three suggested sub-planning areas is described as follows: **GILMORE TRAIL** Very low density rural residential development on suitable soils and slopes, generally contained on ridge lines. **CHENA HOT SPRINGS ROAD** Agricultural uses on appropriate lands near the road, with very low suburban to rural residential uses extending inland. **STEESE HIGHWAY CORRIDOR** Low density urban residential development extending north from Fairbanks on both sides of the highway on public/community water and sewer systems. Concentrated commercial service centers at the intersection of Farmers Loop and Chena Hot Springs Road. North of Chena Hot Springs Road intersection, low density suburban residential development.

The following recommendations should be considered in evaluating land use proposals for the Steese Highway Planning Area: The recommended plan for extending public water and sewer systems along the Steese Highway at least as far as the Farmers Loop Road intersection should be implemented to properly regulate the density and intensity of development in the area. Soils in much of the planning area, particularly west of the Steese Highway in the Isabella Creek drainage area, are considered extremely poor for development purposes. These lands should be retained in their natural form and utilized as part of the area-wide Open Space-Trail System. The existing and potential use of land in level areas for agricultural purposes should be protected from suburban and rural residential intrusion. The efficiency of the Steese Highway as a major transportation route should be protected and enhanced by containing commercial or industrial development to certain areas, and by limiting access to the highway from abutting lands. Extending development into hinterland areas should be carefully related to the community's ability to provide services.

FAIRBANKS The Fairbanks Planning Area covers approximately 50 square miles. The area contains approximately half the population of the Fairbanks North Star Borough and nearly all of its major facilities, institutions and transportation terminals. The physical characteristics of the area include a relatively flat plain through which passes the Chena River, running from east to west/southwest, emptying into the Tanana River. Lands on both sides of the Chena River (and the Chena Slough) are well drained gravel soils, excellent for development. Lands immediately north of the Tanana River are poorly-drained Gold Stream soils.

Land use proposed for four suggested sub-planning areas is described as follows: (all land use proposals assume a complete utility system) **UNIVERSITY** See University of Alaska Master Land Use Plan. Areas bordering the University should be developed for low to medium density urban residential uses with appropriate commercial convenience services at central locations. **INTERNATIONAL AIRPORT** See Fairbanks International Airport Master Plan. The areas bordering the airport lands should be developed for related and compatible commercial and industrial uses. Lands bordering the Chena and Tanana River should have multiple usage for flood control as well as part of the area-wide Open Space-Trail System. **FAIRBANKS** See Fairbanks City Center Plan. The areas bordering the downtown commercial core area should develop into high density urban residential uses with appropriate public facilities. The initial elements of the park and Open Space-Trail System should begin in the City Center and extend out accordingly. **SOUTH FAIRBANKS** Lands south of the City Center should be developed for medium to high density urban residential uses, with appropriate parks and public facilities. Lands further south, now having marginal soil conditions, will be improved by the levee project and should ultimately develop into heavy commercial and industrial uses.

The following recommendations should be considered in evaluating land use proposals in the planning area: A full service utility system is a prerequisite for optimum development of the urban area. Due to the proposed concentration of population, and the planned density and intensity of development, strict controls will be required relating to air pollution in the urban area. Urban facilities such as public transportation should be more economical to implement because of these factors. Primary concentration of financial, government and commercial services should remain within the downtown core area. Dispersion of such major services to outlying commercial areas, or allowing strip commercial high-way development, will dilute the effectiveness of the central business district and may increase environmental problems by hindering solutions.

Increasing residential development around the north boundary of the airport should be discouraged for reasons of safety, noise and effective airport operation during differing wind conditions.

FORT WAINWRIGHT The Fort Wainwright planning area covers approximately 24 square miles immediately east of the City of Fairbanks, and extending from the Tanana River north about six and one-half miles. It was the first permanent Army post in central Alaska, and was earlier called Ladd Army Air Field. At the present time there are over 7,000 military personnel, dependents and civilian employees involved in the Base's activities. The military operations involve the Arctic Light Infantry forces, Bassett Army Hospital, Arctic Medical Research Laboratory, Heavy Equipment Helicopter operations, plus several support organizations.

Recently, approximately 300 acres of Fort Wainwright land were determined to be excess to the Army's needs. The Bureau of Land Management took over approximately 200 acres for its airplane fire-fighting operation. Under an arrangement with General Services Administration, the Alyeska Pipeline Service Co. leased certain buildings and facilities involving approximately 100 acres. The physical characteristics of the land are similar to those of the City of Fairbanks, involving a relatively flat plain through which the Chena River passes from east to west. Soils in the area include the Fairbanks and Minto classifications constituting the Birch Hills; Goldstream and Lemeta north of the Chena River; and Salchaket and Tanana soils south of the Chena to the Tanana River.

The proposed land use plan for Fort Wainwright is a supplement to this report, added after the public hearings were concluded. The plan is based upon the assumption that the military will release additional lands, primarily those not actively used in the existing base operations.

Land use proposed for four sub-planning areas is described as follows:

BIRCH HILL Low density residential uses extending along the top of Birch Hill east from the Steese Highway; the south slopes of Birch Hill and the lowlands extending to the Chena River to be used as part of the Open Space/Trail System.

GAFFNEY TOWN This area would include lands on both sides of the Chena River, extending south to the north runway, and extending east and west to the present military boundaries. Land use would consist of industrial and air-related uses adjacent to the runway; institutional and high density urban residential uses, including commercial convenience services, where the existing military housing and barracks are located; and low density urban residential uses on the north side of the Chena Slough, on suitable soils; open space as part of the Open Space-Trail System to remain at both ends of the Runway, and along the Chena River. All development would be served by the existing, or extensions of, the military utility system.

