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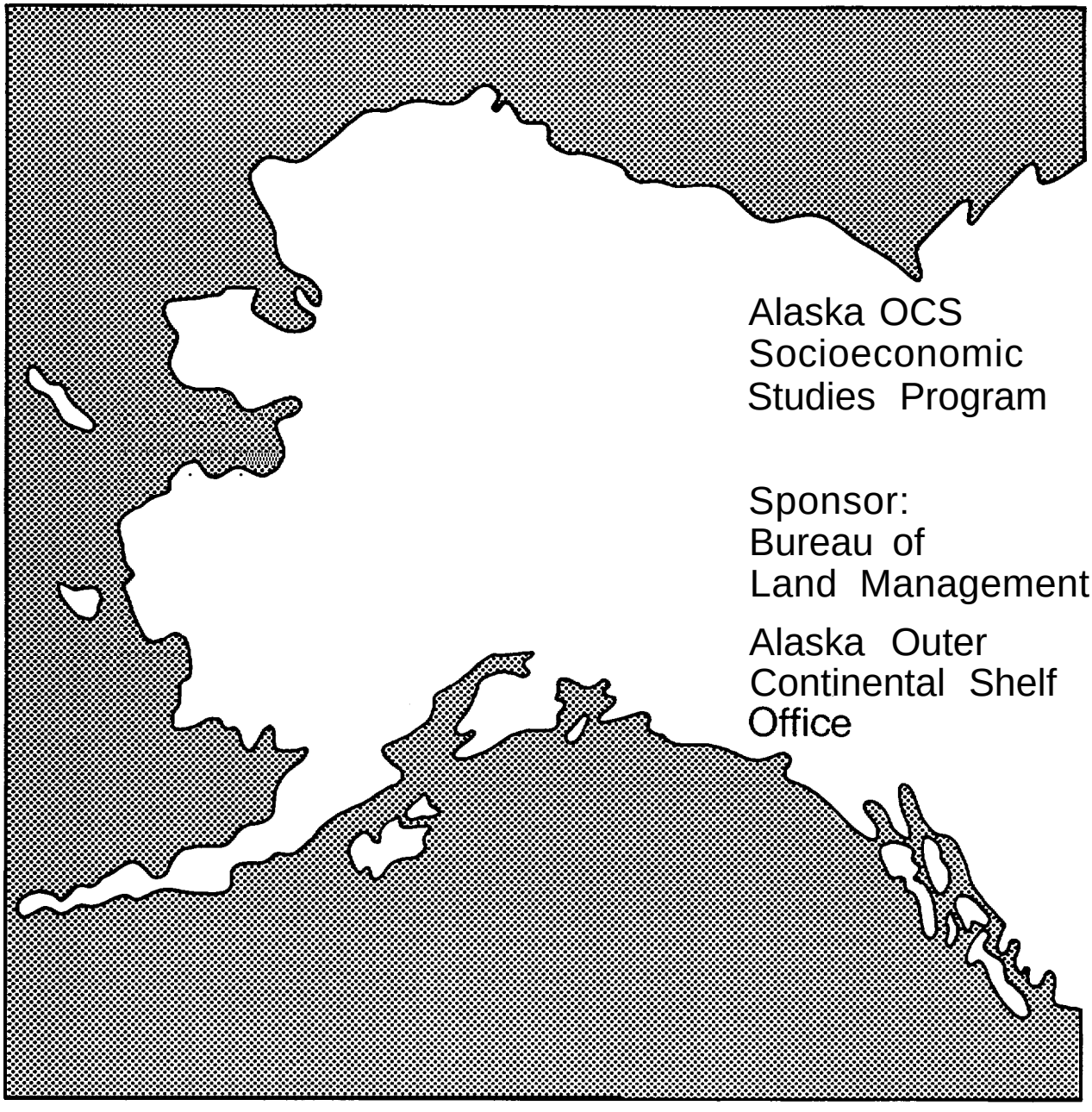

Alaska OCS
Socioeconomic
Studies Program

Sponsor:
Bureau of
Land Management

Alaska Outer
Continental Shelf
Office

Beaufort Sea Petroleum Development Scenarios Impacts on Anchorage, Alaska

The United States Department of the Interior was designated by the Outer Continental Shelf (OCS) Lands Act of 1953 to carry out the majority of the Act's provisions for administering the mineral leasing and development of offshore areas of the United States under federal jurisdiction. Within the Department, the Bureau of Land Management (BLM) has the responsibility to meet requirements of the National Environmental Policy Act of 1969 (NEPA) as well as other legislation and regulations dealing with the effects of offshore development. In Alaska, unique cultural differences and climatic conditions create a need for developing additional socioeconomic and environmental information to improve OCS decision making at all governmental levels. In fulfillment of its federal responsibilities and with an awareness of these additional information needs, the BLM has initiated several investigative programs, one of which is the Alaska OCS Socioeconomic Studies Program.

The Alaska OCS Socioeconomic Studies Program is a multi-year research effort which attempts to predict and evaluate the effects of Alaska OCS Petroleum Development upon the physical, social, and economic environments within the state. The analysis addresses the differing effects among various geographic units: the State of Alaska as a whole, the several regions within which oil and gas development is likely to take place, and within these regions, the various communities.

The overall research method is multidisciplinary in nature and is based on the preparation of three research components. In the first research component, the internal nature, structure, and essential processes of these various geographic units and interactions among them are documented. In the second research component, alternative sets of assumptions regarding the 'location, nature, and timing of future OCS petroleum development events and related activities are prepared. In the third research component, future oil and gas development events are translated into quantities and forces acting on the various geographic units. The predicted consequences of these events are evaluated in relation to present goals, values, and expectations.

In general, program products are sequentially arranged in accordance with BLM's proposed OCS lease sale schedule, so that information is timely to decision making. In addition to making reports available through the National Technical Information Service, the BLM is providing an information service through the Alaska OCS Office. Inquiries for information should be directed to: Program Coordinator (COAR), Socioeconomic Studies Program, Alaska OCS Office, P. O. Box 1159, Anchorage, Alaska 99510.

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ALASKA OCS SOCIOECONOMIC STUDIES PROGRAM

BEAUFORT SEA PETROLEUM DEVELOPMENT SCENARIOS

IMPACTS ON ANCHORAGE, ALASKA

FINAL REPORT

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BUREAU OF LAND MANAGEMENT

ALASKA OUTER CONTINENTAL SHELF OFFICE

August 1978

III

NOTICE

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16. Abstract

This document is an impact assessment on the Municipality of Anchorage, encompassing socioeconomic and physical data, as it relates to future population growth and the overriding ramifications of four proposed development scenarios in the Beaufort Sea region. A brief description of services is included and, where applicable, quantitative and/or qualitative standards have been offered to assess impact. Results of analysis within the community sector include examination of education, public safety, leisure, utilities, housing, health services, social services, transportation, and fiscal requirements.

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I. INTRODUCTION

The Municipality of Anchorage today is the urban center of Alaska and the hub for transportation, finance services, and government throughout the state. The impact of the oil and gas industry on the lives of the people in the metropolitan area has been major.

Directly, a number of the support personnel for the development of the oil, and gas field in Prudhoe Bay and the construction of the trans-Alaska pipeline were located in Anchorage. In addition, as the service center of Alaska, Anchorage was the focus of much of the movement of goods and services. Almost more importantly, Anchorage was impacted indirectly as public, commercial, and industrial investments were made to meet the rising demands for goods and services. The rapid growth of the Anchorage population and economy during the mid-1970's served to further consolidate its role as the state's metropole.

The purpose of this study is to assess the future impacts of oil and gas development in a non-OCS case and in the case of four OCS scenarios on the man-made physical environment of Anchorage. In each of the four OCS cases, the emphasis is placed on the additional impacts such scenarios could be expected to have beyond what would be anticipated in a non-OCS case. Based on a projection of the population and labor force, community infrastrucural requirements in the case of a non-OCS scenario and additional requirements likely to be generated by each of the four OCS scenarios have been examined.

II. ASSESSMENT OF THE MAN MADE PHYSICAL ENVIRONMENT - 1977-2000

Introduction

Anchorage is recognized as the major metropolitan area for the State of Alaska with the population of the Municipality closely approaching one-half of the state's total population. Due to the strategic central location of Anchorage in relation to the rest of the state, continued growth is inevitable. Any additional petroleum developments occurring in the Beaufort Sea Region will accentuate this growth, and the size and complexity of development determined for the Beaufort Sea would be the key in determining the level of impact on Anchorage.

ALTERNATIVE COMMUNITY POPULATION AND EMPLOYMENT FORECASTS

In order to assess the extent of the impact of each of the scenarios, it is necessary to analyze the affect of the non-OCS case population projections on key indicators in the community. It is in the non-OCS analyses that such aspects as saturation points and projected manpower requirements can be determined in order to provide a comparative base for each of the four petroleum scenarios.

There are two possible approaches to this type of modeled forecasting. The first is to construct a forecast of the most probable future growth of the Anchorage area. The effects of the Beaufort Sea Region petroleum development scenario are then disaggregated from the most probable case to produce a non-OCS base case projection.

A second approach would be to build the most conservative base case consisting of just presently known and highly probable developments. Development scenarios are then added to this. This basically is the method utilized by the Institute of Social and Economic Research (ISER) in constructing non-OCS projections.

ISER discusses the parameters of this approach in their report. "This scenario, while representing a consistent and plausible development pattern, should not be construed in any sense as a 'best guess' of development likely to occur in Alaska during the forecast period. The actual pattern likely to occur is subject to an enormous amount of uncertainty concerned with technology, market prices, federal policies, and so on. To forecast any specific development path as most likely would at this point be little more than idle speculation. Rather, the Man in the Arctic Program (MAP) model is designed to permit the formulation of ranges of scenarios which encompass these uncertainties in order to trace out the range of possible outcomes from alternative developments and policies. This base case should be regarded as a very conservative development pattern which includes only activities to which current commitments have been made." (University of Alaska, Institute of Social and Economic Research, 1978)

This approach has two possible weaknesses. First, the use of the non-OCS case and the development scenario projections could be misconstrued as an acceptable range of future population growth. In actuality, the range developed in this way is likely to be an unacceptably low range for

planning purposes or in terms of realistic expectations.

A second problem is that the impact of possible development scenarios could have a varying impact depending on the size of the non-OCS base case. The impact of development on a community of 2,000 is easily seen as different compared to the impact on a community of 250,000. The question for Anchorage is, would the projected impact on non-OCS base case scenarios for the same community of 250,000 and 275,000 be different.? The economic dynamics of those additional people in the base case could slightly alter the magnitude of expected impacts from any development scenario.

A final problem is that any model finds it difficult to cope with the concept of growth which will occur just because a critical size is reached. The history of Anchorage reveals the growth of the city is patterned after the classic growth pole theory. "It's attraction is so strong that Anchorage is now viable in its own right." (Fisher, 1976)

Using a conservative base case over a best estimate model would seem to minimize some of the dynamics that a metropole has in smoothing out the impact of economic and population fluctuations that occur in other regions served by the metropole. An example of this may be the model's inability to predict continued economic expansion in Anchorage after the completion of the oil pipeline.

TABLE 1

COMPARISON OF MAP MODEL POPULATION TO ACTUAL POPULATION

1975- 1978

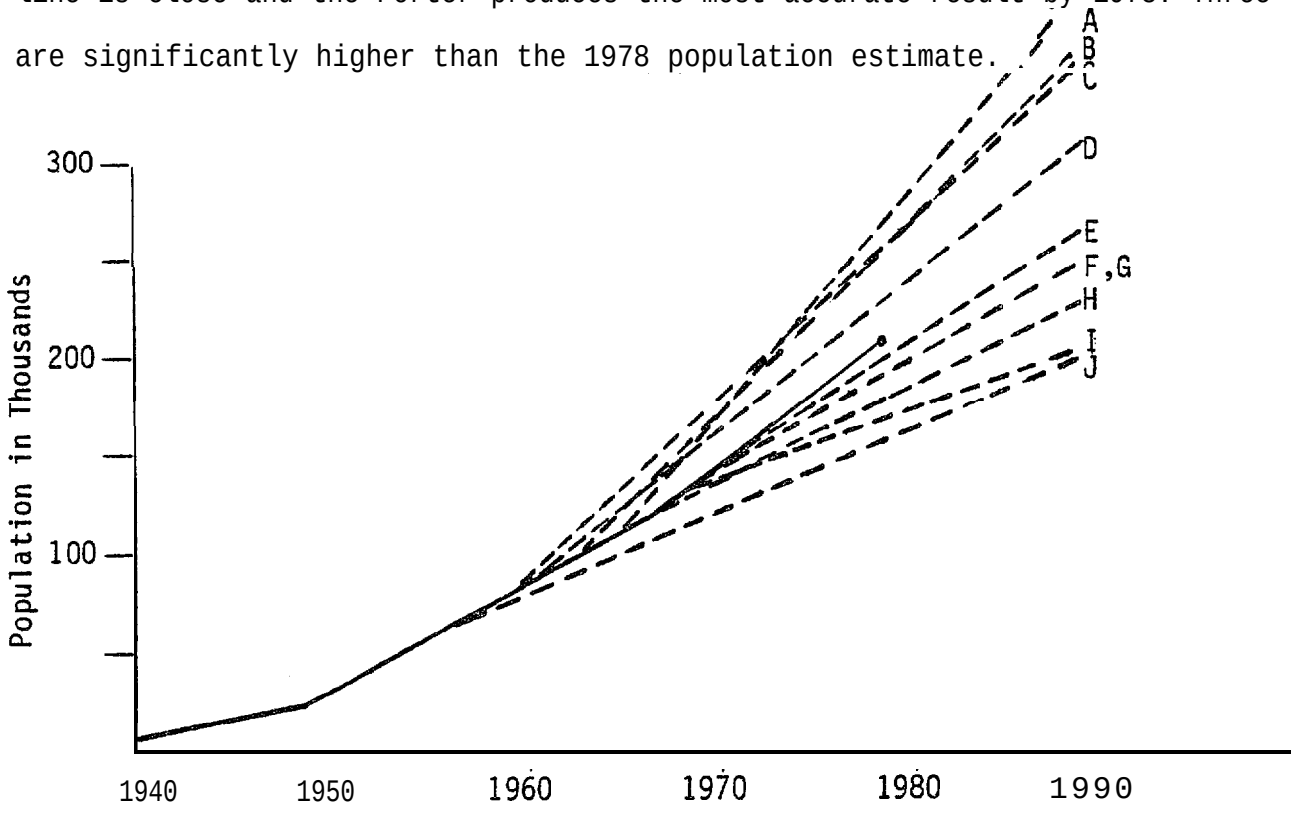
Year	MAP Population[a]	Actual Population[b]
1975	156,888	174,890
1976	160,747	180,960
1 9 7 7	169,704	188,304
1978	178,166	201,790

[a]Institute of Social & Economic Research
[b]Anchorage Urban Observatory

It is estimated that by 1978 the non-OCS model predicts a population which is 23,624 persons lower than the actual estimated population of Anchorage. This discrepancy is almost 12 percent off and occurs only three years into the continuum of years being forecasted. This approach also depresses other aspects of the model including employment (about 4,000 lower than estimated in 1977) and personal income (ISER estimated the 1977 non-OCS per capita income to be $9,243 while the 1976 actual estimate is $10,377). Using a conservative five percent increase in per capita income from 1976 to 1977, the non-OCS case produces a 15 percent error in just two years.

One way to judge the usefulness of the non-OCS base case is to compare its results with other forecasting attempts. Ten forecasts devised between 1956 and 1967 are shown in figure 1. Some were simplistic and others were mathematically sophisticated. However, all but one were developed before the Prudhoe oil discoveries and, therefore, are not particularly useful. Comparing the forecasts with actual population trends through 1978, six

of the attempts are significantly low. The Wilsey, Ham and Blair trend line is close and the Porter produces the most accurate result by 1978. Three are significantly higher than the 1978 population estimate.



Study	Year	1990 Projection
A	1966 - Tryck, Nyman and Hayes	365,000
B	1963 - Wilbur Smith & Associates	340,000
c	1960 - Tippets-Abbett-McCarthy-Stratton	332,000
D	1961 - Wilsey, Ham and Blair	295,000
E	1967 - Porter, Armstrong, Ripa & Assoicates	257,000
F	1964 - Real Estate Research Corporation	244,000
G	1965 - Lounsbury-Sl eavin-Kel ly	244,000
H	1964 - City of Anchorage Planning Comm.	220,000
I	1969 - Wilbur Smith & Associates	200,000
J	1956 - Coverdale and Colpitts	195,000

FIGURE 1

POPULATION PROJECTIONS : 1990[a]

aGreater Anchorage Area Borough, People in Anchorage, 1974

A second set of projections were made in the 1970's based on a knowledge of growth due to the development and transportation of oil from Prudhoe Bay.

In 1972 the Anchorage Borough Planning Department produced a cohort survival method to project population growth and produced three different forecast levels based on differing migration rates. The results are shown in table 2 and figure 2. In 1974 the Municipal Planning Department adjusted their work and produced two new forecasts based on a revised cohort survival method and also the component method. These produced 1990 population estimates of about 313,000. About the same time, ISER produced nine development scenarios tied to patterns of growth and the oil wellhead price. For Anchorage this produced 1990 estimates ranging from 297,695 to 565,701. Amid-range forecast of 358,000 has been used as a best estimate using ISER's MAP model.

In 1977 the Municipality contracted with ISER to produce a forecast of the most probable future growth of the Anchorage region through 1995. Their 1990 estimate was 358,114, and for 1995, 437,084 people were forecasted for Anchorage.

The Metropolitan Anchorage Urban Study (MAUS) developed population projections for use in estimating water demand and wastewater production to the year 2000. Their 1990 population estimate was 434,274, and 507,000 people were projected for the year 2000. The MAUS estimates are somewhat higher, but this can be expected due to the intent of the MAUS study which

involves the engineering need of service facilities projection.

TABLE 2

COMPARISON OF POPULATION FORECASTS OF ANCHORAGE

Year	Projection Method		Population 1980	Population 1990
1972	GAAB, cohort survival method[a]	High	187,566	280,375
		Medium	184,420	270,397
		Low	180,301	260,083
1974	GAAB, cohort survival method		215,802	313,550
	component method[a]		216,079	313,398
1974	MAP,[b] limited growth, $3 well head price		191,834	297,695
	accelerated growth, $3		198,103	342,693
	maximum growth, $3		198,074	427,219
	limited growth, $5		203,084	329,918
	accelerated growth, $5		209,633	390,255
	maximum growth, $5		209,604	492,241
	limited growth, $7		241,508	363,925
	accelerated growth, $7		221,328	442,277
	maximum growth, $7		221,298	565,701
1977	MAP, most probable growth[c]		222,579	358,114
1977	MAUS[d]		221,629	434,274
1978	Breakthrough[e]		213,500	369,500

aGAAB, Population Projections 1970-1995, December 1974
by. Fischer, Regional Effects of Anchorage Metropolitan Growth, 1976
CL. Huskey, Anchorage Population Growth to 1995, 1977
'U.S. Army Corps of Engineer, Metropolitan Anchorage Urban Study, 1977
'Breakthrough Booklet Packet, 1978

In 1978' Operation Breakthrough, a private citizen's group projecting public facilities for the Municipality, produced a set of forecasts and estimated that 369,500 people would live in the metropolitan area by 1990 and 478,000 by 1997.

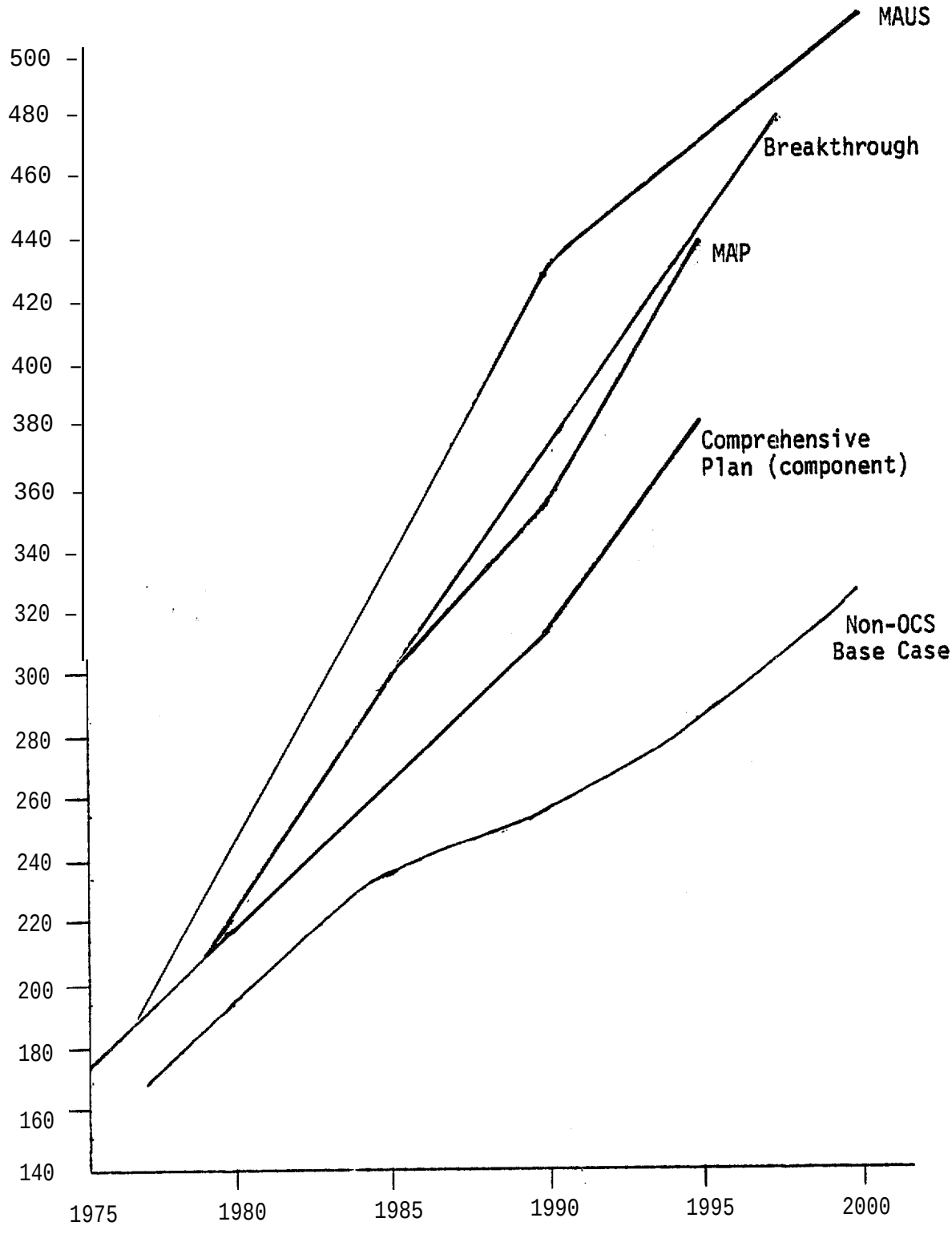


FIGURE 2

COMPARISON OF ALTERNATIVE POPULATION PROJECTIONS

While there are other forecasts, these tend to show the variety of approaches and the widely differing end results. The comparison of the component method (adopted into the Comprehensive Plan) and the 1977 MAP most probable projection produces a reasonable range of population estimations. Comparing the non-OCS base case to these two projections reveals the conservative nature of the base case estimates. (See figure 2.) It falls 58,488 people short of the component method and 103,204 short of the most probable estimate. The weakness of developing a base case in this way is evident in trying to judge the impacts OFI various service sectors. If the estimate of service expansion is based on either the component method or MAP model, the base case would be easily met and might even produce some surplus service capacity increasing per capita service costs. An even greater problem of interpretation occurs in interpreting the effects of the four OCS scenarios. The scenarios added to the non-OCS base case would simply be taking up slack in an overbuilt service sector. The effect could be seen as positive as the scenarios produce a population closer to the estimates of the planner.

However, if the OCS scenario added on impacts to the component method estimate, the effects might be negative as certain services would encounter a service shortfall due to the unexpected population growth. The size of the base case projection is then important and interpretation of an unrealistically conservative base case makes a realistic and accurate interpretation of the cumulative impacts of various OCS development scenarios difficult and less useful.

CONCLUSION

Since this study is based on the non-OCS base case projections, considerable caution should be used in terms of the conclusions made and the magnitude of' the growth impacts estimated.

Because of the fairly smooth incremental pattern of growth when examining different key indicators in the community, five-year intervals were chosen to indicate strategic plateaus and growth periods.

A description of services likely to be impacted and their respective indicators utilized to measure impact are discussed under the non-OCS growth scenario and the four proposed growth scenarios for the Beaufort Sea Region. A "list of the key indicators discussed in this report are as follows:

- Education
- Public Safety
- Leisure
- Utilities
- Housing
- Heal th
- Social Services
- Transportation
- Financial Capacity and Capital Requirements

These descriptive indicators provide the impact information necessary to assess both the positive and negative aspects of further development in the Beaufort Sea.

Identification of Impacts

OVERVIEW OF INFRASTRUCTURE STANDARDS

The following standards have been developed for Anchorage services and local government capacity so that future needs in these areas can be determined in the event of growth in population and/or employment.

Education

Primary and Secondary Education. Over the past ten years, the school district has provided more teachers than their standard student teacher ratio of 27 to one. Currently, this ratio is 22.63 students per teacher (with 1,600 teachers and 39,509 students). Nevertheless, because special education requires approximately one teacher per 12 students (Harper, Community Contact, 1978), this ratio has been adjusted down to 25 to one and will be the standard utilized in assessing student/teacher manpower requirements for future population growth.

The school district strives to maintain 25 students per classroom, and presently provides 25.47 students per room (1,551 total rooms currently available including an adjustment for special education [Anchorage School District, 1978]). This indicates that the Anchorage School District is now at its saturation level. However, for assessing classroom requirements through the period under study, the ratio of 25 students per classroom will be used as the standard for analysis.

Current demographic data indicates that 20 percent of the total population is composed of school age children. Although the profile of this segment of the population will undoubtedly increase by the turn of the century, the proportion is speculative. Therefore, for projection purposes only, the 20 percent will remain as the indicator to compute the number of school age children. A thorough description of this segment of the population is contained in the description of services likely to be impacted section.

Postsecondary Education and Career-Vocational Training.

- Public Institutions. For the two public postsecondary institutions in Anchorage there are no applicable quantifiable standards. However, recently there has been a split between the two public institutions, University of Alaska, Anchorage (UAA) and Anchorage Community College (ACC), and they are now mutually exclusive institutions. Due to its program orientations in vocational/technical training, it can be assumed that ACC will continue to grow at a steady pace. Between 1975 and 1978, ACC has increased its proportion of students to the population from 3.7 to 4.0 percent. Expansion beyond this 4.0 percent would require major new resources for program development. UAA will continue to grow as its programs change to that of a four-year institution. It has increased its proportion from 1.1 to 2.35 percent. As a four-year institutional model is developed, it is reasonable to assume that this proportion should be increasing slowly to between

three and four percent. However, this development is also contingent on funding.

- Private Nonprofit. There are no quantifiable standards for the one private nonprofit university in Anchorage, Alaska Methodist University. The University was closed in 1976 due to lack of funding and reopened again in 1977. Due to its recent reopening, the impact of future population growth cannot be assessed.

- Private Profit. No quantifiable standards exist for private profit education institutions. It can be assumed that as long as there is a demand for training in schools such as hair design, business, etc., they will be viable enterprises.

Public Safety

Police. The Anchorage Police Department (APO) presently maintains a ratio of approximately 1.52 sworn officers per 1,000 in the population. No recommended national standard is deemed valid in assessing manpower requirements for a city the size of Anchorage. Each city's workload and associated crime profile is unique and no one standard has yet to be designed to assess service requirement. (S. Gorski, Community Contact, 1978a)

At a minimum, the APO would like to maintain this current ratio, but it is by no means firm. Variables such as the number of requests

for service, incidence of Part I crimes (murder, rape, aggravated assault, burglary, larceny, and auto theft), budgetary processes, the natural population increases, and population profile could realistically increase or decrease the ratio of police to the total population.

However, for purposes of assessing the future impact of population growth, it is assumed that the APD will at least maintain this ratio. The standard offered for analysis to assess future manpower requirements will be based on the 1.52 sworn officers per 1,000 in the population.

Troopers. Due to the recent passage of proposition eight regarding territorial expansion of the Anchorage Police Department, the Alaska State Troopers will be relieved of their jurisdictional law enforcement responsibilities for the majority of the Municipality. (Additional information contained on the passage of proposition eight can be found in the Anchorage Socioeconomic and Physical Baseline under the section entitled Public Safety.) However, the Troopers will continue to produce law enforcement services for some of the peripheral areas of Anchorage, but the main thrust will be toward increased highway patrol for the entire Municipality".

It is assumed that an increasing population will require additional manpower for the purpose of adequate highway patrol. Although there is limited road access out of Anchorage, increases in the population

should result in the highways accommodating increased traffic volume, especially on weekends and holidays. This should ultimately result in a higher demand for services provided by the Alaska State Troopers.

There are no plans to decrease the size of the force as a result of the territorial expansion of the Anchorage Police Department. The Troopers will continue to maintain between four and seven units on duty at any one shift. The total force presently consists of 29 commissioned officers. Using the mid-1977 population figure generated by the University of Anchorage, Anchorage Urban Observatory, of 1.88,725 for the entire Municipality, a ratio can be calculated at .15 Troopers per 1,000 in the population. This will be the standard used to assess future growth in Anchorage and its corollary impact on the Alaska State Troopers.

Fire. The Anchorage Fire Department currently employs 278 people on the force. Two hundred and three personnel are under the Fire and Rescue Operations Division and 37 personnel are employed under the emergency medical services. The remaining personnel are under the Fire Protection Division, Support Services, and top administrative positions. (For a complete description of the organizational context of the Anchorage Fire Department, refer to the Anchorage Socioeconomic and Physical Baseline.)

