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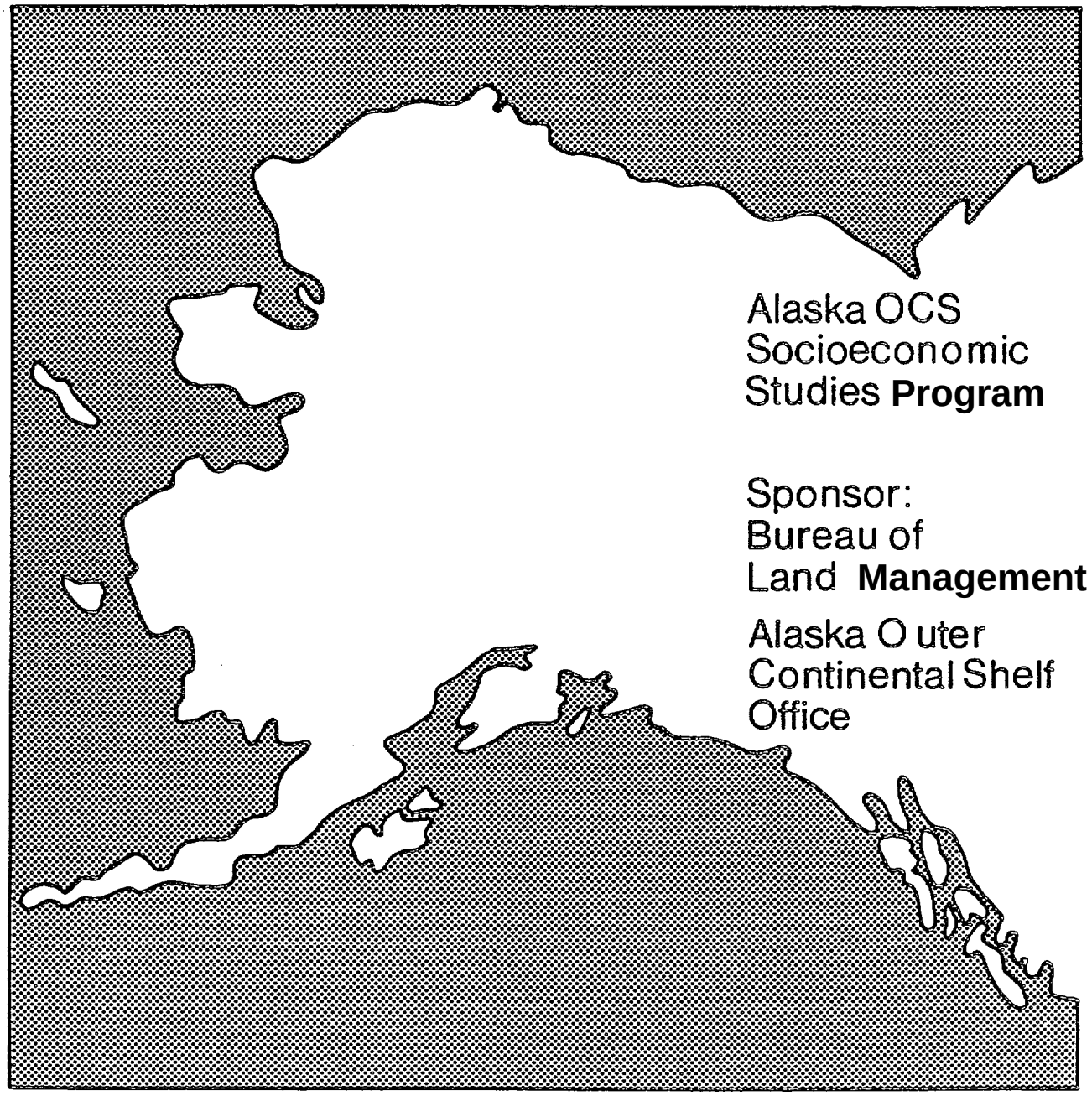

Alaska OCS
Socioeconomic
Studies **Program**

Sponsor:
Bureau of
Land **Management**

Alaska Outer
Continental Shelf
Office

Gulf of Alaska and Lower Cook Inlet Petroleum Development Scenarios Anchorage Impact Analysis

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 (SESP).

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 overall methodology is divided into three broad research components. The first component identifies an alternative set of assumptions regarding the location, the nature, and the timing of future petroleum events and related activities. In this component, the program takes into account the particular needs of the petroleum industry and projects the human, technological, economic, and environmental offshore and onshore development requirements of the regional petroleum industry.

The second component focuses on data gathering that identifies those quantifiable and qualifiable facts by which OCS-induced changes can be assessed. The critical community and regional components are identified and evaluated. Current endogenous and exogenous sources of change and functional organization among different sectors of community arid regional life are analyzed. Susceptible community relationships, values, activities, and processes also are included.

The third research component focuses on an evaluation of the changes that could occur due to the potential oil and gas development. Impact evaluation concentrates on an analysis of the impacts at the statewide, regional, and local level.

In general, program products are sequentially arranged in accordance with BLM's proposed OCS lease sale schedule, so that information is timely to decisionmaking. Reports are available through the National Technical Information Service, and the BLM has a limited number of copies available 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

GULF OF ALASKA AND LOWER COOK INLET PETROLEUM DEVELOPMENT SCENARIOS

ANCHORAGE IMPACT ANALYSIS

VOLUME II

Prepared by

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AND

BUREAU OF LAND MANAGEMENT

ALASKA OUTER CONTINENTAL SHELF OFFICE

January 1980

NOTICE

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Alaska OCS Socioeconomic Studies Program
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TABLE OF CONTENTS

TABLE OF CONTENTS, continued

TABLE OF CONTENTS, continued

TABLE OF CONTENTS, continued

TABLE OF CONTENTS, continued

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES, continued

LIST OF TABLES, continued

LIST OF TABLES, continued

LIST OF TABLES, continued

LIST OF TABLES, continued

I. INTRODUCTION

The Municipality of Anchorage is the urban center of Alaska and the hub for transportation, financial and business services, trade, and government throughout the state. The organization and development of the oil and gas industry throughout the state have both direct and indirect impacts of the services and population of Anchorage.

Directly, a large portion of the support and administrative personnel for the oil and gas fields in Prudhoe Bay and the construction of the trans-Alaska pipeline were located in Anchorage. This included personnel residing in Anchorage, though working elsewhere, and headquarter and administrative offices located here. In addition, as the service center of Alaska, Anchorage was the focus of much of the movement of goods and services related to development. 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 metropolis. In keeping with past trends, it is expected that future OCS oil and gas exploration and production will affect the Anchorage infrastructure by stimulating population increases and economic growth.

The purpose of this study is to assess the future impacts of oil and gas development in three potential OCS lease areas - Northern Gulf of Alaska, Western Gulf of Alaska, and Lower Cook Inlet. For each of the areas, non-

OCS cases were developed which projected the region's growth without the effects of the particular OCS lease sale. Also, OCS scenarios were projected for each lease area. 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. Both the non-OCS and OCS scenarios are analyzed in relation to the man-made physical environment of Anchorage. Based on projections of the population and labor force, community infrastructure requirements in the case of non-OCS scenarios and additional requirements likely to be generated by each of the OCS scenarios have been examined.

To accomplish this goal, this volume must be placed in the context of the companion document: Volume I, Socioeconomic and Physical Baseline. This volume provides the historical and current data base which is imperative to understand in order to give the standards, assumptions, and projections found in the impact document a proper perspective.

This volume is divided into four major sections:

- The first is a chapter concerning the "Impacts of Infrastructure Standards." This chapter outlines both the quantitative and qualitative standards designed to project impacts on the community's infrastructure due to non-OCS and OCS growth projections. Key indicators are derived from the following service areas:
  - Education
  - Public Safety
  - Leisure

- Utilities
- Housing and Land Use
- Health
- Social Services
- Transportation
- Financial Capacity and Capital Requirements

The remaining three chapters deal with lease sale areas. Each area constitutes a single chapter - Northern Gulf of Alaska, Wester Gulf of Alaska, and Lower Cook Inlet. Within each of the lease sale impact chapters, three major sections are defined. First, the community population and employment forecasts are introduced and reviewed. Second, the non-OCS cases are assessed in terms of their impact on the Anchorage infrastructure using the standards noted above. Finally, the OCS scenarios are analyzed in terms of their incremental effects in relation to a specified non-OCS base case.

The lease sale chapters are not necessarily comparable and care should be taken in using and interpreting the results. The success of any projection is always found in its capacity to accurately reflect the future. This, of course, is only as good as the model's construction and the assumptions that are used in deriving it. Before the particular lease sale forecasts are reviewed, some general discussion of Anchorage regional forecasts is necessary to place the process in perspective.

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 set of 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 set of comparative bases for each of the OCS scenarios.

The Institute of Social and Economic Research (ISER) described the impact assessment process in their Northern Gulf Report: "Changes in the economy which result from the development of OCS resources can be defined as the impact of this development. The impact can only be described as changes from a certain pattern of economic growth which would have occurred without OCS development. The base case describes the projected growth of the economy without the development for which the impact is to be measured. Comparing two projections of the economy, the base case and the OCS case will define the impact of OCS development." (University of Alaska, ISER, 1979a)

The process of building a non-OCS base case can be done a number of ways. The MAP model developed by ISER has not been a static approach to forecasting but has changed substantially over the life of the OCS studies program. Major improvements in the assumptions and equations deriving the model have produced widely differing population forecasts for Anchorage.

In their first use of the model for the OCS program, ISER discusses the

parameters of their approach. "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) is ales" gned 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, ISER, 1978b)

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 is, would the projected impact on non-OCS base case scenarios for Anchorage be different if the community were 250,000 or 275,020 in

a given year. The economic dynamics of those additional people in the base case could slightly alter the magnitude of expected impacts from any development scenario.

The Northern and Western Gulf projections produced higher rates of growth for the non-OCS case. With similar disclaimers concerning the tenuous nature of forecasting, the report removed the words, "very conservative," and discussed the base case as more of a reasonable prediction of actual growth. Much of these changes were reflected in forecasts made for the Southcentral Alaska Water Resources Study which was a more optimal prediction.

While these forecasts correspond more closely to other projections made for Anchorage, an evaluation of the assumptions suggested that the forecasts were unrealistically high. It'was felt that the internal dynamics of the model forced up the forecasts without sufficient corresponding economic activity. The major change involved alterations in the wage rate equations. Of less influence was a change in the real price index equation. These and several other less influential alterations have made the predictions lower than previous modeling exercises. Figure one compares the Anchorage moderate non-OCS base cases for four lease sale areas.

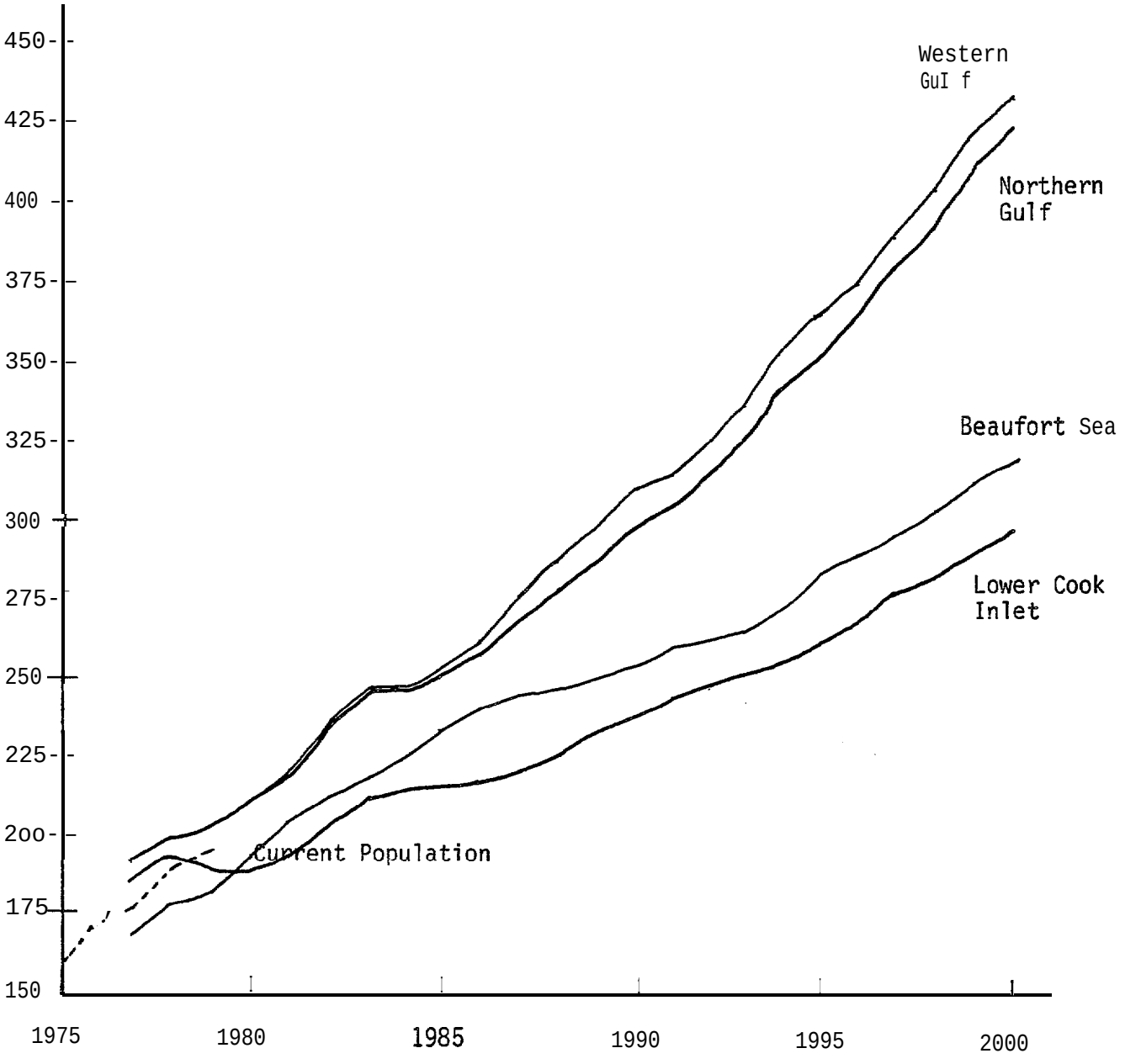


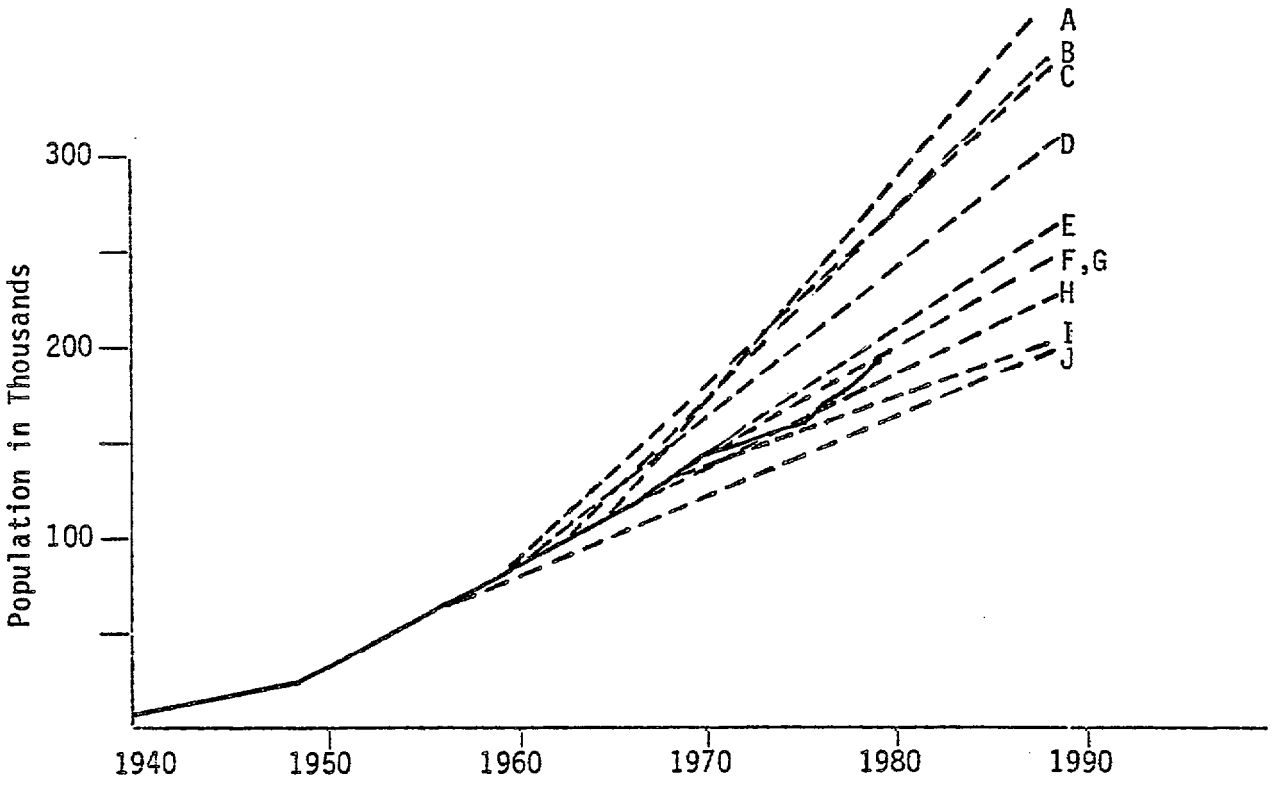
FIGURE 1

ANCHORAGE POPULATION NON-OCS FORECASTS BY LEASE SALE AREAS

While the Lower Cook Inlet forecast is the most conservative, its approach places in question more expansive scenarios of growth made by previous forecasts. The equations were altered to reflect more realistically. the effects of economic growth by trying to "capture the essence of the Alaska growth process."