FORT WAINWRIGHT This area would constitute the revised boundary of the military base and would contain all military operational uses and buildings, south of the north runway, and south of the Richardson Highway to include the existing rifle range.

MENAIR WOODS This area would include those of former military lands north and west of Badger Road and south of the Richardson Highway. Land use would consist of urban and suburban residential uses on an extension of the military utility system; air-related light industrial uses along the south side of Montgomery Road; industrial uses bordering the railroad line and extending south of the Richardson Highway. Commercial facilities near the intersection of Badger Road and Richardson Highway. The Open Space-Trail System would separate the military from civilian lands, extending south from the Chena River to connect with the Open Space-Trail System extending along the levee.

The following recommendations should be considered in evaluating land use proposals in the planning area: Operation of the existing runways must be protected from incompatible uses; All land use proposals are intended to operate off the existing utility system; Due to the proposed concentration of density and intensity of use, strict controls will be required regarding air pollution; Lands in the Badger Road area and also south of Fort Richardson may be suitable for natural resource extraction prior to ultimate development; Commercial uses proposed for the Gaffney Town area should not dilute the effectiveness of the downtown area.

NORTH POLE The North Pole Planning Area covers approximately 67 square miles east of Fairbanks and Ft. Wainwright, generally along Badger Road and the New Richardson Highway. The physical characteristics of the area are similar to those of Fairbanks, involving a broad level plain through which the Chena Slough winds. Lands north of the Chena Slough are well drained, with gravel soils and good tree cover. Numerous creeks and streams flow through the area. Lands generally south of the Chena Slough towards the Tanana River are poorly drained Bradway and Tanana Soils. Existing land use is concentrated in the North Pole area and along the Old and New Richardson Highways, and along Badger Road.

Land use proposed for three suggested sub-planning areas is described as follows: **CLEAR CHEEK** Concentration of urban and suburban, commercial and residential development around the intersection of Badger and Dennis Roads with the New Richardson Highway, on a public water and sewer system. Industrial uses extend south of the highway and southeast along the railroad tracks. Further south, agricultural land use along the levee. **BADGER ROAD** Low density suburban and rural subdivision development of limited depth along the highway, with convenience commercial service areas at spaced locations. Lands abutting the Chena Slough and other major drainage areas should be retained as part of the area-wide Open Space-Trail System. The use of lands for agricultural purposes in the Bradway Road area, as well as other parts of the planning area, should be retained.

NORTH POLE Concentrated commercial and urban and suburban residential development in the City Center area south of the New Richardson Highway on the existing water and sewer system. Development of land outside of the limits of the system should be at low suburban rural densities on lands suitable for development. Lands along the Chena Slough should be retained as part of the Open Space-Trail System.

The following recommendations should be considered in evaluating land use proposals for the planning area: The use of land for strictly rural residential purposes should be confined to areas where the soils are suitable for on-site water and sewer systems. The multiple use of certain lands for agricultural-residential purposes should be encouraged, however, purely residential uses should not be allowed to intrude on agricultural areas. 3) The development of hinterland areas should be carefully related to the community's ability to provide services.

TWO RIVERS The Two Rivers Planning Area covers approximately 80 square miles, generally on both sides of the Chena Hot Springs Road, east of Fairbanks and terminates at the State Park Reserve. Chena Hot Springs, a tourist hotel and resort, is open all year. The physical characteristics of the planning area include a broad, relatively level plain draining from the northeast to southwest through which the Little Chena River winds. On the north and east sides of the river are rolling hills, punctuated with numerous valleys, creeks and drainage areas. Soils in the area include the Gilmore, Fairbanks, Minto, Ester, Gold Stream, Lomita, Salcha and Tanana series, of which the latter five are considered the least desirable for development purposes. Generally, most of the lands in the valley areas are considered unsuitable for development due to high water table and flooding conditions during the spring breakup. Existing development is generally confined to elevated land areas along the Chena Hot Springs Road.

Land use proposed for two suggested sub-planning areas is described as follows: **West Chena Hot Springs Road:** Agricultural uses on appropriate soil and land areas adjacent to the highway. Very low density rural residential uses on suitable slopes and soils in the hill areas. Lodges and commercial convenience centers should concentrate at appropriate distances along the Road. **Two Rivers School:** Very low density rural residential development on appropriate soils and slopes. Commercial convenience and tourist facilities should concentrate at appropriate locations and distances along the road areas. Camper-trailer pull-off areas should be developed at appropriate locations for picnicking and camping.

The following recommendations should be considered in evaluating land use proposals for the planning area: Purely residential uses should not be allowed to intrude upon existing or potential agricultural areas. Development of land in the valley areas should be strictly regulated due to poor soil conditions and frequent spring flooding. Development of the hinterland areas for residential uses should be carefully related to the community's ability to provide services.