Utilizing the mid-1977 population estimate for Anchorage of 188,725, a ratio of 1.47 fire department personnel per 1,000 in the population

can be established. This is merely the current ratio and not a set national standard. However, the ratio is offered as the means of assessing manpower requirements for future population growth.

It is important to note that planning for expansion in the area of fire protection is closely related to the Insurance Service Offices (1S0) schedule for grading fire defenses. This grading determines the insurance premium rate for a community. Planning for fire protection involves several factors, for example, 1S0 recommendations, population density, zoning, distance and response time, and water flow requirements for firefighting. The above mentioned factors make each city unique in determining its level of need for acquisition of manpower and equipment. (Ender, et al., 1978).

Leisure

Recreation and leisure activities in Anchorage are provided predominately by private organizations and the Municipal Department of Cultural and Recreational Services. The State of Alaska and the federal govenment support leisure primarily through grants for art activities and in provision of parkland, trails, and paths.

Major standards for recreational facilities are established by the National Recreation and Park Association which states that approximately 25 percent of a city or planned area should be devoted to park and recreation lands and/or open space. Table 3 illustrates optimum standards for and local availability of specific types of recreational activities

and programs.

TABLE 3

OPTIMUM STANDARDS FOR RECREATIONAL ACTIVITIES AND PROGRAMS COMPARED TO THOSE AVAILABLE LOCALLY[a]

Activity	Optimum	Locally Available
Play Lots Lots/.40 hectares (acre)/500-2,500 population	80[b]	37
Neighborhood Parks 2.0 hectares (5 acres)/2,000-10,000 population	20	12
Community Parks 8.1-40.5 hectares (20-100 acres)/10,000-50,000 population	4-20	7
Large Urban Parks 40.5+ hectares (100+ acres)/50,000 population	4	2
Regional Parks 64.8+ hectares (160+ acres)/area	1	6
Softball Diamonds 1/3,000 population	67	24[c]
Basketball Courts 1/500 population	400	300*
Swimming Pools 1 (22.9 meters [25 yards]) /10,000 population 1 (50.0 meters [46 yards]) /20,000 population	20 10	5[d] -0-
Skating Rinks 1/30,000 population	6	46[e]
Community Centers 1/25,000 population	8	5

[a]National Recreation and park Association
[b]Using 200,000 population for calculations
[c]Includes softball and baseball
[d]YMCA, Public Schools
[e]Includes parks, schools and three indoor (Ben Boeke, Royal Roller Rink, and Anchorage Roller Rink)

While there are no recognized quantifiable standards for expenditures for leisure activities, the Municipality of Anchorage currently spends approximately $500,000 in this area. The February 19, 1978, issue of the Anchorage Times reported that Anchorage spends $1.81 per capita on art activities compared t New York State, the next highest spender, at $1.59 and Utah, $.72.

A major type of recreational activity and source of revenue in Alaska is sport fishing and hunting industry. Table 4 illustrates Alaska Department of Revenue, Office of Fish and Game Licenses' report on the levels of license sales for 1977 and January to June 1978 for residents and nonresidents.

TABLE 4

SPORT FISHING, HUNTING AND TRAPPING LICENSES FOR ALASKAN RESIDENTS AND NONRESIDENTS

Fishing/Hunting/Trapping Licenses Sold	Resident	Nonresident	Total
1977	145,444	52,015	24,9,474
1978 January-June	56,989	Not Available	56,989

While there are no norms for this activity, the issuance of 145,444 licenses in 1977 represents sales of approximately 35 percent to the state's 411,211 population. Although specific totals are not avilable for the Anchorage area, one may assume a proportionate level of sales based upon the local population.

Utilities

Water. Estimates of the additional water requirements of the three major service providers in the Anchorage bowl have been computed to the year 2000 by the U.S. Army Corps of Engineers in the Metropolitan Anchorage Urban Study (MAUS), Stage II Report, Part V, Water Supply. Table 5 depicts these figures which take into account present capacity and planned improvements.

TABLE 5

PROJECTED ADDITIONAL WATER Requirements

Year	Requirements
1980	20.4 mld[b] (5.4mgdc)
1985	62.8 mld (16.6 mgd)
1990	93.1 mld (24.6 mgd)
1995	133.2 mld (35.2 mgd)
2000	185.5 mld (49.0 mgd)

[a]Metropolitan Anchorage Urban Study, 1977
[b]Millions of liters per day
[c]Millions of gallons per day

The U.S. Army Corps of Engineers estimates that residential consumption is approximately 325.5 liters (86 gallons) per capita per day. An estimated 768.4 liters (203 gallons) per capita per day is a close approximation of the average commercial, industrial, and residential consumption. This is assumed as the standard to project future demands for water through 1990 for the major service provider, the Anchorage Water Utility. Implicit in this assumption is that additional conservation measures will just off-set the increasing

per capita use associated with real rising income (U.S. Army Corps of Engineers, 1977a).

The standard of 768.4 liters (203 gallons) per capita per day, as described above, is offered to assess the impact of future population growth on Anchorage. However, the MAUS Report describes a range of possible per capita consumption figures. The study notes that "accurate per capita use information is lacking because o-f inadequate information on numbers of consumers, amount of production, or both. Per capita use varies greatly among the various water systems from about 946.3 liters (250 gallons) per capita per day (pcpd) for the military system to about 378.5 lpcpd (100 gpcpd) for persons using private wells. The primary causes of variation are the amount of nonresidential water consumption and system leakage." (U.S. Army Corps of Engineers, 1977b) Although 768.4 lpcpd (203 gpcpd) for the Anchorage Water Utility is at the high end of the range, future commercial/industrial development is speculative. The high standard was chosen to insure an overall adequate water supply for the future commercial/industrial sector of the Anchorage community and a high urban denisty profile.

One additional assumption is necessary in assessing water resources requirements. All future population growth will be utilizing either the two utilities' or the military water sources. No factor has been developed for those who might use private ground water resources. Although this assumption will not hold entirely true, it is necessary

to point out that expansion by utilities is being planned on the basis of population saturation in the Anchorage bowl.

The resultants of the above two conditions are accentuated water production and accentuated demand for water resources which should insure adequate water for a high density urban profile as well as the possibility of increasing activity in the commercial/industrial sector of Anchorage.

Sewer. Per capita wastewater generation closely approximates per capita water consumption. A rule of thumb estimate is computed by allocating 80 percent of the average per capita water consumption (includes residential, commercial, and industrial) to arrive at wastewater generation figures. (Gorski, Community Contact, 1978b) Utilizing the U.S. Army Corps of Engineers per capita water consumption of 768.4 lpcpd (203 gpcpd), wastewater generation standard can be established at 613.2 lpcpd (162 gpcpd). (See Overview of Infrastructure Standards Section on per capita water consumption.)

Table 6 indicates the MAUS water demand projections through the year' 2000 and the corresponding wastewater generation.

TABLE 6

PROJECTED ADDITIONAL WATER REQUIREMENTS

FOR WASTEWATER Generation

Year	Requirements
1980	20.4 mld[b] 5.4 mgd[c])
1985	62.8 mld 16.6 mgd)
1990	93.1 mld (24.6 mgd)
1995	133.2 mld (35.2 mgd)
2000	185.5 mld (49.0 mgd)

[a]Metropolitan Anchorage Urban Study, 1977
[b]Millions of liters per day
[c]Millions of gallons per day

The 613.2 lpcpd (162 gpcpd) will be used as the standard to establish the impact of future population growth on primary sewage treatment facilities in the Anchorage area.

Electricity. The utilities providing electric service within the Municipality base their load projections on a multivariate process. Variabl es determining the planning and sizing of additional generation facilities include monitoring of federal legislation with regard to the possible curtailment of the use of fossil fuels, historical demand figures, population projections, and proposed commercial/ industrial development for the Anchorage area.

One variable used in the planning process, as noted above, is historical growth rates. Table 7 indicates kilowatt hour consumption figures for residential and commercial/industrial sections in Municipal Light and Power's service area for a five-year period. It

is important to note that this historical data indicates a tremendous growth as a direct result of the impact of the trans-Alaska pipeline. Although future population growth will affect the demand for electricity, the impact should be on a far lesser scale.

TABLE 7 ,

MUNICIPAL LIGHT AND POWER HISTORICAL USAGE RATES[a]

	1972 KWH	1973 KWH	1974 KWH	1975 KWH	1976 KWH
Residential	72,992,878	82,663,300	89,946,252	105,214,452	119,474,692
Commercial/ Industrial	205,287,563	233,311,883	250,409,196	289,296,110	339,549,678

[a]Municipal Light and Power, Annual Operating Revenue Relationships

Examination of land use patterns projected for development by the Comprehensive Plan indicate that 339 hectares (986 acres) will be used for industrial development by 1995 and 3,054 hectares (7,546 acres) will be developed in the commercial sector. For industrial land use, this is a 73.9 percent increase over 1975 and 291 percent increase for commercial land. Residential land only increases 31.3 percent over this same period (Municipality of Anchorage, 1977d). These statistics indicate a high trend toward commercial/industrial development. Because of this trend as well as other variables mentioned above which affect the planning process, it is not statistically valid to set up a population-power generation ratio. For example, some industries require substantial power demands but maintain relatively few employees.

For planning purposes, Chugach Electric Association utilizes a 13.9 percent growth factor to 1983 and then drops to ten percent growth factor until 1995 (Gorski, Community Contact, 1978d). Municipal Light and Power (ML&P) currently places their annual rate of growth at 12 percent (CCC/HOK, 1977). Growth factors in each case determine demand for power which does not correlate exclusively with population growth.

The combination of both utilities' current generating capabilities are 487 megawatts. Between now and 1986 there are firm plans to add 1,055 megawatts (row) of additional load. This is a 12.5 percent annual increase of the total additions planned which closely approaches annual growths projected by both utilities.

Table 8 shows electrical projections by ML&P through the year 2000 for the entire Anchorage area. The projections in table 8 under the highest of the three ML&P scenarios through 1985 approximates the planned additions plus the current generation capabilities as noted above.

TABLE 8

ELECTRICAL DEMAND PROJECTIONS FOR THE MUNICIPALITY OF ANCHORAGE[a]

Year	Lowest Growth	Growth as Usual (Limited)	Highest Growth
1980	460 mw	653 mw	729 mw
1985	701 mw	1,140 mw	1,477 mw
1990	1,046 mw	1,812 mw	2,455 mw
1995	1,590 mw	2,898 mw	4,126 mw
2000	2,128 mw	3,878 mw	5,522 mw

anchorage Area Power Requirements Fact Sheet, 1976

Meeting future power demands is, in itself, a complex phenomenon. The State of Alaska is energy rich with petroleum resources (oil, gas, and coal). In addition, extracation and utilization of coal and harnessing of hydroelectric power has, perhaps, the most tremendous potential with regard to meeting long-range energy demands. Other forms of possible energy sources include tidal, wind, geothermal, recycled solid waste, and nuclear power.

In consideration of the above, the following qualitative standard is offered to assess future demand for power. Future development will undoubtedly be met with many obstacles such as environmental impact problems, time slippages in construction of generation facilities, and ever changing federal legislation which could conceivably place Anchorage in a tenuous position to meet future power demands. Currently, the electric utilities serving Anchorage are barely keeping abreast of the current demands for power due to the impact of the trans-Alaska oil pipeline. Once this current condition is under control and planning and implementing of increased generation can be carried out in a timely manner, the utilities should be able to meet future electrical requirements. If obstacles such as those previously noted produce time slippages in planned developments, Anchorage could easily be faced with power shortages during peak demand periods for many years to come.

Telephone. Standards to determine planning for installation of equipment and acquisition of manpower are a multivariate process.

Criteria examined include historical trends, demand for service, and future population forecasts. Currently, the Anchorage telephone utility, the service provider for the majority of the Anchorage population, is adding equipment based on an 18-month growth projection.

Table 9 shows projected five-year statistics indicating average numbers of customers and projected telephones necessary to meet this demand.

TABLE 9

PROJECTION OF AVERAGE NUMBER OF CUSTOMERS AND Telephones

Year	Average No. of Customers	Average Telephones in Service
1978	62,311	134,958
1979	67,011	144,958
1980	70,711	153,958
1981	72,611	160,958
1982	77,120	170,958

[a]Municipality of Anchorage, Capital Improvements Plan, 1978-1983

Population growth for this utility is a positive factor. Economically, as growth occurs and population density increases, there should be a positive effecton the utility's financial position. The utility's growth as a result of the trans-Alaska oil pipeline required massive line extensions throughout the Anchorage bowl. Much of the area requiring service accommodated a low density population. Increasing density in the future will obviously produce a better return in revenues when utilizing existing line extensions.

Because of the multivariate planning process as well as the positive influence of population growth on this industry. No quantifiable standard is deemed necessary to assess impact on this utility.

Solid Waste. Historical data indicate a propensity towards an increasing per capita generation of solid waste. Table 10 illustrates this trend using both historical and future projections of unit quantities of solid waste per person in the population.

TABLE 10

PER CAPITA SOLID WASTE GENERATION PER DAY

Year	Quantity per Person
1920[a]	1.24 kgms (2.75 lbs)
1970[b]	2.26 kgms (5.00 lbs)
1975	2.31 kgms (5.09 lbs)
1980[c]	2.71 kgms (5.97 lbs)
1985	3.06 kgms (6.75 lbs)
1990	3.47 kgms (7.64 lbs)
2000	3.92 kgms (8.65 lbs)

[a]Preliminary Solid Waste Master Plan, 1975
[b]Request for Proposal, Milling Operation, 1977
[c]1980-1995, projected figures, Request for Proposal, Milling Operation, 1977

Due to the introduction of a milling (shredding) facility due to become operational in May 1979, the volume of solid waste entering the Anchorage sanitary landfill will be reduced by an estimated 30 percent. In addition, joint consideration by the Municipality and the military is being given to the use of solid wastes as a fuel in power generation by the military. This process would reduce the

quantity of solid waste entering the sanitary landfill by 60 to 65 percent. (Ender, et al., 1978) Because of the above technologies currently being introduced or under consideration for solid waste disposal, a quantifiable standard based on per capita generation is at best nebulous.

In addition, the current landfill in use has a life expectancy through 1982. A tentative site has been targeted for the development of a new sanitary landfill. The estimated life expectancy of the proposed site is at least 50 years with the assumption of continued population growth in the Anchorage area.

Housing

There are three major criteria needed to predict the housing needs in the Anchorage metropolitan area. The first is the number of units based on the size of the household. The second deals with the mix of units necessary by type to meet differential market demands. The third focuses on the Anchorage construction industry's capacity to build housing units within the forecasted limits.

Housing Unit Demand Based on Housing Size. The 1977 civilian household size in Anchorage was 3.18 persons per unit. This reflects a national decline in family size. The 1970 Anchorage census, for example, noted a household size of 3.28. This pattern, however, is not uniform by housing type. It ranges from single family residences with 3.64 persons per household to apartments with 2.38 persons per

household. Others include duplexes with 3.04 persons and mobile homes, 2.77 persons. (Ender, 1978).

The overall houshold size will rise or fall based on continuing demographic trends and the mix of housing built in the future. As discussed in the section on education, the declining number of children per household is expected to stabilize by the mid-1980's. This should force the household size to stabilize since declining numbers of children have been the primary cause of this trend. On the other hand, higher units of single adults, one adult households, or multifamily unit living styles should continue to press household sizes down for at least a decade or so. To take account of these forces, a factor of 3.1 persons per household will be used to calculate the number of units needed for future population growth.

Type of Units Needed to Meet Market Demand. The majority of housing in Anchorage is the single family unit (52.0 percent), while 37.0 percent are multifamily and 11.0 percent are mobile homes. However, the stock has not been increasing proportionally to the existing mix. Fifty-three percent of the housing built from 1975 through October 1977 were multifamily. This pattern is encouraged by the high cost of alternative housing, land availability, and encouragement of high density housing styles from building economies, financing methods, and other reasons.

The primary problem is the softness of the multifamily market both in

the rental and owner areas. Housing desires of the community still favor the single family unit, and the relative prosperity of the community makes ownership a possibility for at least a majority of the residents. The other market, mobile homes, has demand potential. but is unlikely to grow because of legal constraints and community resistance.

Considering demand preference and the economic constraints of the single family house, a reasonable standard for the mix of new units is about 48 percent of the units needed will be single family, 46 percent will be multifamily (both apartments as well as townhouses and condominiums), and six percent will be mobile homes.

Capacity of the Construction Industry. The capacity of the construction industry to build housing appears to be quite flexible. With a recent history of 4,000 plus units per year and an excess number of craftsmen and construction workers in the labor pool, the industry should at a minimum be able to build 4,000 units a year with a capacity to increase above this amount.

Heal th

Selected federal and state infrastructure standards exist to govern provision of health care services. Application of manpower facility and services standards to the local health care delivery system requires some modifications. Specific adjustment to national and other norms are discussed where applicable within each of the following sections.

The standards described below are presented to assess the impact of future population growth on the Anchorage health care delivery system.

- Manpower - Primary care physician ratio
- Facilities - Acute care bed need
  - inpatient (acute care) utilization rate
  - facility occupancy rate
  - average (inpatient) length of stay

Manpower. National standards for adequate medical manpower require approximately one primary care physician (family medicine, pediatrics, obstetrics - gynecology) for 800 in the population. Utilizing this recommended standard produces a large discrepancy between the actual number of primary care physicians in Anchorage and the optimum number as generated by the above ratio. Table 11 displays this discrepancy and illustrates the issue of the severe manpower shortage in the number of primary care physicians in Anchorage.

TABLE 11

NUMBER OF PRIMARY CARE PHYSICIANS IN ANCHORAGE COMPARED TO THE FEDERAL STANDARD OF ONE PER 800 IN THE POPULATION

Actual Number in Anchorage	Federal Standard for a City the Size Of Anchorage
77	250[a]

[a]Figure is based on a population of 200,000.

Facilities. The availability and use of health care facilities is a primary indicator of the health care system's ability to serve local health needs and provides indices to the relative cost of health care.

Acute care bed need is based upon several factors: 1) inpatient days per 1,000 in the population, 2) facility occupancy rate, and 3) average length of patient stay.

National Guidelines for Health Planning (42 CFR 12) 1978 and the Alaska State Medical Facilities Plan draft indicate that to maximize cost efficiencies in a level IV city (cities of 30,000 to 750,000 population) that the following optimum standards of care apply.

- Inpatient Utilization Rates. Inpatient facility utilization rates in Anchorage are significantly lower than rates for the nation as a whole. Lower rates are due to 1) a lower median age of the population, 2) high availability of ambulatory and outpatient services, and 3) peer review programs encouraging more efficient use of facilities and services.

  Utilization rates are based upon hospital patient days per 1,000 in the population. Table 12 illustrates the degree to which the national patient days ratio exceeds that of the Anchorage area.

TABLE 12

PATIENT DAYS PER 1,000 IN THE Population

Facility	Year	Patient Days Per 1,000
All United States Hospitals	1973	1,181
	1974[b]	1,207
Anchorage Hospitals	1973	527
	1974	560

anchorage Health Services Plan, 1977
[b]No later data available

- Facility Occupancy Rate. The guidelines also indicate that the average annual occupancy rate for acute care facilities of 200 or more beds should be at least 80 percent (85 percent recommended). Adjustments may be made if a) large seasonal variations in use occur and/or b) in rural hospitals with less than 4,000 admissions. The nationwide average occupancy rate is currently 75 percent.

- Average Length of Stay. The average length of stay in an acute care facility for the nation is six days. The local average is four to five days. Table 13 displays the three standard indicators of acute care bed need discussed above compared to those same standards for the entire United States.

TABLE 13

APPLICATION OF ACUTE CARE BED NEED STANDARDS IN ANCHORAGE COMPARED TO THOSE STANDARDS FOR ENTIRE U.S.

	Anchorage	United States
Occupancy rate	65%[a]	85%
Open beds/1,000 population	2.6	4[b]
Inpatient days/1,000 population	550	1,200
Average length of stay (days)	4 - 5	6

[a]Percent of licensed beds
[b]National Guidelines for Health Planning CFR 42, Part 12, 1978

Lower numbers of open beds, inpatient days, and average length of stay significantly alter, local ability to achieve the recommended 85 percent occupancy rate.

While there are no formally designated standards for numbers of long-term and skilled nursing beds, it appears that the two local long-term facilities with 202 beds cannot sufficiently serve the needs of 4,000 aged and 20,000 indigent.

Although there exists no recognized federal standard, average utilization of ambulatory care services in physicians' offices in Anchorage is lower (3.7 visits per person) than the national average (5.7 visits per person).

Social Services

There currently exists no formal quantitive standards for the delivery of social services. The underlying assumption is that services never equal demand and that any increase in the general population will cause resultant increases in demand for most social services.

The following section discusses existing status of and need for social services delivery in Anchorage. Where appropriate, program standards have been included.

Direct delivery social services in Anchorage fall into six major categories:

- Children's services
- Senior citizen's assistance
- Employment assistance
- Income assistance
- Housing assistance
- Youth services

The majority of services are provided by field offices of the state and federal government. Both program priorities for 1979 include information and referral, individual and family counseling, and child and adult protective services.

The Anchorage social services profile varies significantly from any established nationwide social services norms or standards. There are no quantifiable formulas for availability of social services. However, indicators most often used to describe the status of social services

delivery are 1) unemployment rates, 2) size of early childhood and elementary school age children, 3) number of senior citizens, 4) number of low income residents, and 5) number of low cost housing units available.

Unemployment Rates. Unemployment in Anchorage has always been higher than in the lower 48 states. It has ranged from 6.7 percent in 1970 to a peak of 9.7 percent in 1973. The pipeline construction reduced it to 6.7 percent in 1975. Unlike other cities, the rate here is predominately function of seasonal variance, job skills and occupational opportunities imbalance, and work force and employment expansion lag. The cessation of heavy pipeline activity and lack of additional major construction projects have contributed to the maintenanceof a relatively high unemployment rate (8.6 percent). As the major metropolitan area within the state, Anchorage has become the central market place for unemployed persons from throughout Alaska. For purposes of projection, the present rate of 6.7 percent for insured unemploymend claimants will be used to assess impact of future copulation growth on Anchorage.

Early Childhood and ElementaryAge Children. The public school enrollment has increased 23 percent since 1970; a much faster rate Of growth occurred from 1950 to 1970 during which time enrollments quadrupled. The slower rate of growth rate and the relatively small average family size of 3.18 people have minimized the demand for child related social services in the Anchorage area compared to the demand for other economic related services (approximately 18,760 Anchorage residents are nine years or younger). Licensed day care

centers (45) are serving about 2,000 children and licensed day care homes serve an additional 500. Although these are not quantifiable norms, it appears that small child and day care needs are far from staisfied by existing providers. The 2,500 licensed spaced available constitute approximately 1.5 percent of the Anchorage population. This percentage will be used to assess the impact of future population growth on licensed day care space.

Number of Senior Citizens. Only two percent of the Anchorage population are over 65 years of age. This age group has grown only 0.4 percent since 1970. The most critical needs for senior citizens are low cost, safe housing, reliable and convenient transportation, and inexpensive long-term health care. Demands by senior citizens on the social services delivery system are growing in proportion to the aging of the general population.

Number of Low Income Residents. The low to moderate income persons constitute the greatest single user of local social services in the Anchorage area. Federal eligibility standards and norms are adjusted to reflect the disparity between economic status of Anchorage and other U.S. citizens.

TABLE 14

COMPARISON OF LOW AND MEDIAN INCOME

BETWEEN ANCHORAGE AND TOTAL UNITED STATES

	Anchorage	U.S.	% of Difference
Per Capita Income	$10,337	$6,441	38%
Median Income	$30,115	$13,500	55%
Low Income	$17,500	$8,150	53%

Number of Low Cost l-lousing Units Available. According to the 1977 Housing Assistance Plan prepared for the Department of Housing and Urban Development by the Municipal Planning Department, there are approximately 300 units of low cost housing available in the Anchorage area. In addition to housing units, approximately 554 low income qualified housholds receive rental assistance payments from Alaska State Housing Authority, Section Eight Program. (While there are no established quantifiable standards for numbers of low income housing units per population, Anchorage housing supply falls severely short of serving the 50,000 {28 percent} residents earning less than $17,500.) It is estimated that about 8,200 households would be eligible for housing assistance if it were available. This is about 14.0 percent of the nonmilitary reservation occupied units in Anchorage. Present efforts meet about 10.4 percent of the estimated need. While no standard is available on an optimal client penetration rate, the 1976 Anchorage Housing Assistance plan estimated that a 33 percent service rate would have been optimal. This standard will be used.

Two additional factors which tend to increase the impact of the delivery of social services in Anchorage are 1) the continuing transiency of the population and resultant population turnover and 2) the increasing influx into Anchorage of natives and other residents from elsewhere in the state.

Transportation

Both short- and long-range planning have been designed to address current transportation issues and accommodate certain population growth. Transit and road expansion proposals are geared to a long-range calendar and incorporate a dynamic increase in the population. Table 15 indicates the population projections utilized in the transportation planning process (includes military living on base).

TABLE 15

TRANSPORTATION PLANNING POPULATION Projections

Year	Population
1980	210,976
1985	256,003
1990	308,245
2000	372,081

[a]Municipality of Anchorage, 1977-1995 Long Range Element, AMAT, 1977

However, severa? problems arise in examination of transportation planning which could ultimately damper its effectiveness. The first is that a substantial portion of future plans are already apparent needs. It would

appear that much of the upgrading planned over the next decade and beyond could be used to presently overcome existing traffic congestion problems. If this is true and the rapid increase in vehicles continues with the growth of the population, the road system will continue to play catchup for the rest of the century.

A major difficulty stems from the problems of lead time and slippage. Five to eight years are needed to go from a proposed road to its final construction. In addition, the short construction season in Anchorage enhances the possibility of substantial slippage in terms of timing. The problem could ultimately push the 18-year long range transportation plan past the year 2000 in order to physically complete proposed projects.

The long-range plans are also projecting needs on a 14 percent reduction in load by 1995 because of an increased bus ridership. While ridership has steadily gone up, achieving this goal would be exceedingly difficult. The relative household wealth, plentiful and relatively cheap gasoline, a transportation plan which is making strong progress in traffic circulation, a decentralized commercial system, and a generally low density residential pattern militates against a transit system making dramatic gains. On the one hand, the long-range plan talks of a strong parking management policy, but the short-range plan calls for a municipal downtown parking garage. Simple service improvements and good marketing will not achieve the transit goals without a significant distinctive program to reduce car use.

The final problem is cost. With a substantial shortfall in necessary revenues, there is no chance the plans could be fully implemented without major new revenue sources. It appears that without a fundamental policy change in Washington, the major source for additional resources would be the state or local government. Due to the major resource allocation required, the availability of sufficient resources could be reasonably questioned, Local bonding for increased transit and city parking have not faired well at the polls; however, road improvement bonds have been somewhat more successful. Table 16 illustrates this trend.

TABLE 16

COMPARISON OF LOCAL TRANSIT RELATED BONDS[a]

Issue Area	# of Propositions	# Successful	Proportion Successful
Roads	5	3	60%
Transit/Port	3	1	33%
Parking	1	0	0%

[a]Ender, Public Support for Local Bonding in Anchorage, 1977

Because of the above, it becomes difficult to generate a quantitative and/or qualitative standard to determine the impact of future population growth on the transportation sector of the community. Several assumptions are deemed necessary: 1) relatively little time slippage in construction will be encountered; 2) a substantial increase in bus ridership will be realized; and 3) alternative sources of revenue will be obtained to offset deficit spending.

If any of the above conditions cannot be met, slippage in the implementation process will occur with future population growth accentuating already existing transportation problems. In addition, due to the nature of the industry, it is questionable whether these elements can be met. It might be further assumed that the percent of slippage in meeting the above will directly correlate with the level of effectiveness in attaining transportation goals.

Financial Capacity and Capital Requirements

No quantifiable standards exist nor were developed for the financial capacity and capital requirements of Anchorage. The capacity question can only be addressed by relating two questions of economic growth and service demand. Service demand is sufficiently political that it becomes speculative at best to project expenditures either capital or operating beyond the six-year capital improvements plan.

The major issues facing the capacity question is discussed in a qualitative mode in the description of services likely to be impacted section.

DESCRIPTION OF SERVICES LIKELY TO BE IMPACTED

Education

Education is divided into three general areas: primary and secondary, special education services, and postsecondary career and vocational/ technical training. Because special education is primarily provided by the Anchorage School District, it will be included under the primary and secondary education section.

Primary and Secondary Education. Primary, secondary, and special education cover kindergarten through twelfth grade and are primarily offered through the Anchorage School District with various private schools providing alternative programs to the public school system. Statistics show that the student population is rising slowly in comparison to its growth from 1960 to 1970; and, in fact, the student population has actually decreased in the last three years. However, student enrollment in the special education programs has expanded greatly in the last two years with the introduction of Federal Law 94-142 which states that every handicapped child (age three to 19) has a right to expect free and appropriate education by the school district (Harper, Community Contact, 1978). This law, in effect, mandates the school district to provide specialized and individualized programs to meet the needs of the handicapped. It has, as well, compelled the district to hire more teachers.

As noted in the overview of infrastructure standards, the school

district strives to maintain 25 students per classroom and presently provides 25.47 students per room (1,551 total rooms presently available including adjustment for special education [Anchorage School District, 1978]). This indicates that the school district is now at its saturation level.

There are six buildings, and an addition to an existing facility being considered for construction in the early 1980's. These facilities will be located in the suburban areas of north and south Anchorage that are currently experiencing the most rapid growth of population in proportion to other Anchorage areas. Together these buildings will provide an increase of 138 rooms and provide space for an additional 3,450 students or a total of 42,225.