As with any model, the further into the future and the more the data are disaggregate to the regional or local level or to a specific year, the less confidence one can have of the results. A model is also as good as the relevance of the model's historical structure and the accuracy of the assumptions about the level, timing, and distribution of the exogenous variables.

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 two. 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 that the 1979 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, Rips &"Associates	257,000
F	1964 - Real Estate Research Corporation	244,000
G	1965 - Lounsbury-Sleavin-Kel ly	244,000
H	1964 - City of Anchorage Planning Comm.	220,000
I	1959 - Wilbur Smith & Associates	200,000
J	1956 - Coverdale and Colpitts	195,000

. FIGURE 2

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 one. 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. A mid-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 1

COMPARISON OF POPULATION FORECASTS OF ANCHORAGE

Year	Projection Method		Population 1978	Population 1990
1972	GAAB[a], cohort survival method	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 methods		216,079	313,398
1974	MAP, [b] limited growth, $3 wellhead 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
1979	Southcentral Alaska Water Resources Study (Intermediate)[f]		184,965	256,019

[a]GAAB, Population Projections 1970-1995, December 1974

[b]V. Fischer, Regional Effects of Anchorage Metropolitan Growth, 1976

[c]L. Huskey, Anchorage Population Growth to 1995, 1977

[d]U. S. Army Corps of Engineers, Metropolitan Anchorage Urban Study, 1977

[e]Breakthrough Booklet Packet, 1978

[f]ISER, February 1979

In 1979, ISER published an optimal or "best" estimate of growth for Anchorage as part of the Water Resources Study. This produced the most conservative estimate and was 100,000 below their estimate made in 1977, and reaches only 405,035 by the year 2000. While these are only a sample of' the total number of forecasts done, they do highlight the difficulty in estimating future growth.

This volume utilized three non-OCS base case forecasts each which produce a low, moderate, and high projection. There is less than a five percent difference between the low and high cases within each set, but the variation between the lease areas base forecasts is substantial (see figure two).

Since the intent of this study is to measure disaggregate OCS scenario impacts, the base case is not the critical focus of the study's objectives. However, in so much as the non-OCS case because of its size produces a different conclusion concerning OCS impacts, the base case is critical. An OCS increment on a sluggish, slowly expanding base might be seen as an economic benefit with little influence on services. OCS effects on a rapidly growing base case, which is straining existing service structures, could be seen as injurious,

Despite these uncertainties, the program provides an invaluable set of tools to look into the future and describe reasonable scenarios of impact.

II. OVERVIEWOF 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 employment. The standards combine both nationally established norms and local standards derived from historical data on the Anchorage community.

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 20.47 students per teacher (with 1,725 teachers and 35,310 students). Nevertheless, because special education requires approximately one teacher per 12 students (Harper, Community Contact, 1978), the standard student ratio of 27 to one 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.

For assessing classroom requirements through the period under study, the ratio of 25 students per classroom will be used as the standard for analysis.

Between now and the fall of 1985, the district will phase out 107 elementary classrooms and add 55 junior high classrooms. Assuming that the teacher ratio stays approximately the same, the 1,499 rooms remaining in 1984 could support about 37,475 students. This is very close to the School Board's conservative projection of 37,726. The reason for this conservative assessment is the low growth rate of the student population in the 1970's. From 1970 to 1979, the student population rose at a rate only one--fifth the growth rate of the whole population. The influx of new residents are composed largely of young, unmarried men and women and young couples who do not have children or whose children are below the age of' five. In addition, the higher transiency of this population keeps many of these preschoolers from reaching the Anchorage system. Moreover, present enrollments in the school district are affected by the number of students attending private Anchorage institutions (3.8 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). In recent years, the percent of public school children within the population has declined from 24 to 20 percent. In 1975 it was 23.0 percent; in 1977 it was 20.9 percent; and 1978 it was 20.3 percent. Considering the demographics of the community, the proportion of the school age population will likely bottom out at some point in the future. When this will be is difficult to predict. However, comparing the School Boards projections for 1985 to the moderate non-OCS case for the Northern

Gulf suggests that only 15.2 percent of the population will be in primary and secondary schools. Even the more conservative Lower Cook Inlet non-OCS case projects only 17.5 percent of the population would be students when using the School District's projections. This prediction conflicts with the MAP model population forecasts which suggest that the school age population is stable through the end of this century at about 26 percent. Subtracting out early graduates and those not in the public system places the attendance ratio at about 20 percent which is the present level. 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 the 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 1.008 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 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 possible 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 affect the evaluation of the usefulness of the schools located in the central areas.

Because of this assessment, a sliding ratio for projection of the non-OCS case will be used. This will begin at 20 percent and drop annually to 18 percent by 1985 and return to 20 percent by 1990, stabilizing at that point. For the incremental effects of the OCS scenarios, a constant. 18 percent of' the population is used to project primary and secondary school enrollment.

Another issue 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. Because of this, no standards will be tied to expenditures.

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 4.1 to 4.4 percent. Continued expansion beyond this 4.4 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 1.2 to 2.0 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.

Based on the assumption that the well established Anchorage Community College (ACC) has reached its potential penetration of the population, maintaining four to four and one-half 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. It is estimated that UAA will slowly increase its share to 4.0 percent by 2000. 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. UAA has increased its credit for student ratio from 4.3 to 5.1 in the past two years, and this is expected to rise to 6.0 over the projection period. ACC as it continues to stress a community education model should maintain its present credit per student ratio of between 5.4 and 5.9.

Private Nonprofit

There are no quantifiable standards for the one private nonprofit university in Anchorage, Alaska Pacific 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 has hair design, business, etc., they will be viable enterprises.

Public Safety

POLICE

When the Anchorage Police Department (APD) completes the annexation process in 1979, the ratio of sworn officers per 1,000 in the population will be 1.79 based on the 1979 APD service area population estimate of 155,732 (Anchorage Urban Observatory, University of Alaska, population estimate.)

This falls below the national average of 2.1 sworn officers per 1,000 in the population; however, no recommended national standard has been deemed valid in assessing manpower requirements for cities the size of Anchorage. Each city's workload and associated crime profile is unique, and no one standard or model has yet to be designed to assess service/manpower requirements. (Gorski, Community Contact, 1978a).

At a minimum, the APD would like to maintain this current ratio, but this figure is by no means firm. Variables such as the number of requests for service, incidence of Part I crimes (murder, rape, robbery, aggravated assault, burglary, larceny, and auto theft), budgetary constraints, and population shifts could realistically increase or decrease this ratio of police to the total population.

However, for the purposes of assessing future 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 1.79 sworn officers per 1,000 in the population. The standard is calculated to reflect the lack of jurisdictional control over military personnel.

ALASKA STATE 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 on the passage of Proposition 8 can be found in Volume I, Socioeconomic and Physical Baseline.) However,

the Troopers will continue to provide law enforcement services for some of the peripheral areas of Anchorage, but the main thrust will be toward increase highway patrol for the entire Municipality.

There are no plans to decrease the size of the force because of the territorial expansion of the Anchorage Police Department. The Troopers will continue to maintain between three and five units on duty at any one shift. The total force presently consists of 38 commissioned officers which includes 20 patrol units. For the purpose of assessing the impact of future population growth on the Alaska State Troopers, the present ratio of .10 patrol officers per 1,000 in the population will be the standard in use. This ratio is based on a population of 195,254 for the Municipality in 1979 (Anchorage Urban Observatory population estimate.)

For those peripheral areas which will continue to receive law enforcement and traffic patrol from the Alaska State Troopers, the ratio of commissioned officers per 1,000 in the population is 2.0. This ratio is based on a population of 18,924 for the territory outside the APD .-jurisdiction. However, it. is assumed that in the early 1980's, areawide police service will be in effect. Therefore, this standard is offered only for information purposes and will not be used to assess future impact.

a

FIRE

The Anchorage Fire Department currently employs 278 people on the force. Two hundred 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, refer to Volume I, Socioeconomic and Physical Baseline.)

Utilizing the 1979 population estimate for the Anchorage Fire Department service area of 172,364 (Anchorage Urban Observatory population estimate), a ratio is established at 1.61 fire department personnel per 1,000 in the population. This figure is merely a current ratio and not a set national standard. However, the ratio is offered as a means of assessing manpower requirements for future population growth. Although portions of the Municipality are receiving volunteer fire fighting services, it is assumed that if these areas become part of the service districts, the manpower level will closely reflect the 1.61 personnel per 1,000 in the population.

It is important to note that planning for expansion in the area of fire protection is closely related to the Insurance Service Office (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 fire fighting. The above mentioned factors make each city unique in determining its level of need for acquisition of manpower and equipment.

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 federal government support leisure primarily through grants for art activities arid 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 2 illustrates optimum standards based upon National Recreation and Park Association recommendations and adopted for local conditions and local availability of specific types of recreational activities and programs.

Upon first glance, one would assume there is sufficient park and recreational land available to residents of the Anchorage area. While there is an excess of land designated as regional parks and open space, there is a severe shortage of the smaller pJay lots, neighborhood and community parks, which tend to receive heavier use. Many residential areas of town have grown so rapidly that dedication of park space has become a secondary priority. The greatest need seems to be for park areas which promote a wide variety of activities, i.e. ball lots, courts, playground equipment, etc. While outdoor skating rinks are abundant, closed or indoor rinks are strained to meet the demand of many who enjoy this inexpensive winter sport. Due to the number of months spent inside, Anchorage residents and their clubs and organizations could well support additional community centers.

TABLE 2

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

Activity	Optimum[b]	Locally Available
Play Lots Lots/.40 hectares (acre)/500-2,500 population	80	39
Neighborhood Parks 2.0 hectares (5 acres)/2,000-10,000 population	20	14
Community Parks 8.1-40.5 hectares (20-100 acres)/10,000-50,000 population	4-20	12
Large Urban Parks 40.5+ hectares (100+ acres)/50,000 population	4	2
Regional Parks 64.8 hectares (160+ acres)/area	1	5
Softball Diamonds (180 ft. or longer) 1/3,000 population		
Baseball Diamonds (300 ft. or longer) 1/10,000 population	20	14
Basketball Courts 1/2000 population	100	300±
Swimming Pools 1 (22.9 meters [25 yards]) /25,000 population 1 (50.0 meters [46 yards]) /75,000 population	8 3	5[c] 1
Skating Rinks (pleasure) 1/5,000 population	40	92
Hockey Rinks 1/15,000 population	13	5
Community Centers 1/25,000 population	8	5
Tennis Courts 1/2,000 population	20	60
Shooting Ranges 1/50,000 population	4	1

TABLE 2, continued

Activity	Optimum	Locally Available
Golf Course (18 hole) 1/50,000	4	1

[a]National Recreation and Park Association with local adaptions (MDA: Department of Cultural and Recreational Services, 1979)
[b]Using 200,000 population for calculations
[c]YMCA, Public Schools

Strict use of space standards (acreage per population) does not provide the flexibility in application needed for evaluation of municipalities with certain distinct characteristics. Location and size standards have also been considered in adapting national standards to more accurately reflect local needs.

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 to 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 3 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 non-residents.

TABLE 3

SPORT FISHING, HUNTING AND TRAPPING LICENSES FOR

ALASKAN RESIDENTS AND NONRESIDENTS

Fishing/Hunting/Trapping Licenses Sold	Resident	Nonresident	Total
1977	145,444	52,015	249,474
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 of the state's 411,211 population. Although specific totals are not available for the Anchorage area, one may assume a proportionate level of sales based upon the local population.

Utilities

WATER

Estimates of the water requirements for the Anchorage area have been computed to the year 2025 by the U.S. Army Corps of Engineers in the Metropolitan Anchorage Urban Study (MAUS), Volume 5, Water Supply. Table 4 depicts these figures and takes into account present capacity and planned improvements.

TABLE 4

PROJECTED ADDITIONAL WATER REQUIREMENTS

FOR THE THREE MAJOR WATER UTILITIES[a]

Year	Requirements
1980	15.5 mld[b] (4.1 mgd)[c]
1985	51.1 mld (13.5 mgd)
1990	88.6 mld (23.4 mgd)
1995	131.0 mld (34.6 mgd)
2000	171.8 mld (45.4 mgd)
2025	308.5 mld (81.5 mgd

[a]Metropolitan Anchorage Urban Study
[b]mld = million liters per day
[c]mgd = million gallons per day

Accurate reporting of consumption figures is a problem with a primarily unmetered water system; however, the U.S. Army Corps of Engineers analyzed water consumption data from both Central Alaska Utilities (CAU) and the Anchorage Water Utility and derived a best estimate per capita consumption figure of 594 liters per capita per day (lpcpd) (157 gallons per capita per day [gpcpd]). This figure is assumed to be a close approximation of the average commercial, industrial, and residential consumption and will be used as the standard to assess future water requirements through the period under study. 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).

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 is not entirely true it is necessary to point out that expansion by utilities is being planned on the basis of population saturation in the Anchorage bow".

The resultant of the above two conditions are accentuated water production and 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 594 lpcpd (157 gpcpd), wastewater generation standard can be established at 477 lpcpd (126 gpcpd).

Table 5 indicates the MAUS water demand projections through the year 2000 and the corresponding wastewater generation.

TABLE 5

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 o-F gallons per day

The 477 lpcpd (126 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. Variables 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 demand figures. Table 6 indicates kilowatt. hour consumption figures for residential and commercial/industrial sectors 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 6

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

The above usage rates yield a power consumption ratio for residential versus commercial/industrial of approximately 25 percent to 75 percent respectively.

A second variable used in assessing projected power need is the anticipated level of commercial/industrial development. 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 a 291 percent increase for commercial land. Residential land only increases 31.1 percent over this same period. These statistics indicate a high trend toward commercial/industrial development creating a comparable demand for land in this sector.

Presently, the per capita load for all uses is 2.9 kilowatts (kw). Utilizing the Institute for Social & Economic Research MAP Model for the Northern Gulf lease sale, specifically the moderate base case population projections as a close approximation of real growth, and a third variable in the planning process, the per capita load by the year 2000 will be 6.1 kw. Table 7 illustrates the probable ratio which will exist with the anticipated growth in the commercial/industrial sector. It is assumed that residential per capita will hold constant until 1990 when a greater proportion of new homes may utilize electric as opposed to gas heating and a greater usage of electrical appliances might be anticipated.

TABLE 7

RATIO OF RESIDENTIAL - COMMERCIAL/INDUSTRIAL TO PER CAPITA

Year	Projected Population	Total Per Capita KW	Residential Proportion	Commercial/Industrial Proportion
1979	201,235	2.9[a]	0.7	2.2
1983	244,804	3.5	0.7	2.8
1985	248,194	3.6	0.7	2.9
1987	265,322	3.8	0.7	3.1
1988	275,583	4.0	0.7	3.3
1990	295,590	4.3	0.8	3.5
1995	350,467	5.1	0.8	4.3
2000	422,609	6.1	0.8	5.3

[a]1979 is based on a 25 percent/75 percent residential - commercial/industrial split.