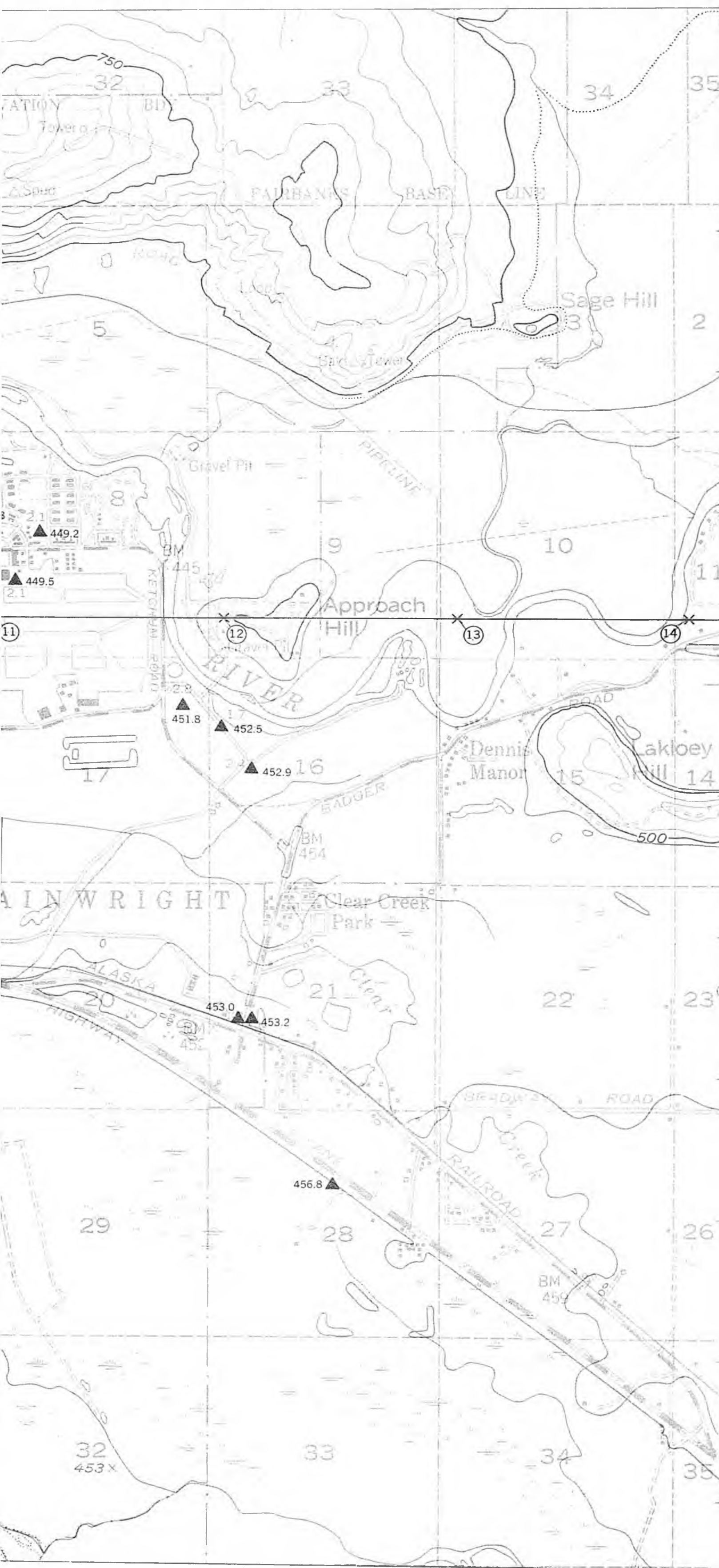
Photograph by The Alaska Railroad.

Aerial view of downtown Fairbanks near crest of flood on Chena River, August 15, 1967. Arrow indicates direction of flow of river.



Photograph by U.S. Bureau of Land Management.

Aerial view of western part of Fairbanks near crest of flood on Chena River, August 15, 1967. Arrow indicates direction of flow of river.



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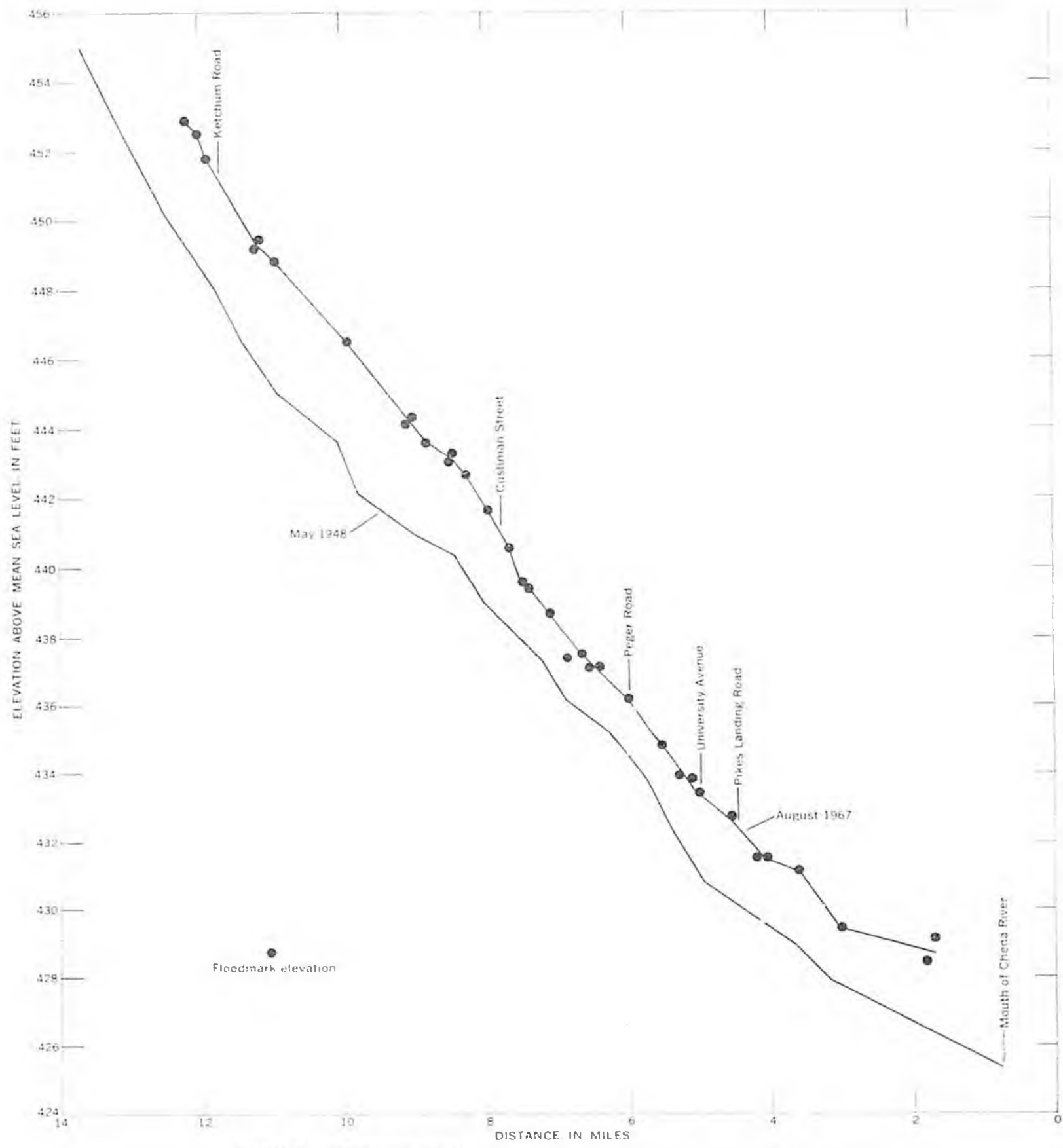