Provided that the school district hires more teachers, the space available by the early 1980's would support 42,225 students. If the 1.5 percent growth factor the school district uses for planning is applied, the school district will be able to maintain its present level of services only until 1983. The problem is that during the 1970's the student population rose at a rate only one-fifth the growth rate of the whole population. Because of this, a low growth estimate was appropriate. The influx of new residents was composed largely of young, unmarried men and young couples who did not have children or whose children were below the age of five. Moreover, present enrollments in the school district are affected by the number of students attending private Anchorage institutions (3.2

percent of the total school age population, students attending schools outside Anchorage or the state (1.6 percent), and drop-outs (0.4 percent) (Ender, 1977a). Considering the demographics of the community, the proportion of the school age population has a certain minimal level. In recent years, the percent of public school children within the population has ranged from 20 to 24 percent. In 1975 it was 23.0 percent, and in 1977 it was 20.9 percent. Comparing the 1.5 percent district's planning rate and a conservative ratio of 20 percent of the population produces very different results. Table 17 illustrates the growing gap between the two estimates. By 1995 the 1.5 percent method results in the public school population being only 11.8 percent of the total population.

TABLE 17

COMPARISON OF METHODS TO PROJECT SCHOOL ENROLLMENTS

Year	Projected Population	1.5% Growth	20 % of Population	Difference
1977	188,725a	39,509[b]	37,745	(1 ,764)
1980	222,579[c]	41,315	44,516	3,201
1983	261,214	43,202	52,243	9,041
1985	295,337	44,508	59,067	14,559
1990	358,114	47,949	71,623	23,674
1995	437,084	51,674	87,417	35,763

anchorage Urban Observatory, population estimate, 1977
[b]Actual student enrollment-1977
[c]ISER, Optimum population projections for Anchorage

It is apparent that the 1.5 percent growth rate must be increased at some point in time to more realistically represent student population increases. Twenty percent of the total population may in

fact be a more accurate predictor. In support of this, table 18 depicts ISER's statewide MAP model projections for ages five through 19 in the ten year intervals through the year 2000.

TABLE 18

MAP POPULATION FORECASTSa

PERCENT OF TOTAL POPULATION AGES 5-19

Year	5-19 Year Olds
1980	26.53%
1990	26.87%
2000	26. 02%

[a]University of Alaska, Institute of Social & Economic Research, Beaufort Sea Petroleum Development Scenarios, Economic & Demographic Impact

Subtracting out the 19 year olds plus those who are not in the public school system from the above projections places the school age population at approximately 20 percent. However, demographic characteristics may alter the usefulness of this figure as a means of projection. The greatest factor that could change the character of the Anchorage population and likewise the student enrollment is stabilization of the population. Anchorage in recent years has been characterized as young and transient. As a community stabilizes, children whose families usually leave the area before they reach school age will be enrolling in the public schools. Also, stabilization will increase the number of 25 to 35 year old females. As this female cohort group increases, this should increase the birth rate. Anchorage already has a high birth rate. This will also increase the number of school age children especially in the elementary schools but, later, even in the secondary schools. There

is also the possibility that the 1.08 number of children per family may rise and thus increase the number of school age children. National demographic analysis suggests that the large post-World War II cohort group has delayed having children; but with the large size of this group, the birth rate will increase even if the children per family rate stays low. Speculating on the future, it would seem that a school age growth rate below the population will continue into the early or middle 1980's. This is a period of strong expansion and should continue the transient nature of the population. From 1985 to 1995, the growth slows and the transiency should slow with it. With more rapid expansion occuring in the mid-1990's, the proportion of school age children should again drop but never to the levels of the pipeline boom. All of these factors appear to indicate that the 20 percent ratio is a reasonable and possibly conservative predictive tool.

In order to realistically approach its future needs, the school district will be forced to reevaluate its present projections of growth by the early 1980's. The present movement away from the older central areas of the city to the northern and southern boundaries will also affect the evaluation of the usefulness of the schools located in the central areas. (Al ternatives can be obtained in the Anchorage Socioeconomic and Physical Baseline report).

Another major problem is the escalating costs of education. If public school expenditures continue to rise substantially above the

general cost of living, the capacity to fund education could be jeopardized. Between 1969 and 1976 the cost of living rose 52.9 percent while public school expenditures per student rose 226 percent. With the state now taking a greater share of construction and education costs and with some measure of fiscal restraint, the projected local revenue base should keep pace with expansion of the system.

Postsecondary Education and Career Vocational/Technical Training. Postsecondary education and career vocational/technical training are provided by the public, private nonprofit, and private profit institutions.

- Public Institutions. Public institutions include the University of Alaska, Anchorage (UAA) and Anchorage Community College (ACC). Both of these institutions have undergone dramatic increases in enrollment over the past ten years. Because there are no official student projection estimates available, it is difficult to predict the impact of natural growth on postsecondary education.

  However, the most important issue facing the viability of public institutions in Anchorage is adequate funding. The funding of UAA reveals a sharp disparity between campus appropriations based on the numbers of students. Funding has not kept pace with demands for higher education oppor-

tunities; and the University and, to some extent, the community college face serious shortfalls in bringing facilities and manpower resources up to a level sufficient for present and future demand. Review of five year plans of both institutions and basic support services including library facilities suggest serious problems and little hope for progress without a redistribution of high education resources to meet Anchorage's needs in this area.

- Private Nonprofit. Private nonprofit institutions include Alaska Methodist University (AMU) and apprenticeship training organizations. AMU is currently a reorganized institution undergoing development pains. Its future is highly contingent on funding. Because of its limited capacity to attract a large student body, future population growth will have little effect on its future. The ability to attract resources and the development of special programs will be more critical to their future.

  Apprenticeship programs are presently training a minimal number of people. Because it is based on labor market needs, it is conceivable that there will be a degree of demand in these training programs with the projected growth.

- Private Profit. Likewise, private profit institutions will continue to provide training in business, hair design, real

estate, etc., as long as there is a demand for these professions.

Public Safety

Police. Within the old city limits of Anchorage and the Spenard area, law enforcement is the responsibility of the Anchorage Municipal Police Department (APD). As a result of the passage of Proposition Eight on October 4, 1977, the service area of the municipal police will be expanded to include the Sand Lake area, Muldoon, and Eagle River. The annexation of these areas will occur within the next nine months. This expansion of service is a move toward areawide police service within the Anchorage bowl and some outlying communities. Although the communities of Hillside, Rabbit Creek, Alyeska/Girdwood, and Potter's Marsh defeated the issue, as the population density increases in these sparsely settled regions, expansion of municipal police will undoubtedly occur. These areas currently receive law enforcement services from the Alaska State Troopers, C Detachment.

Figure 3 delineates the APD's service area prior to and after July, 1978. Those areas which voted down the proposition are depicted in bold print. Eagle River/Chugiak appear on the map to assist in location purposes only.

When Proposition Eight is fully implemented in 1979, the APD will be serving approximately 165,000 people. In order to meet the increased

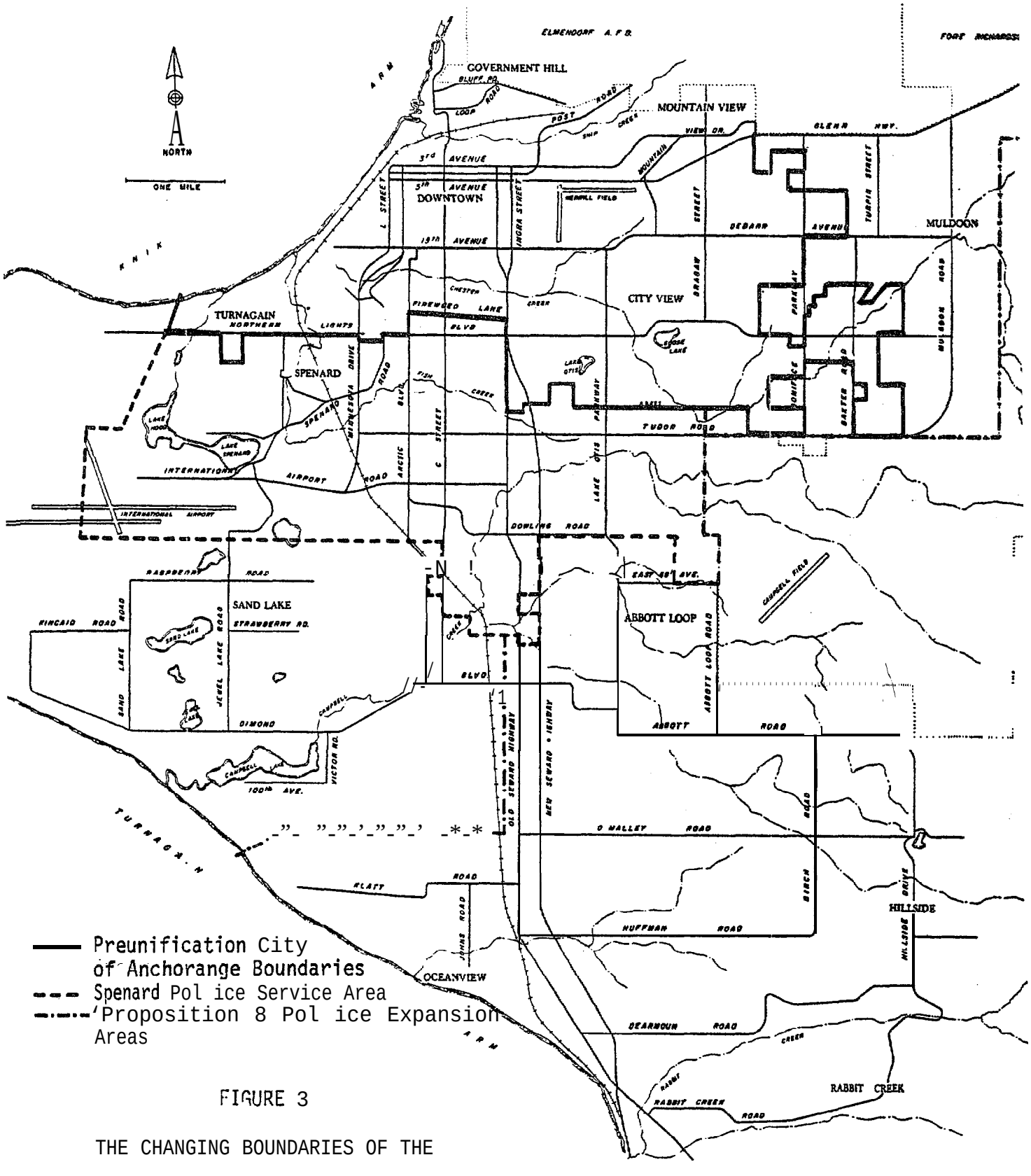


FIGURE 3

THE CHANGING BOUNDARIES OF THE

MUNICIPAL POLICE SERVICE AREAS

demands for service, the standard ratio of 1.52 sworn officers per 1,000 in the population would dictate a force of 250 sworn officers. With the current sworn forceat 163, an increase of approximately 53 percent would be realized.

The police presently have one group in the academy for training. Two more groups of approximately 22 each will enter the academy in 1978. A fourth group of 25 will begin training in January 1979. Academy and field training take approximately 18 weeks. By June 1979 approximately 100 additional sworn officers will be available to service the newly acquired areas.

Assuming that areawide police service will encompass the entire Anchorage basin within the next five to seven years, the primary issue which will affect the municipal police's abilities to function at an optimum level will be in the acquisition and training of a sufficient number of qualified personnel. Without taking into account any natural increase in population, annexation of new areas will require substantial increases in the force. Adding in the natural increases of the population definitely accentuates this issue.

This type of growth under any circumstances in such a short time frame poses a tremendous strain on the administrative responsibilities of the department and could ultimately affect the police's ability to provide adequate service to the public. Once this short-

term issue is under control, the APD will realize increases on a more incremental level.

A second issue relating to police standards and ultimately quality of service is unionization of the APO. Unionization of the Anchorage municipal police officers with the Teamsters has demonstrated a decrease in the turnover rate of personnel. Union benefits have had a stabilizing affect. If this type of trend continues, it is conceivable that police expenditures could skyrocket between the years of 1990 and 2000. The fact that longevity with the department increases the wage benefits indicates the department could become top heavy with highly paid personnel. This factor alone could pose a tax burden the general public could or would not tolerate. In effect, unionization could result in a decline of the ratio of police to the population.

A third variable of considerable importance pertains to the demographic profile of the Anchorage population. Anchorage is currently depicted as a highly transitory community with the population theoretically turning over every three and one-half years. As demonstrated during the heighth of the pipeline construction, 1974 through 1977, the crime index rose a significant 49 percent. Bust and boom occurances resulting in highly mobile urban setting indicate higher crime rates. If the transitory nature of the community eventually smooths out, it is possible that the relative frequency of Part I crimes could decrease requiring less demand for services. (A description of the

historical and current crime profiles is available in the Anchorage Socioeconomic and Physical Baseline report.)

Paradoxically, areas characterized by high density urban profiles tend to display higher crime rates. Since Anchorage"is becoming more densely populated, the crime index could show a marked increase in some communities, ultimately leading to increased demand for services.

The above discussion further supports the section on police in the overview of infrastructure standards. No standard is firm; and in the case of the APD, manpower requirements could be altered significantly by variables totally outside of their control.

Alaska State Troopers. The C Detachment of the Alaska State Troopers currently provides highway patrol service for the Municipality and law enforcement services for 71,000 people outside the old city limits of Anchorage and the Spenard service area. (See figure 3 for Detachment jurisdiction.) With the move of the municipal police toward areawide service (annexation to be completed in January 1979), C Detachment will be relieved of the majority of their responsibility in the area of law enforcement. Law enforcement services will be provided to only those areas where Proposition Eight failed; specifically, Girdwood-Alyeska, Potter's Marsh, Rabbit Creek and Hillside - with a total population of approximately 12,000 (University of Alaska, Anchorage Urban Observatory population estimate).

As a result of this reorganization, the emphasis will shift from both highway patrol and law enforcement to focus mainly on highway patrol. In effect, the move toward areawide police services is a beneficial one for the troopers. For example, plans to implement air patrol on a more regular basis will be more easily accomplished with the manpower now freed from law enforcement activities.

In summary, future population growth in Anchorage should easily be accommodated by incremental increases in the force.

Fire. The Anchorage Fire Department (AFD) provides fire and rescue operation services and emergency medical services for the Municipality of Anchorage. The current status of this department can be characterized as well organized and highly effective in providing these critical services to the citizens of Anchorage.

There are two major concerns which exist in the area of fire protection but for the most part are outside of the control of AFD. The first issue of community concern is the amount of suspicious arson occurring in Anchorage. In 1977 of the 181 fires labeled suspicious, 126 were assumed to be arson based on strong circumstantial evidence. An additional 113 fires were proven cases of arson. Comparing per capita loss nationally, Anchorage experienced $8,600 loss per capita versus the national figure of $4,500. Even considering the cost of living differential, Anchorage is above the national average. (Ender, et al., 1978)

The second issue deals with fire vulnerability in the upper Hillside area along the Chugach Mountain Range. No water mains exist in this area and, consequently, no fire hydrants. According to the AFD, it is not a question of if but when a major fire will break in this area. Until water mains are introduced, the Hillside area will continue to be highly vulnerable to fire loss. (Ender, et al., 1978)

These issues, as noted above, are basically outside the control of the AFD. The department is geared toward good comprehensive planning and is continually working to decrease response time to emergency calls. The goal of the department is to average a 4.0 minute response time for first due fire companies. For the last quarter of 1977, the response time was 4.8 minutes. Presently, no new manpower will be added to achieve this goal. (Ender, et al., 1978)

As noted in the section on overview of infrastructure standards, the current ratio of the total force to the population is 1.47 personnel per 1,000. If Anchorage develops along a high density urban profile, the trend of expansion would be in the area of additional personnel and fire companies. However, if land use develops along a low density context, problems could occur in responding to emergency situations within the 4.0 minute time frame. Under this scenario, additional fire stations would most probably be added to the system. (Ender, et al., 1978)

Leisure

Recreational and leisure activities in the Anchorage arch are provided by agencies and organizations in both the private and public sector. The majority of the recreational facilities, programs, and activities are provided by the Municipality's Department of Cultural and Recreational Services. That department maintains and coordinates libraries, the museum, local parks and trails, community schools, community centers, and a variety of recreational programs and activities. Through their work with the Anchorage Art Advisory Commission, the department has input regarding local performing and visual art activities.

State and federal support of leisure and recreational activities come largely in the form of grants to the Municipality (for libraries, museum, community education, etc.) and as grants and endowments to private non-profit agencies and organizations. State and federal government also provide and maintain parkland, trails, and paths.

A discussion of services likely to be impacted is presented according to the following categories:

- Recreational inventory
  - Facilities
  - Programs
- Planned Activities
- Issues

Recreational Activities. State, federal, and local resources combine to provide a wide variety of recreational opportunities. Traditionally Anchorage residents display intense interest in outdoor activities and sports, i.e. fishing, hiking, camping, skiing, and skating. However, the long, dark winters have forced individuals and families to seek, also, some form of physical and/or leisure activity which can be persued indoors. Each of the following sections describes activities, events, and resources currently available for the Anchorage resident.

- Facilities

  - Parks. Within the Anchorage bowl area there are over 1,503 hectares (3,710.36 acres) of parkland. Outside the metropolitan area there are 562 hectares (1,388 acres) of parks. The total accessible parkland equals 327,666 hectares (809,336 acres) in 93 parks and areas (Gehler, Community Contact, 1978).

    The federal government provides and maintains 2,020 square kilometers (780 square miles) of federal parkland located within or near the Anchorage bowl area. The major federal funding source for parkland acquisition and development is the Department of the Interior, Bureau of Outdoor Recreation, Land and Water Conservation Funds.

TABLE 19

PARKLAND Inventory

	No. of Parks	Type of Park	No. of Hectares	No. of Acres
Municipal	37	Vest Pocket	20.48	50.59
	12	Neighborhood	49.75	122.88
	7	Community	110.04	271.79
	2	Large Urban	79.82	197.15
	6	Regional	739.09	1,825.55
	8	Special	239.55	591.70
	5	Conservation Areas	113.76	280.98
	13	Open Spaces	149.68	369.72
	3	Regional (Outside Metropolitan Areas)	1,776.52	4,388.00
	3	Greenbelt	275.56	680.64
State	1	Accessible Wilderness	200,404.86	495,000.00

ap. Martin, Physical Planning Division, Municipal Planning Department, Anchorage, Alaska

- Paths and Trails. There are currently approximately 322 kilometers (200 miles) of ski/bike paths within the Anchorage bowl area (municipal: bikeways, 67 kilometers [km] [42 mi.]; ski trails, 105 km [65 mi.]; snow mobile, 8 km [5 mi.]; sled dog trails, 48 km [30 mi.]; state: hiking/ skiing trails, 499 km [310 mi.]). An additional 161 km (100 mi.) are projected for construction through state and local development by 1982.

- Recreational Facilities. Most of the existing recreational facilities in the Anchorage area are owned and operated by the Municipality. A few exceptions would include one indoor ice rink and two roller skating rinks, three health

spa/handball court facilities, one curling gym, and many tennis courts, outdoor basketball courts, picnic areas, etc. A newly constructed YMCA houses a pool, a gymnasium, ball courts, and game areas. The University of Alaska, Anchorage will open a new physical education facility in the fall of 1978, some services of which will be available to the general public.

Additional recreational facilities available within the Municipality include those mentioned in table 20.

TABLE 20

MUNICIPAL RECREATION Facilities

Type of Facility	Number of Facilities
Hockey Rinks	4
Public Rinks[b]	92
Ski Hills	2
Sledding Hills	2
Snow Machine Areas	2
Tennis Courts[b]	60
Bowling Green	1
Baseball Diamonds	14
Outdoor Basketball Court	1
Golf Course	1
Softball Fields	10
Outdoor Volleyball Courts	2
Camper Parks	2
Football Fields[b]	9
Swim Beach	3
Swimming Pools	3
Soccer Fields	4
Boating Lagoon	1
Day Camp	1
Tracksb	9

[a] L. Penna, Municipal Park Planning and Design

[b] Anchorage School District maintains 82 free/hockey rinks, 33 tennis courts, nine tracks, and eight football fields.

- Libraries. There are currently six libraries located throughout the Municipality.

- Museums. The Municipality of Anchorage maintains the Anchorage Historical and Fine Arts Museum. In addition, there are two other privately owned and operated museums in town.

- Programs. Over 200 organizations, clubs, and agencies meet local leisure needs by providing a wide variety of recreational and cultural programs. Most are well supported and traditionally public and private providers have been able to service the public demands through expansion via fee for service or grant income. The nature of most such programs allows them to serve all or most who seek involvement. They are largely self-supporting through fees, donations, volunteer staffing, and fund raising.

  Of the more than 200 private clubs and organizations which offer local recreational programs, the following are among the most active in this community:

  - Girl and Boy Scouts
  - Camfire Girls
  - Little League
  - Boys and Girls Clubs
  - Y.M.C.A.

- Church Groups

Of the community-wide special events, the following six are most popular:

- Fur Rendezvous
- Anchorage Symphony Orchestra
- Alaska Repertory Theater
- Festival of Music
- Open Aire Pleasure Faire
- Friday at 8 Concerts

Other major municipal recreation programs include:

- Community Schools
- Summer Elementary Playground Programs
- Special Recreational Events for Handicapped
- Special Recreational Events for Senior Citizens
- Swimming Programs at School Pools
- Intermural Athletics
- Special Seasonal Activities and/or Events (i.e. dances, camping trips, Easter egg hunt, Christmas caroling, children's parade, July 4th celebration> etc.)

Planned Activities. The Parks and Recreation Division of the Department of Cultural and Recreational Services has proposed a number of activities within their capital improvements program.

- Library. Approximately $17 million will be spent through 1981 for a headquarters library which will house systemwide administrative services, centralized processing, and serve as a main library for the Municipality.

- Bike Trails. Approximately $14.5 million will be spent by 1984 on the development of Type I and II bike trails throughout the Anchorage area. Trail development is proposed for downtown/Fairview area, Inlet View/Turnagain area, Lake Otis, Sand Lake, South Anchorage, and the Spenard areas.

- Land Acquisition. Approximately $4.4 million are to be used for acquisition of more than 271 hectares (670 acres) of parkland throughout the Anchorage area.

- Park Development. Approximately $3 million will be targeted for park development including such activities as general upgrading, trails for handicapped and senior citizens, refurbishing community center facilities, paving recreation courts and parking lots, and developing picnic areas, greenbelts, and ball fields.

Current Issues. Germaine to any discussion of issues surrounding recreational development are the elements of feasibility and pertinent policy implications.

While it is true that existing use statistics describing available facilities and services may indicate a need for more parkland, ball fields, swimming pools, and community centers, achieving national norms for those and other facilities or services may not be desirable from a policy point of view. Constraints against movement to attain national standards for parks and other facilities throughout the Anchorage bowl area are as follows:

- high cost of acquisition;
- high cost of development and improvement to a usable state;
- high and increasing cost of maintaining public property;
- loss of prime property from development in a relatively land-locked area with limited expansion opprotunities.

Local decision-makers are repeatedly confronted with often incompatible alternatives for recreational, cultural, and other developmental activities.

- Operation Breakthrough. A private citizens' committee named Operation Breakthrough recently submitted to the Municipal Assembly a proposal for the development of the following recreational efforts:
  - development of one community and 38 neighborhood parks (to 1986);
  - installation of a major botanical display garden and arboretum;

    creation of a Public Lands Conservancy Foundation;

implementation of a parks interpretive program in all public schools;

construction of two new recreation centers in Muldoon and Sand lake;

completion of additional activities relating to bike, nature, ski, equestrian, sled dog, snow machine, physical fitness, and handicapped trails.

Many of the proposed acquisition and development activities are currently included in the Department of Cultural and Recreational Services Capital Improvement Program 1978-1983. Adoption of any of the proposed projects would significantly impact the Capital Improvement Program (CIP).

- Community Center Complex. Several studies (Human Resources Study and the Operation Breakthrough Report) indicate public support and community need for a comprehensive civic/recreational/sports center to serve Anchorage residents. The evolution of sports and arts programs and services provides a mandate for a suitable performance and activities center.

- Library. Another major issue being examined by the Department of Cultural and Recreational Services is the construction of a new neighborhood library in the Muldoon area. Municipal and community personnel are currently meeting to determine the optimum location, size, and feasibility of completing the

the library.

- Community Schools. Also under discussion is the direction and scope of the Municipality's community schools program. The program has grown from two to 16 schools within three years. Parks and recreation personnel, Community Schools Association members, and representatives from other interested groups (UAA, ACC, Federation of Community Councils, Anchorage Public School District, Municipal Planning Department) are currently in the process of developing a long-range plan for community schools. Inherent in this plan is the examination and definition of community education and a determination of the most desirable and cost-effective means of coordinating the provision of community education to the public (via Parks and Recreation, ACC, and Anchorage School District). The plan will provide a basis for decisions regarding further expansion of the program by creating new community schools.

Utilities.

Water. Water resources in Anchorage are tapped and distributed by three separate service providers. Anchorage Water Utility (AWU), under the Department of Enterprise Activities within the municipal government, is the largest of the utilities for public water supply. AWU obtains about one-half of its water from Ship Creek and the balance from high producing wells. The military bases provide water for their own distribution, utilizing Ship Creek as their main water

source. Central Alaska Utility (CAU), a private corporation, provides its customers primarily through a series of wells located in the southern portion of the Anchorage bowl. CAU interties with the AWU distribution system in times of water shortage.

Anchorage has abundant water resource potential, most of which is untapped and the water quality is very good. However, the impact of the trans-Alaska oil pipeline on Anchorage has placed a tremendous strain on the current service providers. In short, the utilities are barely meeting the demand for water on a year-by-year basis. Short-range plans are currently being implemented to offset this problem, and long-range solutions will be pursued after the release of a major study being conducted by the U.S. Army Corps of Engineers entitled Metropolitan Anchorage Urban Study (MAUS). The interim Stage Two Report of MAUS addresses the possible alternatives available to the Anchorage area in meeting future water demands. Table 21 lists these alternatives and capacities as well as what is presently developed.

TABLE 21

ALTERNATIVE WATER RESOURCESa

Resources	Capacity		Presently Underdeveloped Capacity	
	mldb	m g d c	ml d	mgd
Anchorage Bowl Wells (A&B)	83-125	22- 33	45- 87	12- 23
Anchorage Bowl Recharge/withdrawal (from aquifers) (A&B)	83-167	33- 44	87-129	23- 34

TABLE 21, continued

Resources	Capacity mld	Capacity mgd	Presently Underdeveloped Capacity mld	Presently Underdeveloped Capacity mgd
Ship Creek Off-stream Storage (C)	208-246	55- 65	178-216	47- 57
Ship Creek Dam (D)	208-284	55- 75	178-254	47- 67
Eagle River Wells (E)	114-227	30- 60[d]	114-227	30- 60d
Eagle River Dam (F)	757	200[d]	757	200[d]
Eklutna Diversion (G)	643-757	170-200	643-757	170-200

[a]U.S. Army Corps of Engineers, MAUS, Part V, Water, 1977
[b]Millions of liter per day
[c]Millions of gallons per day
[d]Estimates uncertain "

Figure 4 indicates the location of these proposals.

The MAUS, Stage II Report addresses the development of Ship Creek in detai 1. Ship Creek will undoubtedly play a very major role in meeting long-range water needs in the Anchorage area. The AWU also contends that other long-range developments such as Eagle River or the Eklutna Diversion will be necessary to supplement water sources derived from Ship Creek.

Assuming long-range development of Ship Creek is implemented, MAUS has proposed four plans of development. Details of these proposals can be found in the Anchorage Socioeconomic and Physical Baseline.

Table 22 correlates the four developments with the additional

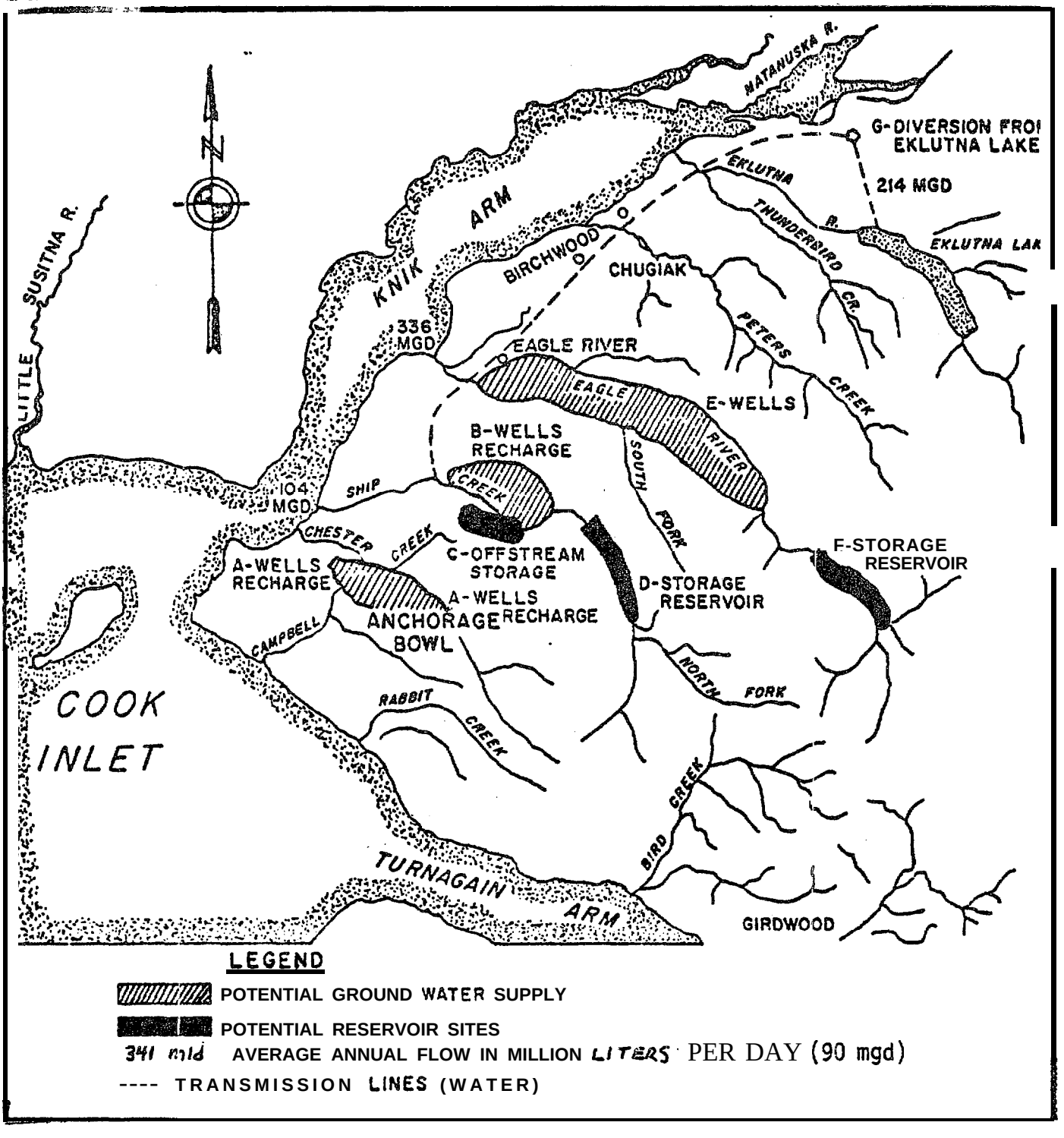


FIGURE 4

POTENTIAL WATER RESOURCESa

[a]Metropolitan Anchorage Urban Study, Part V, Water Supply

population that each can respectively accommodate. These figures approximate a 768 lpcpd (203 gpcpd) standard.