Between 1979 and 2000, the per capita kw for all uses increases 110 percent; however, the commercial/industrial sector increases 141 percent and the

residential proportion increases only 14 percent.

Due to the many variables built into models which predict load requirements, there does not exist one set of agreed upon projections. However, Municipal Light and Power has completed one set of projections of electrical need through the year 2000 for the Anchorage area excluding military. Table 8 illustrates their low, normal and high scenarios.

TABLE 8

ELECTRICAL DEMAND PROJECTIONS FOR THE

MUNICIPALITY OF Anchorage

Year	Lowest Growth	Growth as Usual	Highest Growth
1980	460 mw[b]	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

[a] Anchorage Area Power Requirement Fact Sheet

[b] mw = megawatts

With the total per capita kw factor of 6.1 as shown in table 7 by the year 2000, and an anticipated population of 422,609, the total electrical load requirement would be 2,578 mw which does fall in line with Municipal Light and Power's projections between Lowest Growth and Growth as Usual. This appears to be realistic in terms of the probable service needs for the area, however no factor has been built in for surplus power sales to other

utilities outside the municipal boundaries. In addition, this population figure includes the two military bases and Matanuska Electric's territory which presently provide for their own generation.

With respect to the above analysis on historical usage, proposed commercial/ industrial development, and future population projections, the standard offered to assess OCS development impact is the total per capita kw factors which appear in table 7.

SOLID WASTE

Historical data indicate a propensity towards increasing per capita generation of solid waste. Table 9 illustrates this trend using both historical and future projections of unit quantities of solid waste per person in the population.

TABLE 9

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)
1995	3.92 kgms (8.65 lbs)
2000[d]	4.43 kgms (9.77 lbs)

[a]Preliminary Solid Waste Master Plan, 1975
[b]Request for Proposal, Milling Operation, 1977
[c]1980-1995 projected figures, RFP, Milling Operation, 1977
[d]Based on a 13 percent increase over the five year period.

Due to the introduction of a milling (shredding) facility due to become operational in the summer of 1979, the lands consumed by solid waste will be reduced by an estimated 30 percent because of increased density. In addition, joint consideration by the Municipality and the military is being given to the use of solid wastes as a fuel source in power generation by the military. This process would reduce the volume of solid waste entering the sanitary landfill by 60 to 65 percent. Because of the above mentioned technologies currently being introduced or under consideration for solid waste disposal, a quantifiable standard based on per capita generation and its impact is at best nebulous. In addition, the current landfill in use is anticipated to have a life expectancy through 1986. A tentative site has been targeted for the development of a new sanitary landfill with an estimated life expectancy of approximately fifty years.

However, for projection purposes, the per capita figures for solid waste generation displayed in table 9 beginning in 1985 will be used as the standard to assess quantity through the period under study

TELEPHONE

Standards to determine planning for installation of equipment and manpower are a multivariate process. Criteria examined to produce baseline data for projection include historical trends, demand for service and future population foretastes. Currently, the Anchorage Telephone Utility is the service provider for the majority of the Anchorage population. Various facilities require different planning intervals, ranging up to ten-year periods.

Table 10 shows projected four year statistics indicating average number of customers and projected telephones necessary to meet this demand.

TABLE 10

PROJECTION OF' AVERAGE NUMBER OF CUSTOMERS AND Telephones

Year	Avg. No. of Customers	Avg. Telephones in Service
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

Although long-term investment in new facilities must be carefully and prudently planned for, population growth for this utility in one light can be considered a positive factor. 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 on the one hand will require continual expansion of major facilities but will also produce a better return in revenues when utilizing existing equipment.

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 household 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. Average household size is expected to decline from 3.1384 in 1980 to 2.9444 in 2000 (see table 11).

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 ·s unlikely to grow because of legal constraints and community resistance.

Considering demand preference and the economic constra·nts of the single family house, the balance of housing type is expected to show a four percent decline of single family and mobile homes and about an eight percent increase in the proportion of multifamily units (see table 11).

TABLE 11

CHANGING HOUSEHOLD SIZE AND DISTRIBUTION OF HOUSING TYPE

Year	Single Family		Multifamily		Mobile Home		Total
	Person/HH	%	Person/HH	%	Person/HH	%	Person/HH
1980	3.6	51.7	2.6	37.6	2.8	10.7	3.1384
1985	3.5	52.0	2.5	38.2	2.7	9.8	3.0396
1990	3.6	50.0	2.4	41.2	2.6	8.8	3.0176
1995	3.6	48.0	2.3	44.2	2.6	7.8	2.9474
2000	3.6	48.0	2.3	45.2	2.6	6.8	20 9444

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.

Health

Selected federal and state infrastructure standards exist to govern the 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
- Services
  - obstetrical
    neonatal special care
  - pediatric inpatient services

- Services, continued
  - open heart surgery
  - cardiac catheterizations
  - radiation therapy
  - computed tomographic scanner
  - end stage renal services

MANPOW?

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 12 displays this discrepancy and illustrates the issue of the severe manpower shortage in the number of primary care physicians in Anchorage.

TABLE 12

NUMBER OF PRIMARY CARE PHYSICIANS IN ANCHORAGE

COMPARED TO THE FEDERAL STANDARDOF ONE PER 800 IN THE POPULATION

Actual Number in Anchorage	Federal Standard for a City the Size Of Anchorage
144[a]	244[b]

[a]Includes Family Practice, General Practitioner, Pediatrics, OB-GYN all Internists, in private, military and Public Health Service
[b]Figure is based on a population of 195,000.

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 121) 1978 and the Alaska State Medical Facilities Plan draft indicate that to maximize cost efficiencies in the 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 13 illustrates the degree to which the national patient days ratio exceeds that of the Anchorage area.

TABLE 13

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., 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 14 displays the three standard indicators of acute care bed need discussed above compared to those same standards for the entire United States.

TABLE 14

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

	Anchorage	United States
Occupancy rate	65%[a]	80%
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 121, 1978

The Hill-Burton formula for medical facilities will be used in the calculation of acute care bed needs. The formula is as follows:

1) $\frac{\text{Population}(1{,}000) \times \text{Use Rate}(600 \text{ for } 1978)}{365} = \text{Average Daily Census}$

2) $\frac{\text{Average Daily Census}}{\text{Optimum Occupancy Rate } (.80)} = \text{Actual Bed Need}$

Accurate bed need must be based upon a civilian, non-native population figure. To use a total population figure would fallaciously assume that federal native and military beds would be available to the general public.

Lower numbers of open beds, inpatient days, and average length of stay significantly alter local ability to achieve the recommended 80 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 316 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).

SERVICES

Critical to the determination of the adequacy of the local health care system is the degree to which the system can meet a wide variety of health service needs. The availability and increasing use of services listed below reflect an increase in public confidence and less reliance on out-of-state health care systems. Just as the previous types of standards are compared to norms outlined in the National Health Planning Guidelines, so too, are the standards discussed below. The recommended standards for services are presented here for baseline information only and will not be used in projections of service demand.

Obstetrical Services

Hospitals should be equipped to service normal and problem obstetrical cases in areas where at least 1,500 live births occur each year and should average 75 percent in the obstetrical unit. During 1978 Alaska Hospital averaged 74.2 percent occupancy and Providence Hospital, 71.0 percent.

TABLE 15

NUMBER OF LIVE BIRTHS PER HOSPITAL FOR 1977- 1978

Hospital	1978 # of Live Births	1977 # of Live Births
Elmendorf AFB	N/A	954
Alaska Native Medical Service	567	545
Alaska Hospital	1,058	1,005
Providence Hospital	1,786	1,619

Neonatal Special Care Unit

Hospitals should have no more than four neonatal intensive and intermediate care beds per 1,000 live births. Neonatal units should have a minimum of 15 beds to be cost effective. Alaska Hospital has six such beds and Providence has 15.

Pediatric Inpatient Services

There should be a minimum of 20 beds per pediatric unit, and that 20 to 39 bed units should have an average annual occupancy rate of 65 percent. Alaska Hospital currently has nine beds at 72.8 percent occupancy, with Providence at 15 beds at 75.5 percent occupancy.

Open-Heart Surgery

Where performed, a minimum of 200 open-heart procedures should be performed within three years of implementation of the services. In 1978 Providence Hospital performed 62 procedures. No new unit should be initiated until existing units are operating at a minimum of 350 cases per year in adult surgeries.

Cardiac Catheterizations

There should be a minimum of 300 cardiac catheterizations performed per year within a unit with a minimum of 150 pediatric cardiac procedures. Providence Hospital performed 218 catheterizations in 1978. No additional unit should be added until existing service levels exceed 500 procedures per year.

Radiation Therapy

Implementation of a radiation therapy unit must be based on service to at least 150,000 population, treating at least 300 new cancer cases annually. In 1978 approximately 285 new cancer cases were served. In 1978 actual treatment totalled 3,671 and the projected for 1979 is 6,000±.

Computed Tomographic Scanners (C.A.T.)

Existence of a C.A.T. scanner is based on performance of at least 2,500 medically necessary patient procedures per year. Of the two units in Anchorage, one performs 2,500 procedures annually and the second performs 1,300.

End Stage Renal Disease

Adopting the Department of Health, Education and Welfare guidelines, there should be a minimum of 15 renal transplants performed per year.

While the level of current services is often below recommended standards, local health planners suggest maintaining those services awaiting the normal increased demand which will follow due to population growth and increased reliance on the ability of the local delivery system to meet citizens' needs. Caution must be used in determining the point at which demand requires and the system can support increasing units of any specialized service. The cost of adding expensive equipemnt to the delivery system is automatically passed along to the consumer. Therefore, in the interest of cost-containment in health care, providers must utilize equipment and procedures to the maximum before expanding services and equipment.

Social Services

There currently exists no formal quantitative 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 a 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 maintenance of 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 unemployment claimants will be used to assess impact of future population growth on Anchorage.

Projected unemployment has been calculated assuming that the effect of gasline development will have similar effects as the previous oil pipeline development.

The average unemployment rate for the previous five years was 6.8 percent, ranging from a low of 5.5 percent and a high of 8.3 percent. Projections are based on the correspondence of an average annual employment rate of 6.8 percent. For every .1 percent variance in employment rates, the unemployment rate will change .05 percent in the opposite direction.

EARLY CHILDHOOD AND ELEMENTARY AGE 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 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 34,000 Anchorage residents are nine years or younger). Licensed day care centers (42) are serving about 2,110 children and licensed day care homes serve an additional 565. Although these are not quantifiable norms, it appears that small child and day care needs are far from satisfied by existing providers. Current spaces

available reflect a service per target population ratio of 7.8 percent. Consensus among interested personnel is that a significant number of young children are being left unattended while parents are at work or school. Therefore, projections of spaces needed will be based on a service ratio of ten percent of the target population. This percentage will be used to assess the impact of future population growth on licensed day care spaces.

NUMBER OF LOW INCOME RESIDENTS

The low to moderate income persons constitute the greatest single userof 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. Low income housing has been identified as one primary indicator of need.

Low Income Housing

The need for low income housing currently exceeds the supply of adequate units. In 1978, approximately 23 percent of Anchorage households (or 14,000 households) earned less than $17,500, and were thus designated low-moderate income. (1978 Population Profile) Current service levels address the needs of only 6.1 percent of the target group. Optimally, housing assistance should be available to serve at least 33 percent of the target group (1978 Housing Assistance Plan.) It appears that projections of actua' units necessary to serve one-third of the target population go beyond the financial and developmental means available for support of such acquis' tion and construction. Increasing numbers of dollars

available for actual rent subsidies and other housing assistance payments may be a more realistic means of achieving some level of service to 33 percent of the target population.

CURRENT SERVICE CAPABILITIES OF DIVISION OF SOCIAL SERVICES

The Southcentral Regional Office of the State's Division of Social Services administers four major programs: child protection, adult protection, information and referral, and individual and family counseling. The majority of the persons served enter the system through adult and/or child protection. From there, social workers assign and refer cases to other offices, agencies and services, depending on the client's need profile. The administration (Dept. of Health and Social Service) has granted the Division 4,500 units (hours) of service for fiscal 1979, which is an increase of 1,000 units or 29 percent over fiscal 1978. Division personnel now anticipate having sufficient service units available to meet any known need for 1979. As discussed previously, the major barrier to meeting clients' needs is the lack of awareness of existing service agencies. One might assume, in a community of this size, that the lack of a single entry vehicle into the social services delivery system represents the absence of that which is commonly used as a measure of the community's ability to respond to needs. Minimal interagency cooperation and a deficient information and referral network preclude development of system standards and agency performance measures.

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 16 indicates the population projections utilized in the transportation planning process (includes military living on base). It should be noted that this projection is substantially above the non-OCS Lower Cook Inlet scenarios and comparable the Northern and Western Gulf base cases as outlined in this study. Because of this, any shortfall in actual population growth below AMATS estimates would benefit the capacity of the system to handle future demand. However, OCS scenarios added to the Gulf base cases could adversely effect the quality of the transportation systems in Anchorage.

TABLE 16

TRANSPORTATION PLANNING P9PULATION Projections

Year	Population
1980	210,976
1985	256,003
1990	308,245
1995	372,081

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

However, several 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, a value system seeming to reflect a willingness to pay for the higher cost of gasoline, a transportation plan which is making 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 more successful. A recent success with a transit bond may reflect an altered perception of need for future issues. Table 17 illustrates this trend. Increased state revenues may improve state support. for transportation facilities construction in the short-term but historical evidence suggests that this is not necessarily probable beyond committed projects planned for.

TABLE 17

COMPARISON OF LOCAL TRANSIT RELATED BONDS[a]

Issue Area	#of Propositions	# Successful	Proportion Successful
Roads	6	4	67%
Transit	2	1	50%
Parking	1	0	0%
Port	2	1	50%

[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. 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. This means that government spending can be highly elastic growing faster than the private sector in response to public or interest group demand or growing slower than the private sector in response to the same stimuli. Anchorage reflected this by rapid expansion in government spending. One important point is that the short-term prediction of Municipal revenue and expenditures has been downgraded recently suggesting a shortfall in revenues leading to an increase in local property taxes to

meet service demands.

The major issues facing the capacity question is discussed in a qualitative mode in Volume I of this report, Anchorage Socioeconomic & Physical Baseline.

III. NORTHERN GULF OF ALASKA IMPACT ANALYSIS

Baseline Conditions and Forecasts of Conditions Without the Planned Lease Sale

SIGNIFICANT FACTORS AFFECTING CHANGE

Change in the three Anchorage Northern Gulf non-OCS bases cases is incremental rather than overwhelming. The factors affecting change are the primary components of the MAP 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 state population and economy in its largest. city.

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

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

- Employment more than doubles (129 percent increase) during the base period with the most rapid growth experienced during construction of the ALCAN gasline in 1981-83. This causes a bulge in the projection during this period and results in an actual decline in employment in all three base cases from 1983 to 1984. Growth in the employment improves in the later 1980's and achieves a 3.4 to 3.6 percent annual growth rate in the 1990's.

- Population grows by 122 percent, somewhat below employment. This could be reflective of the decreasing household size that has already been observed in Anchorage's population in the 1970's.

- Since population is tied to employment, Anchorage is expected to increase its share of the state's population from 46.3 percent of the population in 1977 to 54.0 percent in 2000.

- Growth in Anchorage is the 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 economic concentration and health growth.

- The structure of the Anchorage economy cushions the effects of seasonality of employment when comparing it to other areas of the state.

Table 18 and 19 show the growth and structure of the Anchorage economy to the year 2000 under the assumptions of the non-OCS base cases. It can be noted that the three base cases show only slight differences in size and almost no differences in the patterns of the data,. By the year 2000, the low and high base cases are only 10,097 people apart in projecting population. This is a 2.4 percent difference which in an economy the size of Anchorage's is negligible in the provision of most services. Any of the three base cases would produce about the same service demand levels and planning in the coming years.