FIGURE 3.—Flood crest profiles of Chena River at Fairbanks (1948 profile adapted from Corps of Engineers data).

The flood of August 1967 was so much greater than any previous flood event of record on the Chena River that a reliable determination of its frequency cannot be made. However, a rough concept of how rare the 1967 flood was can be seen from the fact that the peak discharge was 2.6 times the discharge of the 50-year flood at Fairbanks.

Additional data.—Additional information pertaining to floods and floodflow characteristics on the Chena River can be obtained at the offices of the U.S. Geological Survey in Anchorage and Fairbanks, Alaska, and from the following report:

Berwick, V. K., Childers, J. M., and Kuentzel, M. A., 1964, Magnitude and frequency of floods in Alaska, south of the Yukon River: U.S. Geol. Survey Circ. 493, 15 p.

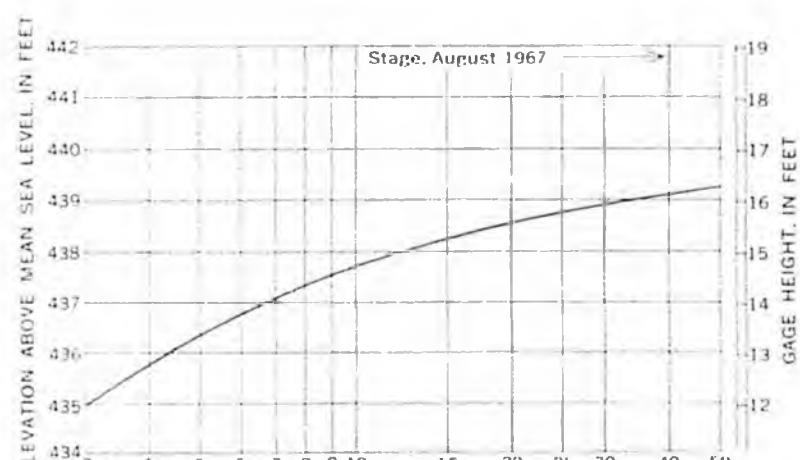
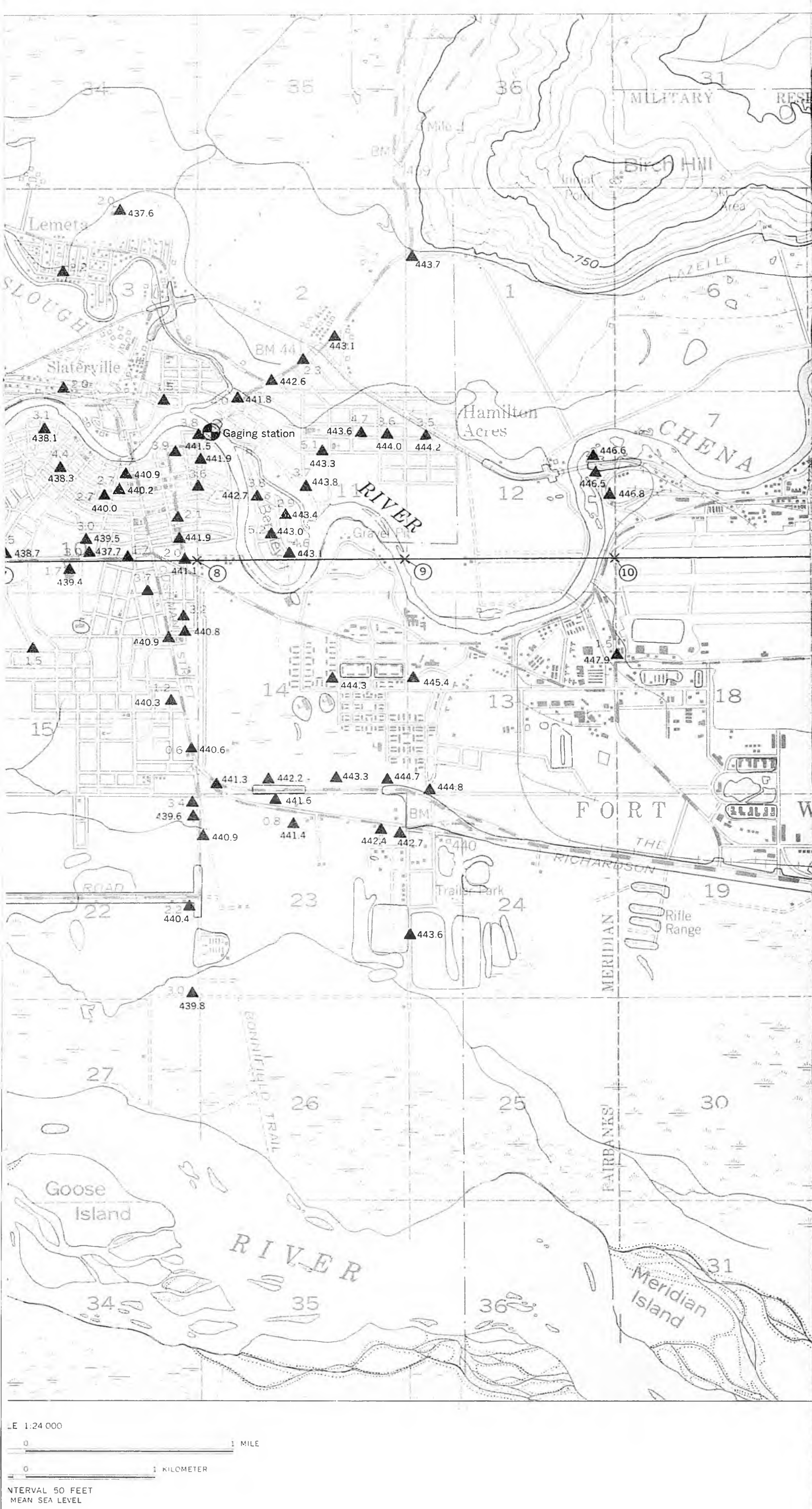