TABLE 22

SHIP CREEK DEVELOPMENT - FOUR PLANSa

Plan	Additional Population	mldb	mgdc
1	70,000	53.7	14.2
2	125,000	94.6	25.0
3	220,000	166.5	44.0
4	223,000	169.2	44.7

aU.S. Army Crops of Engineers, MAUS, Part V, Water, 1977
bMillions of liters per day
cMillions of gallons per day

It is important to note that no matter what type of major development occurs, one agency will probably be delegated to oversee the project(s) and most likely would act as a bulk water supplier selling water to the individual utilities on a wholesale basis. For the purpose of assessing the impact of future population growth, it is assumed that Ship Creek will be the priority of further development.

Sewer. Wastewater disposal in Anchorage is handled in one of two ways - either by on-site septic systems or through the Anchorage Sewer Utility under the jurisdiction of the Department of Enterprise Activities.

The chief of operations at the Anchroage Sewer Utility is planning for a high growth rate. To engage in planning, the utility is

utilizing a high density profile to ensure that adequate sewer lines are installed and primary treatment facilities as federally mandated, are adequate. Additional information on regulatory permits regarding sewage treatment facilities can be found in the Anchorage Socioeconomic and Physical Baseline.

Anchorage presently has one primary sewage treatment facility, the John M. Asplund Water Pollution Control Facility, located at Point Woronzof. The Pt. Woronzof plant is designed to handle 128.7 million liters per day (34 million gallons per day) of wastewater and is functioning most of the time at its full capacity. Through the municipal planning process - the CIP, expansion of the Pt. Woronzof plant is planned for 1979 and 1980. By 1985 depending on the development of the Anchorage bowl, further expansion would probably be necessary. Another 1985 alternative would be the development of a second sewage treatment plant in the south Anchorage area (Gorski, Community Contact, 1978c).

A particular case of community concern is the wastewater treatment procedure in the upper Hillside area. The procedure currently in use is on--site septic disposal. It appears that drainage fields in the upper Hillside areas are infiltrating into the lower regions' water supply resulting in potentially polluted water sources. Because of the prohibitive cost to the individual property owner and the desire to maintain a low density development in this area, sewer line extensions have never been instigated. However, future

planning will include this area because of the obvious health related problems (Ender, et al., 1978).

Two studies are underway which intertie with the quality of service and growth. The first study, conducted by Bomhoff and Associates, is the production of a master plan for sewer line expansion. Part of their task is to provide planning for line extensions throughout the Anchorage bowl. Bomhoff and Associates are designing plans through 1995 using a tentative population estimate of 376,000.

The second study addresses a rather serious problem of infiltration into the sewer lines. Estimates by the U.S. Army Corps of Engineers places the infiltration at 20 percent of the designed volume. The Anchorage Sewer Utility has recently awarded a contract for a sewer system evaluation study to work on offsetting this percentage (Ender, et al., 1978) .

Electricity. Chugach Electric Association, a cooperative, and Municipal Light and Power (ML&P), a municipally operated utility, provide electrical generation and distribution for the Anchorage bowl and south to Alyeska-Girdwood. The communities of Eagle River and Chugiak obtain electricity for Matanuska Electric Association, a cooperative, which purchases much of its power from Chugach Electric Association. The current generating capabilities plus the planned future installations of ML&P and Chugach Electric Association totals 1,542 megawatts (row) through 1986. The primary source of fuel

for both utilities is currently natural gas.

It is assumed that Anchorage will continue to prosper as an economic center for the state, that population will continue to increase, and that commercial/industrial development will undoubtedly expand requiring utilities to increase their generation capabilities to meet future demands.

To comply with pending federal legislation, it will be necessary to shift the fuel source away from natural gas to coal and/or oil fired plants. Because petroleum is a nonrenewable resource and the use of coal is comparatively more expensive, a move in this direction will have a cost-escalating effect on the rate structures of both utilities.

As noted above, petroleum fuel sources are nonrenewable and will only provide a partial solution to meeting long-range energy demands. Long-range demands will be met by a probable shift away from oil and gas to the use of coal and hydroelectric generation. In the long run, hydrogeneration should specifically prove cost-effective due to the renewable nature of the fuel source. Once construction costs of facilities are met, only operation and maintenance costs are affected, primarily through increased labor costs. One could assume that these costs would increase at the overall inflation rate.

One such proposal is the Susitna project, a series of four hydro-

electric dams proposed for the Susitna River. Only the first two of the series are currently under serious consideration and have produced much controversy. This is a costly project to build, and the demand for such a capital intensive project is questionable. However, the industry requires tremendous lead time to plan and build new types of generation facilities, and any long-range planning should include implementation of this project or similar proposals. Not only would the Susitna project help to provide sufficient power to maintain the current quality of life in Anchorage, but it would benefit communities as far north as Fairbanks. To not host such proposals would place Anchorage in a tenuous position for meeting future energy requirements. (For a complete description of planned generation facilities, see the Anchorage Socioeconomic and Physcial Baseline report.)

Telephone. The Anchorage Telephone Utility functions under the Department of Enterprise Activities within the municipal government of Anchorage. The purpose of the utility is to provide communication services for the Anchorage bowl.

The largest capital expenditure the utility must continually meet is the expansion of new services. Financing of expansion is through revenue bonds.

The utility was very hard hit during the tremendous impact of the trans-Alaska pipeline. The growth factor during the early 1970's

required massive line extensions throughout the Anchorage bowl to accommodate the expanding population. Even with this tremendous growth, the utility actually began improving the service quality by implementing a change to solid state switching equipment. Although this change is not completed, future installations of switching gear will be in this advanced technological form.

Since the utility has demonstrated its capabilities to cope with massive growth during a short timeframe as a result of the oil pipeline impact, accommodation of future expansion should not be a problem. Economically, as growth occurs and population density increases, there should be a positive effect on the utility's financial position. One line extension to serve many people obviously produces a better return in revenues than an extension serving very few when keeping the cost of the line extension constant. Therefore, increasing population will be a positive economic factor for this utility.

Solid Waste. Outside of the two military bases there is currently one sanitary landfill in operation for the Anchorage population. This sanitary landfill is presently the only method in use for the disposal of solid waste in the Anchorage area. Projections for the life expectancy of the current site places saturation at 1982. Prior to that time, the Department of Public Works, under the municipal government of Anchorage, will have to begin formal proceedings for acquisition of a new landfill site.

Table 23 indicates the projected annual solid waste tonnage for the Anchorage solid waste disposal service area from 1978 through 1995. (Anchorage sol id waste disposal service area excluded the communities of Eagle River-Chugiak to the north and Alyeska-Girdwood to the south.)

TABLE 23

PROJECTED SOLID WASTE TONNAGE[a]

Year	Projected Annual Tonnage[b] Metric Ton	U.S. Ton
1978	192,601	211,882
1979	247,363	224,853
1980	216,928	238,645
1981	234,405	257,871
1982	252,616	277,905
1983	271,796	299,005
1984	291,760	320,968
1985	312,166	343,417
1986	331,303	364,470
1987	351,021	386,162
1988	371,885	409,114
1989	393,152	432,511
1990	415,633	457,242
1991	440,633	484,745
1992	467,017	513,770
1993	493,960	543,410
1994	522,361	574,655
1995	551,620	606,843

[a]Department of Public Works, Request for Proposal - Resource Recovery
[b]Municipality of Anchorage including military bases

Between 1978 and 1995 there will be an increase of 186 percent in the volume of solid waste generated. To accommodate this increase, the tentative selection site for the new landfill has a projected life expectancy of at least 50 years. In addition, mechansims for reduction

of the volume of solid waste going into the sanitary landfill are currently being studied and implemented. The first is a milling (shredding) operation facility which is under construction and due for completion in May 1979. This wil 1 reduce the volume of solid waste entering the sanitary landfill by an estimated 30 percent. Under joint consideration by the Municipality of Anchorage and the military is the feasibility of using the combustible milled wastes as a possible fuel source for power generation. If this process could be implemented, the reduction in volume into the sanitary landfill would be 60 to 65 percent.

Since the amount of suitable land within the Anchorage area is limited, the above introduction of solid waste reduction measures should greatly benefit in the acquisition of the new landfill site.

Housing

The total housing stock of Anchorage metropolitan area stood at 60,483 in July 1977. This is estimated to have increased by 65,423 by July 1978. This includes 4,154 units located on the two military reservations. Within the civilian stock, 52.3 percent are single family units, 38.2 percent are multifamily, and 10.8 percent are mobile homes. About 40 percent of the developed land is used for residential purposes. In 1975 the civilian housing used 4,705 hectares (11,627 acres) of developed land out of a total 12,344 hectares (30,501 acres). Vacant land totaled 17,683 hectares (43,694 acres) in 1975.

The housing stock increased rapidly in the 1970's to cope with the high demand of the oil pipeline boom. An estimated 12,426 permits were issued between January 1970 and October 1977 for single family units. Another 13,117 multifamily permits were issued, and an estimated 1,326 mobile home units were established. This activity was insufficient to cope with the rapid population growth, especially in 1975 and most of 1976, as the vacancy rate dipped to one percent in the summer of 1975. The growth did, however, increase the capacity of the housing industry. Between 1975 and 1977 the number of units constructed has been above 4,000. This had included a variety of types including single family, duplexes, townhouses apartments, and mobile homes. There has been a trend to increase the multifamily stock at a faster rate than single family housing. As table 24 shows this trend has increased in recent years.

TABLE 24

RECENT HOUSING STOCK ADDITIONS

Civilian Housing	% of Stock July 1977	% of Stock Added 1/70-10/77	% of Stock Added 1/75-10/77
Single Family	52.0	46.2	40.1
Multifamily	37.0	48.8	53.3
Mobile Home	11.0	4.9	6.6
	100.0	99.0	100.0

Issues. There are four issues which could effect the housing industry's future. The first is the capacity of the industry to cope with demand during rapid growth periods. This would not appear to be a problem. With the industry's capacity presently above 4,000 units a

year and a majority of the unemployed 'in occupations which could support expansion of the residential construction industry, there appears to be little problem in meeting future projected growth patterns. The problem may be the reverse in that more of the units are being built by larger contractors, who are trying to achieve economies of scale. If growth trends turned downward, this could severely impact this approach to residential construction.

The second issue is financing and the related problem or rising costs. Housing is expensive and was increasing at one and one-half percent per month during the pipeline construction period. Even now, new construction costs are continuing to rise at a rate at or above the general cost of living. The cost of materials promises to escalate as both international factors (reduced cutting in the lumber industry is expected to raise costs) and local factors (the phasing out of the gravel industry in the bowl should have serious inflationary effects) push costs up. This is linked to continuing high labor costs and the problems are obvious, especially in providing moderate and low income housing. The swing factor presently is the relative prosperity in the community which has pushed household income high enough so that a relatively large proportion of the family units can afford home ownership. Seventy-eight point six percent of the four person households are above the Department of Commerce's intermediate budget for Anchorage. In addition, 49.7 percent are above the highest family budget. The effect of this prosperity is seen in the differential vacancy rate comparing vacancy

rates in single family homes to multifamily units. Specifically units in May 1978 had a vacancy rate of 1.3 percent, while civilian multifamily units had 9.3 percent. This suggests that builders still have problems meeting all single family housing demand, while apartment units are presently overstocked.

This suggests the third issue involving differential demand. Attitudinal data noted in the Anchorage Socioeconomic and Physical Baseline and vacancy information both point to ownership and specifically the single family house as the most preferred housing style. The trend has clearly been toward fewer single family units and more multifamily units. While the reasoning is cost, the market may not be able to absorb new units of which a majority are multifamily, when the natural demand is occuring in the single family unit. An unbalanced market (too few single family and a surplus of multifamily) is especially true if the affluence of the community continues to improve or at least holds its own. Presently, per capita income is $10,377. Even with cost of living adjustments, the per person average living Power is $1,200 to $1,900 above the U.S. urban average. This income structure only improves the demand structure for the single family home.

If the planners and builders are unable to market a greater proportion of new stock as multifamily, this will result in a marked increase in the land removed to residential land use. The Anchorage Comprehensive Plan estimated that only 1,473 hectares (3,639 acres) would be added

to the amount of developed residential land between 1975 and 1995. In 1975 there were approximately 47,943 civilian housing units in Anchorage on 4,705 hectares (11,627 acres) of land producing a ratio of 4.12 units per 2.47 hectares (acre). The Comprehensive Plan also forecasted a 204,294 increase in population between 1975 and 1995 which would result in an estimated new 64,243 units. This would bring the density ratio to 7.35 units per 2.47 hectares (acre). This is a 78 percent increase in housing density. All of this density increase is expected to occur in the older portions of the community as older single family homes are replaced. This would include areas from Spenard to Government Hill and east to Mountain View and North Muldoon, plus a strip along east Tudor. To accomplish this, a disproportionate share of all new construction would have to be multi-family housing (an unlikely event).

The problem is that if these patterns occur, the social and economic divisions within the community would be exacerbated along geographic lines. The heterogeneity of the Anchorage area may produce aesthetically difficult land use problems, but does minimize a ghetto mentality both for the affluent and the poor. While increasing density of residential land use may provide certain economies of scale, especially in the utilities field, but it would tend to increase service needs in the areas of public safety, recreation, and public health.

The opposite problem is the limited land space in the basin. If the

density patterns were retained, 6,220 additional hectares (15,369 acres) would have to be brought into residential land use. This would cut the 1995 projected vacant land pool by one-half from 9,599 hectares (23,719 acres) to 4,852 hectares (11,989 acres). The vacant land would be effectively exhausted before the year 2010 assuming no additional use over that projected in any other land use category. The conclusion is that some increase in density will occur (or continue to occur), but it will occur at the rate suggested by the Comprehensive Plan.

Health

As the major center for provision of primary (early detection and routine care), secondary (acute, emergency, and critical care), and tertiary (specialized, highly technical care) health care, Anchorage maintains a delivery system based upon local and statewide health needs. As such, a description of the services encompassed by the system reflect a variety of socioeconomic phenomena occurring throughout the state.

Major factors which contribute to the atypical, local health profile are 1) the youth and relative good health of the population, 2) the relatively high percentage of employed persons and subsequent high rate of third party payments for health care, 3) the availability of ambulatory and out-patient services, 4) the lack of a senior citizen population in proportion to the total area population, and 5) an intense review procedure for ensuring that equipment, facilities, and services within the system are based upon needs.

The local health care delivery system is presented according to the following categories:

- Manpower
- Facilities
- Services
- Issues

Manpower. Medical manpower in Anchorage falls short of meeting public demand. Table 25 illustrates the numbers of physicians, dentists, and nurses available through private, public health and military sources.

TABLE 25

AVAILABLE MEDICAL MANPOWER

	Private	Public Health	Military
Physicians	209	46	49
Dentists	100	20	5
Registered Nurses	895	118	65

Severe shortages exist in specialized practices (obstetrics, pediatrics, and general dental surgery). Such shortages allow Anchorage to qualify as a Medically Underserved Area (MUA). Criteria for eligibility are discussed in the following section.

- Medically Underserved Area Designation. Section 1302 (7) of the Public Health Service Act, as enacted through Public Law 93-222, provides that the Secretary of Health, Education, and Welfare (HEW) may designate as medically underserved those

areas or population groups, both urban and rural, with a shortage of personal health services. The medically underserved designation is determined through use of an Index of Medical Underservice (IMU). The IMU for Anchorage is calculated by applying a weighted value to the factors of 1) infant mortality rate, 2) ratio of primary care physicians, 3) percentage of the population over 65, and 4) percentage below poverty income levels.

Table 26 illustrates the factor calculations used for Index of Medical Underservice for the Anchorage area.

TABLE 26

FACTOR CALCULATIONS FOR IMU Designation

Infant Mortality Rate

$$\frac{\text{No. infant deaths (1,350)}}{\text{No. live births (15,075)}} \times 1{,}000 \times \text{factor weight} = 13.1$$

Primary Care Physicians/Population

$$\frac{\text{No. of Physicians (77)}}{\text{Population (195,200)}^{b}} = 0.385\text{x factor weight} = 10.7$$

Population Over 65

$$\frac{\text{No. over 65 (4,290)}}{\text{Population (195,200)}^{b}} = 2.2\% \text{ x factor weight} = 20.2$$

TABLE 26, continued

FACTOR CALCULATIONS FOR IMU Designation

Population Below Poverty

$$\frac{\text{No. below poverty (28,000)}}{\text{Population (195,200)}^{b}} = 14\% \times \text{factor weight} = 17.4$$

IMU Score

Factor 1	13.1	
Factor 2	10.7-	
Factor 3	10.1	
Factor 4	17.4	
Total	61.4	Median IMU: 62.0

anchorage Health Services Plan, 1977
[b]Population figures used in original calculation

The median IMU for all of the United States counties in 1975 was 62.0. Anchorage with an IMU of 61.4 in 1976 was designated by HEW as a Medically Underserved Area.

Anchorage medical manpower resources-also include approximately 22 public health nurses and seven home health care personnel who extend medical services into the community through home visits, neighborhood clinics, and telephone follow-up consultations.

Facilities. The availability of a relatively broad spectrum of health care facilities and services in Anchorage is due to the city's isolation from other larger metropolitan centers and to the role the city plays as the center for service delivery for the entire state.

Table 27 illustrates the numbers of beds available under the categories of acute, intermediate, and long-term care.

TABLE 27

NUMBER OF BEDS AVAILABLE AND LICENSED IN ANCHORAGE FOR ACUTE, INTERMEDIATE, AND LONG-TERN CARE[a]

	No. Beds Available	No. Beds Licensed
Acute	840[b]	701[b]
Intermediate	100	100
Long-Term	200	200

[a]Anchorage Health Services Plan, 1977
[b]Includes native and military hospitals

Anchorage residents and other Alaskans also have access to the following health care facilities:

- psychiatric Institute (200 beds)
- substance abuse facilities (199 beds)
- neighborhood health center
- municipal health department clinics and dispensaries (family planning, V.D., early periodic screening, WIC, immunizations, etc.)

Services. The scope and quality of local available health care parallels and often exceeds that provided by "outside" communities of comparable size. The inability of the local system to serve the needs of the resident is rapidly becoming myth. While difficult to

document, increasing numbers are seeking critical and comprehensive care in Anchorage as opposed to going "outside" for help. In addition to standard services and capabilities found within the manpower and facilities mentioned above, the delivery system also provides:

- Acute Care
  - 1. A head and full body computerized axial tomography (C.A.T.) scanner at Providence Hospital;
  - 2. A head C.A.T. scanner at Alaska Hospital;
  - 3. A full burn unit and de-briding room at both hospitals;
  - 4. The leading expert in the U.S. on hypothermia, Dr. Mills;
  - 5. A comprehensive orthopedic surgical and therapy unit;
  - 6. A neurosurgeon;
  - 7. Two of three neurologists practicing in the state;
  - 8. Comprehensive critical care unit in both hospitals;
  - 9. Comprehensive neo-natal unit at both hospitals; and
  - 10. Open heart surgical ability.

- Ambulatory Care (public sector only)
  - 1. Free well child examinations, 8 weeks old to 24 months (33 children per month per well child clinic)
  - 2. Early periodic screening (80 referrals per month)
  - 3. Veneral disease treatment and counseling (600 visits per month)
  - 4. Family planning services (450 contacts per month)

- 5. Nutritional aide and food purchase assistance (316 contacts per month)
- 6. Home health care visit (240 visits per month)
- 7. Battered persons centers (75 contacts per month)
- 8. Public health centers (580 visits per month)

In addition, federal, state, local public and private dollars are used to support a number of substance abuse and mental health services including outpatient therapy, counseling, crisis lines, rape and assault counseling, group homes, facilities and services for developmental and emotional disabilities, and pastoral counseling.

Issues. Issues which further characterize the Anchorage health care delivery system are discussed below. The two most critical and subsequently more thoroughly explored issues are local acute care bed need, as it relates to cost containment, and the incidence and trends for substance abuse. Secondary issues, including 1) low income, z) elderly, 3) mental health, 4) native, 5) handicapped 6) abused persons, 7) health demographics, and 8) communicable diseases, are discussed in depth in the Anchorage Socioeconomic and Physical Baseline report.

- Local Acute Care Bed Need. The cost of inpatient (acute) care in Anchorage is determined by examining the total number of beds available and current bed utilization rate (days per 1,000 population) in light ofa desirable occuapncy rate

(85 percent) to yield the number of beds needed at specific levels of population.

Anchorage currently has 470 beds available and uses them at an occupancy rate of 59 percent. The daily maintenance cost of each empty bed is $364. As the occupancy rate of an acute care facility decreases, the cost to maintain each empty bed increases. Therefore, given a stable incidence of use, adding to the supply of beds causes higher maintenance and subsequent consumer costs. To compensate hospitals and physicians may be inclined to require longer stay than a patient truly requires. Longer stay requires using additional ancillary services and resultant increases in third party payor claims. As claim values increase, insurance firms tend to increase premiums to offset costs. And unfortunately, the cost increase spiral begins to adversely affect the consumer's budget.

The projected result of construction of a proposed 125 acute care bed hospital is a decrease from 59 percent to 48 percent occupancy which increases the cost of an empty bed from $364 to $849. Proportionate increases would occur in other related costs.

Conversely, increased use of existing facilities which would occur as a normal effect of population growth would increase

the occupancy rate and, in turn, decrease the real cost of the remaining empty beds.

Current available beds should adequately serve normal population growth for at least ten years. Supplementing acute care beds will be the growth of noninstitutional care alternatives, i.e. short-term noncritical care units, 12 to 24 hour surgi-centers, more intermediate and restorative care units, and additional home health care and nursing services.

- Substance Abuse. Alcoholism and alcohol abuse are recognized by most in the community as the number one health and safety problem in Anchorage.

Estimates of 13,183 problem drinkers, 2,000 habitual public inebriates, and 400 "street" inebriates underly the lack of confidence that local resources are sufficient to solve or deal with the problem.

Major efforts of the Salvation Army as major service provider have yielded only a "revolving door" maintenance program rather than a true curative based approach.

The Municipality of Anchorage Health Commission and Department of Health and Environmental Protection are currently developing a comprehensive treatment program based upon educational,

prevention, and treatment activities. Treatment will incorporate in-take, referral, rehabilitative, and follow-up activities, along with cooperative efforts with the judicial system.

Facilities and services for an estimated 2,000 drug addicts correspond in scope and adequacy to those for alcoholism and alcohol abuse. While several private, nonprofit drug rehabilitation programs and homes exist, treatment and counseling needs for this segment of the population are far from being met.

Social Services

Social services delivery in the Anchorage area is provided predominately by field offices of the state and federal government. A limited scope of services is also provided by the local municipal government as well as select private agencies and organizations.

Federal-State Coordination for Service Delivery. The Alaska Division of Social Services and select federal agencies have signed memoranda of agreement to facilitate coordination of the following services:

- Office of Aging with Division of Pioneers' Benefits (Alaska's Pioneers Home and the Longevity Bonus Program);
- Division sponsored children's services with Criminal Justice

Planning Commission, Department of Education, Department of Community and Regional Affairs as well as private children's service providers;

- Division of Public Assistance with Division of Vocational Rehabilitation, Department of Education, and Employment Security Division, Department of Labor;
- Division of Social Services with the Divisions of Public Health and Public Assistance to coordinate delivery and insure compliance to regulations for family planning services.

Local Social Services Availability. The Municipality of Anchorage provides the following types of social services to Anchorage residents:

- Children's services,
- Senior citizens' assistance,
- Employment assistance,
- Income assistance
- Housing assistance
- Youth services

Each of the following sections discusses th'e current type of assistance available according to the six categories listed above. For a more in-depth discussion in each area, refer to the Anchorage Socio-economic and Physical Baseline report.

- Children's Services. A combination of state, federal, and

local funding is used to support the following children's services:

Service	Type of Assistance
AFDC	Economic
Alaska Children's Services	Residence-Counseling
Family & Children's Services - Eagle River	Counseling
Anchorage Head Start	Pre-school
State Day Care Assistance	Economic Counseling

Based upon existing studies and service inventories, it appears that the Anchorage area is deficient in three major areas relating to children's services. They are:

- Inexpensive, quality day care for working families;
- Inexpensive family and child counseling;
- Long-term and intermediate care facilities for children with severe development disabilities.

Limited economic assistance for day care and health care is available through a variety of local programs which offer cost deferment and/or reduction based upon economic need, such as:

- 45 licensed day care centers;
- 120 licensed day care homes;
- 4,700 early periodic screening conferences;

- 678 well child examination/immunization clinics.

Psychiatric and family counseling services are provided by many private mental health clinics and churches as well as most of the public agencies listed above. Other local ancillary services include Anchorage School District's Whaley Center, providing psychological evaluation and diagnosis as well as an early childhood day school program for 115 educationally handicapped children. The municipal health department provides sudden infant death counseling through individual and small group conferences.

- Senior Citizen's Assistance. The cost of maintaining a satisfactory lifestyle is the major problem for Anchorage residents over 60 years of age. As needs for inexpensive housing, medical care, transportation and recreation become satisfied, the number of seniors leaving Alaska will decrease. This trend toward an increasing percentage of the population over 60 years old will in turn create greater availability of senior assistance benefits.

Financial and housing assistance for seniors is available as indicated below:

- Adult Public Service - economic aid and rent subsidies;
- Alaska Longevity Bonus - economic aid;
- Pioneer's Home Program - residential facilities.

- Employment Assistance. Employment training and job placement are provided by the Alaska Department of Labor's Job Service Center and federal programs under the Comprehensive Employment Training Act 1974 (CETA). Additional assistance is provided by eight other organizations listed below. Over 10,325 persons were served by these organizations during 1976-77 fiscal year.

  - Alaska Skill Center
  - Work Incentive (WIN) Program
  - National Alliance of Businessmen
  - Young Adult Conservation Corps
  - Youth Employment Service
  - Vocational Rehabilitation Center
  - Union Apprenticeship Programs
  - University of Alaska, Anchorage, Educational Opportunity Center

- Income Assistance. Table 28 illustrates types of services provided by the Alaska Division of Public Assistance and Cook Inlet Native Association (CINA), Division of Social Services; assistance was given to over 27,000 persons in the 1976-77 fiscal year. This figure does not include unemployment payments as those figures are confidential. However, with a local unemployment rate of 8.4 percent, based upon the 1976 population of 185,179, approximately 15,555 persons were served through unemployment insurance

claims.

TABLE 28

INCOME ASSISTANCE SERVICES AVAILABLE

TO ANCHORAGE RESIDENTS

Service	Type of Service
Alaska Division of Public Assistance	Food stamps General relief Medicaid Unemployment
CINA Social Services	Financial assistance Counseling

- Housing Assistance. Local housing assistance involves establishing rent schedules for low rent housing and providing limited amounts of rent subsidies for qualified recipients. The most critical issue in this area is the lack of sufficient numbers of low cost housing units. There are currently 300 low cost units with additional subsidy payment available to 554 people.

- Youth Services. Five agncies listed below were the major providers of services to over 1,500 youth and families during the 1976-77 fiscal year. Assistance takes the form of crisis, family, individual, career and legal counseling with limited residential care available.
  - Alaska Superior Court
  - Alaska Youth Advocates

- CINA - Shisagvik and Youth Services
- Family Connection
- Hilltop Group Home
- Youth Manpower Services

Cost of Services. The most critical issue in the delivery of social services is the cost of the delivery system. Recent growth patterns and resultant service demands have management inefficiencies which, in turn, decrease the cost effectiveness of service delivery. The lack of a social services delivery plan causes providers to be largely reactive rather than goal directed. The costs of state and federally funded programs are high. Estimated costs for statewide services shown below reveal a high cost-per-service unit (Alaska Dept. of Health and Social Services, 1978).

TABLE 29

ESTIMATED COSTS FOR STATEWIDE SERVICES

Services	# Served	cost	Cost/Unit
Information and referral	2,500	$ 944,000	$ 378
Individual and family counseling	500	502,000	1,004
Child protective services	4,500	10,284,000	2,285
Adult protective services ,	650	1,198,000	1,843

Locally financed social services operate under the same constraints as federal and state systems, facing the unpopular alternative of increasing taxes or reducing some portion of service delivered to the public.