TABLE 18

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

Year	Moderate Base Case	Low Base Case	High Base Case
1977	190,188	190,188	190,188
1978	197,348	197,343	197,343
1979	201,235	200,907	200,907
1980	207,323	206,423	206,423
1981	218,413	216,931	217,657
1982	235,032	233,228	233,660
1983	244,804	242,950	246,035
1984	243,808	241,985	248,283
1985	248,194	246,256	252,884
1986	256,190	254,018	260,198
1987	265,322	262,930	269,366
1988	275,583	272,710	279,892
1989	286,278	283,077	290,948
1990	295,590	292,680	300,225
1991	305,641	302,975	310,818
1992	315,565	312,800	320,758
1993	326,780	324,094	332,522
1994	338,200	335,431	344,314
1995	350,467	347,483	356,650
1996	363,718	359,812	369,075
1997	377,150	373,421	382,869
1998	391,303	387,679	397,269
1999	407,125	403,464	413,320
2000	422,609	418,885	428,982

[a]MAP Regional Model for Northern Gulf of Alaska Base Case Projections

TABLE 19

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

Year	Moderate Base Case	Low Base Case	High Base Case
1977	85,523	85,523	85,523
1978	84,128	84,136	84,136
1979	87,606	87,309	87,309
1980	91,938	91,195	91,195
1981	98,363	97,275	97,886
1982	107,329	106,272	106,731
1983	111,220	110,286	112,667
1984	108,713	107,806	112,197
1985	110,055	109,153	113,132
1986	114,113	113,152	116,136
1987	118,863	117,898	120,548
1988	124,228	123,025	125,931
1989	129,727	128,355	131,550
1990	134,221	133,096	135,983
1991	138,703	137,799	140,592
1992	143,318	142,357	145,372
1993	148,754	147,859	151,097
1994	154,245	153,322	156,762
1995	160,260	159,194	162,746
1996	166,870	165,137	168,670
1997	173,444	171,909	175,473
1998	180,343	178,965	182,513
1999	188,369	187,022	190,652
2000	196,092	194,737	198,450

aMAP Regional Model for Northern Gulf of Alaska Base Case Projections

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.

Education

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards section, table 20 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 the five-year intervals. The data reflected in table 20 are cumulative such that each year reflects the previous year plus incremental effects between the two dates.

TABLE 20

TEACHER AND CLASSROOM NEEDS - NON-OCS CASES

	Moderate Base Case		Low Base Case		High Base Case	
Year	Projected Student Population	Total No. of Classrooms/ Teachers	Projected Student Population	Total No. of Classrooms/ Teachers	Projected Student Population	Total No. of Classrooms/ Teachers
1380	39,391	1,576	39,220	1,569	39,229	1,569
1985	44,675	T ,787	44,326	1,773	45,519	1,821
1990	59,118	2,365	58,536	2,341	60 .045	2,402
1995	70,093	2,804	69,497	2, 780	71 ,330	2,853
2000	84,522	3,381	83,777	3,351	85,796	3,432

The implications for the Anchorage School District is a shortage of classrooms by 1985 based on their present building programs. The

projections all fall into the range of the high scenarios of the school district which were rejected for planning.

Postsecondary and Career Vocational Training. Applying the ratios as described in the standards section, table 21 and 22 display the projected student population and credit hour production through the year 2000. The data are cumulative.

TABLE 21

UAA PUBLIC POSTS ECONDARY STUDENT ENROLLMENT PROJECTIONS

	Moderate Case		Low Case		High Case	
Year	UAA Student Population	UAA Credits[b]	UAA Student Population[a]	UAA Credits[b]	UAA Student Population[a]	UAA Credits[b]
1980	4,146	21,559	4,128	21,466	4,?28	2?,466
1985	6,205	32,887	6,156	32,627	6,322	33,507
1990	8,868	48,774	8,78(9	48,290	9,007	49,538.
1995	12,266	69,916	12,162	69,323	12,483	71,153
2000	16,904	101,424	16,755	100,530	17,159	102,954

[a]Based on an increasing percentage of the population of students from 2.0 percent in 1980 to 4.0 percent in 2000.

[b]An increase from 5.2 credits per student to 6.0 credits.

TABLE 22

ACC PUBLIC POSTSECONDARY STUDENT ENROLLMENT PROJECTIONS

	Moderate Case		Low Case		High Case	
Year	ACC Student Population	ACC Credits[b]	ACC Student Population[a]	ACC Credits[b]	ACC Student Population[a]	ACC Credits[b]
1980	9,330	53,181	9,289	52,947	9,289	52,947
1985	10,672	60,830	10,589	60,357	10,874	61,982
1990	12,119	69,078	12,000	68,400	12,309	70,161
1995	14,369	81,903	14,247	81,208	14,623	83,351
2000	16,904	96,353	16,755	95,503	17,159	97,806

[a]Based on a peaking percentage of 4.5 in 1980, decreasing slowly to 4.0 percent by 2000.
[b]Steady 5.7 credits per student.

These projections produce two almost equal sized institutions by 2000 and almost 200,000 credit hours per semester produced which is over three times its present level.

Private university and career/vocational training programs have not been projected. **Issues** discussing their role in postsecondary education can be found in the standards section of this report.

Public Safety

Police. Using the current ratio of police to the population served, table 23 indicates the cumulative number of police required for five-year intervals beginning in 1985 (excludes military personnel). At that time, it is assumed that areawide police enforcement will be in effect for the entire Municipality. The present ratio is 1.79 sworn police officers per 1,000 in the population.

TABLE 23

CUMULATIVE MANPOWER REQUIREMENTS , ANCHORAGE POLICE DEPARTMENT

THREE NON-OCS CASES[a]

Year	Moderate Case ManPower Requirements	Low Case Manpower Requirements	High Case Manpower Requirements
1985	412	409	420
1990	497	492	505
1995	595	590	606
2000	724	718	736

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

As of June 1979, the department will have employed 230 sworn officers. Under the assumption of areawide police expansion, the force will increase 170 percent under the moderate case, 168 percent under the low case and 174 percent under the high case by the year 2000.

Since densely populated urban centers tend to display higher crime profiles, questions of the adequacy of the ratio in use toward the end of the period under study becomes apparent. Presently, Anchorage's ratio of police to the population falls below the national average by 0.21 sworn officers per 1,000 in the population. The adequacy of the ratio will, in part, be determined by how the profile of the Part I crime index varies as Anchorage becomes more densely populated. This may be especially critical if the high base case projections do, in fact, characterize the actual rate of growth.

Alaska State Troopers. Table 24 depicts the cumulative increase in the number of commissioned officers necessary to meet population growth under the moderate, low and high base cases. The standard in use is .10 patrol officers per 1,000 in the population.

TABLE 24

CUMULATIVE MANPOWER REQUIREMENTS - ALASKA STATE TROOPERS

THREE NON-OCS CASES

Year	Moderate Case Manpower Requirements	Low Case Manpower Requirements	High Case Manpower Requirements
1980	21	21	21
1985	25	25	25
1390	30	29	30
1995	35	35	36
2000	42	42	53

C Detachment is a training center for the troopers and these figures could conceivable fluctuate depending on the number of trainees within the detachment. However, in all probability, these f gures represent the " owest projections under non-OCS development.

Over the 21-year period under study, the troopers wou" d realize an average increase of 112 percent over the three base cases. The time span is long enough, however, to absorb an additional 22 or 23 patrol officers.

Fire. Using the present ratio of fire department personnel to the total population, table 25 indicates the cumulative manpower requirements necessary to accommodate the population for the three non-OCS base cases. The ratio in use is 1.61 fire department personnel per 1,000 in the population (figures exclude military personnel.)

TABLE 25

CUMULATIVE MANPOWER REQUIREMENTS OF FIRE DEPARTMENT PERSONNEL

THREE NON-OCS CASES

Year	Moderate Case Manpower Requirements	Low Case Manpower Requirements	High Case Manpower Requirements
1980	305	303	303
1985	371	367	378
1990	447	442	454
1995	535	530	545
2000	651	645	662

With the present ratio, the Anchorage Fire Department would increase 113 percent for the moderate base case, 113 percent for the low base case, and 118 percent for the high base case between the years 1980 and 2000. However, much is contingent upon such factors as land use patterns, population density, and water-flow 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 cases.

Recreation Facility Needs. Utilizing the standards established by the National Recreation and Park Association, table 26 indicates the cumulative requirements based upon population growth as projected under the non-OCS cases.

TABLE 26

CUMULATIVE RECREATIONAL FACILITY NEEDS

Facility	Moderate Base Case				
	1980	1985	1990	1995	2000
Play Lots	82	99	118	140	169
Neighborhood Parks	20	25	30	35	42
Softball	69	83	99	117	141
Basketball	104	124	148	175	211
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	23	28
Community Centers	8	10	12	14	17

Facility	Low Base Case				
	1980	1985	1990	1995	2000
Play Lots	82	98	117	139	168
Neighborhood Parks	20	25	29	35	42
Softball	68	82	98	116	140
Basketball	104	124	146	174	209
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	23	28
Community Centers	8	10	11	14	17

Facility	High Base Case				
	1980	1985	1990	1995	2000
Play Lots	82	101	120	143	172
Neighborhood Parks	20	25	30	36	43
Softball	68	84	100	119	143
Basketball	104	126	150	178	214
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	24	28
Community Centers	8	10	12	14	17

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 built would reflect that standard within the 20 year projection period. The

most efficient means of constructing a pool is with n the design of a larger complex, such as a school or recreation center. Recreation centers with high admission costs to the con ume r havea relatively limited clientele; junior and senior h' gh 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 two indoor rinks, 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 and probably two additional indoor rinks.

- 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 the construction ofa 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 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 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 16,717 (1978) men, women, and children of the Anchorage area (Municipality of Anchorage, 1977).

Parkland. Utilizing the recommended standard of devoting approximately 25 percent of a city or planned area to park, wilderness, or open space, the Anchorage area currently exceeds the recommended total as displayed in table 27.

TABLE 27

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	3,274	1,264
Recommended Standard	1,101	425

available as parkland, wilderness, and open space

If open space and wilderness areas are exe" uded, however, there are approximately 45.3 square kilometers (sq. I m) (17.5 square miles [sq. mi.]) of usable parkland in the above area. Achieving the additional 84.2 sq. km (32.5 sq. mi.) o-F 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. Per capita water consumption has been calculated by the U.S. Army Corps of Engineers for Anchorage consumers at 594 liters per

capita per day (lpcpd) (157 gallons per capita per day [gpcpd]). This figure is offered as the standard to assess water need under the moderate, low and high base cases through the period under study.

TABLE 28

WATER NEED - MILLION LITERS PER DAY

Year	Moderate Case		Low Case		High Case	
	mld	mgd	mld	mgd	mld	Jl!!!!-
1980	123.0	32.5	122.6	32.4	122.6	32.4
1985	147.0	39.0	146.5	38.7	150.3	39.7
1990	175.6	46.4	174.1	46.0	178.3	47.1
1995	208.2	55.0	206.7	54.6	212. 0	56.0
2000	122.6	66.3	249.1	65.8	255.1	67.4

The U.S. Army Corps of Engineers has designed long-range plans that would meet, in a timely manner, this increasing demand for water. This is primarily due to the Corps' anticipation of a greater population increase than is proposed under any of the above base cases. For a complete description of the plans for water development in the Anchorage area, refer to Volume I, Socioeconomic and Physical Baseline.

Sewer. Sewer line extensions and expansion of sewage treatment plants are, in part, based on population projections generated by the Municipal Planning Department. The Planning Department is projecting a tentative population of 353,184 by the year 1995 for utility planning purposes. Plans are geared toward a high rate of growth in order to avoid the costly problem of paralleling sewer lines.

Using the per capita wastewater generation standard, as explained in the overview of infrastructure standards of 477 liters per capita per day (lpcpd) (126 gallons per capita per day [gpcpd]), table 29 displays the cumulative wastewater generation through the year 2000 for the three non-OCS base cases.

TABLE 29

WASTEWATER GENERATION - MILLION LITERS PER DAY

Year	Moderate Case		Low Case		High Case	
	mld	mgd	mld	mgd	mld	mgd
1980	98.8	26.1	98.4	26.0	98.4	26.0
1985	118.5	31.3	117.3	31.0	120.7	31.9
1990	140.8	37.2	129.7	36.9	143.1	37.8
1995	167.3	44.2	165.8	43.8	170.0	44.9
2000	201.4	53.2	199.8	52.8	204.8	54.1

[a]These figures do not reflect the additional 20% infiltration/ inflow problem as discussed in the baseline analysis.

The resultant of the above is that the population forecasts of the three base cases will have some impact on the existing municipal sewer utility planned expansions. The problem occurs between 1995 and 2000 where the base case projections may exceed the planning figures. Expansion will haveto be stepped up prior to 1995 to accommodate the effect of these projections. If time delays are encountered in completing construction/installation of planned facilities, 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 experienced the major portion of its development. Although Chugach Electric will feel the most direct impact from future population growth, ML&P will be indirectly impacted due to the corresponding expansion in their commercial/industrial service sector and redevelopment of areas around the central business district to a higher density urban profile.

Table 30 displays the electrical requirements for the Anchorage area for the period under study. The standard in use is described in detail in the Overview of Infrastructure Standards section of this report.

TABLE 30

ELECTRICAL LOAD REQUIREMENTS - MEGAWATTS

Year	Factor KW	Moderate Case	Low Case	High Case
1980	3.0	622	619	619
1985	3.6	893	887	910
1990	4.3	1,271	1,259	1,291
1995	5.1	1,787	1,772	1,819
2000	6.1	2,578	2,555	2,617

The level of commercial/industrial development is one of the key determinants in assessing future power demand. At this point in time, the level and type of activity in this sector is somewhat speculative over the period under study resulting in projections

which could either be high or low. In addition, the overall effect of the Northern Gulf projections is below that of the projections presently being utilized by the utilities for planning purposes. Only if the timeframe for planned installation of new generation facilities occurs in a timely manner will the utilities meet the electrical service needs of the Anchorage community.

Telephone. The Anchorage Telephone Utility has demonstrated the the capability of coping with massive growth during a short-time frame as a result of of the oil pipeline. The utility should be able to accommodate future expansion as a result of natural population increases as well as proposed OCS activity with adequate planning. Economically, as growth occurs and population density increases, there should be a positive effect on the utilities financial position. One line extension to serve many people will produce a better return in revenues than an extension serving very few when keeping the cost of equipment and line extensions constant. Although population projections under the moderate, low and high base cases will require adequate planning, the increase could potentially have a positive economic impact. No other impacts resulting from population growth were identified.

Solid Waste. Table 31 displays the solid waste generation projections for the moderate, low and high base cases for the Northern Gulf lease sale. The figures are based on an increasing factor of per capita solid waste generation as projected by the Department of Public Works.

TABLE 31

DAILY SOLID WASTE GENERATION

	Per Capita Per Day		Moderate Case		Low Case		High Case	
Year	kgms[a]	lbs[b]	Metric Tons	U.S. Tons	Metric Tons	U.S. Tons	Metric Tons	U.S. Tons
1980	2.71	(5.97)	561	619	559	616	559	616
1985	3.06	(6.75)	760	838	754	831	774	853
1999	3.47	(7.64)	1,024	1,129	1,014	1,118	1,040	1,147
1995	3.92	(8.65)	1,375	1,516	1,363	1,503	1,400	1,543
2000	4.43	(9.77)	1,872	2,064	1,856	2,046	1,901	2,096

[a]k gms = kilograms

bibs = pounds

With the introduction of new processing techniques commensurate with increasing the density of the fill and assuming the site targeted for the new sanitary landfill is obtained as discussed in Volume I of this report, the Northern Gulf projections will pose no impact on the management of solid waste.

Housing

Table 32 projects the civilian housing stock requirements based on the ratio outlined in the overview of infrastructure standards section. The demand for new housing is strong for all three base cases. Ranging from 3,300 units per year to 5,200 units per year, the pattern shows a strong demand in the early 1980's with a slacking off during the following ten years. In the last decade of the period under study, there is a strengthening of demand. All three base cases could be handled by the construction

industry and provide a fairly steady demand for new units during the study period.. It should be noted that present estimates of housing stock exceed the projected demand through 1980 suggesting an existing surplus of units.

TABLE 32

HOUSING STOCK Projections

Year	Moderate Base Case			
	Single Family	Multi-Family	Mobile Home	Total
1980	31,812	23,816	6,584	62,212
1985	41,072	30,508	7,603	79,183
1990	47,254	40,082	8,316	95,652
1995	55,559	52,665	9,028	117,252
2000	67,778	65,707	9,601	143,081

Year	Low Base Case			
	Single Family	Multi-Family	Mobile Home	Total
1980	31,661	23,703	6,552	61,916
1985	40,004	30,253	7,539	77,796
1990	46,761	39,665	8,230	94,656
1995	55,064	52,196	8,947	116,207
2000	67,159	65,101	9,514	141,774

Year	High Base Case			
	Single Family	Multi-Family	Mobile Home	Total
1980	31,661	23,703	6,552	61,316
1985	41,161	31,127	7,757	80,045
1990	48,036	40,746	8,455	97,237
1995	56,586	53,639	3,287	119,512
2000	68,838	66,729	9,752	145,319

Health Services

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

Acute Care Bed Need. Applying the Hill-Burton formula for acute care bed need, figures in table 33 were derived by using a civilian, non-native population figure, a 1978 use rate of 600 (based upon number of inpatient days experienced), and an 80 percent occupancy rate.