FIGURE 4.—Frequency of floods at gaging station on Chena River at Fairbanks, Alaska.



7 AT FAIRBANKS, ALASKA

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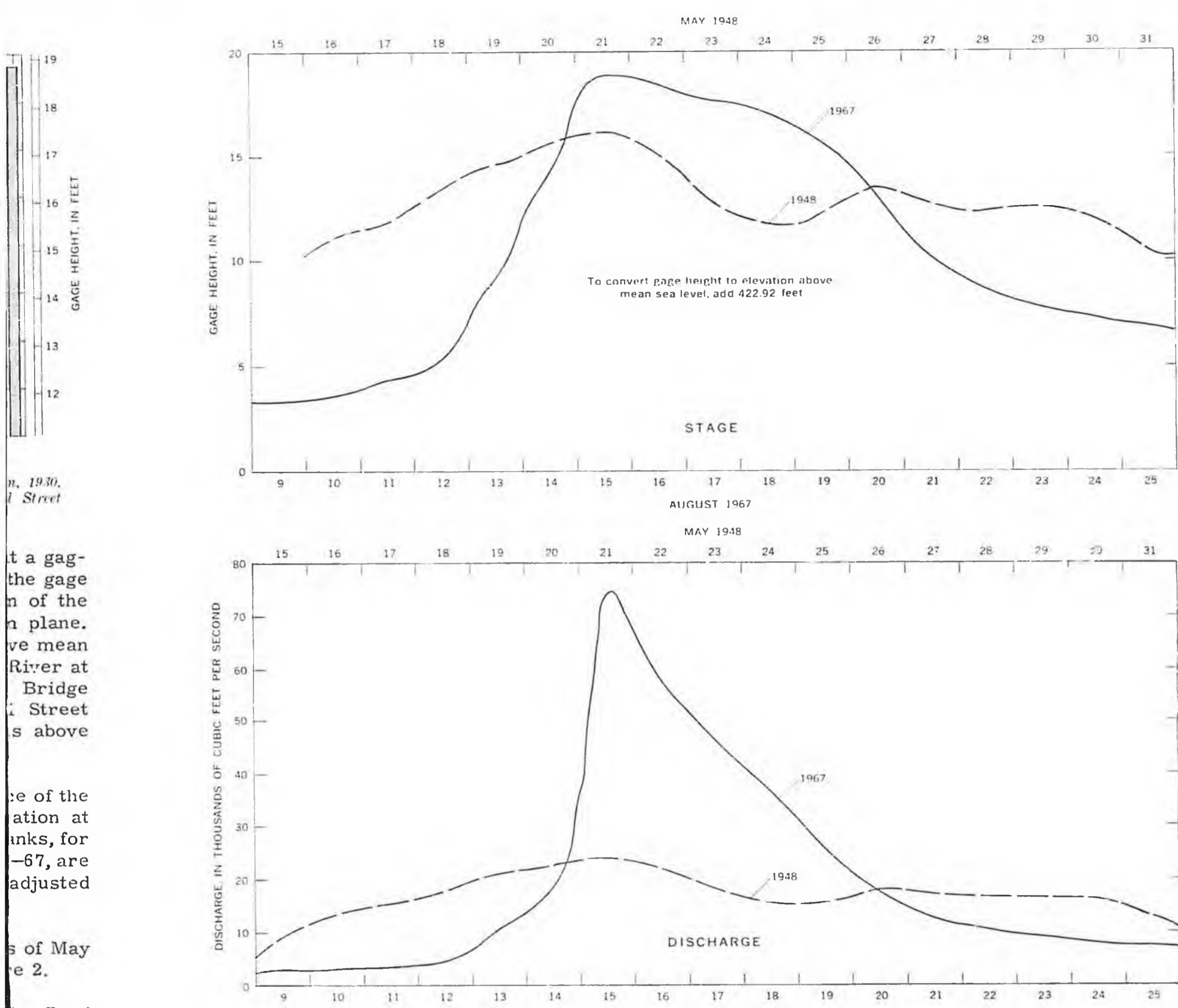