Transportation

Current planning efforts in the transportation arena are based on the ongoing Anchorage Metropolitan Area Transportation Study (AMATS) ten year plan. The AMATS plan is currently based on a review of the 1995 land use plan as proposed by the Comprehensive Plan and the completion of an extensive land use inventory (Municipality of Anchorage, 1977d). The AMATS plans are designed to not only upgrade the existing road network and transit plans but propose a recommended long-range program.

It is important to note that presently certain areas within the Anchorage area are plagued with heavy traffic congestion. The corridors providing access to the central business district and the industrial areas of Ship Creek are currently at capacity. This problem is enhanced by the geographic location of the area which is in the far northwest corner of the Anchorage bowl. In addition, commercial strip development along heavily travelled arterials in Anchorage is one of the most expensive problems in the area, both from the taxpaying public and businessman's standpoint. This type of commercial development has led to a very costly replacement of two once vital arterials. The irony of this process is that the very commercial establishments which contributed to the problem also suffered from 70ss of traffic which now bypass their front doors (Ender, et al., 1978).

Time slippage in construction of new roads is also visibly evident. If this trend continues, scheduled long-range plans will suffer from time lags in the construction process and will place the transportation sector

behind in accommodating a growing population.

In addition, a problem of auto emissions has developed and 15 areas within the Anchorage bowl have been identified as potentials for exceeding the National Ambient Air Quality Standards (nine parts per million of carbon monoxide through an eight hour period). (Municipality of Anchorage, 1977d)

To address transportation issues and plan for future population growth, the AMATS Recommended Long-Range Plan consists of three elements: 1) a roadway network, 2) a mass transit goal, and 3) a set of transportation policies. Incorporated in the plan is a general summary statement: "The proposed facilities improve the safety and capacity of the overall roadway network, extend existing streets into newly developing areas, and link primary employment centers to residential areas. There is a minimal amount of new roadway construction under this plan.) (Municipality of Anchorage, 1977d, p. 29) By 1995 the proposed facilities include four freeways or freeway extensions, 20 major arterials, and 25 minor arterials.

As an adjunct to the proposals under the recommended plan, a short and long-range mass transit plan have been devised to better accommodate public needs, reduce dependency on the automobile, assist in energy conservation, and improve air quality. Presently, the ridership is at .6 percent; however, the long-range goal calls for a fleet of 540 buses by 1995 and an increased ridership to 14.4 percent of all person

trips. (Ender, et al., 1978)

An alternative plan in the area of mass transit is the feasibility of a light rail system along the Alaska Railroad. This plan is now under study and any commitment to this mode would occur in the near future. If implemented, the light rail system will ultimately provide transportation from Wasilla to Portage.

As noted in the overview of infrastructure standards on transportation an additional problem that will need to be addressed in implementation of the above proposals is the cost factor and the level of deficit spending that will ultimately be encountered. Attainment of alternative sources of revenue is a must in meeting the above long-range transportation goals.

Additional detailon issues and short and" long-range planning can be obtained in the transportation section of the Anchorage Socioeconomic and Physical Baseline.

Financial Capacity and Capital Requirements

The size, complexion, and role of local government in the Anchorage bowl has changed commensurately with the growth of the area. Beginning as a tent city for railroad construction, Anchorage incorporated in 1920 and grew through population increases and annexation until unification with the Greater Anchorage Area Borough in 1975. The Borough had been established in 1963 by state mandate to provide areawide service to the region.

Using different fiscal years, the new Municipality ran parallel budgets and took the first two years to integrate the various services and develop the management systems necessary to monitor the fiscal process.

In 1976 the City of Anchorage expended $26,952,689 and generated revenues totaling $27,216,539. In 1974-75, the Greater Anchorage Area Borough spent $104,970,430 and took in $108,303,042 (this included schools which constituted 61.2 percent of the budget). The 1978 budget was the first unified budget for the Municipality. Expenditures of $89,551,710 were authorized and revenue of the same amount were projected (see table 30). Traditional services of police, fire, road maintenance, etc. make up the largest expenditure categories. Local property taxes make up the majority of revenues (56 percent), but state and federal sources are an increasingly important component (29 percent).

TABLE 30

1978 APPROVED BUDGET DISTRIBUTION OF

REVENUES AND EXPENDITURES[a]

Revenue Distribution By Source	Amount	Percentage
Taxes	$50,175,350	56%
Local Sources Other - than Taxes	11,077,590	13
State Revenues	19,782,620	22
Federal Revenues	6,539,340	7
Fund Balance	1,967,810	2
Total	$89,551,710	100%

TABLE 30, continued

Distribution of General Funds Expenditures	Amount	Percentage
Police	$16,352,740	18%
Fire	12,866,950	14
Streets & Drainage Maintenance	10,669,160	12
General Services	8,393,790	9
Health & Environmental Services	5,737,020	7
Parks & Recreation	5,654,660	6
Transit	4,039,140	5
Debt Service - General	'2 ,749,980	3
Library	2,792,460	3
Planning	2,767,180	3
Building Safety	2,233,040	3
Emergency Medical	2,137,890	2
Solid Waste	1,402,400	2
All Other Services	11,755,300	13
Total	$89,551,710	100%

[a]Municipality of Anchorage, 1978 Annual Operating Budget

Issues.

- Local Government Revenue Capacity. Local government revenue capacity is finite in terms of the legal limits and the willingness of the taxpayer to accept increased taxation. Presently, Anchorage local government receives the majority of its local revenues from the property tax. The assessed value of all taxable land in the metropolitan area was estimated to be $4.19 billion in 1978. Using both the areawide and service area concept, the mill levy varies in relation to the services delivered. Spenard, Sand Lake and Muldoon have the highest levy (18.53 mills) with the old city following at 18.28 mills. Less densely populated areas which do have

services such as police, fire, road maintenance, etc. have lower levies. Eagle River is 13.18 mills, Chugiak is 11.09 mills, and Rabbit Creek-Oceanview is 15.93 mills.

These differential rates will produce an expected $40,633,330 in real property taxes in 1978. This excludes property tax (6.98 mills) revenues dedicated for public schools. Other local tax sources include personal propertyandmotel/hotel taxes. Under the present tax system, the real property tax has the best chance of expanding to produce sufficient local tax revenues in the future. The latest projection of property tax projections suggest a pattern of sharp growth over the next seven years (see table 31). This increase comes from new construction and the additional value of real property due to inflation.

TABLE 31

1978 TO 1984 ESTIMATE OF ASSESSED VALUES[a]

Year	Estimate
1978	$4,800,000,000
1979	5,525,000,000
1980	6,900,000,000
1981	7,850,000,000
1982	8,800,000,000
1983	10,000,000,000
1984	11,000,000,000

[a]G. McKee, Statistics of Anchorage Assessed Value of Real and Personal Property, 1978

The implementation of annual revaluation of property is the main cause for adjusting these estimates over those made as late as fall. Personal property value is also expected to increase from $833,115,460 in 1978 to $1,675,781,250 in 1983. Projecting local capacity past 1984 is speculative, but the no growth scenario suggests a slowdown of the upward trend after 1987. It would be reasonable to suggest property valuation would follow this pattern. How high the tax can rise on residential property before the taxpayers react negatively is difficult to say. Legally, the local government has a 30 mill limit at 100 percent valuation. However, the inflationary increase in Anchorage property valuation could cause the property tax ceiling to occur well below the legal limits. Also, the market could force values into a slower rate of growth, if housing costs continue to rise beyond the capacity of those who want to buy. This, of course, would effect revenue. However, all indicators are that property tax revenue will continue to grow rapidly at least through mid-1980's.

- Local Tax Alternatives. If present local tax mix becomes insufficient for meeting future revenue needs, other alternatives are available. The Municipality, a Mayor's ad hoc group, the Operation Breaktrhough Committee, and others have looked at various revenue alternatives including sales tax, income tax, user's taxes, assessment districts, etc. The most

discussed options are a gas user's tax to pay for road improvements and a sales tax suggested for both general revenues or specific purposes, such as a civic center.

A number of groups have recommended various sales taxes. Estimated revenues from a one percent sales tax, exempting food and medicine to remove the regressive problems of the tax, is shown in table 32. A three percent tax in 1978 would generage $23,304,000 in revenues. This is about 57 percent of the real property tax projections in 1978. The major impediments to this alternative is its controversy within the electorate. While a plurality selects the sales tax as the preferred tax for additional reveneus, there are about as many bitter opponents as backers of the option.

TABLE 32

ESTIMATE OF SALES TAX REVENUE

Year	1% Sales Tax Revenue
1977	$6,998,000
1978	7,768,000
1979	8,622,000
1980	9,570,000

- Revenue Sharing. Intergovernmental transfers constitute an important source of revenue for the Anchorage Municipality. In 1978 it is estimated that 29 percent of the budget will be paid by state and federal dollars. Federal dollars

(seven percent) will continue to be important, especially with Anchorage's designation as a depressed area (because of its high unemployment). It is unlikely, however, that federal contributions will grow faster than the total budget.

State revenues, on the other hand, have greater potential. With massive resource potential, the state will have a substantial capacity for revenue sharing in the coming years. The 1977 legislature did pass a state bill of relief of school construction debt service payments. Up until now, category grants have been the approach for state revenue sharing. There is a bill in the present Legislature which would change the approach to a general grant formula approach. Municipal evaluation suggest that Anchorage will be hurt by this approach as it is weighted against Alaska's only urban area.

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Bonding. Bonding for capital outlays is an integral part of the Municipality's approach to financing. Presently, $394,105,005 of debt is carried by local government ($330,537,987 will be outstanding as of December 1978). Twenty percent are for roads and drainage projects, 6.8 percent for port facilities, and 63 percent for utilities (with about one-half of this being telephones). In 1978 $29,726,425 will be paid out in principal and interest

payments. Most is paid out of user fees or assessments, but about three percent of the general expenditures also go to debt service.

Presently, the two major sources for bondable projects are the Municipality's Six Year Capital Improvements Program (CIP) and Operation Breakthrough. The former has developed roughly $60 million in bonding proposals over the life of the program. These include areas such as transportation, culture and recreation, public works, and sewer. In 1978 $13,403,000 in bonds are scheduled for voter review. Operation Breakthrough has made an ambitious proposal to have the government make the largest single capital investment in history. Their proposals would at a minimum double the Municipality's nonutility indebtedness. The group is asking for $126,000,000 in bonds to be placed on a 1978 ballot. A companion bill was submitted to the state legislature to share in the cost with an additional $126,000,000. Projects include a civic center, regional library, park acquisition, and municipal office building (Hunter, 1978). The cost of servicing just $126 million (though the state legislature did not seriously consider this proposal at least in this session) would be $10,875,000 a year. This is 12.1 percent of the estimated 1978 budget. Without major additional financing, this would be impossible. This could mean a 1.5 percent sales tax or a two mill increase in real property tax. State

support, at this time, has failed, and it appears that voters will have an opportunity to vote on a mix of CIP and Breakthrough proposals piecemealed over the next several years.

- Changing Demand and the Rising Cost of Government. One of the most difficult issues to quantify is a two-bladed sword. First, survey and census analysis suggest that the character of the community is changing. The population has increased with a greater proportion of new residents whose expectations for government services are greater than long-time residents. The demand for services, both in type and scope, has increased in recent years. While the basis of public safety, roads, schools, etc. are strongly preferred, even amenities or nontraditional services are given majority support. The perceptions of what the government's role is have increased to a more expansive one. If this trend continues, the problems of balancing revenue with expenditures would become serious.

  The second edge is the rapid rise in service costs. General inflation, expanded services, and rapid unionization of most employees have tended to move costs steadily upward. Unification has taken more than two years, but now the Municipality is probably in the best poistion it ever has been in to manage the costs of government. This required a slow and not easy task of establishing a financial management system, which only now is providing the information necessary for good fiscal planning.

Impact Assessment

SIGNIFICANT 'FACTORS AFFECTING CHANGE

Change in the Anchorage non-OCS base case is incremental rather than overwhelming. The factors affecting change are the primary components of the model forecasting growth. They are noted generally in the introduction chapter and include the relationship between the internal dynamics of the local economy and the fact that Anchorage is the center for much of the economic activity in the state and that occurring in other regions. Anchorage's size should continue the trend toward an increasing concentration of the state population and economy in its largest city.

Assumptions, Methodology, and Results: Non-OCS Scenario

In evaluating the service impacts of the non-OCS scenario, the following assumptions were made:

- The migration patterns of the Anchorage population begins to slow in the 1980's leading to a decline in transiency and creating a slightly older population over time. This could have an effect on a number of services. In police, this could decrease the need for services and ultimately affect the ratio of the force to the total population. For school enrollments, it could increase the real number of school children in the system by maintaining the relative population of school age children in the population to approximately current levels.

- Factors, indicators, and corresponding variables which may affect standards generated to assess the effect of future population growth are contained in the overview of infrastructure standards by service category and, where applicable, are described in detail under the description of services likely to be impacted.

- Population density will continue to increase in the Anchorage bowl . This factor will place an increased demand on existing services and will undoubtedly stimulate expansion of services to accommodate the density. Increased demands could pose problems in meeting transportation requirements, water requirements, and other services deemed necessary to accommodate a growing population. A rational "land use policy may also become difficult. Population density seems to be directly correlated with the crime profile. As density increases, the demand for police services could increase.

- Technological advances that will occur during the period under consideration will be primarily concentrated on the expansion and improvement of known technologies. In addition, new technologies are not expected to effect the status of Anchorage as the focus of economic activity and development in the state. These technologies are not expected to alter the present distribution patterns of goods and services, especially in the transportation sector.

OVERVIEW OF THE ASSUMPTIONS, METHODOLOGY AND RESULTS - NON-OCS BASE CASE

The following basic assumptions were made in forecasting employment and population in Anchorage in the non-OCS case:

- Employment more than doubles during the base period with the most rapid growth experienced during the construction of the ALCAN gas line.

- Growth is a result of state expenditures increasing personal income, increasing demand for local products, and Anchorage's role as the financial, distributional, and administrative center for the rest of the state account for continued concentration and healthy growth.

- The structure of the economy prevents seasonality from bearing an important problem compared to other parts of the state.

- Since population growth is tied to employment, Anchorage is expected to increase its share of the state population from 42 percent in 1977 to 56 percent in 2000.

- Beginning in the mid-1980's the rate of population will basically weaken.

- Personal income in Anchorage experiences growth above other regions in the state.

Tables 33 and 34 show the growth and structure of the Anchorage economy to the year 2000 under the assumptions of the non-OCS base case.

TABLE 33

BASE CASE GROWTH OF ANCHORAGE ECONOMY - 1977-2000[a]

Year	Population	Total Employment	Personal Income[b]
1977	169,704	82,752	$1,568.56
1978	178,166	83,200	1,626.21
1979	183,832	86,742	1,790.62
1980	194,636	94,178	2,093.61
1981	205,468	98,363	2,308.42
1982	212,561	97,299	2,350.92
1983	218,881	99,726	2,520.34
1984	226,590	102,963	2,730.33
1985	234,393	106,942	2,986.72
1986	240,447	109,817	3,212.04
1987	244,764	111,484	3,395.37
1988	246,582	112,553	3,560.22
1989	250,617	114,733	3,787.27
1990	254,910	117,490	4,050.72
1991	260,327	120,833	4,360.86
1992	265,097	124,059	4,676.54
1993	271,092	128,139	5,055.18
1994	276,490	132,138	5,445.28
1995	283,070	136,744	5,891.92
1996	289,277	141,555	6,369.37
1997	296,892	147,193	6,923.64
1998	304,282	153,216	7,525,87
1999	313,361	160,346	8,233.04
2000	322,608	168,310	9,026.04

[a]MAP Regional Model
[b]Millions of dollars

TABLE 34

STRUCTURE OF THE ANCHORAGE ECONOMY - BASE CASE[a]

1980, 1990, 2000

	1980		1990		2000	
	#	%	#	%	#	%
Mining	1,009	1.1	1,009	.9	1,009	.6
Construction	5,971	6.3	7,101	6.0	10,392	6.2
Manufacturing	1,895	2.0	2,100	1.8	2,100	1.2
Transportation	5,182	5.5	5,896	5.0	8,772	5.2
Trade	18,733	19.9	25,511	21.7	41,490	24.7
Finance	4,405	4.7	7,013	6.0	13,084	7.8
Service	14,416	15.3	23,598	20.1	45,847	27.2
State & Local Gov't.	11,981	12.7	13,882	11.8	12,738	7.6
Federal Government	22,100	23.5	22,100	18.8	22,100	13.1
Other[b]	8,486	9.0	9,280	7.9	10,778	6.4

[a]MAP Regional Model
[b]Includes agriculture, communications, public utilities, and other

RESULTS OF ANALYSIS

Reviewing the existing service infrastructure, the following additional needs for education, public safety, leisure activities, utilities, housing, health and social services, transportation, and financial capacity are seen to be required to the year 2000 in the case of a non-OCS scenario.

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards section, table 35 displays the projected student population through the year 2000, number of teachers required, and number of classrooms necessary to accommodate the projections in the non-OCS case of five year intervals. The data reflected in Table 35 are cumulative.

TABLE 35

TEACHER AND CLASSROOM NEEDS - NON-OCS CASE

Year	Projected Student Population	Total No. of Teachers Required	Total No. of Classrooms Required	% of Change
1980	38,927	1,557	1,557	--
1985	46,879	1,875	1,875	20.4
1990	50,982	2,039	2,039	8.7
1995	56,614	2,265	2,265	11.0
2000	64,521	2,581	2,581	14.0

Postsecondary and Career-Vocational Training. Based on the assumption that the well established Anchorage Community College (ACC) has reached its optional penetration of the population, maintaining a four percent share of the population would be reasonable. Conversely, the University of Alaska, Anchorage (UAA) has grown rapidly since its establishment and should continue growing faster than the normal population as it moves toward a four-year university model and programs are improved and expanded. Table 36 projects the student body of the two institutions. The second possibility is that the potential of a

greater number of full-time students could raise the credits for students in the coming years. This should occur more within the university model and raise its credits per student from 4.3 to 6.0 credits over the next two decades. This would mean over 77,000 credit at UAA and 70,000 credits at ACC. This represents almost a four-fold increase in credits at UAA and about a 50 percent increase at ACC.

Private university and career/vocational training programs have not been projected. Issues discussing their role in postsecondary education can be found in descriptions of services to be impacted section and the Anchorage Socioeconomic and Physical Baseline.

TABLE 36

PUBLIC POSTSECONDARY STUDENT ENROLLMENT PROJECTIONS

Year	Non-OCS Base Case Population	UAA Student Population	UAA Credits[b]	ACC Student Population	ACC Credits[d]
1980	194,636	4,866	20,972	7,785	42,039
1985	234,393	7,032	35,160	9,376	50,630
1990	254,910	8,412	46,266	10,196	55,058
1995	283,070	10,191	61,146	11,323	61,144
2000	322,608	12,904	77,424	12,904	69,682

aBased on an increasing percentage of the population of students from 2.5 percent in 1980 to 4.0 percent in 2000.
bAn increase from 4.31 credits per student to 6.0
cSteady four percent rate through 2000
dSteady 5.4 percent credits per student

Public Safety

Police. Using the current ratio of police to the total population

served, table 37 indicates the cumulative number of police required for five year intervals beginning in 1985. At that time, it is assumed that areawide police enforcement will be in effect for the entire Municipality. The standard ratio is 1.52 sworn police officers per 1,000 in the population.

TABLE 37

CUMULATIVE RATIO OF POLICE TO THE POPULATION - NON-OCS CASE[a]

Year	Projected Population	No. of Sworn Officers	% of Change
1985	234,393	356	--
1990	254,910	387	8.7
1995	283,070	430	11.1
2000	322,608	490	14.0

aIt is assumed that areawide police expansion will not be in effect until the early 1980's.

As of March 1978, the Anchorage Police Department employed 163 sworn officers. Under the above assumption of areawide police expansion, the force will increase 201 percent by the year 2000. Variables which may influence the above figures are listed in the overview of infrastructure standards section and discussed in detail in the description of services likely to be impacted section.

Alaska State Troopers. Table 38 depicts the cumulative increase in the number of commissioned officers necessary to meet the population projections under the non-OCS case. The standard in use is .15 commissioned officers per 1,000 in the population.

TABLE 38

CUMULATIVE MANPOWER REQUIREMENTS OF ALASKA STATE TROOPERS - NON-OCS CASE

Year	Population Projections	Cumulative Manpower Requirements	% of Change
1980	194,636	29	--
1985	234,393	35	20.7
1990	254,910	38	8.6
1995	283,070	42	10.5
2000	322,608	48	14.3

Over a 22-year span, the Alaska State Troopers will realize a 66 percent increase in the force. The time span is' long enough, however, to absorb 19 additional commissioned officers.

Fire. Using the current ratio of fire department personnel to the total population, table 39 indicates the cumulative manpower requirements necessary to accommodate the population projections for the non-OCS case. The ratio is 1.47 fire department personnel per 1,000 in the population.

TABLE 39

CUMULATIVE MANPOWER REQUIREMENTS OF FIRE DEPARTMENT PERSONNEL - NON-OCS CASE

Year	Population Projections	Cumulative Manpower Requirements	% of Change
1980	194,636	286	--
1985	234,393	345	20.6
1990	254,910	375	8.7
1995	283,070	416	10.9
2000	322,608	474	13.9

If the ratio of 1.47 remains constant, the department could realize a 65.7 percent increase between 1980 and the year 2000. However, much is contingent upon such factors as land use patterns, population density, and waterflow requirements as noted in the section on overview of infrastructure standards.

Leisure

The following projections are provided in relation to population increases under the non-OCS scenario.

Recreation Facility Needs. Utilizing the standards established by the National Recreation and Park Association, table 40 indicates the cumulative requirements based upon population growth as projected under the non-OCS scenario.

TABLE 40

CUMULATIVE RECREATIONAL FACILITY NEEDS - NON-OCS CASE

Facility	Existing	1980	1985	1990	1995	2000
Play Lots	37	77	93	101	113	129
Neighborhood Parks	12	19	23	25	28	
Softball	24	65	78	84	94	1;;
Basketball	300+	389	468	509	566	645
Swimming Pools	5	19	23	25	28	32
Skating Rinks	46	6	7	8	9	10
Community Centers	5	8	9	10	11	12

- Swimming Pools. While the Anchorage area falls considerably short of achieving the established standard for numbers of pools per population, it is unlikely that the number would

ever reflect that standard. The most efficient means of constructing a pool is within the design of a larger complex, such as a school or recreation center. Recreation centers with high admission costs to the consumer have a relatively limited clientele; junior and senior high schools and other public facilities will never exist in numbers sufficient to facilitate achieving the "pool standard".

- Skating Rinks. The Anchorage area currently exceeds the recommended level of ice skating rinks. However, the existence of only one indoor rink, now used more than ten hours a day, severely limits the skating activities available to and demand by the public. Clients of the indoor arena indicate that demand for facilities would support at least one additional indoor rink.

- Community Centers. Although Anchorage maintains and uses five community centers, demands far exceed present service capabilities. Operation Breakthrough, a volunteer community study group, has suggested the need for and proposed construction of a large cultural/recreational/sports complex to serve the entire Anchorage area. If built as proposed, the center, although a single structure, would facilitate achievement of a service level equal to that implied in the standard.

Activities. Art activities and other culturally related events are governed by no specific standards. However, historically, such activities are very well attended. Citizen surveys and attitude poles reflect a high degree of interest in and desire for greater number and varieties of both participatory and spectator events.

The Anchorage Historical and Fine Arts Museum, while seemingly used to its capacity during the summer tourist season (700± average daily attendance), has the potential to serve considerably greater numbers in the winter (200± average daily attendance). The museum served over 100,000 people in 1977. Off-season services include weekly children's programs, guest lecturers, films, etc.

The demand for creation of community schools arises from the neighborhood level when an identified group is ready to support a program with volunteer service. There are currently 16 community schools serving approximately 15,337 (1977) men, women, and children of the Anchorage area (Municipality of Anchorage, 1978).

Parkland. Utilizing the recommended standard of devoting approximately 25 percent of a city or planned area to parks, wilderness, or open space, the Anchorage area currently exceeds the recommended total as displayed in table 41.

TABLE 41

AVAILABLE PARKLAND ACRES COMPARED TO

RECOMMENDED STANDARD ACREAGE

	Square Kilometers	Square Miles
Total Anchorage Area	4,403	1,700
Suitable Habitation Area	622	240
Actual Parkland Available[a]	3,274	1,264
Recommended Stardard	1,101	425

available as parkland, wilderness, and open space

If open space and wilderness areas are excluded, however, there are approximately 45.3 square kilometers (sq. km) (17.5 square miles [sq. mi.]) of usable parkland in the above area. Achieving the additional 84.2 sq. km (32.5 sq. mi.) of parkland needed to meet the established standard may not be feasible due to the nature and location of available land and the long-range need/projections for development of that land. Local decisions regarding the highest and best use of available lands may preclude attainment of the national standard in this area. Public sentiment and spiraling cost may require an increasing proportion of local budgets to be spent on parkland development, maintenance, and the acquisition of equipment as opposed to acquisition of additional land.

Utilities

Water. The 1978 non-OCS case projections place the Anchorage population at 178,166. Currently, the total water production for

all utilities is 106.7 million liters per day (mld) (28.2 million gallons per day [mgd]), excluding private ground water resources in use. Assuming Ship Creek will be the priority of development to meet additional demands for water, Plan I, as described in the Anchorage Socioeconomic and Physical Baseline, would provide a diversion which would accommodate an additional 71,000 people. The implementation of this plan would provide sufficient water resources through 1980 based on the non-OCS population projection of 194,636, Plan II builds on Plan I and can provide water resources for an additional 125,000 people or 94.6 mld (25.0 mgd). The combination of Plans I and II for the development of Ship Creek will be sufficient to provide water needs through the year 2000 under the projections in the non-OCS case. Table 42 depicts this development.

TABLE 42

PROJECTED WATER DEMANDS AND FACILITIES - NON-OCS CASE

Year	Non-OCS Population Projections	Projected Consumption (768 lpcpd)[a]		Current Production Plus Projected Plans for Ship Creek	
		mld	mgd	mld	mgd
1980	194,636	149.5	39.5	160.5	42.4[b]
1985	234,393	180.2	47.6	255.1	67.4[c]
1990	254,910	195.7	51.7	255.1	67.4[c]
1995	183,070	217.6	57.5	255.1	67.4[c]
2000	322,608	247.9	65.5	255.1	67.4[c]

[a]Equivalent to 203 gallons per capita per day
[b]Current production plus Plan I
[c]Current production plus Plan II

The Metropolitan Anchorage Urban Study (MAUS) population projections

differ significantly from the non-OCS projections. Their estimations indicate that the combination of Plan I and Plan II would only suffice through 1990 at which time additional development of Ship Creek or other alternative water resources would have to be tapped.

Sewer. As noted in the description of services likely to be impacted section, line extensions for the Anchorage sewer system are being gauged for a tentative population of 376,000 by 1995 in the Anchorage bowl . In addition, the utility is planning for a high rate of growth to avoid the costly problem of paralleling sewer lines. The primary sewage treatment plans for expansion are correspondingly geared toward this high growth rate. Using the per capita standard, as described in the overview of infrastructure standards, of 613 liter per capita per day (lpcpd) (162 gallons per capita per day [gpcpd]), the non-OCS projected wastewater generation for the year 2000 would be 198.0 mld (52.3 mgd). Line extensions and planned primary treatment expansions will be able to accommodate approximately 230.5 mld (60.9 mgd) based on the tentative population estimate of 376,000. The resultant is the non-OCS case population forecasts will have no impact on the existing municipal sewer utility planned expansions. The only problem which might occur would be in the area of construction/installation time delay. If implementation of planned installations are hindered, the overall effectiveness of the system would be of major concern.

Electricity. It is assumed that population growth in Anchorage will fall mostly under Chugach Electric Association's service territory since the majority of the area served by Municipal Light and Power (ML&P) has been developed. Although Chugach Electric will feel the most direct impact of future population growth, ML&P will be indirectly impacted due to corresponding expansion in their commercial/ industrial service sector and redevelopment of areas around the central business district to a higher density urban profile.

It is Important to note that both utilities are planning for 'increased commercial/industrial development, but the character of this type of growth is speculative. As noted in the overview of infrastructure standards section, no quantifiable standard can be generated that correlates demand for power with population growth. The following qualitative standard is offered to assess population growth through the study period. If current plans and implementation can be carried out in a timely manner, the utilities should be able to meet future electrical requirements of the non-OCS case. If obstacles such as environmental impact problems, time slippages in construction, or mandates from federal legislation regarding the use of fossil fuels produce time slippages in planned developments, Anchorage could be faced with power shortages during peak demand periods for many years to come.

As a sidenote to the above, much of the planning for growth within the municipal government of Anchorage is based on the population

forecast in the comprehensive plan. The 1995 forecast in the comprehensive plan (372,081) exceeds the non-OCS population projection for the year 2000 (322,608) by 15.3 percent. This municipal forecast is generally considered to be at the lower range of the spectrum of a number of forecasts available. Although population projection is only one of several elements which determine the demand for power, it is a vitally important one.

Telephone. As noted in the description of services likely to be impacted, "since the utility has demonstrated its capabilities to cope with massive growth during a short time frame as a result of the oil pipeline, accommodation of future expansion should be be a problem. Economically, as growth occurs and population density increases, there should be a positive effect on the utilities' financial position. One line extensions to serve many people obviously produces a better return in revenues than an extension serving very few, when keeping the cost of the line extension constant." Therefore, population projections under the non-OCS case will be a positive economic factor for this utility. No other impacts resulting from population growth are identified.