TABLE 33

PROJECTED ACUTE CARE BED NEED

Year	Moderate Case Bed Need	Low Case Bed Need	High Case Bed Need
1980	369[a]	367	367
1985	449	446	444
1990	543	537	552
1995	651	645	663
2030	792	785	805

[a]Based upon civilian, non-native population; derived by deducting 19,000 military and 4.2% of total population from total population figure provided

There are currently 404 beds licensed and approximately 840 beds available if one includes all military and native hospital beds. Adequate acute beds exist to serve the general public through at least 1985, whether applying the moderate, low, or high projections in the non-OCS base cases. 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 34

PROJECTED PRIMARY CARE PHYSICIAN NEEDS

Year	Moderate Case Physician Needs	Low Case Physician Needs	High Case Physician Needs
1980	259	258	258
1985	310	307	316
1990	369	366	375
1995	438	434	446
2000	528	524	536

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 primary 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 21 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 related 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 efforts were successful by both civilian non-native hospitals to justify the addition of a head and full body computerized axial tomography (C.A.T.) scanner, The result will be the emergence of the sophistication of the Anchorage health 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 with 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 35 illustrates projected increased levels of service for areas of need based upon the annual population growth rate required in the non-OCS base cases.

TA8LE 35

CUMULATIVE GROWTH IN SELECTED SOCIAL SERVICES AREAS[a]

	Moderate Base Case				
Service	1980	1985	1990	1995	2000
Day Care Spaces	3,732	4,467	5,321	6,308	7,607
Low Income Housing	4,722	6,009	7,260	8,899	10,860
	Low Base Case				
	1980	1985	1990	1995	2000
Day Care Spaces	3,716	4,433	5,268	6,255	7,540
Low Income Housing	4,693	5,905	7,184	8,820	10,760

Service	High Base Case 1980	1985	1990	1995	2000
Day Care Spaces	3,716	4,551	5,404	6,420	7,722
Low Income Housing	4,699	6,075	7,380	9,071	11,030

[a]Assumes that the target population will remain constant; 18 percent of the total population for children ages 0-14 years.

Day Care Spaces. There are currently spaces within day care centers and homes for 2,675 children. The target group for such services is all children from age 0 to 14 years or 33,984 children. This, the current service per population ratio is 7.87 percent. While not officially documented, school, public health, and community personnel claim that a significant number of children are alone before and after school when parents are at work. Projections listed above are based on the assumption that a more realistic projection of numbers of children needing partial or total day care would be to increase the service ratio to ten percent of the target population. The net effect would be to add 723 day care spaces to better meet the demands for services for the 1978 target population. Projected increases in day care needs for each base case will demand significant additions in the service delivery system.

Low Income Housing. The need for the low income housing currently exceeds the supply of adequate units. In 1978, approximately 23 percent (or 14,037 households) earned less than $17,500, and were thus designated low-moderate income. (Ender, 1978) Current service levels address the needs of only 6.1 percent of the target group. Optimally, housing assistance should be available to serve

at least 33 percent of the target group (1978 Housing Assistance Plan.) It appears that projections of actual units necessary to serve one-third of the target population go beyond the financial and developmental means available for support such as acquisition and construction. Increasing numbers of dollars available for actual rent subsidies and other housing assistance payments may be a more realistic means of achieving some level of service to 33 percent of the target population.

Unemployment. Projected unemployment has been calculated assuming that the effect of gasline development will have similar effects as the previous oil pipeline development. The average unemployment rate for the previous five years was 6.8 percent, ranging from a low of 5.5 percent and a high of 8.3 percent. Projections are based on the correspondence of an average annual employment rate increase of four percent with an average annual unemployment rate of 6.8 percent. For every .1 percent variance in employment rates, the unemployment rate will change .05 percent in the opposite direction. Rates have in the past and will again respond consistently to development activities, unemployment declining dramatically in 1981 and 1982, and rising thereafter as activity terminates, stabilizing finally by 1995 through the year 2000. Heavy surges in unemployment rates in 1983, 1984, and 1985 reflect a combination of the high rate of in-migration of workers who move into the area, hoping to take advantage of gasline development jobs, and the addition of pipeline workers to the work force at the wind-down and termination of development.

TABLE 36

VARIANCE IN EMPLOYMENT AND UNEMPLOYMENT RATES

Year	Moderate Case		Low Case		High Case	
	Employ Rate Increase	Unemploy Rate	Employ Rate Increase	Unemploy Rate	Employ Rate Increase	Unemploy Rate
1982	9.1%	5.5%	9,2%	5.5%	9.9%	5.5%
1983	3.6	7.0	3.8	6.9	5.5	6.0
1984	-2.2	8.3	2.0	8.3	-0.4	8.3
1985	1.8	8.3	1.2	8.3	0.8	8.3
1986	3.7	7.0	3.7	7.0	2.6	7.6
1987	4.1	6.8	4.2	6.7	3.7	7.0
1988	4.5	6.5	4.3	6.7	4.4	6.6
1989	4.4	6.6	4.3	6.7	4.4	6.6
199!3	3.5	7.1	3.7	7.0	3.3	7.2
1991	3.3	7.2	3,5	7.1	3.3	7.2
1992	3.3	7.2	3.3	7.2	3.3	7.2
1993	3.8	6.9	3.9	6.9	3.9	6.9
1994	3.7	7.0	3.7	7.0	3.7	7.0
1995	3.9	6.9	3.8	6,9	3.8	6.9
1996	4.1	6.8	3.7	7.0	3.6	7.0
1997	4.0	6.8	4.1	6.8	4.0	6.8
1998	3.9	6.9	4.1	6.8	4.0	6.8
1999	4.4	6.6	4.5	6.5	4.4	6.6
2000	4.0	6.8	3.7	7.0	4.0	6.8

Transportation

The population projections for the non-OCS base cases are similar to the estimates used for transportation planning, falling 15,000 to 25,000 below by 1995. This would suggest that goals set by the plan would meet the transportation needs of the population estimates of the base cases. The weakness lies primarily in that the Anchorage Metropolitan Area Transportation Study (AMATS) plan will very likely not be fully implemented. Also, since the transportation plan is designed to meet present and future needs, the lag time required to complete various segments will mean that the needs will always exceed the system's capacity.

The greatest concern must be that if any major portion of the long-range plan fails to be developed, the impacts on the system will 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 progress of implementation. If anything, the plan is a good effort to provide for reasonable good auto access but would reduce the viability of a strong transit system.

Financial Capacity and Capital 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 slowdown 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 improve in the mid-1980's. The non-OCS base cases do project a reasonable pattern of growth for most of the period. If a slowdown occurs or continues, 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 govern-

ment 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 somewhat too high during the base case period. Rapid expansion of services now could be caught in a revenue bind within ten years. Presently, the Municipality is embarking on a very ambitious capacity projection study which should place 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.

SUMMARY OF IMPACTS

The following matrices display 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 each matrix. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifers are discussed in the respective sections on overview of infrastructure standards and Volume I, Socioeconomic and Physical Baseline.

NON-OCS MODERATE BASE CASE

CUMULATIVE RAT IO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	207,323	248,194	295,590	350,467	422,609
Education: Primary/Secondary - No. of Manpower/Facilities	1,576	1,787	2,365	2,804	3,381
Public Postsecondary - UAA No. of Credits	21,559	32,887	48,774	69,916	101,424
Public Postsecondary - ACC No. of Credits	53,181	60,830	69,078	81,903	96,353
Public Safety: Police - Manpower		412	497	595	724
State Troopers - Manpower	21	25	30	35	42
Fire - Manpower	305	371	447	535	651
Leisure: Play Lots	82	99	118	140	169
Neighborhood Parks	20	25	30	35	42
Softball Diamonds	69	83	99	117	141
Basketball Courts	104	124	148	175	211
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	23	28
Community Centers	8	10	12	14	17
Utilities: Water - (Million Gallons Per Day)	32.5	39.0	46.4	55.0	66.3
Sewer - (Million Gallons Per Day)	26.1	31.3	37.2	44.2	53.2
Electricity - Megawatts	.622	893	1,271	1,787	2,578
Telephones					
Solid Waste - U.S. Tons	619	838	1,129	1,516	2,064
Housing: Units	62,212	79,183	95,652	117,252	143,081
Health: Bed Needs	369	449	543	651	792
Primary Care Physicians	259	310	369	438	528
Social services: Day Care Space	3,732	4,467	5,321	6,308	7,607
Unemployment rates		8.3	7.1	6.9	6.8
Low Income Housing Units	4,722	6,009	7,260	8,899	10,860
Transportation[a]					
Financial Capacity and Capital Requirements[a]					

[a]See Section on Overview of Infrastructure Standards

NON-OCS LOW BASE CASE

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	206,423	246,256	292,680	347,483	418,885
Education: Primary/Secondary - No. of Manpower/Facilities	1,569	1,773	2,341	2,780	3,351
Public Postsecondary - UAA No. of Credits	21,466	32,627	48,290	69,323	100,530
Public Postsecondary - ACC No. of Credits	52,947	60,357	68,400	81,208	95,503
Public Safety: Police - Manpower		409	492	590	718
State Troopers - Manpower	21	25	29	35	42
Fire - Manpower	303	367	442	530	645
Leisure: Play Lots	82	98	117	139	168
Neighborhood Parks	20	25	29	35	42
Softball Diamonds	68	82		116	140
Basketball Courts	104	124	1%	174	209
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	23	28
Community Centers	8	10	11	14	17
Utilities: Water - (Million Gallons Per Day)	32.4	38.7	46.0	54.6	65.8
Sewer - (Million Gallons Per Day)	26.0	31.0	36.9	43.8	52.8
Electricity - megawatts	619	887	1,259	1,772	2,555
Telephones					
Solid Waste - U.S. Tons	616	831	1,118	1,503	2,046
Housing: Units	61,916	77,796	94,656	116,207	141,774
Health: Bed Needs	367	446	537	645	785
Primary Care Physicians	258	307	366	434	524
Social Services: Day Care Space	3,716	4,433	5,268	6,255	7,540
Unemployment rates		8.3	7.0	6.9	7.0
Low Income Housing Units	4,699	5,905	7,184	8,820	10,760
Transportation [a]					
Financial Capacity and Capital Requirements a					

[a]See section on Overview of Infrastructure Standards

NON-OCS HIGH BASE CASE

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	206,423	252,884	300,225	356,650	428,982
Education: Primary/Secondary - No. of Manpower/Facilities	1,569	1,821	2,402	2,853	3,432
Public Postsecondary - UAA No. of Credits	21,466	33,507	49,538	71,153	102,954
Public Postsecondary - AcC No. of Credits	52,947	61,982	70,161	83,351	97,806
Public Safety: Police - Manpower		420	505	606	736
State Troopers - Manpower	21	25	30	36	43
Fire - Manpower	303	378	454	545	662
Leisure: Play Lots			120	143	172
Neighborhood Parks			30	36	43
Softball Diamonds			100	119	143
Basketball Courts			150	178	214
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	24	28
Community Centers	8	10	12	14	17
Utilities: Water - (Million Gallons Per Day)	32.4	39.7	47.1	56.0	67.4
Sewer - (Million Gallons Per Day)	26.0	31.9	37.8	44.9	54.1
Electricity - Megawatts	619	910	1,291	1,819	2,617
Telephone[a]					
Solid Waste - U.S. Tons	616	853	1,147	1,543	2,096
Housing: Units	61,916	80,045	97,237	119,512	145,319
Health: Bed Needs	367	444	552	663	805
Primary Care Physicians	258	316	375	446	536
Social Services: Day Care Space			5,404	6,420	7,722
Unemployment rates			7.2	6.9	6.8
Low Income Housing Units			7,380	9,071	11,030
Transportation [a]					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

Impact Assessment of Northern Gulf of Alaska OCS Scenarios

INTRODUCTION

The purpose of this section is to assess impact on specific indicators in the Anchorage community commensurate with OCS petroleum development in the Northern Gulf of Alaska.

From the infrastructure which developed as a result of the construction of the trans-Alaska pipeline, Anchorage, in general, is in a position to more easily absorb continued growth than was the case in the pre-pipeline years. Nevertheless, certain indicators such as utilities and transportation were impacted so tremendously and require such capital intensive expansion that they are still of somewhat tenuous character. This will continue to be the case with or without OCS development until long range plans can be fully implemented. Other indicators which will show an increased demand include education, public safety, recreation, health, social services, housing, and financial capacity and capital requirements. However, the capacity of the community infrastructure will, for the most part, be able to expand proportionately to meet the incremental effects of each of the Northern Gulf of Alaska OCS scenarios.

Of the five scenarios developed to assess impact from the Northern Gulf lease sale, only three display impacts of significant levels to affect the service infrastructure. The forecasts of population and employment (measured as change from a specified base case) are shown in table 37. This section focuses on a detailed service impact analysis of the five percent - moderate scenario with additional information presented on the mean =-

moderate and the five percent - high scenarios as the others reflecting significant impact.

In presenting quantitative data to describe the incremental service demand required by the five percent - moderate scenario, five dates were used rather than the twenty separate years the scenarios occur over. This was done to simplify the presentation without distorting the events which occur. In addition, the annual cumulative demand is a poor and unreliable predictive tool. While the model produces annualized predictions and annual change can be calculated using the standards established, key dates would better provide an understanding of service demands by not focusing on the more speculative annual data.

The benchmark dates used are 1985, 1988, 1990, 1995, and 2000. The five percent - moderate scenario begins in 1981 and reaches a plateau of initial major gains in 1985, and peaks in 1990. The scenario then slowly loses strength and declines to lows in 1995 and some but not all of this loss is regained by the year 2000. The dates selected provide the scenario with the key benchmarks required for a full description of the incremental and cumulative demand that are discussed in the remainder of this section.

TABLE 37

POPULATION AND EMPLOYMENT IMPACT ON ANCHORAGE DUE To NORTHERN GULF OF ALASKA OCS DEVELOPMENT Scenarios

Year	95% Scenario Moderate Base		Mean Scenario Moderate Base		5% Scenario Moderate 8ase		5% Scenario High Base		95% Scenario Low Base	
	Population	Employment	Population	Employment	Population	Employment	Population	Employment	Population	Employment
1977	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1976	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1979	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1980	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1981	0.141	0.193	0.136	0.157	0.146	0.205	0.145	0.205	0.138	0.192
1982	0.369	0.318	0.328	0.312	0.434	0.457	0.444	0.461	0.374	0.321
1983	0.468	0.316	0.566	0.512	0.793	0.685	0.813	0.693	0.469	0.316
1984	0.385	0.167	0.759	0.592	3.362	2.370	3.508	2.447	0.406	0.173
1985	0.135	0.091	1.768	1.203	9.153	6.080	9.804	6.553	0.331	0.093
1986	0.255	0.049	3.392″	2.241	13.854	8.476	14.658	9.025	0.267	0.049
1987	0..221	0.033	6.123	3.803	17.262	9.803	18.092	10.327	0.231	0.032
1988	0.196	0.025	?. 737	4.618	19.266	10.337	20.095	10.818	0..?06	0.023
1989	0.177	0.021	8.752	4.890	19.086	9.294	19.936	9.761	0.185	0.018
1990	0.161	0.017	10.343	5.522	18.156	8.041	19.004	8.484	0.167	0.015
1991	0.148	0.015	9.308	4.400	18.947	7.971	19.833	8.413	0.154	0.012
1992	0.139	0.014	8.432	3.220	18.225	6,826	19.078	7.225	0.142	0.010
1993	0.128	0.012	7.791	2.588	17.260	5.777	18.118	6.158	0.131	0.009
1994	0.115	0.007	7.460	2.275	16.697	5.253	17.560	5.619	0.122	0.007
1995	0.108	0.007	7.328	2.202	16.389	4.970	17.246	5.319	0.113	0.006
1996	0. 105	0.008	7.464	2.357	16.410	5.001	17.226	5.309	0.102	0.003
1997	0.098	0.007	7.679	2.517	16.712	5.248	17.555	5.567	0.099	0.005
1998	0.095	0.008	7.931	2.677	17.113	5.507	18.040	5.883	0,094	0.006
1999	0.086	0.005	8.190	2.S15	17.575	5.757	18.576	6.320	0.091	0.006
2000	0.086	0.007	8.417	2.920	17.899	5.874	18.960	6.320	0,087	0.006

[a]MAP Regional Model

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.