FIGURE 2.—Hydrographs of stage and discharge for floods of May 1948 and August 1967, Chena River at gaging station at Hall Street Bridge at Fairbanks, Alaska.

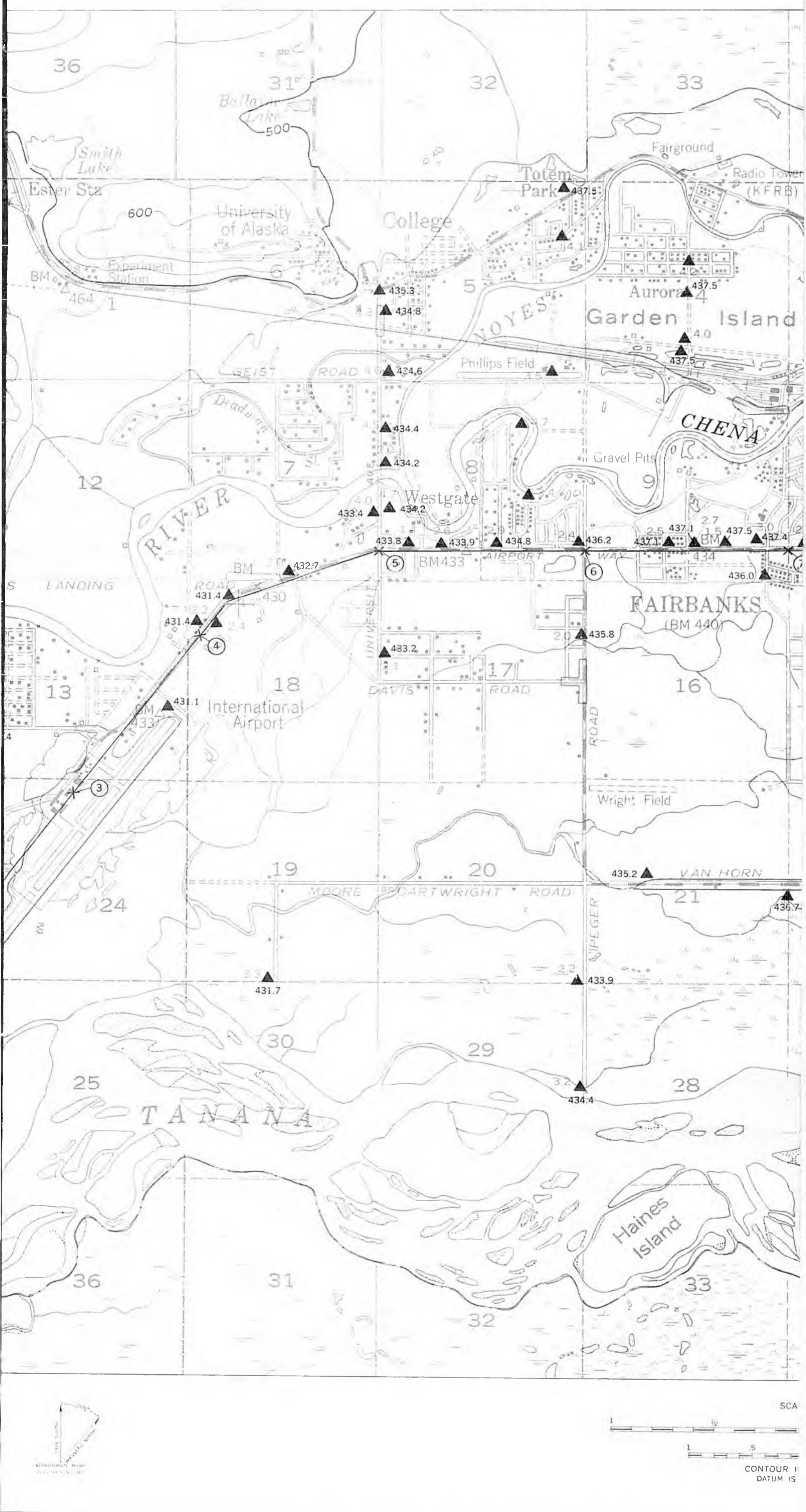
Depths of inundation can be estimated from the map by subtracting the ground elevation at a specific point from the water-surface elevation at the same point as indicated by the profiles in figure 3. Ground elevations can be estimated from contours on the map, although more accurate elevations can be obtained by leveling to nearby bench marks. The depth of inundation in 1967 at the site of most high-water marks is shown in blue numerals on the flood map.

Flood discharge.—Discharge is the rate at which water flows, expressed as volume per unit time, usually cubic feet per second (cfs). Peak discharge is the maximum value of the discharge attained during a flood. The peak discharge of the Chena River on August 15, 1967, was 74,400 cfs. The discharge hydrograph for August 1967 is shown in figure 2.