Solid Waste. With the introduction of new sanitary landfill techniques and assuming the site targeted for the new sanitary landfill is obtained as described in the description of services likely to be impacted, growth projections for the non-OCS case will pose no impact in the management of solid waste.

Housing

Table 43 notes the projected housing demand under the non-OCS scenario. Between July 1978 and 2000, 42,807 housing units would be necessary for the projected growth rate. The building program would slow from the 1977 peak, exceeding 4,000 units to about 2,600a year through 1985. Between 1986 to 1995 about 1,400 units a year would be needed. This would increase to over 1,600 units a year from 1990 to 1995 and 2,600 units a year after 1995. Considering the present capacity of the housing construction industry, this would bea significant downturn in output. The 1986 to 1990 period would be especially difficult. Even with the possibility of replacing old units which leave the market, this is unlikely to add more than 250 to 275 units a year (an optimistic thought, since past patterns never exceeded 100).

TABLE 43

PROJECTED HOUSING DEMAND - NON-OCS BASE CASE

Year	Non-OCS Case Population Projections	Cumulative Units Required[a]	% of Change
1980	194,636	65,297	--
1985	234,393	78,635	20.4
1990	254,910	85,518	8.8
1995	283,070	95,145	11.3
2000	322,608	108,230	13.8

[a]Based on a 3.1 persons per household plus an assumed four percent vacancy factor.

Assuming a building program favoring multifamily over single family units, about about 8,296 hectares (20,500 acres) of land would be in use for

residential purposes by the year 2000. While the housing industry would be able to handle any of the demands under this scenario, the slack in the industry could aggravate the already serious unemployment problems in the construction and laborer occupations.

Health Services

The following projections of need are provided in relation to the existence of the non-OCS case.

Acute Care Bed Need. Using the local standard of 560 inpatient days per 1,000 population at 85 percent occupancy, projections for acute care bed need are as follows:

TABLE 44

PROJECTED ACUTE CARE BED NEED - NON-OCS CASE

Year	Bed Need	% of Change
1980	376	--
1985	453	20.5
1990	493	8.8
1995	547	11.0
2000	624	14.1

There are currently 470 beds licensed and approximately 840 beds actually existing (but not all currently licensed}. Adequate acute care beds exist to serve the projected population through the year 2000, providing licensure of all available beds is possible. This projection will remain even more secure as 1) additional

noninstitutional care alternatives emerge (neighborhood clinics, additional long, intermediate and custodial care providers, etc.), 2) the local population grows older, 3) those currently seeking medical care outside Alaska recognize the scope and availability of the existing system, and 4) the facility occupancy rates extend beyond 85 percent of the facilities' available beds.

Ratio of Physicians to Population. In 1977 the primary care physician to population ratio was .385 per 1,000 in the population. Any level above .4 primary care physicians per 1,000 population no longer qualifies as a medically undeserved area. Optimum ratio for the nation is one physician per 800 population. Based upon those ratios, the number of Anchorage area primary care physicians would have to increase as indicated below:

TABLE 45

PROJECTED PRIMARY CARE PHYSICIAN NEEDS - NON-OCS CASE

Year	Physician Need	% of Change
1980	243	--
1985	292	20.2
1990	318	8.9
1995	353	11.0
2000	403	14.2

These increases might be slightly offset by the following factors:

- 1) the number of non-Anchorage recipients of health care,
- 2) the number of transient seasonal residents utilizing

primay care physicians,

- 3) the number of existing physicians who leave Anchorage.

Special Service Needs. While no attempt has been made to project the number of alcoholics and alcohol abusers over the next 22 years, one can assume that the level of abusers will remain proportionately the same. Increased program efforts (including increasing amount of targeted state and federal dollars) may be effective in relieving ' the "street inebriates" problem and may also contribute to the decline of alcohol realted crimes. However, the predominant causes for alcohol abuse will likely remain, e.g. remoteness, long dark winter syndrom, unemployment, cultural incompatibility, etc.

As the number of long-term, intermediate and residential care units grow (offering lower cost care than acute care facilities), the proportion of acute beds available for true acute care will increase. Such a focus will help hospitals justify need for and subsequent acquisition of modern equipment and service 'units. For example, recent successful efforts by both civilian non-native hospitals to justify addition of a head and full body computerized axial tomography (c. A. T.) scanner. The result will be an emergence of the sophistication of the Anchorage health care system.

Social Services

There are no nationally accepted nor locally adopted quantifiable standards for levels of social services delivery. Therefore, a discussion of impacts

on the system relative to projected scenarios can only indicate trends based upon appropriate assumptions. The following analysis assumes a degree of stability in local socioeconomic characteristics. Given no major new high impact project occurring within the state, service demand ought to increase at a rate consistent with current growth levels. The ability of federal, state, and local government to serve greater portions of the population in need will depend predominantly on efficiencies of management and increased legislative interest, resulting in significant higher dollar appropriations.

The greatest impact on available social services will come as a result of two factors: 1) the continuing transiency of the population and resultant population turnover and 2) the increasing influx into Anchorage of natives and other residents from elsewhere in the state. Examining past trends since the pipeline, it appears that approximately 40 percent "of the Anchorage population turns over every. three and one-half years. Pipeline and seasonal workers complete their jobs, remain in Anchorage seeking additional employment, raising the unemployment rate, drawing unemployment insurance, and ultimately either take work or depart the state. As they leave, they are replaced by equal numbers of the same type of worker.

As Anchorage grows and lifestyles throughout the state's smaller cities and villages change, increasing numbers of native Alaskans will seek residence in Anchorage. Generally nonskilled and minimally educated people may seek employment, income, and housing assistance raising the level of need for those services.

Based upon population trends since the wind-down of the oil pipeline, the Anchorage population growth should stabilize at about 3.5 to four percent per year. At that rate, the normal increases in social services funding by local, state, and federal sources should consistently maintain the current level of services. One may anticipate, however, proportionally greater numbers of state dollars being allocated for social services as agencies and interest groups become more effective lobbyists.

Major impacts of the existing level of growth will occur in demands for unemployment assistance, child care assistance and day care services, and low income housing. In addition, as the health care system becomes more sophisticated, the need for closely related social services such as rehabilitation, counseling, and other socio-psychological assistance will be needed. Table 46 illustrates projected increased levels of service for areas of need based upon the annual population growth rate required in the non-OCS case.

TABLE 46

CUMULATIVE GROWTH IN SELECTED SOCIAL SERVICE AREAS - NON-OCS CASE

Year	Day Care	% of Change	Unemployment Assistance	% of Change	Low Income Housing Units	% of Change
1980	2,919	--	12,651	--	3,017	--
1985	3,515	10.4	15,235	10.4	3,633	20.4
1990	3,823	8.8	16,569	8.8	3,951	8.8
1995	2,246	11.0	18,399	11.0	4,396	11.3
2000	4,839	14.0	20,969	14.0	5,000	13.7

Transportation

The population projections for the non-OCS case fall 89,011 people below the 1995 estimates used for transportation planning. This would suggest that goals sought by the plan would meet or exceed the transportation needs of the population of the scenario. The weakness lies primarily in the possibility that the Anchorage Metropolitan Area Mass Transit Study (AMATS) plan will not be fully implemented. Also, if the transportation plan is designed to meet present and future needs, the lag time required to complete the various segments will mean that the needs will always exceed the systems capacity.

The greatest concern must be that if any major portion of the long-range plan fails to be developed, the impact on the system will probably be severe. The potential for this to occur is high because of the revenue projection shortfalls and the fact that high transit estimates are not tied to a strong distinctive program. If anything, the plan is a well thought out effort to provide for reasonably good auto access but would reduce the viability of a strong transit system.

Financial Capacity and Capita? Requirements.

The municipal government views growth as beneficial to the maintenance of an adequate tax base. Predicting the capacity of local government depends on a dozen critical factors. Some include:

- The economy must continue to grow at a strong rate. The Municipality's estimates of revenue, growth of the population, and

commercial/industrial sectors are on the optimistic side. A slow-down of the economy could cripple local government's capacity to meet rising service demands. The short-term estimates appear to support the Municipality's forecasts and the economy should continue to grow rapidly until the mid-1980's. The non-OCS scenario does project a measurable slowdown in growth from about 1987 to 1997. If this occurred, local government would have to revise its long-term forecasts and adjust its expenditure patterns to cope with a slower revenue growth.

- The Municipality will have to continue a conservative pattern of fiscal responsibility. Other jurisdictions have found that government cannot provide for every human want. As demands for human services eventually rise, a measured amount of restraint will be necessary to forestall future fiscal problems. A massive bond obligation or inflationary employee contract would seriously impact municipal figures if (or when) the economy slows down.

- Intergovernmental transfers will most likely become a larger portion of local government expenditures. This will on the one hand increase Anchorage's fiscal capacity, but also increase their dependency on another decision-making level that may not share the Municipality's perception of the community's needs. Historically, state and especially federal government action fund very expensive and complex programs as a demonstration only to expect the local area to pick them up after a few years.

In summary, it appears that municipal economic predictions may be too high from the late 1980's to 1997. Rapid expansion of services now could be caught in a revenue bind within ten years. Presently, the Municipality in embarking on a very ambitious capacity projection study which should place the government in a much better position to plan for the future. Despite the potential future pitfalls, it appears that the Municipality will have the long-term financial management capacity to deal with them.

CAUSE/EFFECT OF IMPACTS

In the case of a non-OCS scenario, impacts on local government facilities and services will be related to economic and population growth. From a review of the Anchorage service infrastructure, a basic array of usual urban services are presently in place and functioning. Their quality varies and deficiencies are recognized and noted for each.

The effects of impacts in the case of a non-OCS scenario are not expected to be severe. Most plans for future service provision is for population estimates much higher than the scenario. Concern will arise only if present plans and target dates are not met in a timely manner. This is especially critical in some of the utilities. It appears that the transportation system will encounter difficulty in implementing their plans in an expeditious manner which could mean a long-term problem in this area.

PROBLEMS/ISSUES AFFECTING THE ANCHORAGE INFRASTRUCTURE AND MUNICIPAL DELIVERY SYSTEMS

The primary issue facing Anchorage is whether the pace of economic growth and expansion is sufficient to maintain and operate service systems and at the same time expand them to meet new population growth. The weakening of the growth pattern in the mid-1980's could cause financial problems for local government and have negative effects on their long-term fiscal capacity. The major problem then could occur for the lack of expansion or the slowing of expansion below the rate anticipated by municipal planners.

Another issue tying together most of the services discussed is the finite availability of land in the Municipality. Geological and public land restrictions make it very possible that land not be available in sufficient quantities to meet the housing and public service requirements of the population. While this is not expected to occur before the end of this century, its preliminary effects are being felt even now.,

SUMMARY OF INPACTS

The following matrix displays the services likely to be impacted through the period under study. Where quantifiable, standards exist to assess service needs; the actual figures generated are listed in the matrix. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifiers are discussed in the respective sections on overview of infrastructure standards and description of services likely to be impacted.

NON-OCS CASE

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	194,636	234,393	254,930	283,070	322,608
Education: Primary/Secondary - No. of Manpower/Facilities	1,557	1,875	2,039	2,265	2,581
Public Postsecondary - No. of Credits	63,011	85,790	101,324	122,250	147,106
Public Safety: Police - Manpower		356	387	430	490
State Troopers - Manpower	29	35	38	42	48
Fire - Manpower	286	345	375	416	474
Leisure: Play Lots	77	93	101	113	129
Neighborhood Parks	19	23	25	28	32
Softball Diamonds	65	78	84	94	107
Basketball Courts	389	468	509	566	645
Swimming Pools	19	23	25	28	32
Skating Rinks	6	7	8	9	10
Community Centers	8	9	10	11	12
Utilities: Water - (Millions of Gallons per Day)	39.5	47.6	51.7	57.5	65.5
Sewer - (Millions of Gallons per Day, Wastewater Generated)	31.5	38.0	41.3	45.9	52.3
Electricity					
Telephones					
Solid Waste[a]					
Housing: Units	65,297	78,635	85,518	95,145	108,230
Health: Bed Needs	376	453	493	547	624
Primary Care Physicians	243	292	318	353	403
Social Services: Day Care Space	2,919	3,515	3,823	4,246	4,839
Unemployment. Claimants	12,651	15,235	16,569	18,399	20,969
Low Income i-busing Units	3,017	3,633	3,951	4,396	5,000
Tranportation[a]					
Financial Capacity and Capital Requirements[a]					

[a]See section on Overview of Infrastructure Standards

III. PROJECTED IMPACTS OF OCS DEVELOPMENT - CAMDEN-CANNING SCENARIO

Introduction

All but a small fraction of oil and gas development on community facilities and services in Anchorage will be indirect. As the service center of the state, Anchorage will experience increases in population. The timing of the impacts are important in that Anchorage is expected to incur a downturn in the economy under the non-OCS case at the time Camden-Canning scenario begins to have significant effects on the community. While additional services will be required, the community will generally have the fiscal capacity and lead time to cope with the demands.

COMMUNITY POPULATION AND EMPLOYMENT FORECASTS

Forecasts of population in a Camden-Canning OCS scenario for Anchorage were made by the Institute of Social and Economic Research (ISER). The additional population, employment,. and personal income (measured as change from the non-OCS case) is shown in table 47. Table 48 shows the industrial distribution of the additional labor force due to the Camden-Canning scenario.

TABLE 47

CAMDEN-CANNING SCENARIO TOTAL ECONOMIC IMPACT - ANCHORAGE, 1979-2000[a]

(measured as change from the base)

Year	Population	Tots 1 Employment	Personal Income[b]
1979	0	0	0.000
1980	0	0	0.000
1981	167	116	3.574
1982[c]	573	349	11.691
1983	790	459	16.257
1984	940	495	18.327
1985	941	489	18.509
1986[d]	1,256	725	28.876
1987	2,263	1,515	63.325
1988	4,147	2,913	126.951
1989	5,017	3,003	136.136
1990[e]	7,352	4,025	191.755
1991	8,763	4,451	219.719
1992	10,344	4,897	251.719
1993	11,468	5,231	278.781
1994	12,914	5,966	328.184
1995	14,251	6,605	375.441
1996	14,655	6,528	383.387
1997	15,802	7,207	436.953
1998	16,465	7,412	464.512
1999	17,346	7,915	512.203
2000	18,689	8,841	590.742

[a]MAP Regional Model
[b]Millions of dollars
[c]Exploration begins
development begins
[e]Production begins

TABLE 48

INDUSTRIAL DISTRIBUTION OF CAMDEN-CANNING EMPLOYMENT IMPACT[a]

(measured as changes from the base)

	1985		1989		2000	
	Employment	%	Employment	%	Employment	%
Mining	11	2.2	34	1.1	107	1.2
Construction	25	5.1	163	5.4	445	5*O
Trade	132	26.9	939	31.3	2,499	28.3
Services	134	27.3	937	31.2	3,479	39*4
Finance	38	8.0	262	8.7	930	10.5
Transportation	39	8.0	295	9.8	587	6.6
State and Local Government	90	18.4	255	8.5	531	6.0
Other[b]	10	4.1	118	3*9	263	3.0

[a]MAP Regional Model
[b]Includes public utilities, communications, and other

Identification of Impacts

The overview of infrastructure standards and a description of regional and community services likely to be impacted are contained in the non-OCS section of this report.

Impact Assessment

SIGNIFICANT FACTORS AFFECTING CHANGE

The same factors identified in the non-OCS scenario are anticipated to

to affect change in the case of all the OCS scenarios.

OVERVIEW OF THE ASSUMPTIONS, METHODOLOGY, AND RESULTS

The same assumptions as were made in the non-OCS scenario are also made in the case of the OCS scenarios except that, with increased population, the fiscal capacity of the local government to provide community facilities and services should improve with the size of the OCS scenario even though the service levels also increase. However, the timelines of implementing service plans also become more critical the larger the OCS scenario impacts.

RESULTS OF ANALYSIS

The following requirements for community facilities and services in the case of this OCS scenario relate only to additional needs above and beyond the non-OCS case. That is, they are facilities and services which will be required solely because of the added increase in population derived from OCS activities.

Telephone utilities will not be discussed because the impact will be negligible or positive. Solid waste is also not treated because no significant impact is foreseen. The issues facing these services are discussed in the non-OCS base case.

Education

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards, table 49 displays the projected student population through the year 2000, number of teachers required, and number of classrooms necessary to accommodate the population projections for the Camden-Canning scenario in five year intervals. The date reflected in table 49 are cumulative.

TABLE 49

ADDITIONAL TEACHER AND CLASSROOM NEEDS - CAMDEN-CANNING SCENARIO

(cumulative)

Year	Non-OCS Teachers/ Classrooms Population	Additional Projected Student Population	# of Teachers/ Classrooms Required	Total # of Teachers/ Classrooms Required	% of Change
1980	1,557	0	0	1,557	0
1985	1,875	188	8	1,883	
1990	2,039	1,470	59	2,098	2:;
1995	2,265	2,850	114	2,379	5.0
2000	2,581	3,738	150	2,730	5.8

Public Postsecondary and Career/Vocational Training. Table 50 projects the additional public postsecondary student credit hours expected to occur under the Camden-Canning scenario. The overall effect is expected to be modest in its impact on the resources of higher education. No standards were developed for private college or vocational/career education.

TABLE 50

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC HIGHER EDUCATION

UNDER CAMDEN-CANNING SCENARIO

(cumulative)

Year	Non-OCS Credits Projected	Additional Credits Under Camden-Canning	Tota 1 Credits projected	% of Change
1980	63,011	0	63,011	.0
1985	85,790	344	86,134	.4
1990	101,324	2,922	104,246	2.9
1995	122,290	6,156	128,446	5.0
2000	147,106	8,522	155,628	5.8

Public Safety

Police. The impact of the Camden-Canning scenario will be a modest one on the demand for police services. Using the ratio of 1.52 sworn police officers per 1,000 in the population, table 51 indicates the cumulative manpower requirements necessary to accommodate the Camden-Canning development scenario. A total cumulative column is offered as a means to compare the impact of this propsed scenario with the non-OCS case.

TABLE 51

CUMULATIVE POLICE MANPOWER REQUIREMENTS OF CAMDEN-CANNING SCENARIO

COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Camden-Canning Additional Manpower Requirements	Total Sworn @ l S ! l -	% of
1985	356	1	357	0.3
1990	387	12	399	3.1
1995	430	22	452	5.1
2000	490	29	419	5.9

Alaska State Troopers. Table 52 compares the cumulative manpower requirements for this scenario to those generated under the non-OCS case. The standard in use is .15 commissioned officers per 1,000 in the population.

TABLE 52

CUMULATIVE ALASKA STATE TROOPERS MANPOWER REQUIREMENTS

CAMDEN-CANNING SCENARIO COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Camden-Canning Additional Manpower Requirements	Tots l Force	% of Change
1980	29	0	29	.0
1985	35	0	35	.0
1990	38	1	39	2.6
1995	42	3	45	7.1
2000	48	3	51	6.3

It is conceivable that sometime between 1990 and 2000 the force could increase from one to three commissioned officers. However, the increase rather minimal indicating minor impact on this agency.

Fire. The Camden-Canning development scenario will add manpower to the Anchorage Fire Department on an incremental basis. The current ratio of 1.47 fire department personnel is used in assessing the manpower requirements for this scenario. Table 53 compares the cumulative manpower requirements of the scenario to the non-OCS case using the above ratio as the standard.

TABLE 53

CUMULATIVE FIRE DEPARTMENT PERSONNEL REQUIREMENTS

CAMDEN-CANNING SCENARIO COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Camden-Canning Additional Manpower Requirements	Total Force	% of Change
1980	286	0	286	.0
1985	345	1	346	0.3
1990	375	11	386	2.3
1995	416	21	437	5.0
2000	474	28	502	5.9

Camden-Canning would realistically impact Anchorage between 1985 and 1990. Prior to about 1987, the additional population from this scenario migrating into Anchorage would probably be absorbed by the manpower projected to accommodate the non-OCS case. However, the density profile which will characterize Anchorage in the future will be a major factor in determining the future requirements.

Leisure

Utilizing the standards presented in the overview of infrastructure standards, table 54 illustrates the cumulative requirements of the Camden-Canning scenario. Need data from the non-OCS case are presented as well as the total cumulative column indicating the affect of the scenario.

TABLE 54

CAMDEN-CANNING RECREATION FACILITIES NEEDS

COMPARED TO NON-OCS CASE

Facilities	Year	Non-OCS Case	Camden-Canning Needs	Total Needs	% of Change
Play Lots	1980	77	0	77	0
Neighborhood Parks		19	0	19	0
Softball Diamonds		65	0	65	0
Basketball Courts		389	0	389	0
Swimming Pools		19	0	19	0
Skating Rinks		6	0	6	0
Community Centers		8	0	8	0
Play Lots	1985	93	1	94	1.1
Neighborhood Parks		23	0	23	0
Softball Diamonds		78	0	78	.4
Basketball Courts		468	2	470	0
Swimming Pools		23	0	23	0
Skating Rinks		7	0	7	0
Community Centers		9	0	9	0
Play Lots	1990	101	3	104	3.0
Neighborhood Parks		25	1	26	4.0
Softball Diamonds		84	3	87	3.6
Basketball Courts		509	15	524	2.9
Swimming Pools		25	1	26	4.0
Skating Rinks		8	0	8	0
Community Centers		10	0	10	0

TABLE 54, continued

Facilities	Year	Non-OCS Case	Camden-Canning Needs	Total Needs	% of Change
Play Lots	1995	113	5	118	4.4
Neighborhood Parks		28	1	29	3.6
Softball Diamonds		94	5	99	5.3
Basketball Courts		566	28	594	4.9
Swimming Pools		28	1	29	3.6
Skating Rinks		9	0	9	0
Community Centers		11	0	11	0
Play Lots	2000	129	7	136	5.4
Neighborhood Parks		32	2		6.2
Softball Diamonds		107	6	17:	5.6
Basketball Courts		645	37	682	5.7
Swimming Pools		32	2	34	6.5
Skating Rinks		10	1	11	10.0
Community Centers		12	1	13	8.3

As the interest and support for a recreational/cultural/sports complex increases, it will become easier for local and state decision-makers to justify the necessary expense for such a project; so too, will the support for cultural and art related activities. With increasing demands on local dollars, it will be necessary for art interest groups to better justify their dollar requests, demonstrating their ability to fulfill the needs of the entirearea community. This may, in turn, result in the expansion of their programs to include less costly and more easily accessible activities.

Utilities

Water. Over the 22-year study period, the Camden-Canning scenario will add an additional 18,689 people to the non-OCS case projection of 322,608 people. This will require a production level of 262.3 millions of liters per day (mId) (69.3 millions of gallons per day [mgd]) based on the standard of 7681 iters per capita per day (lpcpd) (203 gallons per capita per day [gpcpd]). This is a 14.4 mld (3.8 mgd) increase in production over the non-OCS case. The effect of this scenario on the future development of water resources will be some increase in the implementation of Plans I and II for the development of Ship Creek. In addition, between 1995 and the turn of the century Ship Creek, Plan III, as described in the Anchorage Socioeconomic and Physical Baseline, will have to be developed to accommodate the projected population of 341,297 by the year 2000. The present capacity plus the addition of Plans I, II, and III total 421.6 mld (111.4 mgd) of available water resources.

Sewer. Based on the standard of 613 lpcpd (162 gpcpd), the Camden-Canning scenario will generate 209.3 mld (55.3 mgd) of wastewater by the year 2000. This is 11.4 mld (3.0 mgd) more than the non-OCS case. This falls below the planned expansions of the Anchorage Sewer Utility designed to accommodate approximately 376,000 people by 1995. This scenario should pose no impact on expansion plans of the utility provided that plans can be implemented on schedule.

Electricity. The Camden-Canning scenario will impact Anchorage with

an additional 18,689 people over the non-OCS case. Although the utilities are continually expanding based on the variables noted in the overview of infrastructure standards, the impact of this population could conceivably step up the pace of development. Plans for expansion should probably be on-board in the early 1980's to accommodate the additional population through the period under study.

Housing

The Camden-Canning scenario has a positive effect on the housing industry. It improves demand after 1985 and produces an additional annual demand of about 374 units (see table 56). With a 1977 construction capacity in excess of 4,000 units, the Camden-Canning scenario would only improve the productivity of the industry. The greatest impact would come between 1986 and 1995 when demand under the non-OCS scenario is weakest. This is a 21 percent increase in demand between 1986 and 1990, and a 23 percent increase between 1991 and 1995. The conclusion is that the housing impacts of the Camden-Canning scenario are positive, well-timed, and partially fill the excess capacity of the industry.

TABLE 55

CUMULATIVE HOUSING REQUIREMENTS - CAMDEN-CANNING SCENARIO

Year	Non-OCS Housing Requirements	Camden-Canning Additional Units Required	Total Units	% of Change
1980	65,297	0	65,297	0
1985	78,635	941	79,576	1.2
1990	85,518	2,372	87,890	2.8
1995	95,145	4,597	99,742	4.8
2000	108,230	6,029	114,259	5.6

Health

Utilizing the standard of 550 inpatient days per 1,000 population at 85 percent occupancy, table 57 illustrates the acute care bed need requirements of the Camden-Canning scenario. Bed need as determined under the non-OCS case is presented as well as the total effect of this scenario.

TABLE 56

CUMULATIVE ACUTE CARE BED NEED PROJECTIONS

CAMDEN-CANNING COMPARED TO NON-OCS CASE

Year	Non-OCS Bed Needs	Camden-Canning Bed Needs	Total Bed Needs	% of Change
1980	376	0	376	0
1985	453	2	455	0.4
1990	493	14	507	2.8
1995	547	28	575	5.1
2000	624	36	660	5.8

Using the standard of one primary care physician per 800 population, table 58 illustrates the increased need based upon requirements of the Camden-Canning scenario compared to requirements of the non-OCS scenario.

TABLE 57

CUMULATIVE PRIMARY CARE PHYSICAN NEEDS PROJECTIONS

CAMDEN-CANNING COMPARED TO NON-OCS CASE

Year	Non-OCS Physicians Needed	Camden-Canning Physicians Needed	Total Physicians Needed	% of Change
1980	243	0	243	0
1985	292	2	294	0.7
1990	318	9	327	2.8
1995	353	18	371	5.1
2000	403	23	426	5.7

Compared to the non-OCS scenario requirements, the anticipated effect on other health care elements under Camden-Canning would be minimal. Meeting the need for primary care physicians, whether in private or clinical practice, would be most critical.

Social Services

There are no federal, state or local day care service norms. Currently, there are licensed spaces available to serve 1.5 percent of the Anchorage area population, assuming the present level to be adequate. Table 58 illustrates projection of spaces needed on the basis of serving 1.5 percent of the given population (Alaska Department of Health and Social Services, 1978).

Projection of numbers of unemployment insurance recipients are based upon the existing rate of claimants or 6.7 percent of the Anchorage population. Table 59 describes the anticipated numbers of recipients assuming maintenance of the same rate.

The current supply of low rent housing (854 units) serves approximately 10.4 percent of the low income population. Assuming the proportion of eligible low income residents to the total Anchorage population will remain the same (“14 percent), table 60 illustrates projected levels of low income housing needed as a result of this scenario projecting an optimal 33 percent penetration rate of the identified population.

TABLE 58

CUMULATIVE DAY CARE NEEDS

CAMDEN-CANNING COMPARED TO NON-OCS CASE

Year	Non-OCS Day Care	Camden-Canning Day Care Needs	Total Camden-Canning Day Care	% of Change
1980	2,919	0	2,919	0
1985	3,515	15	3,530	5.0
1990	3,823	110	3,933	2.8
1995	4,246	213	4,459	5.0
2000	4,839	280	5,119	5.7

TABLE 59

CUMULATIVE UNEMPLOYMENT ASSISTANCE NEEDS

CAMDEN-CANNING COMPARED TO NON-OCS CASE

Year	Non-OCS Unemployment	Camden-Canning Unemployment	Total Camden-Canning Unemployment	% of Change
1980	12,65S	0	12,65.1	0
1985	15,235	61	15,296	0.2
1990	16,569	478	17,047	2.8
1995	18,399	925	19,324	5.0
2000	20,969	1,215	22,184	5.7

TABLE 60

CUMULATIVE LOW INCOME HOUSING NEEDS

CAMDEN-CANNING COMPARED TO NON-OCS CASE

Year	Non-OCS Low Income Housing	Camden-Canning Low Income Housing Needs	Total Camden-Canning Low Income Housing	% of Change
1980	3,017	0	3,017	0
1985	3,633	43	3,676	1.2
1990	3,951	110	4,061	2.8
1995	4,396	212	4,608	4.8
2000	5,000	279	5,279	5.6

Transportation

The 1995 population estimate used for transportation planning is 372,081 (includes military living on bases). This figure exceeds both the 1995 and 2000 population projections for the Camden-Canning scenario by 74,760 and 30,784 people respectively. Because the impact from the Camden-Canning scenario occurs largely after 1985, the short-range improvements should be completed and available. Any additional impacts beyond those already outlined in the non-OCS case are minimal. However, the additional growth from this scenario would be sufficient to accentuate the adverse effects on the system if the road and transit long-range plans are not carried out.

Financial Capacity and Capital Requirements

The Camden-Canning scenario adds 18,689 people to the population between 1985 and 2000. While modest, this 5.5 percent cumulative increase adds to the non-OCS scenario at a time when the latter's growth rate is slowing. The latter start up dates in this scenario could lead to a temporary downturn in the mid-1980's. The impact of service expenditures is incremental but would cause some budget increases. The scenario could also continue to alter the service demand structure to a more expansive model. However, the stimulative effect on the economy and general revenue base should be sufficient to meet any projected needs. Because of this, any increase from the Camden-Canning scenario would most likely be positive in terms of the financial position of the local government. The only difficult period would be from 1997 to 2000 when the aggregate growth rate turns sharply upwards.

This could produce service shortfalls in times of rapid growth.