Education

Primary and Secondary. The ratios described in the overview of infrastructure standards were altered to reflect a constant 18 percent student ratio. This is due to the transient nature of the scenario's population. Table 38 displays the projected student population through the year 2000, and the number of teacher/classrooms necessary to accommodate the population projections for the five percent scenario - moderate base. It should be noted that the scenario produces a peak increment in 1988 which constitutes 6.2 percent of the total projected requirement. By 2000, this declines to 3.7 percent of the projected requirement. The incremental change due to the scenario is sufficient and lasts long enough to suggest some real increase in capability will be necessary to meet the need. It is estimated that about 3.7 percent of the peak 6.2 percent increase will be in permanent additions to facilities while the remaining 2.5 percent will be met through temporary additions or increased efficiencies in the system. Even though a six percent increase in permanent capability in 1988 would eventually be used by the increasing permanent population, it may be unwarranted to plan for those additional facilities and manpower at that time and pay

for the operation and maintenance costs three to five years earlier than a permanent demand warrants.

TABLE 38

ADDITIONAL TEACHER AND CLASSROOM NEEDS

MODERATE BASE - 5% SCENARIO

(cumulative)

Year	Moderate Base Case Projected Student Population	Moderate Base Case Total Number of Classrooms/ Teachers	Additional Projected Student Population	Number of Teachers/ Classrooms Required	Total Teachers/ Classrooms Required
1980	39,391	1,576	0	0	1,576
1985	44,675	1,787	1,648	66	1,853
1988	52,361	2,094	3,468	139	2,233
1990	59,118	2,365	3,268	131	2,496
1995	70,093	2,804	2,950	118	2,922
2000	84,522	3,381	3,222	129	3,510

Public Postsecondary and Career/Vocational Training. Table 39 projects the additional public postsecondary student credit hours expected to occur under the five percent scenario-moderate base case. The overall effect is moderate and peaks at 6.5 percent of the total projection in 1988 dropping to four percent by 2000. Since this suggests manpower/facility increases of 28 professional staff, two support staff and seven additional classrooms by 1988, efficiencies would not likely meet the increased demand without additional resource allocations. The scenario is projected to produce an additional need of 3.5 to four percent in manpower and facilities while temporary increases would be met by efficiencies in the system due to impoved productivity. No standards were developed for private college or career vocational education.

TABLE 39

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC POSTSECONDARY EDUCATION

MODERATE BASE - 5% SCENARIO

Year	Moderate Case Total Credits[a]	Additional Projected Credits	Total Projected Credits
1980	74,740	0	74,740
1985	93,717	3,456	97,173
1988	108,424	7,580	116,004
1990	117,852	7,343	125,195
1995	151,819	7,100	158,919
2000	197,777	8,377	206,154

[a]Total student enrollment data are not given because adding of institutional enrollment would not give an unduplicated total count.

Public Safety

Police. Using the current ratio of police to the population served (1.79 per 1,000), excluding military personnel, table 40 indicates the cumulative number of police required during strategic years for the period under study.

TABLE 40

POLICE MANPOWER REQUIREMENTS[a]

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total Requirement
1985	412	16.4	428.4
1988	461	34.5	495.5
1990	497	32.5	529.5
1995	595	29.3	624.3
2000	724	32.0	756.0

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

Variables which may influence the above projections include fluctuations in the Part I crime index, budgetary restrictions, and the level of urban density characterizing Anchorage through the period under study.

The greatest impact period for the five percent scenario occurs between 1984 and 1988. It may not be economically sound to create the infrastructure displayed in the table due to the decrease in the scenario projections after 1988. Instead, a slower rate of increase then that derived from the standard would probably be advisable to avoid a surplus of manpower after the projected peak years. However, if additional manpower is deemed necessary during this peak period, it might best be met with an increase in the reserve force.

Alaska State Troopers. Table 41 displays the cumulative increase in the number of commissioned officers necessary to meet population growth under the moderate base case and five percent scenario. The standard in use is .10 patrol officers per 1,000 in the population.

TABLE 41

TROOPERS - MANPOWER REQUIREMENTS

MODERATE CASE - 5% SCENARIO

Year	Moderate Case	5% Scenario	Total
1985	25	0.9	26
1988	28	1.9	30
1990	30	1.8	32
1995	35	1.6	37
2000	42	1.7	44

Because of the low standard in use, it is unlikely that impact of additional manpower will occur as a result of the five percent. scenario over the moderate base case projections.

Fire. Table 42 displays the cumulative projections of fire department personnel under the moderate base case and five percent scenario during strategic years through the period under study. The standard in use is the ratio of 1.61 fire department personnel per 1,000 in the population (excluding military personnel).

TABLE 42

MANPOWER REQUIREMENTS OF FIRE DEPARTMENT PERSONNEL

MODERATE CASE - 5% SCENARIO

Year	Moderate Case	5% Scenario	Total
1985	371	14.7	385.7
1988	415	31.0	446.0
1990	447	29.2	476.2
1995	535	26.4	561.4
2000	651	28.8	679.8

Variables which may influence the above projections include such factors as budgetary restrictions, land use patterns, population density and waterflow requirements.

The peak impact years for the five percent scenario occur between 1984 and 1988. In order to avoid a possible surplus of manpower when the scenario projections begin their decline after 1988, it may, instead be more economically advisable to add manpower at a lesser rate through

the peak impact years. However, if additional manpower becomes a necessary requirement to maintain adequate service during this peak period, an alternative which might be explored is a reserve volunteer force.

Leisure

Using the standards presented within the overview of infrastructure standards, table 43 depicts cumulative recreational facility requirements of the five percent scenario as compared to the moderate base case.

TABLE 43

RECREATION FACILITIES NEEDS

MODERATE BASE - 5% SCENARIO

	1985		
Facility	Moderate Base Case	5% Scenario	Total Needs
Play Lots	99	4	103
Neighborhood Parks	25	1	26
Softball Diamonds		3	86
Basketball Courts	1;;	5	129
Swimming Pools	10	0	10
Skating Rinks	17	0	17
Community Centers	10	0	10

	1988		
Facility	Moderate Base Case	5% Scenario	Total Needs
Play Lots	110	8	118
Neighborhood Parks	26	3	29
Softball Diamonds	92	6	
Basketball Courts	138	9	1:;
Swimming Pools	11	1	12
Skating Rinks	18	2	20
Community Centers	11	1	12

TABLE 43, continued

Facility	1990 Moderate Base Case	1990 5% Scenario	1990 Total Needs
Play Lots	118	7	125
Neighborhood Parks	30	1	31
Softball Diamonds	99	6	105
Basketball Courts	148	9	157
Swimming Pools	12	1	13
Skating Rinks	20	1	21
Community Centers	12	1	13

Facility	1995 Moderate Base Case	1995 5% Scenario	1995 Total Needs
Play Lots	140	7	147
Neighborhood Parks	35	2	37
Softball Diamonds	117	5	122
Basketball Courts	175	8	183
Swimming Pools	14	1	15
Skating Rinks	23	1	24
Community Centers	14	1	15

Facility	2000 "Moderate Base Case	2000 5% Scenario	2000 Total Needs
Play Lots	169	7	176
Neighborhood Parks	42	2	44
Softball Diamonds	141	6	147
Basketball Courts	211	9	220
Swimming Pools	17	1	18
Skating Rinks	28	1	29
Community Centers	17	1	18

The need for new facilities increases appreciably, beginning in 1988, peaking in 1990 and remaining relatively constant through the year 2000. The addition of as many as three neighborhood parks (two hectares [five acres]) and eight play lots by 1988 could create a significant impact on municipal parkland acquisition funds. Sufficient land for the number of

baseball diamonds may also be difficult to locate and expensive to acquire.

The three most difficult and costly facilities to provide are skating rinks (indoors), swimming pools, and community centers. To add one or two such facilities within three to five year increments would seem to adequately meet the demands generated by the projected population. Once in operation or existence, these types of facilities tend to quickly be fully utilized.

Utilities

Water. Table 44 indicates water needs for the moderate base case, the five percent scenario, and the total demand for water under this OCS development. The figures are based on per capita consumption as as discussed in the overview of infrastructure standards.

TABLE 44

WATER CONSUMPTION - MILLION LITERS PER DAY

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case		5% Scenario		Total	
	mld[a]	mgd[b]	mld	mgd	mld	mgd
1985	147.0	39.0	5.3	1.4	152.9	40.4
1988	163.9	43.4	11.4	3.0	175.6	46.4
1990	175.6	46.4	11.0	2.9	186.6	49.3
1995	208.2	55.0	9.8	2.6	218.0	57.6
2000	250.9	66.3	10.6	2.8	261.5	69.1

[a] Million Liters Per Day
b Million Gallons Per Day

Either the development of Eagle River or the Eklutna Diversion as major water resources for the Anchorage area would accommodate the effect of the moderate base case - five percent scenario if the projects can be implemented in the timeframes proposed by the U.S. Army Corps of Engineers. For further information on water resource development, refer to Volume I, Socioeconomic and Physical Baseline.

Sewer. The per capita wastewater generation figure in use is 477 liters per capita per day (126 gallons per capita per day). Table 45 displays the moderate base case wastewater generation, the five percent scenario, and the total wastewater generation dictating service requirements for the period under study.

TABLE 45

WASTEWATER Generation - MILLION LITERS PER DAY

Year	Moderate Base Case mld[b]	Moderate Base Case mgd[c]	5% Scenario mld	5% Scenario mgd	Total mld	Total mgd
1985	118.5	31.3	4.5	1.2	123.0	32.5
1988	131.3	34.7	9.1	2.4	140.4	37.1
1990	140.8	37.2	8.7	2.3	149.5	39.5
1995	167.3	44.2	7.9	2.1	175.2	46.3
2000	201.4	53.,2	8.7	2.3	210.1	55.5

aThese figures do not reflect the additional 20 percent infiltration, inflow problem as discussed in the baseline analysis.

bmld = million liters per day

cmgd = million gallons per day

If plans for expansion are implemented in a timely manner, the Municipality should be geared to handle approximately 44.5 million gallons per day of

actual wastewater generation (does not include the present 20 percent infiltration/inflow problem) based on a municipal planning population projection of 353,184 by the year 1995. Plans for expansion of the system will have to be stepped up prior to 1995 to accommodate the effect of this scenario. In addition, if time delays are encountered in completing construction/installation of planned facilities, the overall effectiveness of the system would be of major concern.

Electricity. The per capita kilowatt factors described in the overview of infrastructure standards are offered to assess the load requirements for the five percent scenario and the moderate base case. Table 46 displays the projections in megawatts at strategic years through the period under study.

TABLE 46

ELECTRICAL LOAD REQUIREMENTS - MEGAWATTS

MODERATE BASE - 5% SCENARIO

Year	Factor kw[a]	Moderate Base Case (mw)[b]	5% Scenario (row)	Total (mw)
1985	3.6	893	33.0	926.0
1988	4.0	1,102	77.1	1,1'79.1
1990	4.3	1,271	78.1	1,349.1
1995	5.1	1,787	83.6	1,870.6
2000	6.1	2,578	109.2	2,687.2

[a] mw = megawatts
[b] kw · kilowatts

The level of commercial/industrial development is one of the key determinants in assessing future power demand. At this point in time,

the level and type of activity in this sector is somewhat speculative over the period under study resulting in projections which either could be high or low. However, with the additional population projected under the five percent scenario, planned generation facilities must not only be implemented in a timely manner, but possibly stepped up to accommodate the increased demand between 1988 and 2000.

Solid Waste. Table 47 displays the solid waste generation for the moderate base case, the five percent scenario and the total effect of these projections for the period under study. The figures are based on an increasing factor of per capita solid waste generation as projected by the Department of Public Works.

TABLE 47

DAILY SOLID WASTE GENERATION

MODERATE BASE - 5% SCENARIO

	Per Capita Per Day		Moderate Base Case		5% Scenario		Total	
Year	kgms[a]	lbs.	Metric Ton	U.S. Ton	Metric Ton	U.S. Ton	Metric Ton	U.S. Ton
1985	3.06	6.75	760	838	28.0	30.9	788	869
1988	3.26	7.20	900	922	62.9	69.4	962	1,061
1990	3.47	7.64	1,024	1,129	62.9	69.4	1,087	1,198
1995	3.92	8.65	1,375	1,516	64.3	70.9	1,439	1,587
2000	4.43	9.77	1,872	2,064	79.3	87.4	1,951	2,151

[a]kgms = kilograms

With the introduction of new processing techniques commensurate with reducing the volume of fill, and assuming the site targeted for the new sanitary landfill is obtained as discussed in Volume I, the five percent scenario will pose no impact on the management of solid waste.

Housing

Table 48 shows the incremental effects of the five percent scenario on the housing demand of the moderate base case. The overall increase is not major, but does occur in a short time span and is strongest during the slack economic period of the moderate base case following the construction of the gas pipeline. The timeliness of the demand makes it easier for the market to respond. Approximately 1,000 additional units are expected to impact the base case in 1983 - 1984; 2,000 in 1984 - 1985; and 1,000 units a year to 1988. This acts as a buffer for moderating economic trends in the base case. In addition about one-third of the increment could be absorbed temporarily by increasing household size and reducing the vacancy rate. It is possible that the peak demand can be partially met in the short term without adding to the housing stock as rapidly as projected.

TABLE 48

CUMULATIVE HOUSING DEMAND

MODERATE BASE CASE - 5% SCENARIO

	Moderate Base Case			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	31,812	23,816	6,584	62,212
1985	41,072	30,508	7,603	79,183
1988	44,572	35,717	8,127	88,416
1990	47,254	40,082	8,316	95,652
1995	55,559	52,665	9,028	117,252
2000	67,778	65,707	9,601	143,081

TABLE 48, continued

Year	5% Scenario Single Family	Multi-Family	Mobile Home	Total
1980	0	0	0	0
1985	1,566	1,150	295	3,011
1988	3,243	2,525	591	6,359
1990	3,009	2,479	529	6,017
1995	2,669	2,458	433	5,560
2000	2,918	2,748	413	6,079

Year	Total Projected Housing Single Family	Multi-Family	Mobile Home	Total
1980	31,812	23,816	6,584	62,212
1985	42,638	31,658	7,898	82,194
1988	47,815	38,242	8,718	94,775
1990	50,263	42,561	8,846	101,669
1995	58,228	55,123	9,461	122,812
2000	70,696	68,455	10,014	149,160

Health

Using the Hill-Burton formula for calculating acute care bed need, with a utilization rate of 600, and at 80 percent occupancy, table 49 illustrates the bed needs for the five percent scenario and the moderate base case.

TABLE 49

ACUTE CARE BED NEED

MODERATE BASE - 5% SCENARIO

Year	Moderate Case Bed Need	5% Scenario Bed Need	Total Bed Need
1985	449	19	468
1988	503	39	542
1990	543	37	580
1995	651	33	684
2000	792	38	830

Need for acute care beds will exceed the present supply of 449 civilian, non-native available beds by 1985. If one considered approximately 300 existing native and military beds, need would not exceed demand until 2000. However, until public law and prevailing practices change, the civilian, non-native population is restricted to the two existing hospitals within the community. The need for additional beds may also be diminished by the emergence of a variety of alternatives to institutional care, i.e. home health nursing, outpatient clinics or overnight surgicenters, neighborhood level clinics or health centers, etc.

A second indicator under the health sector is primary care physician needs Utilizing the standards of one primary care physician per 800 in the population table 50 depicts the increased need for physicians under the five percent scenario as compared to the moderate base case.

TABLE 50

PRIMARY CARE PHYSICIAN NEEDS

Year	Moderate Base Physician Needs	5% Scenario Physician Needs	Total Needs
1985	310	13	322
1988	344	22	369
1990	369	23	392
1995	438	20	458
2000	528	23	551

The need for primary care physicians will exceed the existing supply before 1985. Limited access to physicians due to overcrowded and closed practices is now a major health problem and is one which will be aggravated by significant influx of population. It is unlikely that the supply will ever equal or exceed demand. When adequate numbers of physicians are available, perhaps better preventive medicine can be practiced. Under less crowded conditions, patients may feel free to access their physician more frequently and at an earlier onset of health problems.