Flood frequency.—Flood-frequency relations based upon discharge have been defined for the Fairbanks area (Berwick, and others, 1964). The relation between stage and frequency is depend-

ent on the relation between stage and discharge. Changes in the physical conditions of channels, flood plains, and structures constricting the stream will affect the stage-discharge relation. The frequency curve in figure 4 is based on channel conditions existing in 1967 and is limited to a recurrence interval of 50 years. Large errors may result if the flood-frequency curve is extrapolated beyond the limits shown.

Recurrence interval, as applied to flood events, is expressed in years and is the average interval of time within which a given flood will be equaled or exceeded once. Frequency can also be stated as a probability, which is virtually the reciprocal of the recurrence interval for floods greater than the 10-year flood. Thus, a 50-year flood would have 1 chance in 50, or a 2-percent chance, of being equaled or exceeded in any given year. Because the 50-year flood can occur in any year or even in successive years, any inference that such a flood will occur only once during a 50-year period or at regular intervals would be misleading.



FLOOD OF AUGUST 1967

Joseph M. Childer

FLOOD OF AUGUST 1967 AT
FAIRBANKS, ALASKA

The disastrous flood of August 12-20, 1967, on the Chena River at Fairbanks, Alaska, is described. The map and graphs show the results of analysis of data on the depth, extent, and recurrence interval of this flood. These data serve as a basis for making sound decisions concerning development of the flood plain.

A general rainstorm covering the Chena River basin and adjacent watersheds caused the August 1967 flood. Total precipitation during the period August 8-15 at Chena Hot Springs, 60 miles upstream from Fairbanks, was 6.93 inches. Storm runoff caused numerous slides on headwater hillsides, washed out roads and tree-covered river terraces, and covered the flood plain at Fairbanks with water up to 5 feet deep. About half of the 30,000 inhabitants in the Fairbanks area were evacuated, and five deaths were reported. Urban Fairbanks and nearby Fort Wainwright, both on the flood plain near the mouth of the Chena River, were damaged seriously. Final estimates of flood damage exceed \$170 million. The crest stage, 18.82 feet, at the U.S. Geological Survey stream-gaging station on the Chena River at Fairbanks was 2.7 feet higher than the previous maximum recorded stage which occurred May 21, 1948. The Chena River basin upstream from Fairbanks has its own built-in flood control. The present natural channel, old oxbows, and wide flood plains provide considerable upstream storage; therefore, the flood crest at Fairbanks was delayed and reduced. About half the rain fell on Saturday, August 12, but the crest at Fairbanks occurred on Tuesday, August 15.

The extent of inundation in the vicinity of Fairbanks is shown on the map. Runoff from the Chena River and adjacent streams caused a flood on the low flood plain along the lower Tanana River from above Fairbanks to the mouth. However, flow from the Tanana River did not contribute to flooding in the Chena River valley. Floodmark elevations throughout the Fairbanks area indicate a general downward slope from the Chena River to the Tanana River.

Acknowledgments.— This atlas was prepared under the direction of Harry Hulsing, Alaska district chief, Water Resources Division, U.S. Geological Survey, with technical assistance from Howard F. Matthai, hydraulic specialist.

The Corps of Engineers furnished flood-profile data and aerial photographs. The Bureau of Land Management and The Alaska Railroad also furnished photographs. Many residents of Fairbanks gave valuable information.

Basin description.— The Chena River is about 100 miles long and drains an area of 1,980 square miles. It rises about 80 miles east of Fairbanks at elevations ranging from 4,000 to 5,000 feet and flows generally west to the Tanana valley lowlands where it empties into the Tanana River about 7 miles southwest of Fairbanks. The principal tributaries are the North Fork Chena River and Little Chena River from the north and South Fork Chena River and Munson Creek from the south.

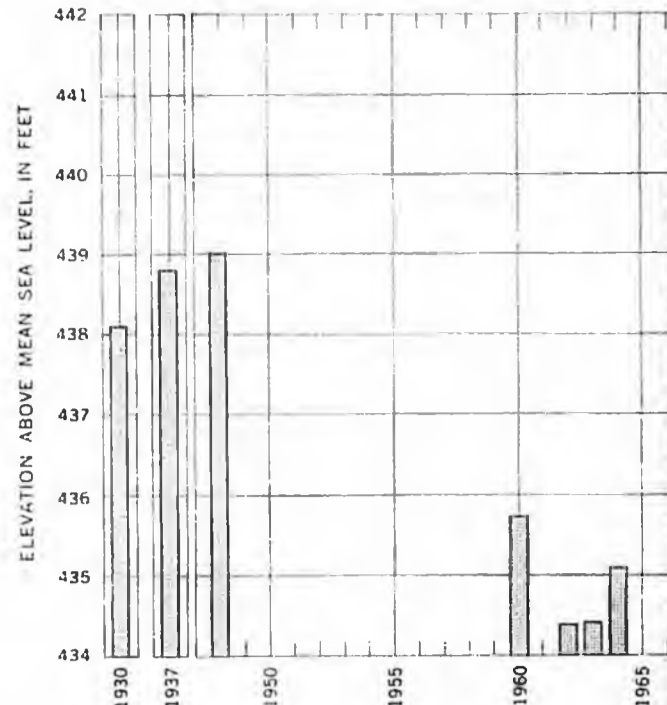


FIGURE 1.— Annual floods above 434-foot elevation at Fairbanks, 1930-67, Chena River at Fairbanks (Hall Street Bridge).