CAUSE/EFFECTS OF IMPACTS

While the overall population impact is significant in the Camden-Canning scenario, the effects are distributed over some 15 years and impacted at a time when Anchorage would be most able to handle and benefit from it.

PROBLEMS/ISSUES AFFECTING THE ANCHORAGE INFRASTRUCTURE AND MUNICIPAL DELIVERY SYSTEMS

No additional problems and issues affecting the community the case of this OCS scenario are foreseen.

Summary of Impacts

The following matrix displays the services likely to be impacted-through the period under study. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrix. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifiers are discussed in the respective sections on overview of infrastructure standards and description of services likely to be impacted.

CAMDEN-CANNING OCS SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980 194,636	1985 235,334	1990 262,262	1995 297,321	2000 341,X7
Education: Primary/Secondary - No. of t4anpower/Facilities	0	8	59	114	150
Public Postsecondary - No. of Credits	0	344	2,922	6,156	8,522
Public Safety: Police - Manpower	0	1	12	22	29
State Troopers - Manpower	0	0	1	3	3
Fire: Manpower	0	1	11	21	28
Leisure: Play Lots	0	1	3	5	7
Neighborhood Parks	0	0	1	1	2
Softball Diamonds	0	0	3	5	6
Basketball Courts	0	2	15	28	37
Swimming Fools	0	0	1	1	2
Skating Rinks	0	0	0	0	1
Community Centers	0	0	0	0	1
Utilities: Water - (Millions of Gallons per Day)	o	.2	1.5	2.9	3.8
Sewer - (Millions of Gallons per Oay, Wastewater Generated)	o	.2	1.2	2.3	3.0
Electricity					
Telephone[a]					
Solid Waste[a]					
Housing: Units	o	941	2,372	4,597	6,029
Health: Bed Needs	o	2	14	28	36
Primary Care Physicians	o	2	9	18	23
Social Services: Day Care Space	0	15	110	213	280
Unemployment Claimant	0	61	478	925	1,215
Low Income Housing Units	o	43	110	212	279
Transportation[a]					
Financial Capacity and Capital Requirements[a]					

[a]See Section n Overview of nfrastructure .tandards

IV. PROJECTED IMPACTS OF OCS DEVELOPMENT - PRUDHOE HIGH CASE SCENARIO

Introduction

The Prudhoe High scenario produces the largest overall impact on Anchorage. Its earlier start-up dates also mean its effect will be felt before Camden-Canning. Its requirements for additional services are the only ones that could put a strain on the infrastructure for their provision. On the other hand, the Prudhoe High scenario begins at a time when the capacity of the community to respond would be optimal. The completion of particular utilities and transportation become more critical under this scenario.

COMMUNITY POPULATION AND EMPLOYMENT FORECASTS

Forecasts of population, employment, and personal income (measured as change from the non-OCS case) are shown in table 61. Table 62 shows the industrial distribution of the additional labor force due to the Prudhoe High scenario. As in the other OCS scenarios, virtually all the impact is indirect occurring most in the services and trade industries with significant increases also in finance, government, transportation and construction.

TABLE 61

PRUDHOE HIGH SCENARIO TOTAL ECONOMIC IMPACT - ANCHORAGE, 1979-2000[a]

(measured as change from the base)

Year	Population	Employment	Personal Income[b]
1979[c]	150	73	2.426
1980	353	175	5*994
1981	570	292	9.675
1982	758	446	14.867
1983	866	484	16.844
1984[d]	987	531	19.308
1985	1,255	729	27.799
1986	4,219	3,115	125.919
1987	5,554	3,616	152.142
1988[e]	7,890	3,780	169.753
1989	'10 ,274	5;025	230.582
1990	11,635	5,477	260.485
1991	13,136	6,100	300.098
1992	14,942	7,058	356.410
1993	16,332	7,626	399.121
1994	17,312	8,018	433.242
1995	18,775	8,722	488.266
1996	20,255	9,427	547.160
1997	21,929	10,259	617.637
1998	23,731	11,316	704.891
1999	25,838	12,631	814.355
2000	28,097	14,201	945.973

[a]MAP Regional Model
[b]Millions of dollars
[c]Exploration begins
development begins
[e]Production begins

TABLE 62

INDUSTRIAL DISTRIBUTION OF THE PRUDHOE HIGH EMPLOYMENT IMPACT[a]

(measured as a change from the base)

	1983		1987		2000	
	Employment	%	Employment	%	Employment	%
Mining	11	2.3	36	1.0	119	.8
Construction	25	5.2	195	5.4	706.	5.0
Trade	129	26.7	1,182	32.7	3,917	27.6
Services	125	25.8	1,084	30.0	5,567	39.2
Finance	36	7.4	304	8.4	1,486	10.5
Transportation	38	7.9	407	11.3	881	6.2
State and Local Government	100	20.7	262	7.2	1,105	7.8
Other[b]	20	4.1	146	4.0	402	3.0

[a]MAP Regional Model
[b]Includes public utilities, communications, and other

Identification of Impacts

The overview of infrastructure standards and a description of regional and community services likely to be impacted are contained in the non-OCS section of this report.

SIGNIFICANT FACTORS AFFECTING CHANGE

The same factors identified in the non-OCS scenario are anticipated to affect change in the case of all the OCS scenarios.

OVERVIEW OF THE ASSUMPTIONS, METHODOLOGY, AND RESULTS

The same assumptions as were made in the non-OCS scenario are also made in the case of the OCS scenarios except. that, with increased population, the fiscal capacity of the local government to provide community facilities and services should improve with the size of the OCS scenario even though the service levels also increase. However, the timelines of implementing service plans also become more critical the larger the OCS scenario impacts.

RESULTS OF ANALYSIS

The following requirements for community facilities and services in the case of this OCS scenario relate only to additional needs above and beyond the non-OCS case. That is, they are facilities and services which will be required solely because of the added increase in population derived from OCS activities.

Telephone utilities will not be discussed because the impact will be negligible or positive. Solid waste is also not treated because no significant impact is foreseen. The issues facing these services are discussed in the non-OCS base case.

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards, table 63 displays the projected student population through the year 2000, number of teachers required, and number of classrooms necessary to accommodate the population projections for the Prudhoe High scenario in five year intervals. The data reflected in table 63 are cumulative.

TABLE 63

ADDITIONAL TEACHER AND CLASSROOM NEEDS - PRUDHOE HIGH SCENARIO

(cumulative)

Year	Non-OCS Teachers/ Classrooms Population	Additional Projected Student Population	# of Teachers/ Classrooms Required	Total # of Teachers Classrooms Required	% of Change
1980	1,557	71	3	1,560	.2
1985	1,875	251	10	1,885	.5
1990	2,039	2,327	93	2,132	4.6
1995	2,265	3,755	150	2,415	6.6
2000	2,581	5,619	225	2,806	8.7

Public Postsecondary and Career/Vocational Training. Table 64 projects the additional public postsecondary student credit hours expected to occur under the Prudhoe High scenario. The overall effect is expected to be significant in that additional resources would be required to meet the higher education needs. Since the impacts primarily occur over 15 years and funding would come from state government which has a greater demonstratable fiscal capacity, the impact is not expected to cause difficulties. No standards were

were developed for private college or vocational/career education.

TABLE 64

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC HIGHER EDUCATION UNDER THE PRUDHOE HIGH SCENARIO

(cumulative)

Year	Non-OCS Credits Projected	Additional Credits Under Prudhoe High	Total Credits Projected	% of Change
1980	63,011	114	63,125	.2
1985	85,790	459	86,249	.5
1990	101,324	4,625	105,949	4.6
1995	122,290	8,110	130,400	6.6
2000	147,106	12,812	159,918	8.7

Public Safety

Police. Compared to the other propsed developments for the Beaufort Sea region, the Prudhoe High scenario has the most potential to impact Anchorage on a noticeable scale and alter the standard offered to assess necessary manpower requirements. Variables which could increase the crime rate and affect the standard include a greater density in the population of the Anchorage bowl and an increase in transiency.

Table 65 shows the cumulative manpower requirements based on the ratio of 1.52 sworn police officers per 1,000 in the population necessary to meet the impact of the Prudhoe High scenario. A total column is offered as a means to compare the impact of this scenario

with the non-OCS case.

TABLE 65

CUMULATIVE POLICE MANPOWER REQUIREMENTS

PRUDHOE HIGH SCENARIO COMPARED TO THE NON-OCS CASE[a]

Year	Non-OCS Case Manpower Requirements	Prudhoe High Additional Manpower Requirements	Tots 1 Sworn m	% of -
1985	356	2	358	0.6
1990	387	18	405	4.7
1995	430	29	459	6.7
2000	490	43	533	8.8

aIt is assumed that the areawide police expansion will nOt be in effect prior to the early 1980's.

It is important to note that these figures may well be conservative based on the above mentioned variables.

Alaska State Troopers. Although the Alaska State Troopers will probably experience some growth as a result of this development, it will not be a marked increase. Table 66 compares the cumulative manpower requirements for the Prudhoe High scenario to the non-OCS projections using the .15 ratio of commissioned officers per 1,000 in the population as the standard.

TABLE 66

CUMULATIVE ALASKA STATE TROOPERS MANPOWER REQUIREMENTS

PRUDHOE HIGH SCENARIO COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Prudhoe High Additional Manpower Requirements	Total Force	% of Change
1980	29	0	29	0
1985	35	0	35	0
1990	38	2	40	5.3
1995	42	3	45	7.1
2000	48	5	53	10.4

The above table indicates that the Alaska State Troopers will probably need to increase the force between 1990 and 2000 as a result of this population forecast.

Fire. Table 67 compares this scenario to the cumulative manpower projections of the non-OCS case. The current ratio of 1.47 fire department personnel per 1,000 in the population is used to assess the manpower requirements for this scenario.

TABLE 67

CUMULATIVE FIRE DEPARTMENT PERSONNEL REQUIREMENTS

PRUDHOE HIGH SCENARIO COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Prudhoe High Additional Manpower Requirements	Total Force	% of Change
1980	246	0	286	0.
1985	345	1	346	0.3
1990	375	17	392	4.5
1995	416	28	444	6.7
2000	474	42	516	8.9

It is evident that shortly after 1985 the Anchorage Fire Department will require additional manpower to accommodate the impact of the Prudhoe High scenario. High density urban development could definitely come into play during this impact period, and there could be a need to increase the ratio of 1.47 fire department personnel per 1,000 in the population upwards to accommodate both the impact and a higher density of urban development.

Leisure

Utilizing the standards presented in the overview of infrastructure standards, table 68 illustrates the cumulative requirements of the Prudhoe High scenario. Need data from the non-OCS case are presented as well as the total cumulative column indicating the effect of the scenario.

TABLE 68

RECREATION FACILITY NEEDS

PRUDHOE HIGH SCENARIO COMPARED TO NON-OCS CASE

Facilities	Year	Non-OCS Case	Prudhoe High Needs	Total Needs	% of Change
Play Lots	1980	77	0	77	0
Neighborhood Parks		19	0	19	0
Softball Diamonds		65	0	65	0
Basketball Courts		389	0	389	0
Swimming Pools		19	0	19	0
Skating Rinks		6	0	6	0
Community Centers		8	0	8	0

TABLE 68, continued

Facilities	Year	Non-OCS Case	Prudhoe High Needs	Total Needs	% of Change
Play Lots	1985	93	1	94	1.1
Neighborhood Parks		23	0	23	0
Softball Diamonds		78	0	78	0
Basketball Courts		468	3	471	.6
Swimming Pools		23	0	23	0
Skating Rinks		7	0	7	0
Community Centers		9	0	9	0
Play Lots	1990	101	5	106	5.0
Neighborhood Parks		25	1	26	4.0
Softball Diamonds		84	4	88	4.8
Basketball Courts		509	14	533	2.8
Swimming Pools		25	1	26	4.0
Skating Rinks		8	0	8	0
Community Centers		10	0	10	0
Play Lots	1995	113	7	120	6.2
Neighborhood Parks		28	2	30	7.1
Softball Diamonds		94	6	100	6.4
Basketball Courts		566	37	603	6.5
Swimming Pools		28	2	30	7.1
Skating Rinks		9	1	10	11.1
Community Centers		11	1	12	9.1
Play Lots	2000	129	11	140	8.5
Neighborhood Parks		32	3		9.4
Softball Diamonds		107	9	1:;	8.4
Basketball Courts		645	56	701	8.7
Swimming Pools		32	3	35	9.4
Skating Rinks		10	1	11	10.0
Community Centers		12	2	14	16.7

As existing facilities become saturated, the interest and support for a recreational/cultural/sports complex will increase. It will become easier for local and state decision-makers to justify the necessary expense for such a project; so too, will the support for cultural and art related activities and agencies. With increasing demands on local recreation dollars, it will be necessary for art interest groups to better justify

their dollar requests, demonstrating their ability to fulfill the needs of the entire art community. This may, in turn, result in the expansion of their programs to include less costly and more easily accessible activities.

Utilities

Water. The 22-year population projection under this petroleum development scenario will impact Anchorage with an additional population of 28,097 by the year 2000 over the non-OCS case projection of 322,608. The effect of the Prudhoe High scenario would be some increase in the implementation of Plans I and II for the development of Ship Creek. In addition, between 1995 and the turn of the century, Plan III as described in the Anchorage Socioeconomic and Physical Baseline will have to be developed to accommodate the total projected population of 350,705. The 768 liters per capital per day (lpcpd) (203 gallons per capita per day [gpcpd]) standard requires the water supply production to be 269 million liters per day (mid) (71.2 million gallons per day). This is 22 mld (5.7 mgd) above the non-OCS scenario by the year 2000. The present capacity plus the addition of Plans I, II, and III totals 421.6 lpd (111.4 mgd) of available water resources.

Sewer. Based on the standard of 613 lpcpd (162 gpcpd), the Prudhoe High scenario will generate 215 mld (56.8 mgd) of wastewater by the end of the period under study. This is 17 mld (4.6 mgd) above the non-OCS case. This falls below the planned expansions of the

Anchorage Sewer Utility designed to accommodate approximately 376,000 people by 1995. This scenario should pose no impact on expansion plans of the utility provided that plans can be implemented on schedule.

Electricity. With the additional population of 28,097 people over the non-OCS case, this scenario will conceivably step up the pace of development of planned generation facilities. Although the utilities are continually expanding based on the variables discussed in the overview of infrastructure standards, plans for expansion should probably be implemented in the early 1980's to accommodate the impact of this population through the period under study.

Housing

The Prudhoe High scenario has a positive effect on the housing industry. It strongly improves demand after 1985 and produces an additional annual demand of about 577 units after that year (see table 69). With a 1977 construction capacity in excess of 4,000 units, the Prudhoe High scenario would produce the best rate of construction to utilize this capacity. The greatest impact would come between 1986 and 1990 when demand under the non-OCS base case is weakest. This would be a 49 percent increase in demand during this five-year period. The conclusion is that the housing impacts of the Prudhoe High scenario are positive, well-timed, and best fill the excess capacity of the industry.

The only problem of the largest scenario is the increased demand it makes

on the available land space of the Anchorage bowl. It is estimated that the non-OCS scenario would reduce the 17,690 hectares (43,694 acres) of vacant land identified in 1976 to approximately 7,484 hectares (18,485 acres) by 2000. The Prudhoe High scenario could reduce this amount another 466 hectares (1,151 acres) and continue the pressure on the amount of available land.

TABLE 69

CUMULATIVE HOUSING REQUIREMENTS - PRUDHOE HIGH SCENARIO

Year	Non-OCS Case Housing Requirements	Prudhoe High Additional Units Required	Total Units	% of Change
1980	65,297	114	65,411	.2
1985	78,635	405	79,040	.5
1990	85,518	3,753	89,271	4.4
1995	95,145	6,056	101,201	6.4
2000	108,230	9,064	117,294	8.4

Health

Utilizing the standard of 550 inpatient days per 1,000 population at 85 percent occupany, table 70 illustrates the cumulative acute care bed need requirements of the Prudhoe High scenario. Bed need as determined under the non-OCS scenario is presented as well as the total effect of this scenario.

TABLE 70

CUMULATIVE ACUTE CARE BED NEED PROJECTIONS

PRUDHOE HIGH SCENARIO COMPARED TO NON-OCS CASE

Year	Non-OCS Bed Need	Prudhoe High Bed Need	Total Bed Need	% "of' Change
1980	376	0	376	0
1985	453	2	455	0.4
1990	493	22	515	4.4
1995	547	36	583	6.5
2000	624	54	678	8.6

Using the standards of one primary care physician per 800 population, table 71 illustrates the increased need based upon requirements of the Prudhoe High scenario compared to the requirements of the non-OCS scenario.

TABLE 71

CUMULATIVE PRIMARY CARE PHYSICIAN NEEDS PROJECTIONS

PRUDHOE HIGH SCENARIO COMPARED TO NON-OCS CASE

Year	Non-OCS" Physicians Needed	Prudhoe High Physicians Needed	Total Physicians Needed	% of Change
1980	243	0	243	0
1985	292	2	294	0.6
1990	3 1 8	15	333	4.7
1995	353	24	377	6.4
2000	403	35	438	8.6

The increase in demand over the non-OCS scenario for other health care and services under Prudhoe High would be minimal. Most critical would be the need for additional primary care physicians. Although there is no applicable formal standard, it is anticipated that the effect of this

scenario would create increasing demands for additional public health and home health care personnel.

Social Services

There are no federal, state or local day care service norms. Currently, there are licensed spaces available to serve 1.5 percent of the Anchorage area population, assuming the present level to be adequate. Table 72 illustrates projection of spaces needed on the basis of serving 1.5 percent of the given population (Alaska Department of Health and Social Services, 1978).

Projection of numbers of unemployment insurance recipients are based upon the existing rate of claimants or 6.5 percent of the Anchorage population. Table 73 describes the anticipated numbers of recipients assuming maintenance of the same rate.

The current supply of low rent housing (854 units) serves approximately 10.4 percent of the low income population. Assuming the proportion of eligible low income residents to the total Anchorage population will remain the same (14 percent), table 74 illustrates projected levels of low income housing needed as a result of this scenario based on a 33 percent penetration rate of the identified population.

TABLE 72

CUMULATIVE DAY CARE NEEDS

PRUDHOE HIGH COMPARED TO NON-OCS CASE

Year	Non-OCS Day Care	Prudhoe High Day Care Needs	Total Prudhoe High Day Care	% of Change
1.980	2,919	6	2,925	0.2
1.985	3,515	19	3,534	0.5
1990	3,823	175	3,998	4.6
1,995	4,246	281	4,527	6.6
2000	4,839	421	5,260	8.7

TABLE 73

CUMULATIVE UNEMPLOYMENT ASSISTANCE NEEDS

PRUDHOE HIGH COMPARED TO NON-OCS CASE

Year	Non-OCS Unemployment	Prudhoe High Unemployment	Total Prudhoe High Unemployment	% of Change
1980	12,651	23	12,674	0.2
1985	15,235	82	15,317	0.5
1990	16,569	756	17,325	4.6
1995	18,399	1,220	19,619	6.6
2000	20,969	1,826	22,795	8.7

TABLE 74

CUMULATIVE LOW INCOME HOUSING NEEDS

PRUDHOE HIGH COMPARED TO NON-OCS CASE

Year	Non-OCS Low Income Housing	Prudhoe High Low Income Housing Needs	Tota l Prudhoe High Low Income Housing	% of Change
1980	3,017	5	3,022	0..2
1985	3,633		3,652	0.5
1990	3,951	1;;	4,124	4*4
1995	4,396	280	4,676	6.4
2000	5,000	419	5,419	8.4

Transportation

Planning for long-range transportation needs is geared for a population of 372,081 (includes military living on bases) through 1995. This figure exceeds both the 1995 and the year 2000 population projections for the Prudhoe High scenario by 70,236 and 21,376 respectively. Because the impact from the Prudhoe Large scenario occurs largely after 1985, the short-range improvements should be completed and available. Any additional impacts beyond those already outlined in the non-OCS case are minimal. However, the additional growth from this scenario would be sufficient to accentuate the adverse effects on the system if the road and transit long--range plans are not carried out.

Financial Capacity and Capital Requirements

The Prudhoe High scenario adds 28,097 people to the population between 1980 and 2000. This is 8.2 percent cumulative increase adds to the non-OCS scenario at a time when the latter's growth rate is slowing. This scenario is sufficiently large to generate significant service demands, especially in the human resource, public safety, and transportation areas. However, the increases are spread over an extended period to mitigate severe impacts from occurring the same way they did during the oil pipeline boom. Because the scenario is incremental in its effects and adds to a slower growth period in the non-OCS case, the impacts are likely to be positive on the balance. This is because the stimulated economy would produce a more improved revenue capacity compared to the service demands made on it. The scenario could alter the service demand

structure to a more expansive one. Also the period from 1997 to 2000 could be difficult. The growth rate turns sharply up, and this could produce service shortfalls and increased spending.

CAUSE/EFFECT OF IMPACTS

While the overall population impact is the highest of the four scenarios, the effects are distributed over some 15 years, at a time when Anchorage would be most able to handle and benefit from it.

PROBLEMS/ISSUES AFFECTING THE ANCHORAGE INFRASTRUCTURE AND MUNICIPAL DELIVERY SYSTEM

No additional problems and issues affecting the community in the case of this OCS scenario are foreseen, except that current long-range plans will have to be implemented in a timely fashion. Slippage in some of the utilities and transportation system could especially bring on service shortfalls on a temporary basis.

Summary of Impacts

The following matrix displays the services likely to be impacted through the period under study. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrix. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifiers are discussed in the respective sections on overview of infrastructure standards and description of services likely to be impacted.

PRUDHOE HIGH SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000 "
	194,989	235,648	266 ,545	301,845	350,705
Education: Primary/Secondary - No. of Manpower/Facilities	3	10	93	150	225
Public Postsecondary - No. of Credits	114	459	4,625	8,110	12,812
Public Safety: Police - Manpower	0	2	18	29	43
State Troopers - Manpower	0	0	2	3	5
Fire - Manpower	0	1	17	28	42
Leisure: Play Lots	0	1	5	7	11
Neighborhood Parks	0	0	1	2	3
Softball Diamonds	0	0	4	6	9
Basketball" Courts	0	3	14	37	56
Swimming Pools	0	0	1	2	3
Skating Rinks	0	0	0	1	1
Community Centers	0	0	0	1	2
Utilities: Water - (Millions of Gallons per Day)	0.1	0.2	2.4	3.8	5.7
Sewer - (Millions of Gallons per Day, Wastewater Generated)	0.1	0.2	1.9	3.0	4.5
Electricity					
Telephones					
Solid Wastea					
Housing: Units	114	405	3,753	6,056	9,064
Health: Bed Needs	0	2	22	36	54
Primary Care Physicians	0	2	15	24	35
Social Services: Day Care Space	6	19	175	281	421
Unemployment Claimants	23	82	756	1,220	1,826
Low Income Housing Units	5	19	173	280	419
Transportationa					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

V. PROJECTED IMPACTS OF OCS DEVELOPMENT - PRUDHOE LOW CASE SCENARIO

Introduction

The Prudhoe Low scenario has only a minimal impact on Anchorage. Many services would likely not be affected in that the elastic nature of the service infrastructure would be adequate to absorb the increases under the non-OCS base case. What increases do occur begin at a time when the capacity of the community to respond would be optimal.

COMMUNITY POPULATION AND EMPLOYMENT FORECASTS

Forecasts of population, employment, and personal income (measured as change from the non-OCS case) are shown in table 74. Table 75 shows the industrial distribution of the additional labor force due to the Prudhoe Low scenario. As in the other OCS scenarios, virtually all the impact is indirect occurring most in the services and trade industries with significant increases also in finance, government, transportation, and construction.

TABLE 75

PRUDHOE LOW SCENARIO TOTAL ECONOMIC IMPACT - ANCHORAGE, 1979-2000a

(measured as change from the base)

Year	Population	Total Employment	Personal Income[b]
1979	0	0	0.000
1980[c]	134	63	2.221
1981	541	541	10.237
1982	777	433	14.644
1983	817	468	16.278
1984	906	492	17.861
1985[d]	933	475	17.828
1986	1,261	733	29.043
1987	3,179	2,132	89.801
1988	4,013	2,394	104.900
1989[e]	5,350	2,773	127.709
1990	5,697	2,647	126.434
1991	6,444	2,971	146.484
1992	6,997	3,077	157.406
1993	7,878	3,525	186.672
1994	8,988	3,986	219.172
1995	9,915	4,411	251.090
1996	10,477	4,647	272.863
1997	11,000	4,871	295.387
1998	11,831	5,340	334.871
1999	11,965	5,378	347.242
2000	12,734	5,908	394.105

[a]MAP Regional Model
[b]Millions of dollars
[c]Exploration begins
development begins
[e]Production begins

TABLE 76

INDUSTRIAL DISTRIBUTION OF THE PRUDHOE LOW EMPLOYMENT IMPACT[a]

(measured as a change from the base)

	1983		1987		2000	
	Employment	%	Employment	%	Employment	%
Construction	26	5.3	151	5.5	298	5.0
Trade	133	27.0	744	31.1	1,661	28.1
Services	131	26.6	732	31.0	2,316	39.2
Finance	37	7.5	205	8*6	620	10.5
Transportation	39	7.9	236	9*9	384	6.5
State, and Local Government	95	19.3	215	9.0	378	6.4
Other	31	6.3	132	5.5	251	4.2

[a]MAP Regional Model
[b]Includes public utilities, communications, and other

Identification of Impacts

The overview of infrastructure standards and a description of regional and community services likely to be impacted are contained in the non-OCS section of this report.

SIGNIFICANT FACTORS AFFECTING CHANGE

The same factors identified in the non-OCS scenario are anticipated to affect change in the case of all the OCS scenarios.

OVERVIEW OF THE ASSUMPTIONS, METHODOLOGY, AND RESULTS

The same assumptions as were made in the non-OCS scenario are also made in the case of the OCS scenarios except that, with increased population, the fiscal capacity of the local government to provide community facilities and services should improve with the size of the OCS scenario even though the service levels also increase. However, the timelines of implementing service plans also become more critical the larger the OCS scenario impacts.

RESULTS OF ANALYSIS

The following requirements for community facilities and services in the case of this OCS scenario relate only to additional needs above and beyond the non-OCS case. That is, they are facilities and services which will be required solely because of the added increase in population derived from OCS activities.

Telephone utilities will not be discussed because the impact will be negligible or positive. Solid waste is also not treated because no significant impact is foreseen. The issues facing these services are discussed in the non-OCS base case.

Education

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards, table 76 displays the projected student population through the year 2000, number of teachers required, and number' of classrooms necessary to accommodate the population projections for the Prudhoe Low scenario in five year intervals. The data reflected in table 76 are cumulative.

TABLE 77

ADDITIONAL TEACHER AND CLASSROOM NEEDS - PRUDHOE LOW SCENARIO

(cumulative)

Year	Non-OCS Teachers/ Classrooms Requirements	Additional Projected Student Population	# of Teachers/ Classrooms Required	Total # of Teachers Classrooms Required	% of Change
1980	1,557	27	1	1,558	.06
1985	1,875	186	8	1,883	.40
1990	2,039	1,139	46	2,085	2.30
1995	2,265	1,983	79	2,344	3.50
2000	2,581	2,547	102	2,683	4.00

Public Postsecondary and Career/Vocational Training. Table 77 projects the additional public postsecondary student credit hours expected to occur under the Prudhoe Low scenario. The overall effect is slight and it is likely that normal institutional expansion would cope with the additional credits. No standards were developed for private college or vocational/career education.

TABLE 78

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC HIGHER EDUCATION

UNDER THE PRUDHOE LOW SCENARIO

Year	Non-OCS Credits Projected	Additional Credits Under Prudhoe Low	Total Credits Projected	% of Change
1980	63,011	46	63,057	.1
1985	85,790	364	86,154	.4
1990	101,324	2,265	103,589	2.2
1995	122,290	4,284	126,574	3.5
2000	147,106	5,807	152,913	3.9

Public Safety

Police. Beginning in 1985, table 78 compares the cumulative manpower requirements for the non-OCS case to those necessary to accommodate the Prudhoe Low development scenario. The ratio used to generate the figures is 1.52 sworn police officers per 1,000 in the population. A total cumulative column is offered as a means to assess the minimal impact of this development on the Anchorage community.

TABLE 79

CUMULATIVE POLICE MANPOWER REQUIREMENTS

PRUDHOE LOW SCENARIO COMPARED TO THE NON-OCS CASEa

Year	Non-OCS Case Manpower Requirements	Prudhoe Low Additional Manpower Requirements	Tota 1 Sworn m	% of -
1985	356	2	356	.6
1990	387	9	596	2.3
1995	430	15	445	3.5
2000	490	20	510	4.1

aIt is assumed that areawide police expansion will not be in effect until early 1980's.

By the year 2000 a force of 510 sworn police officers would be necessary to accommodate a population of 335,342 projected under the Prudhoe Low scenario.

Alaska State Troopers. The Prudhoe Low scenario will produce a very incremental change in requirements for Alaska State Troopers when compared to the non-OCS case. It is conceivable that the projected force under the non-OCS case could absorb the impact of this scenario with little or no additional manpower added to the force. Table 79 gives the cumulative manpower requirements statistically generated for the Prudhoe Low scenario as well as a comparison to the non-OCS case. The standard utilized is the current ratio of .15 troopers per 1,000 in the population.

TABLE 80

CUMULATIVE ALASKA STATE TROOPERS MANPOWER REQUIREMENTS

PRUDHOE LOW SCENARIO COMPARED TO THE NON-OCS CASE.

Year	Non-OCS Case Manpower Requirements	Prudhoe Low Additional Manpower Requirements	Total Force	% of Change
1980	29	0	29	0
1985	35	0	35	0
1990	38	1	39	2.6
1995	42	2	44	4.8
2000	48	2	50	4.2

Fire. Table 80 illustrates the cumulative manpower requirements of fire department personnel under this scenario with a comparison to

the non-OCS case cumulative manpower requirements. The current ratio of 1.47 fire department personnel per 1,000 in the population is used as the standard to assess the impact of the Prudhoe Low scenario.