Social Services

Using the standards discussed in the overview of infrastructure standards, it appears that needs for child care and low income housing assistance will significantly exceed the community's resources by 1985. The number of day care slots needed represent the addition of one to two new centers every five years or more. In relation to housing assistance, it is not likely that low income housing units could be constructed in sufficient numbers to meet the demand. However, a more realistic approach would be to increase governmental housing assistance payments to meet the needs as indicated by

the population projections presented.

Table 51 displays day care and housing assistance needs for the five percent scenario compared to the moderate base case.

TABLE 51

CUMULATIVE CHILD CARE AND LOW INCOME HOUSING NEEDS

	Moderate Base Case				
Service	1985	1988	1990	1995	2000
Day Care Spaces	4,467	4,960	5,321	6,308	7,607
Low Income Housing	6,009	6,710	7,260	8,899	10,860
	5% Scenario				
Service	1985	1988	1990	1995	2000
Day Care Spaces	165	347	326	295	322
Low Income Housing	208	483	457	422	461
	Total Projected Needs"				
Service	1985	1988	1990	1995	2000
Day Care Spaces	4,632	5,307	5,647	6,603	7,929
Low Income Housing	6,217	7,193	7,717	9,321	11,321

Both day care and housing assistance needs rise rapidly beginning in 1988, peaking in 1990, with a gradual increase continuing through 2000.

Unemployment rates are a third indicator to be discussed under the social services sector. Using the standards for projection as described in the overview of infrastructure standards, table 52 displays the employment rate of increase over the period under study and the average unemployment rates for five percent scenario compared to the moderate base case.

TABLE 52

VARIANCE IN EMPLOYMENT AND UNEMPLOYMENT RATES

Year	Moderate Case		5% Scenario	
	Employ Rate Increase	Unemploy Rate	Employ Rate Increase	Unemploy Rate
1982	9.1%	5.5%	9.3%	5.5%
1983	3.6	7.0	3.8	6.9
1984	-2.2	9.9	-2.1	9.8
1985	1.8	8.3	1.2	8.2
1986	3.7	7.0	4.6	6.5
1987	4.1	6.8	5.4	6.1
1988	4.5	6.5	5.0	6.3
1989	4.4	6.6	4.4	6.6
1990	3.5	7.1	3.8	6.9
1991	3.3	7.2	2.4	7.6
1992	3.3	7.2	2.4	7.6
1993	3.8	6.9	3.2	7.2
1994	3.7	7.0	3.4	7.2
1995	3.9	6.9	3.7	7.0
1996	4.1	6.8	4.1	6.8
1997	4.0	6.8	3.9	6.9
1998	3.9	6.9	4.0	6.8
1999	4.4	6.6-	4.5	6.5
2000	4.0	6.8	4.0	6.8

Under the requirements of this scenario, unemployment rates surge steadily from 1982 to 1985, dropping off to a relatively normal level from 1986 through 1990. Rates rise to above 7.0 through the early 1990's, decreasing again to near normal levels from 1996 through 2000.

Transportation

Planning for long-range transportation needs is geared for a population of 372,081 (includes military living on bases) through 1995. This figure is equivalent to the 1995 population projections for the moderate base

case - five percent scenario. Because the impact from the five percent scenario occurs largely after 1983, the short-range improvements should be completed and available. The overall impact is not great quantitatively but the impact occurs in a relatively short four-year period from 1985 to 1988. If the road and transit long-range plans are not carried out, the additional growth from this scenario should be sufficient to accentuate the adverse effects on the system. There is a strong possibility that long-range plans of the system will not be implemented in an expeditious fashion. This could make the concentrated impact of the five percent scenario a negative factor on this service sector.

Financial Capacity and Capital Requirements

The five percent scenario-moderate base case adds 19,266 people to the population between 1981 and 1988. This increase adds to the moderate base case at a time when the latter's growth rate is slowing. This scenario is not of sufficient size to generate serious or adverse service demands. However, the increases are spread over four years of the study period and show real declines in the early 1990's. Because the scenario is incremental in its effects and adds to a slower growth period in the moderate base case, the impacts are on the balance likely to be positive. This is because the stimulated economy would produce a more improved revenue capacity compared to the service demands made on it. This scenario could alter the service demand structure on a temporary basis producing short-term service shortfalls and increased spending. The possibility of this problem is seen as a short-term one (1985 to 1987) which smooths itself out in about two years.

The fact that about one-quarter of the demand increment is temporary should caution planners from over-reacting by creating permanant infrastructure to meet 100 percent of the need.

SUMMARY OF IMPACTS

The following matrices display the services likely to be impacted due to impacts of selected Northern Gulf OCS scenarios. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrices. Where qualitative standards were the only means of determining impacts for a particular service, the conditional qualifiers are discussed in the respective section on overview of infrastructure standards and in Volume I, Socioeconomic and Physical Baseline. The 95 percent scenario, moderate base case produces no significant or measurable effects on the service infrastructure and therefore no matrix is produced. The mean scenario, moderate base case has moderate but measurable effects on selected services and a summary of impacts is shown in the first matrix. The five percent scenario, moderate base case was analyzed thoroughly in this section and its summary of impacts is shown in the second matrix. The five percent scenario, high base case produces a pattern of impacts almost identical to the five percent, moderate base. A summary of its impacts are described in the third matrix. The 95 percent, low base case produces no significant or measurable effects on the service infrastructure, and therefore no matrix is produced.

MODERATE BASE CASE - NEAN SCENARIO

CUMULATIVE RATIO OF SERVICE REQUI REMENTS TO IMPACT PROJECTIONS

	1985	1988	1990	1995	2000
	1,768	7,787	10,343	7,328	8,417
Education: Primary/Secondary - No. of Manpower/Facilities	13	56	74	53	61
Public Postsecondary - No. of Credits	667	3,063	4,183	3,175	3,939
Public Safety: Pol ice - Manpower	3.2	13.9	18.5	13.1	15.1
State Troopers - Manpower	0.2	0.8	1.0	0.7	0.8
Fire - Manpower	2.8	12.5	16.7	11.8	13.6
Leisure: Pl ay Lots	1	3	4	3	3
Neighborhood Parks	0	1	1	1	1
Softbal l Diamonds	1	3	3	3	3
Basketball Courts	1	4	5	4	4
Swimming Pools	0	0	D	0	0
Skating Rinks	0	1	1	1	1
Community Centers	0	0	0	0	0
Utilities: Water - (Million Gallons Per Day)	0.3	1.2	1.6	1.2	1.3
Sewer - (Million Gallons Per Day)	0.2	1.0	1.3	0.9	1.1
Electricity- [Megawatts]	6.4	31.1	44.5	37.4	51.3
Telephone[a]					
Solid Waste (Tons per day)	6.4	28.0	39.5	31.7	41.1
Housing: Units	582	2,570	3,427	2,486	2,859
Heal th: Bed Needs	4	16	21	15	17
Primary Care Physicians	2	10	13	9	11
Social Services: Day Care Space	32	140	186	132	152
Unemployment rates (cumulative)	7.9	6.3	6.9	6.9	6.7
Low Income Housing Units	44	195	260	189	217
Transportation [a]					
Financial Capacity and Capital Requirements[a]					

[a]See Section on Overview of Infrastructure Standards

MODERATE BASE CASE - 5% SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO IMPACTPROJECTIONS

	1985	1988	1990	1995	2000
	9,153	19,266	18,156	16,389	17,899
Education: Primary/Secondary - No. of Manpower/Facilities	66	139	131	118	129
Public Postsecondary - No. of Credits	3,456	7,580	7,343	7,100	8,377
Public Safety: Police - Manpower	16.4	34.5	32.5	29.3	32.0
State Troopers - Manpower	0.9	1.9	1.8	1.6	1.7
Fire - Manpower	14.7	31.0	29.2	26.4	28.8
Leisure: Play Lots	4	8	7	7	7
Neighborhood Parks	1	3	1	2	2
Softball Diamonds	3	6	6	5	6
Basketball Courts	5	9	9	8	9
Swimming Pools	0	1	1	1	1
Skating-Rinks	0	2	1	1	1
Community Centers	0	1	1	1	1
Utilities: Water - (Million Gallons Per Day)	1.4	3.0	2.9	2.6	2.8
Sewer - (Million Gallons Per Day)	1.2	2.4	2.3	2.1	2.3
Electricity- (Megawatts)	33.0	77.1	78.1	83.6	109.2
Telephones					
Solid Waste - (Tons per Day)	30.9	69.4	69.4	70.9	87.4
Housing: Units	3,011	6,359	6,017	5,560	6,079
Health: Bed Needs	19	39	37	33	38
Primary Care Physicians	13	22	23	20	23
Social Services: Day Care Space	165	347	326	295	322
Unemployment rates (cumulative)	8.2	6.3	6.9	7.0	6.8
Low Income Housing Units	208	483	457	422	461
Transportation [a]					
Financial Capacity and Capital Requirements [a]					

HIGH BASE CASE - 5% SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO IMPACT PROJECTIONS

	1985	1988	1990		
	,804	20,095	19,004		
Education: Primary/Secondary - No. of Manpower/Facilities	71	145	137	124	136
Public Postsecondary - No. of Credits	,702	7,906	7,685	7,471	8,873
Public Safety: Police - Manpower	17.5	36.0	34.0	30.9	33.9
State Troopers - Manpower	1.0	2.0	1.9	1.7	1.9
Fire - Manpower	15.8	32.3	30.6	27.8	30.5
Leisure: Play Lots	4	8	8	7	7
Neighborhood Parks	1	2	2	2	2
Softball Diamonds	3	7	7	6	6
Basketball Courts	5	10	10	9	9
Swimming Pools	0	1	1	1	1
Skating Rinks	1	1	1	1	1
Community Centers	0	1	1	1	1
Utilities: Water - (Million Gallons Per Day)	1.5	3.2	3.0	2.7	3.0
Sewer - (Million Gallons Per Day)	1.2	2.5	2.4	2.2	2.4
Electricity- (Megawatts)	35.3	80.4	81.7	88.0	115.7
Telephone[a]					
Solid Waste- (Tons per Day)	33.1	72.3	72.6	74.6	92.6
Housing: Units	,225	6,633	6,298	5,851	6,439
Health: Bed Needs	20	41	39	35	39
Primary Care Physicians	12	25	24	22	24
Social Services: Day Care Space	176	362	342	310	341
Unemployment rates (cumulative)	6.6	6.6	7.7	7.1	6.8
Low Income Housing Units	245	503	478	444	489
Transportation [a]					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

IV. WESTERN GULF OF ALASKA IMPACT ANALYSIS

Baseline Conditions and Forecasts of Conditions Without the Planned Lease Sale

SIGNIFICANT FACTORS AFFECTING CHANGE

Change in three Anchorage Western Gulf non-OCS base cases 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.

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

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

- Employment more than doubles (133 percent increase for the moderate base case) during the base period with the most rapid growth experienced during construction of the ALCAN gasline in 1981-83. This causes a bulge in the projection during this period and results in an actual decline in employment in the

moderate and low base cases from 1983 to 1984. Moderate base case growth in employment reproves to a peak annual growth rate in 1986-87 (5.4 percent) slips to a low point of 2.4 percent growth (1991-1992), and improves to a more stable annual rate after 1995, averaging 4.1 percent. The low and high base cases show similar patterns.

- Moderate base case population grows by 126 percent, somewhat below employment. This could be reflective of the decreasing household size that has already been observed in Anchorage's population in the 1970's.

- Since population is tied to employment, Anchorage is expected to increase its share of the state's population from 46.3 percent of the population in 1977 to 53.5 percent in 2000.

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

- The structure of the Anchorage economy cushions the effects of seasonality of employment when comparing it to other areas of the state.

a

Tables 53 and 54 show the growth and structure of the Anchorage economy to the year 2000 under the assumptions of the non-OCS base cases. It can be noted that the three base cases show moderate differences in size and almost no differences in the patterns of the data. By the year 2000, the low and high base cases are 28,969 people apart in projecting population. This variation is due to the cumulative effects of the model which includes the effects of the Northern Gulf program in the Western Gulf base cases. While this is a 6.9 percent difference, the economy is of sufficient size that any of the base cases will produce similar policy effects, though their magnitude may vary. The differences in service demand levels is shown in the accompanying table. Unless noted, it is assumed that planning and problems will be the same for each of the base cases.

TABLE 53

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

Year	Moderate Base Case	Low Base Case	High Base Case
1977	190,188	190,188	190,188
1978	197,348	197,343	197,343
1979	201,235	200,907	200,907
1980	207,323	206,423	206,423
1981	218,549	217,069	217,802
1982	235,361	233,602	234,104
1983	245,371	243,419	246,848
1984	244,577	242,391	251,792
1985	249,962	246,587	262,688
1986	259,583	254,285	274,856
1987	271,446	263,161	287,458
1988	283,37'0	272,915	299,987
1989	295,031	283,262	310,883
1990	305,932	292,848	319,229
1991	314,949	303,129	330,651
1992	323,997	312,942	339,836
1993	334,571	324,225	350,640
1994	345 ,660	335,553	361 ,874
1995	357,795	347,596	373,896
1996	371,182	359,914	386,301
1997	384,828	373,520	40(9 ,424
1998	399,234	387,774	415,309
1999	415,315	403,555	431,895
2000	431,026	418,972	447,941

[a]MAP Regional Model for Western Gulf of Alaska Base Case Projections

TABLE 54

BASE CASE GROWTH OF ANCHORAGE EMPLOYMENT - 1977-2000a

Year	Moderate Base Case	Low Base Case	High Base Case
1977	85,523	85,523	85,523
1978	84,128	84,136	84,136
1979	87,606	87,309	87,309
1980	91,938	91,195	91,195
1981	98,521	97,468	98,092
1982	107,641	106,593	107,192
1983	111,732	110,602	113,360
1984	109,304	107,979	114,644
1985	111,258	109,246	119,685
1986	116,354	113,201	125,161
1987	122,666	117,930	130,874
1988	128,846	123,048	136,749
1989	134,617	128,374	141,311
1990	139,743	133,111	144,467
1991	143,103	137,811	149,005
1992	146,538	142,368	152,597
1993	151,342	147,868	157,255
1994	156,519	153,329	162,382
1995	162,462	159,200	168,065
1996	169,227	165,140	173,979
1997	175,961	171,914	181,040
1998	183,020	178,971	188,396
1999	191,184	187,028	196,826
2000	199,012	194,743	204,770

[a]MAP Regional Model for Western Gulf of Alaska Base Case Projections

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 the three Western Gulf non-OCS scenarios.

Education

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards section, table 55 displays the projected student population through the year 2000, number of teachers required, and number of classrooms necessary to accommodate the projections of the non-OCS case in five-year intervals. The data reflected in table 55 are cumulative.

TABLE 55

TEACHER AND CLASSROOM NEEDS - NON-OCS CASES

	Moderate Base Case		Low Base Case		High Base Case	
Year	Projected Student Population	Total No. of Classrooms/ Teachers	Projected Student Population	Total No. Of Classrooms/ Teachers	Projected Student Population	Total No. of Classrooms/ Teachers
1980	39,391	1,576	39,220	1,569	39,220	1,569
1985	44,993	1,800	44,386	1,775	47,284	1,891
1990	61,186	2,447	58,570	2,343	63,846	2,554
1995	71,559	2,862	69,519	2,781	74,779	2,991
2000	86,205	3,448	83,794	3,352	89,588	3,584

The implication for the Anchorage School District is a shortage of classrooms by 1985 based on their present building programs. The projections all fall into the range of the high scenarios of the school district which were rejected for planning. After 1985, the district population increases rapidly, assuming a stabilization of the community's demographic characteristics. This could imply a major addition of new facilities in the late 19801s.

Postsecondary and Career Vocational Training. Applying the ratios as described in the standards section, tables 56 and 57 display the projected student population and credit hour production through the year 2000. The data are cumulative.

TABLE 56

UAA PUBLIC POSTSECONDARY STUDENT ENROLLMENT PROJECTIONS

	Moderate Case		Low Case		High Case	
Year	UAA Student Population	UAA Credits[b]	UAA Student Population[a]	UAA Credits[b]	UAA Student Population[a]	UAA Creditsb
1980	4,146	21,559	4,128	21,466	4,128	21,466
1985	6,249	33,120	6,165	32,673	6,567	34,806
1990	9,178	50,479	8,785	48,320	9,577	52,673
1995	12,523	71,380	13,166	69,345	13,086	74,592
2000	17,241	103,446	16,759	100,554	17,918	107,506

[a]Based on an increasing percentage of the population of students for 2.0 students in 1980 to 4.0 percent in 2000.