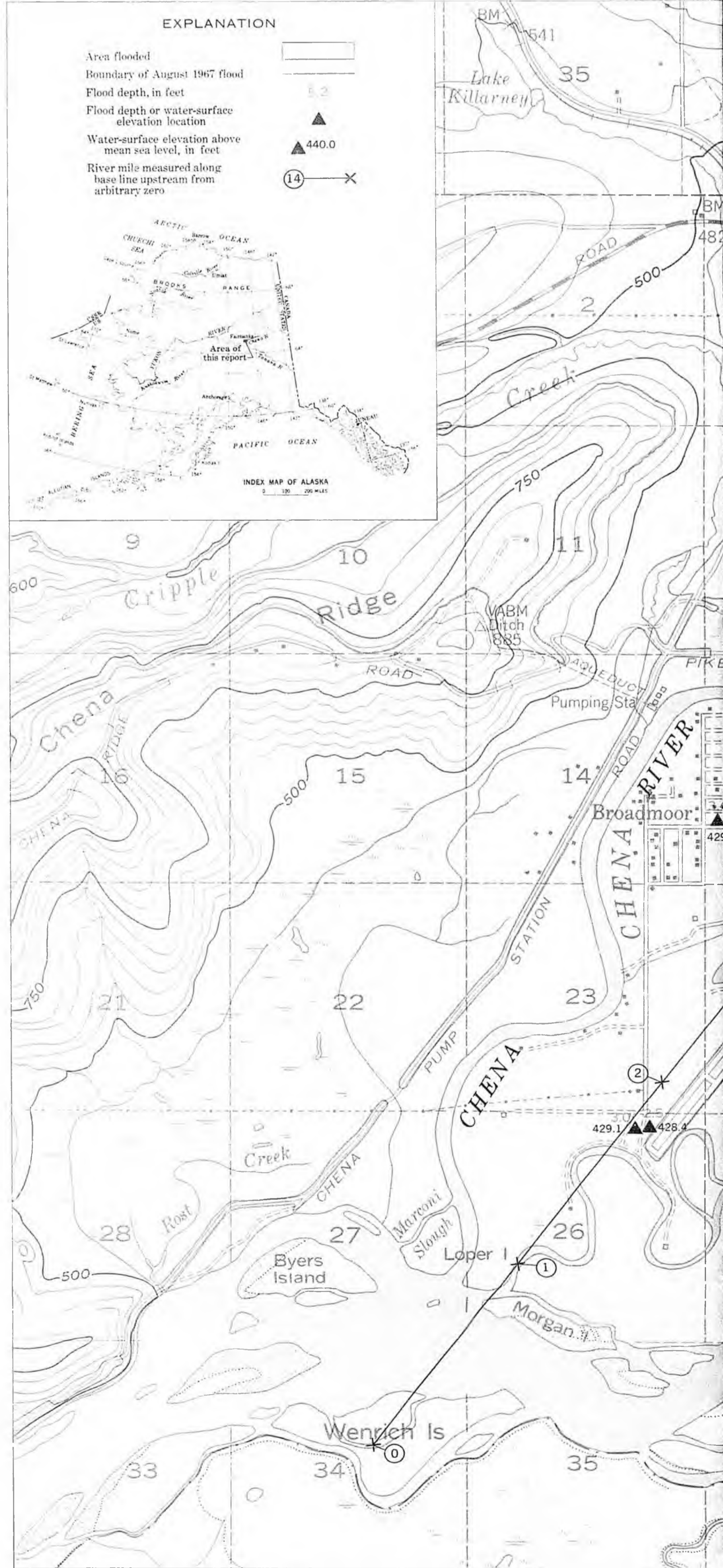
Flood heights.— The height of a flood at a gaging station is usually stated in terms of height or stage, which is the elevative water surface above a selected datum. Elevations in this report are in feet above sea level. Gage heights for the Chena River at Fairbanks, located at the Hall Street Bridge, which is also known as the Wendell Bridge, can be converted to elevation above mean sea level by adding 422.92 feet.

The gage height and year of occurrence of the highest peak stage above 434-foot elevation at the gaging station, Chena River at Fairbanks, for the years 1930, 1937, and the period 1948-67 are shown in figure 1. All data have been referred to the present site and datum.

The stage hydrographs for the flood of May 21, 1948, and August 15, 1967 are shown in figure 2.

Flood-crest profiles.— The profiles of the crests of May 21, 1948, and August 15, 1967, are shown in figure 3. The base line for the flood profile was drawn along Airport Way and projected westward from the airport and eastward to Cushman Street as shown on the map. The profiles of high-water marks left by the August 1967 have been plotted on the map and are the basis for the 1967 flood profile. Stationing for a specific point is obtained from a projection perpendicular to the base line. The 1967 profile is applicable to the Chena River upstream from mile 9 and only to the south or left bank downstream from mile 9.

Profiles of floods are a reflection of the capacity of the main channel, the degree to which bridge openings are obstructed, and the extent of man's encroachment on the flood plain. The 1967 flood profile, figure 3, is smooth with minor breaks in slope. This smooth profile indicates that bridges and other structures are not serious obstructions to the floodflow. Two-thirds of the peak discharge occurs in the flood plains rather than within the channel. Figure 2 shows that the increase in discharge from 40,000 cfs to 74,400 cfs raised the stage less than a foot.



Base from U.S. Geological Survey
Fairbanks D-2, 1955