TABLE 81

CUMULATIVE FIRE DEPARTMENT PERSONNEL REQUIREMENTS

PRUDHOE LOW SCENARIO COMPARED TO THE NON-OCS CASE

Year	Nan-OCS Case Manpower Requirements	Prudhoe Low Additional Manpower Requirements	Tota 1 Force	% of Change
1980	286	0	286	0
1985	345	1	346	0.3
1990	375	8	383	2.1
1995	416	15	431	3.6
2000	474	19	493	4.0

The Prudhoe Low scenario would realistically impact Anchorage between 1985 and 1990. Additions in'manpower would probably occur during that time to offset the effect of this scenario. Much is contingent, however, on the density profile which characterized Anchorage over the next 22 years.

Leisure

Utilizing the standards presented in the overview Of infrastructure standards, table 81 illustrates the cumulative requirements of the Prudhoe High scenario. Need data from the non-OCS case are presented as well as the total cumulative column indicating the affect of the scenario. (No increases in facility needs are projected for 1980.)

TABLE 82

RECREATION FACILITY NEEDS

PRUDHOE LOW SCENARIO COMPARED TO NON-OCS CASE

Facilities	Year	Non-OCS Case	Prudhoe Low Needs	Total Needs	% of Change
Play Lots	1985	93	1	94	1.1
Neighborhood Parks		23	0	23	0
Softball Diamonds		78	0	78	0
Basketball Courts		468	2	470	.4
Swimming Pools		23	0	23	0
Skating Rinks		7	0	7	0
Community Centers		9	0	9	0
Play Lots	1990	101	3	104	3.0
Neighborhood Parks		25	1	26	4.0
Softball Diamonds		84	2	86	2.4
Basketball Courts		509	12	521	2.4
Swimming Pools		25	1	26	4.0
Skating Rinks		8	0	8	0
Community Centers		10	0	10	0
Play Lots	1995	113	4	117	3.5
Neighborhood Parks		28	1	29	3.6
Softball Diamonds		94	3	97	3.2
Basketball Courts		566	19	585	3.4
Swimming Pools		28	1	29	3.6
Skating Rinks		9	0	9	0
Community Centers		11	0	11	0
Play Lots	2000	129	5	134	3.9
Neighborhood Parks		32	1	33	3.1
Softball Diamonds		107	4	111	3.7
Basketball Courts		645	25	670	3*9
Swimming Pools		32	1	33	3.1
Skating Rinks		10	1	11	10.0
Community Centers		12	1	13	8.3

As existing facilities become saturated, the interest and support for a recreational/cultural/sports complex will increase. It will become easier for local and state decision-makers to justify the necessary expense for such a project; so too, will the support for cultural and art related

activities and agencies. With increasing demands on local recreation dollars, it will be necessary for art interest groups to better justify their dollar requests, demonstrating their ability to fulfill the needs of the entire art community. This may, in turn, result in the expansion of their programs to include less costly and more easily accessible activities.

Utilities

Water. Over the 22-year study period, the Prudhoe Low scenario will add an additional 12,734 people to the non-OCS case projection of 322,608 people. This will require a production level of 258 million liter per day (mld) (68.1 million gallons per day [mgd]) based on the standard of 768 liters per capita per day (lpcpd) (203 gallons per capita per day [gpcpd]). The effect of this scenario on the future development of water resources will be a minimal increase in the implementation of Plans I and II for the development of Ship Creek. In addition, between 1995 and the turn of the century Plan III as described in the Anchorage Socioeconomic and Physical Baseline will have to be developed to accommodate the projected population of 335,342 by the year 2000 under this scenario. The present capacity plus the addition of Plans I, 11 and III total 421.6 lpd (111.4 mgd) of available water resources.

Sewer. Based on the standard of 613 lpcpd (162 gpcpd), the Prudhoe Low scenario will generate 206 mld (54.3 mgd) of wastewater by the end of the period under study. This falls below the planned expansions

of the Anchorage Sewer Utility designed to accommodate approximately 376,000 people by 1995. This scenario should pose no impact on expansion plans of the utility provided that plans can be implemented on schedule.

Electricity. Since the utilities are continually expanding based on the variables noted in the overview of infrastructure standards, the addition of 12,734 people under this scenario over the non-OCS case should not affect the pace of development of additional generation facilities.

Housing

The Prudhoe Low scenario has a modest positive impact on the housing market. It produces an additional annual demand of about 250 units after 1985 (see table 82). While the additional demand is not sufficient to solve all the excess capacity problems of the industry, the timing of the scenario's peak is fortuitous in that it comes at a low point in housing demand under the no growth scenario. During 1985 to 1990, this effectively increases demand by 22 percent. The conclusion is that the housing impacts of Prudhoe Low are modest but positive by partially filling excess construction capacity.

TABLE 83

CUMULATIVE HOUSING REQUIREMENTS - PRUDHOE LOW SCENARIO

Year	Non-OCS Case Housing Requirements	Prudhoe Low Additional Units Required	Total w	% of -
1980	65,297	43	65,340	.1
1985	78,635	301	78,936	.4
1990	85,518	1,838	87,356	2.1
1995	95,145	3,198	98,343	3.4
2000	108,230	4,108	112,338	3.8

Heal th

Utilizing the standard of 550 inpatient days per 1,000 population at 85 percent occupancy, table 83 illustrates the acute care bed need requirements of Prudhoe Low scenario. Bed need as determined under the non-OCS scenario is presented as well as the total effect of this scenario.

TABLE 84

CUMULATIVE ACUTE CARE BED NEED PROJECTIONS

PRUDHOE LOW SCENARIO COMPARED TO NON-OCS CASE

Year	Non-OCS Bed Need	Prudhoe Low Bed Need	Total Bed Need	% of Change
1980	376	0	376	0
1985	453	2	455	0.4
1990	493	11	504	2.2
1995	547	19	566	3.5
2000	624	24	648	3.8

Using the standard of one primary care physican per 800 population, table 84 illustrates the increased need based upon requirements of the

Prudhoe Low scenario compared to requirements of the non-OCS scenario.

TABLE 85

CUMULATIVE PRIMARY CARE PHYSICIAN NEEDS PROJECTION

PRUDHOE LOW SCENARIO COMPARED TO NON-OCS CASE

Year	Non-OCS Physicians Needed	Prudhoe Low Physicians Needed	Tots l Physicians Needed	% of Change
1980	243	0	243	0
1985	292	2	294	0.7
1990	318	7	325	2.2
1995	353	13	366	3.7
2000	403	16	419	4.0

Compared to the non-OCS scenario requirements, the anticipated effect on other health care elements under Prudhoe Low would be minimal. Meeting the need for primary care physicians, whether in private or clinical practice, would be most critical.

Social Services

There are no federal, state, or local day care service norms. Currently, there are licensed spaces available to serve 1.5 percent of the Anchorage area population, assuming the present level to be adequate. Table 85 illustrates projection of spaces needed on the basis of serving 1.5 percent of the given population (Alaska Department of Health and Social Services, 1978).

Projection of numbers of unemployment insurance recipients are based upon the existing rate of claimants or 6.5 percent of the Anchorage population.

Table 86 describes the anticipated number of recipients assuming maintenance of the same rate.

The current supply of low rent housing (854 units) serves approximately 10.4 percent of the low income population. Assuming the proportion of eligible low income residents to the total Anchorage population will remain the same (14 percent), table 87 illustrates projected levels of low income housing needed based on a 33 percent penetration rate of the identified population.

TABLE 86

CUMULATIVE DAY CARE NEEDS

PRUDHOE LOW COMPARED TO NON-OCS CASE

Year	Non-OCS Day Care	Prudhoe Low Day Care Needs	Total Prudhoe Low Day Care	% of Change
1980	2,919	3	2,922	0.1
1985	3,515	14	3,529	0.4
1990	3,823	86	3,909	2.2
1995	4,246	148	4,394	3.5
2000	4,839	191	5,030	3.9

TABLE 87

CUMULATIVE UNEMPLOYMENT ASSISTANCE NEEDS

PRUDHOE LOW COMPARED TO NON-OCS CASE

Year	Non-OCS Unemployment	Prudhoe Low Unemployment	Total Prudhoe Low Unemployment	% of Change
1980	12,651	9	12,660	0.01
1985	15,235	61	15,296	0.41
1990	16,569	370	16,939	2.21
1995	18,399	645	19,044	3.51
2000	20,969	838	21,797	4.01

TABLE 88

CUMULATIVE LOW INCOME HOUSING NEEDS

PRUDHOE LOW COMPARED TO NON-OCS CASE

Year	Non-OCS Low Income Housing	Prudhoe Low Low Income Housing Needs	Total Prudhoe Low Low Income Housing	% of Change
1980	3,017	2	3,019	0.1
1985	3,633	14	3,647	0.4
1990	3,951	85	4,036	2.2
1995	4,396	148	4,544	3.4
2000	5,000	190	5,190	3.8

Transportation

The Prudhoe Low scenario falls about 79,096 people below the 1995 population estimates used for transportation planning purposes. The scenario Increment reflects only a modest addition of population (12,734 by 2000) over the non-OCS case. Because this occurs largely after 1985, the short-range improvement should be completed and available. Any additional impacts beyond those already outlined in the non-OCS case are unlikely.

Financial Capacity and Capital Requirements

The Prudhoe Low scenario adds 12,734 people to the population between 1985 and 2000. While small, this 3.7 percent cumulative increase adds to the non-OCS scenario at a time when the latter's growth rate is slowing. The increment is basically insufficient to have a significant impact on service expenditures. However, this addition would have a modest stimulative effect on the economy and general revenue base. Because of this, any increase from the Prudhoe Low scenario would have to be positive in terms

of the financial position of the local government.

CAUSE/EFFECT OF IMPACTS

The overall population impact is minimal in the Prudhoe Low scenario and the effects are distributed over some 15 years. Anchorage would be capable to not only handle but benefit from the development.

PROBLEMS/ISSUES AFFECTING THE ANCHORAGE INFRASTRUCTURE AND MUNICIPAL DELIVERY SYSTEM

No additional problems and issues affecting the community in the case of this scenario are foreseen.

Summary of Impacts

The following matrix displays the services likely to be impacted through the period under study. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrix. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifiers are discussed in the respective sections on overview of infrastructure standards and description of services likely to be impacted.

PRUDHOE LOW OCS SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	194,770	235,326	260.607	292,985	335,342
Education: Primary/Secondary - No. of Manpower/Facilities	1	8			102
Public Postsecondary - No. of Credits	46	364	2,2::	4,2::	5,807
Public Safety: Police - Manpower	0	2	9	15	20
State Troopers - Manpower	0	0	1	2	2
Fire: Manpower	0	1	8	15	19
Leisure: Play Lots	0	1	3	4	5
Neighborhood Parks	0	0	1	1	1
Softball Diamonds	0	0	2	3	4
Basketball Courts	0	2	12	19	25
Swimming Pools	0	0	1	1	1
Skating Rinks	0	0	0	0	1
Community Centers	0	0	0	0	1
Utilities: Water - (Millions of Gallons per Day)	0	0.2	1.2	2.0	2.6
Sewer - (Millions of Gallons per Day, Wastewater Generated)	0.1	0.1	0.9	1.6	2.0
Electricity					
Telephone[a]					
Solid Wastea					
Housing: Units	43	301	1,838	3,198	4,108
Health: Bed Needs	0	2	11	19	24
Primary Care Physicians	0	2	7	13	16
Social Services: Day Care Space	3	14	86	148	191
Unemployment Claimant	9	61	370	645	828
Low Income Housing Units	2	14	85	148	190
Transportationa					
Financial Capacity and Capital Requirements[a]					

[a]See Section on Overview of Infrastructure Standards

V. PROJECTED IMPACTS OF OCS DEVELOPMENT - CAPE HALKETT SCENARIO

Introduction

The Cape Halkett scenario produces only a minimal impact on Anchorage. Many services would likely not be affected in that the elastic nature of the service infrastructures would be adequate to absorb these increases under the non-OCS base case. What increases do occur begin at a time when the capacity of the community to respond would be optimal.

COMMUNITY POPULATION AND EMPLOYMENT FORECASTS

Forecasts of population, employment, and personal income (measured as change from the non-OCS case) are shown in table 88. Table 89 shows the industrial distribution of the additional labor force due to the Cape Halkett scenario. As in the other OCS scenarios, virtually all the impact is indirect occurring most in the services and trade industries with significant increases also in finance, government, transportation, and construction.

TABLE 89

CAPE HALKETT SCENARIO TOTAL ECONOMIC IMPACT - ANCHORAGE, 1979-2000[a]

(measured as change from the base)

Year	Population	Employment	Personal Income[b]
1979	0	0	0.000
1980	0	0	0.000
1981	0	0	0.000
1982	0	0	0.000
1983	0	0	0.000
1984[c]	93	44	1.847
1985	256	133	5.595
1986	403	208	8.913
1987	230	95	4.080
1988[d]	431	269	12.107
1989	1,185	907,	41.564
1990	2,661	2,054	96.942
1991	2,909	1,882	91.671
1992[e]	4,224	2,150	111.406
1993	4,811	2,334	125.180
1994	5,431	2,593	143.641
1995	6.,116	2,875	164.734
1996	6,792	3,191	188.816
1997	7,293	3,411	208.156
1998	7,976	3,777	238.129
1999	8,350	3,963	257.469
2000	9,060	4,426	296.816

[a]MAP Regional Model
[b]Millions of dollars
[c]Exploration begins
development begins
[e]Production begins

TABLE 90

INDUSTRIAL DISTRIBUTION OF THE CAPE HALKETT EMPLOYMENT IMPACT[a]

(measured as a change from the base)

	1983		1987		2000	
	Employment	%	Employment	%	Employment	%
Mining	29	8.4	20	1.1	. 56	1.3
Construction	5	5.3	103	5.5	225	5.1
Trade	29	30.5	598	31.8	1,267	28.6
Services	29	30.5	616	32.7	1,743	39.4
Finance	8	8.4	171	9.1	466	10.5
Transportation	9	9.5	185	9.8	303	6.8
State and Local Government	3	3.2	119	6.3	234	.5.3
Other[b]	4	4.2	70	3.7	132	3.0

[a]MAP Regional Model
[b]Includes public utilities, communications, and other

Identification of Impacts

The overview of infrastructure standards and a description of regional and community services likely to be impacted are contained in the non-OCS section of this report.

SIGNIFICANT FACTORS AFFECTING CHANGE

The same factors identified in the non-OCS scenario are anticipated to affect change in the case of all the OCS scenarios.

OVERVIEW OF THE ASSUMPTIONS, METHODOLOGY, AND RESULTS

The same assumptions as were made in the non-OCS scenario are also made in the case of the OCS scenarios except that, with increased population, the fiscal capacity of the local government to provide community facilities and services should improve with the size of the OCS scenario even though the service levels also increase. However, the timelines of implementing service plans also become more critical the larger the OCS scenario impacts.

RESULTS OF ANALYSIS

The following requirements for community facilities and services in the case of this OCS scenario relate only to additional needs above and beyond the non-OCS case. That is, they are facilities and services which will be required solely because of the added increase in population derived from OCS activities.

Telephone utilities will not be discussed because the impact will be negligible or positive. Solid waste is also not treated because no significant impact is foreseen. The issues facing these services are discussed in the non-OCS base case.

Education

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards, table 90 displays the projected student population through the year 2000, number of teachers required, and number of classrooms necessary to accommodate the population projections for the Cape Halkett scenario in five year intervals. The data reflected in table 90 are cumulative.

TABLE 91

ADDITIONAL TEACHER AND CLASSROOM NEEDS - CAPE HALKETT SCENARIO

(cumulative)

Year	Non-OCS Teachers/ Classrooms Requirements	Additional Projected Student Population	# of Teachers/ Classrooms Required	Total # of Teachers Classrooms Required	% of Change
1980	1,557	0	0	1,557	0
1985	1,875	51	2	1,877	0.1
1990	2,039	532	22	2,061	1.1
1995	2,265	1,223	48	2,313	2.1
2000	2,581	1,813	72	2,653	2.8

Public Postsecondary and Career/Vocational Training. Table 91 projects the additional public postsecondary student credit hours expected to occur under the Cape Halkett scenario. The overall effect is slight, and it it likely that normal institutional expansion would cope with additional credits. No standards were developed for private college or vocational/career education.

TABLE 92

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC HIGHER EDUCATION

UNDER THE CAPE HALKETT SCENARIO

Year	Credits Projected	Additional Credits Under Prudhoe Low	Total Credits Projected	% of Change
1980	63,011	0	63,011	.0
1985	85,790	93	85,883	.1
1990	101,324	1,058	102,382	1.0
1995	122,290	2,642	124,932	2.2
2000	147,106	4,131	151,237	2.8

Public Safety

Police. Utilizing the standard developed of 1.52 sworn police officers per 1,000 in the population, table 92 illustrates the cumulative manpower requirements of the Cape Halkett scenario. Statistics indicating the demand for manpower generated from the non-OCS case are presented as well as a total cumulative column indicating the minimal affect of this scenario.

TABLE 93

CUMULATIVE POLICE MANPOWER REQUIREMENTS

CAPE HALKETT SCENARIO COMPARED TO THE NON-OCS CASEa

Year	Non-OCS Case Manpower Requirements	Cape Halkett Additional Manpower Requirements	Total Sworn Force	% of Change
1985	356	0	356	0
1990	387	4	391	1.0
1995	430	9	439	2.1
2000	490	14	504	3.0

[a]It is assumed that areawide police expansion will not be in effect until the early 1980's.

By the year 2000, a force of 504 sworn police officers would be necessary to accommodate a population of 331,668 projected under the Cape Halkett scenario.

Alaska State Troopers. The Cape Halkett scenrio will produce virtually no change in the manpower requirements for the Alaska State Troopers over the non-OCS case projections. It is realistic to assume that the incremental increase in the force produced by the impact of the Cape Halkett scenario would be absorbed by the projected force under the non-OCS case. Table 93 indicates statistically the additional cumulative manpower requirements for this scenario compared to the cumulative manpower projected for the non-OCS case based on the standard of .15 commissioned officers per 1,000 in the population.

TABLE 94

CUMULATIVE ALASKA STATE TROOPERS MANPOWER REQUIREMENTS

CAPE HALKETT SCENARIO COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Cape Halkett Additional Manpower Requirements	Total	% of
1980	29	0	29	0
1985	35	0	35	0
1990	38	1	39	2.6
1995	42	1	43	2.4
2000	48	2	50	4.2

Fire. Table 94 gives a comparison of the cumulative manpower requirements of the proposed Cape Halkett scenario and the non-OCS case. A total column is presented to illustrate the minimal impact

of this scenario. The present ratio of 1.47 fire department personnel per 1,000 in the population is offered as the measure to assess the need for additional manpower under this scenario.

TABLE 95

CUMULATIVE FIRE DEPARTMENT PERSONNEL REQUIREMENTS

CAPE HALKETT SCENARIO COMPARED TO THE NON-OCS CASE

Year	Non-OCS Case Manpower Requirements	Cape Halkett Additional Manpower Requirements	Total Force	% of Change
1980	286	0	286	0
1985	345	0	345	0
1990	375	4	379	1.1
1995	416	9	425	2.2
2000	474	14	488	3.0

Depending on the profile of urban development, it is conceivable that the Anchorage Fire Department might absorb the additional population impacted by the Cape Halkett scenario until 1995 at which time the demand for services may dictate additions to the force.

Leisure

Utilizing the standards presented in the overview of infrastructure standards, table 95 illustrates the cumulative requirements of the Cape Halkett scenario. Need data from the non-OCS case are presented as well as the total cumulative column indicating the affect of the scenario. (No increases in facility needs are projected for 1980.)

TABLE 96

RECREATION FACILITY NEEDS

CAPE HALKETT SCENARIO COMPARED TO NON-OCS CASE

Facilities	Year	Non-OCS Case	Cape Halkett Needs	Total Needs	% of Change
Play Lots	1985	93	0	93	0
Neighborhood Parks		23	0	23	0
Softball Diamonds		78	0	78	0
Basketball Courts		468	1	469	.2
Swimming Pools		23	0	23	0
Skating Rinks		7	0	7	0
Community Centers		9	0	9	0
Play Lots	1990	101	2	103	2.0
Neighborhood Parks		25	0	25	0
Softball Diamonds		84	0	84	0
Basketball Courts		509	6	515	1.2
Swimming Pools		25	0	25	0
Skating Rinks		8	0	8	0
Community Centers		10	0	10	0
Play Lots	1995	113	2	115	1.8
Neighborhood Parks		28	0	28	0
Softball Diamonds		94	0	94	0
Basketball Courts		566	12	578	2.1
Swimming Pools		28	0	28	0
Skating Rinks		9	0	9	0
Community Centers		11	0	11	0
Play Lots	2000	129	3	132	2.3
Neighborhood Parks		32	1	33	3.1
Softball Diamonds		107	1	12	0.9
Basketball Courts		645	18	663	2.8
Swimming Pools		32	1	33	3.1
Skating Rinks		10	1	11	10.0
Community Centers		12	1	13	8.3

As existing facilities become saturated, the interest and, support for a recreational/cultural/sports complex will increase. It will become easier for local and state decision-makers to justify the necessary expense for such a project; so too, will the support for cultural and art related

activities and agencies. With increasing demands on local recreation dollars, it will be necessary for art interest groups to better justify their dollar requests, demonstrating their ability to fulfill the needs of the entire art community. This may, in turn, result in the expansion of their programs to include less costly and more easily accessible activities.

Utilities

Water. The 22-year population projection under this petroleum scenario will impact Anchorage with an additional population of 9,060 by the year 2000 over the non-OCS case. The effect of the Cape Halkett scenario on the Anchorage water supply might be a slight increase in the implementation of Plans I and II for the development Ship Creek. However, in the early 1980's with the addition of Plan II, Cape Halkett will pose no impact on the Anchorage water supply over the period under study. Current water resources in use plus the additions of Plans I and II place production at 255 million liter per day (mid) (67.4 million gallons' per day [mgd]). The Cape Halkett scenario will requires production level of 255 mld (67.3 mgd) based on the standard of 768 liter per capita per day (203 gallons per capita per day [gpcpd]).

Sewer. Based on the standard of 613 lpcpd (162 gpcpd), the Cape Halkett scenario will generate 203 mld (53.7 mgd) of wastewater by the year 2000. This falls below the planned expansion of the Anchorage Sewer Utility designed to accommodate approximately 376,000

people by 1995. This scenario should pose no impact on the expansion plans of the utility provided that plans can be implemented on schedule.

Electricity. Since the utilities are continually expanding based on the variables noted in the overview of infrastructure standards, the addition of 9,060 people under this scenario by the year 2000 over the non-OCS case should not affect the pace of development of additional generation facilities.

Housing

The Cape Halkett scenario has only a modest impact on the housing market (see table 96). Demand is spread over 15 years and averages less than 200 additional units per year over the no growth scenario. On the one hand, this brings the market over its slack period after 1987 but never comes close to the capacity developed during the mid-1970's. The conclusion is that the housing impacts of Cape Halkett are minor but positive by partially filling excess construction capacity.

TABLE 97

CUMULATIVE HOUSING REQUIREMENTS - CAPE HALKETT SCENARIO

Year	Non-OCS Case Housing Requirements	Cape Halkett Additional Units Required	Total Units	% of Change
1980	55,297	0	55,297	0
1985	78,635	83	78,718	.1
1990	85,518	858	86,376	1.0
1995	95,145	1,973	97,118	2.1
2000	108,230	2,923	111,153	2.7

Health

Utilizing the standard of 550 inpatient days per 1,000 population at 85 percent occupancy, table 97 illustrates the acute care bed need requirement of the Cape Halkett scenario. Bed need as determined under the non-OCS case is included as well the total effect of the scenario.

TABLE 98

CUMULATIVE ACUTE CARE BED NEED PROJECTIONS

CAPE HALKETT SCENARIO COMPARED TO NON-OCS CASE

Year	Non-OCS Bed Need	Cape Halkett Bed Need	Total Bed Need	% of Change
1980	453	0	453	0
1985	453	0	453	0
1990	493	5	498	1.0
1995	547	12	559	2.1
2000	624	17	641	2.7

Using the standard of one primary care physician per 800 population, table 98 illustrates the increased cumulative need for primary care physicians based upon the Cape Halkett scenario as compared to the needs presented in the non-OCS scenario.

TABLE 99

CUMULATIVE PRIMARY CARE PHYSICIAN NEEDS PROJECTION

CAPE HALKETT SCENARIO COMPARED TO NON-OCS CASE

Year	Non-OCS Physicians Needed	Cape Halkett Physicians Needed	Total Physician Needed	% of Change
1980	243	0	243	0
1985	292	1	293	0.3
1990	318	3	321	0.9
1995	353	8	361	2.3
2000	403	11	414	2.7

The increase in demand over the non-OCS scenario for other health care facilities and services under Cape Halkett would be minimal. Most critical would be the need for additional primary care physicians.

Social Services

There are no federal, state, or local day care service norms. Currently, thereare licensed spaces available to serve 1.5 percent of the Anchorage area population, assuming the present level to be adequate. Table 99 illustrates projection of spaces needed on the basis of serving 1.5 percent of the given population (Alaska Department of Health and Social Services, 1978).

Projection of number of unemployment insurance recipients are based upon the existing rate of claimants or 6.5 percent of the Anchorage population. Table 100 describes the anticipated number of recipients assuming maintenance of the same rate.

The current supply of low rent housing (854 units) serves approximately 10.4 percent of the low income population. Assuming the proportion of eligible low income residents to the total Anchorage population will remain the same (14 percent), table 101 illustrates projected levels of low income housing needed based on a 53 percent penetration rate of the identified population.

TABLE 100

CUMULATIVE DAY CARE NEEDS

CAPE HALKETT COMPARED TO NON-OCS CASE

Year	Non-OCS Day Care	Cape Halkett Day Care Needs	Total Cape Halkett Day Care	% of Change
1980	2,919	0	2,191	0
1985	3,515	4	3,519	0
1990	3,823	40	3,863	1.0
1995	4,246	91	4,337	2.1
2000	4,839	136	4,975	2.8

TABLE 101

CUMULATIVE UNEMPLOYMENT ASSISTANCE NEEDS

CAPE HALKETT COMPARED TO NON-OCS CASE

Year	Non-OCS Unemployment	Cape Halkett Unemployment	Total Cape Halkett Unemployment	% of Change
1980	12,651	0	12,651	0
1985	15,235	17	15,252	0.1
1990	16,569	173	16,742	1.0
1995	18,399	398	18,797	2.2
2000	20,969	589	21,558	2.8

TABLE 102

CUMULATIVE LOW INCOME HOUSING NEEDS

CAPE HALKETT COMPARED TO NON-OCS CASE

Year	Non-OCS Low Income Housing	Cape Halkett Low Income Housing Needs	Total Cape Halkett Low Income Housing	% of Change
1980	3,017	0	3,017	0
1985	3,633	4	3,637	.1
1990	3,951	40	3,991	1.0
1995	4,396		4,487	2.1
2000	5,000	1::	5,135	2.7

Transportation

The Cape Halkett scenario falls about 82,895 people below the 1995 population estimates used for transportation planning purposes. The scenario increment reflects only a modest addition of population (9,060 by 2000) over the natural increase. Because this occurs largely after 1985, the short-range improvement should be completed and available. Any additional impacts beyond those already outlined in the non-OCS case are unlikely.

Financial Capacity and Capital Requirements

The Cape Halkett scenario adds 9,060 people to the population between 1985 and 2000. While small, this 2.7 percent accumulative increase adds to the non-OCS scenario at a time when the latter's growth rate is slowing. The increment is basically insufficient to have a significant impact on service expenditures. However, this addition would have a modest stimulative effect on the economy and general revenue base. Because of this, any increase from

the Cape Halkett scenario would have to be positive in terms of the financial position of the local government.

CAUSE/EFFECT OF IMPACTS

The overall population impact is minimal in the Cape Halkett scenario and the effects are distributed over some 15 years. Anchorage would be capable to not only handle but benefit from the development.

PROBLEMS/ISSUES AFFECTING THE ANCHORAGE INFRASTRUCTURE AND MUNICIPAL DELIVERY SYSTEM

No additional problems and issues affecting the community in the case of this scenario are foreseen.

Summary of Impacts

The following matrix displays the services likely to be impacted through the period under study. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrix. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifiers are discussed in the respective sections on overview of infrastructure standards and description of services likely to be impacted.

CAPE HALKETT OCS SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	194,635	234,649	257,571	289,186	331,659
Education: Primary/Secondary - No. of Manpower/Facilities	0	2	22	48	72
Public Postsecondary - No. of Credits	0	93	1,058	2,642	4,131
Public Safety: Police - Manpower	0	0	4	9	14
State Troopers - Manpower	0	0	1	1	2
Fire: Manpower	0	0	4	9	14
Leisure: Play Lots	0	0	2	2	3
Neighborhood Parks	0	0	0	0	1
Softball Diamonds	0	0	0	0	1
Basketball Courts	0	1	6	12	18
Swimming Pools	0	0	0	0	1
Skating Rinks	0	0	0	0	1
Community Center	0	0	0	0	1
Utilities: Water - (Millions of Gallons per Day)	.0	.0	0.6	1.2	1.8
Sewer- (Millions of Gallons per Day, Wastewater Generated)	.0	.0	0.4	0.9	1.4
Electricity					
Telephone[a]					
Solid Waste[a]					
Housing	0	83	858	1.973	2,923
Health: Bed Needs	0	0	5	12	17
Primary Care Physicians	0	1	3	8	11
Social Services: Day Care Space	0	4	40	91	136
Unemployment Claimant	0	17	173	398	589
Low Income Housing Units	0	40	40	91	135
Transportation					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

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