[b]An increase from 5.2 credits per student to 6.0 credits.

TABLE 57

ACC PUBLIC POSTSECONDARY STUDENT' ENROLLMENT PROJECTIONS

Year	Moderate Case		Low Case		High Case	
	UAA Student Population[a]	ACC Credits[b]	UAA Student Population[a]	ACC Credits[b]	UAA Student Population[a]	ACC Credits[b]
1980	9,330	53,181	9,389	52,947	9,389	52,947
1985	10,748	61,226	10,603	60,438	11,296	64,385
1990	12,543	71,496	12,007	68,440	13,088	74,604
1995	14,670	83,617	14,251	81,233	15,330	87,379
2000	17,241	98,274	16,759	95,526	17,918	102,131

[a]Based on a peaking percentage of 4.5 in 1980, decreasing slowly to 4.0 percent by 2000.

[b]Steady 5.7 credits per student.

These projections produce two almost equal sized institutions by 2000 and produce about 200,000 credit hours per semester. This is over three times its present level. The critical question is whether community demand for postsecondary education will be met by an adequate allocation of state revenues. Recent years do not show a pattern of state support for increasing capacity.

Private university and career/vocational training programs have not been projected. Issues discussing their role in postsecondary education can be found in the standards section and in Volume I, Socioeconomic and Physical Baseline.

Public Safety

Police. Using the present ratio of Anchorage Police Department (APD)

personnel to the population served, table 58 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 present ratio including manpower and territorial additions planned for June 1, 1979, is 1.79 sworn officers per 1,000 in the population (excludes military personnel).

TABLE 58

CUMULATIVE MANPOWER REQUIREMENTS, ANCHORAGE POLICE Department

Year	Moderate Case Manpower Requirements	Low Case Manpower Requirements	High Case Manpower Requirements
1985	415	409	438
1990	515	492	539
1995	608	590	637
2000	739	718	770

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

As of June 1, 1979, the department will have employed 280 sworn officers. Under the assumption of areawide police expansion, the force will increase 164 percent under the moderate base case, 156 percent under the low base case, and 175 percent under the high base case by the year 2000. Since densely populated urban centers tend to display higher crime profiles, questions of adequacy of the ratio in use toward the end of the period under study becomes apparent. Presently, Anchorage's ratio of police to the population

falls below the national average by 0.21 sworn officers per 1,000 in the population. The adequacy of the ratio will, in part, be determined by how the profile of the Part I crime index varies as Anchorage becomes more densely populated. This may be especially critical if the high base case projections do, in fact, characterize the actual rate of growth.

Alaska State Troopers. Table 59 depicts the cumulative increase in the number of commissioned officers necessary to meet population growth under the moderate, low, and high base cases. To perform the tasks of highway patrol and related judicial-type functions, the standard in use is .10 patrol officers per 1,000 in the population.

TABLE 59

CUMULATIVE MANPOWER REQUIREMENTS, ALASKA STATE TROOPERS

Year	Moderate Case Manpower Requirements	Low Case Manpower Requirements	High Case Manpower Requirements
1980	21	21	21
1985	25	25	26
1990	31	29	32
1995	36	35	37
2000	43	42	45

It is important to note that C Detachment of the Alaska State Troopers is a training center, and these ratios and corresponding figures could conceivably fluctuate, depending on the number of trainees within the detachment. However, in all probability, these

figures represent the lowest projections under non-OCS development.

Over the remaining 21-year period under study, the troopers would realize an average increase of 117 percent over the three base cases. The time span is long enough, however, to absorb an additional 23 to 25 patrol officers.

Fire. Using the present ratio of fire department personnel to the total population, table 60indicates the cumulative manpower requirements necessary to accommodate the population for the three non-OCS base cases. The standard in use is the present ratio of 1.61 fire department personne' per 1,000 in the population (excludes military personnel).

TABLE 60

CUMULATIVE MANPOWER REQUIREMENTS, FIRE DEPARTMENT PERSONNEL

Year	Moderate Case Manpower Requirements	Low Case Manpower Requirements	High Case Manpower Requirements
1980	305	303	303
1985	373	368	394
1990	464	443	485
1995	547	531	573
2000	665	646	692

With the present ratio, the Anchorage Fire Department would realize increases of 118 percent for the moderate base case, 113 percent for the low base case, and 128 pecent for the high base case from 1980 to 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 cases.

Recreation Facility Needs. Utilizing the standards established by the National Recreation and Park Association, table 61 indicates the cumulative requirements based upon population growth as projected under the non-OCS cases.

TABLE 61

CUMULATIVE RECREATIONAL FACILITY NEEDS

	Moderate Base Case				
Facility	1980	1985	1990	1995	2000
Play Lots	83	100	122	143	172
Neighborhood Parks	21	25	31	36	43
Softball	69	83	110	119	144
Basketball	104	125	153	179	216
Swimming Pools (25m)	8	10	12	14	17
Skating Rinks (Hockey)	14	17	20	24	29
Community Centers	8	10	12	14	17

	Low Base Case				
Facility	1980	1985	1990	1995	2000
Play Lots	83	99	117	139	168
Neighborhood Parks	21	25	29	35	42
Softball	69	82	98	116	140
Basketball	103	123	146	174	209
Swimming Pools (25m)	8	10	12	14	17
Skating Rinks (Hockey)	14	16	20	23	28
Community Centers	8	10	12	14	17

TABLE 61, continued

Facility	High Base Case 1980	1985	1990	1995	2000
Play Lots	83	105	128	150	179
Neighborhood Parks	21	26	32	37	45
Softball	69	88	106	125	149
Basketball	103	131	160	187	224
Swimming Pools (25m)	8	11	13	15	18
Skating Rinks	14	18	21	25	30
Community Centers	8	11	13	15	18

- Swimming Pools. While the Anchorage area falls considerably short of achieving the established standard for number of pools per population, it is unlikely that the number built would reflect the standard within the 20-year projection period. 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 pleasure ice skating rinks. However, the existence of only two indoor hockey rinks, 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 and probably two additional indoor rinks.

- 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 the 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, historitally, 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 100,000 peep'l e 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 servicing approximately 16,717 (1978) men, women, and children of the Anchorage area (Municipality of Anchorage, 1977).

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 62.

TABLE 62

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 Standard	1,101	425

[a] 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. Per capita water consumption has been calculated by the U. S. Army Corps of Engineers for Anchorage consumers at 594 liters per capita per day (lpcpd) (157 gallons per capita per day [gpcpd]). This figure is offered as the standard to assess water need under the moderate, low, and high base cases through the period under study.

TABLE 63

WATER NEED - MILLION LITERS PER DAY

Year	Moderate Case		Low case		High Case	
	mld	mgd	mld	mgd	mld	mgd
1980	123.0	32.5	122.6	32.4	122.6	32.4
1985	148.4	39.2	146.5	38.7	155.9	41.2
1990	181.7	48.0	174.1	46.0	189.6	50.1
1995	212.7	56.2	206.7	54.6	222.2	58.7
2000	256.2	67.7	249.1	65.8	266.1	70.3

The U. S. Army Corps of Engineers has designed long-range plans that would, for the most part, meet this increasing demand for water in a timely manner. This is primarily due to the Corps' anticipation of a population growth comparable to the Institute of Social and

Economic Research's MAP model projections for the Western Gulf cases. The only shortfall appears in the high base case between 1995 and 2000 where the high base case exceeds the Corps' projections by 16,941 people. However, MAUS anticipates a demand for the year 2000 of 295.6 mld (78.1 mgd) which exceeds the demand generated for the high base case using the per capita consumption standard mentioned above. For a complete description of the plans for water development in the Anchorage area, refer to Volume 1, Socioeconomic and Physical Baseline.

Sewer. Sewer line extensions and expansion of sewage treatment plants are based on population projections generated by the Municipal Planning Department. The Planning Department is projecting a tentative population of 353,184 by the year 1995 for utility planning purposes. Plans are geared toward a high rate of growth in order to avoid the costly problem of paralleling sewer lines.

Using the per capita wastewater generation standard, as explained in the overview of infrastructure standards of 477 lpcpd (126 gpcpd). Table 64 displays the cumulative wastewater generation through the year 2000 for the non-OCS base cases.

TABLE 64

WASTEMATER GENERATION - MILLION LITERS PER DAY[a]

Year	Moderate Case		Low Case		High Case	
	mld	mgd	mld	mgd	mld	mgd
1980	98.8	26.1	98.4	26.0	98.4	26.0
1985	119.2	31.5	117.7	31.1	125.3	33.1
1990	145.7	38.5	140.0	36.9	152.1	40.2
1995	171.0	45.1	165.8	43.8	178.3	47.1
2000	205.5	54.3	199.8	52.8	213.5	56.4

[a]These figures do not reflect the additional 20% infiltration/inflow problem as discussed in the baseline analysis.

The resultant of the above is that the population forecast of the three base cases will have some impact on the existing municipal sewer utility planned expansions. The problem occurs between 1995 and 2000 where the base case projections exceed the planning figures. Expansion will have to be stepped. up prior to 1995 to accommodate the effect of these projections. If time delays are encountered in completing construction-installation of planned facilities, the overall effectiveness of the system would be of major concern.

Electricity. It is estimated 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 experienced the major portion of its development. Although Chugach Electric will feel the most direct impact from future population growth, ML&P will be indirectly 'impacted due

to the corresponding expansion in their commercial/industrial service sector and redevelopment of areas around the central business district to a higher density urban profile.

Table 65 displays the electrical requirements for the Anchorage area for the period under study.

TABLE 65

ELECTRICAL LOAD REQUIREMENTS - MEGAWATTS

Year	Factor KW	Moderate Case	Low Case	High Case
1980	3.0	622	619	619
1985	3.6	900	888	946
1990	4.3	1,316	1,259	1,373
1995	5.1	1,825	1,773	1,907
2000	6.1	2,629	2,556	2,732

The level of commercial/industrial development is one of the key determinants in assessing future power demand. At this point in time, the level and type of activity in this sector is somewhat speculative over the period under study, resulting in projections which could either be high or low. In addition, the overall effect of the Western Gulf projections is below that of the projections presently being utilized by the utilities for planning purposes. Only if the timeframe for planned installation of new generation facilities occurs in a timely manner will the utilities be able to meet the electrical service needs of the Anchorage community.

Telephone. The Anchorage Telephone Utility has demonstrated the capability of coping with massive growth during a short-time frame as a result of the oil pipeline. The utility should be able to accommodate future expansion as a result of natural population increases, as well as proposed OCS activity with adequate planning. 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 will produce a better return in revenues than an extension servicing very few when keeping the cost of equipment and line extensions constant. Although population projections under the moderate, low, and high base case will require adequate planning, the increases could potentially have a positive economic impact. No other impacts resulting from population growth were identified.

Solid Waste. Table 66 displays the solid waste generation projections for the moderate, low, and high base cases for the Western Gulf lease sale. The figures are based on an increasing factor of per capita solid waste generation as projected by the Department of Public Works.

TABLE 66

DAILY SOLID WASTE GENERATION

Year	Per Capita Per Day kgms[a]	lbs[b]	Moderate Case Metric Tons	U.S. Tons	Low Case Metric Tons	U.S. Tons	High Case Metric Tons	U.S. Tons
1980	2.71	(5.97)	561	619	559	616	559	616
1985	3.06	(6.75)	766	844	755	832	805	887
1990	3.47	(7.64)	1,060	1,169	1,015	1,119	1,106	1,219
1995	3.92	(8.65)	1,403	1,547	1,363	1,503	1,467	1,617
2000	4.43	(9.77)	1,910	2,106	1,857	2,047	1,984	2,188

[a] kgms = kilograms
[b] lbs = pounds

With the introduction of new processing techniques commensurate with increasing the density of fill and assuming the site targeted for the new sanitary landfill is obtained as discussed in the baseline report, the Western Gulf projections will pose no impact on the management of solid waste.

Housing

Table 67 projects the civilian housing stock requirement based on the ratio outlined in the overview of infrastructure standards section. The demand for new housing is strong in all three base cases. The annual demand follows the population growth but averages 3,977 units per year during the entire period for the low base case, 4,173 units per year for the moderate base case, and 4,485 units per year for the high base case. Annual demand varies substantially with peaks in 1982, 1987, and 1999 and reduced demand in 1985 and 1992. The demands strengthen and stablize

after 1995. All three base cases could be handled by the construction industry and provide a fairly steady demand for new units during the study period. It should be noted that present estimates of housing stock exceed the projected demand through 1980, suggesting an existing surplus of units. This should continue a short-term depression of the housing market through the early 1980's.

TABLE 67

HOUSING STOCK Projections

	Moderate Base Case			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	31,812	12,816	6,584	62,212
1985	40,651	30,741	7,661	79,053
1990	49,001	41,564	8,624	99,189
1995	56,776	53,820	9,226	119,822
2000	69,011	66,897	9,777	145,685

	Low Base Case			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	31,661	23,703	6,552	61,916
1985	40,063	30,296	7,550	77,909
1990	46,789	39,689	8,234	94,712
1995	55,082	52,213	8,951	116,245
2000	67,007'	64,954	9,492	141,453

	High Base Case			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	31,661	23,703	6,552	61,916
1985	42,872	32,421	8,079	83,372
1990	51,249	43,471	9,020	103,740
1995	59,451	56,355	9,660	125,466
2000	71,824	69,623	10,176	151,623

Health Services

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

Acute Care Bed Need. Applying the Hill-Burton Formula for acute care bed need, figures in table 68 were derived by using a civilian, non-native population figure, a 1978 use rate of 600 (based upon number of inpatient days experienced) and an 80 percent occupancy rate.

TABLE 68

PROJECTED ACUTE CARE BED NEED[a]

Year	Moderate Case Bed Need	Low Case Bed Need	High Case Bed Need
1980	385	367	367
1985	453	446	478
1990	563	537	589
1995	665	645	698
2000	809	786	842

[a]Based upon civilian, non-native population; derived by deducting 19,000 for military and 4.2% of the total population for native population.

There are currently 470 beds licensed and approximately 840 beds, if one includes all military and native hospital beds. Adequate acute beds exist to serve the general public through at least 1985, whether applying the moderate, low, or high projections in the non-OCS base cases. 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 80 percent of the facilities' available beds.

Ratio of Physicians to Population. In 1977 the primary care physician population ratio was .385 per 1,000 in the population. Any level above .4 primary care physicians per 1,000 population no longer qualifies Anchorage as a medically underserved area, The 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 69

PROJECTED PRIMARY CARE PHYSICIAN NEEDS

Year	Moderate Case Physician Needs	Low Case Physician Needs	High Case Physician Needs
1980	259	258	258
1985	312	308	328
1990	382	366	399
1995	447	434	467
2000	539	524	560

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 primary care physicians; and

- 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 an 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 related crimes. However, the predominant causes for alcohol abuse will likely remain, e.g. remoteness, long dark winter syndrome, 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-the need for and subsequent acquisition ofmodern equipment and service units. For example, recent efforts were successful by both civilian non-native hospitals to justify the addition of a head and full body computerized axial tomography (C.A.T.) scanner. The result will be the emergence of a sophisticated Anchorage health 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 sociopsychological assistance will be needed. Table 70 illustrates projected increased levels of service for areas of need based upon the annual population growth rate required in the non-OCS base cases.

TABLE 70

CUMULATIVE GROWTH IN SELECTED SOCIAL SERVICES AREAS

	Moderate Base Case				
Service	1980	1985	1990	1995	2000
Day Care Spaces	3,732	4,499	5,507	6,440	7,758
Low Income Housing	4,722	6,000	7,528	9,094	11,057

TABLE 70, continued

Service	Low Base Case 1980	1985	1990	1995	2000
Day Care Spaces	3,716	4,439	5,271	6,257	7,542
Low Income Housing	4,699	5,913	7,189	8,823	10,736

Service	High Base Case 1980	1985	1990	1995	2000
Day Care Spaces	3,716	4,728	5,746	6,730	8,063
Low Income Housing	4,699	6,328	7,874	9,523	11,508

Day Care Spaces. There are currently spaces within day care centers and homes for 2,675 children. The target group for such services is all children from age zero to 14 years or 33,984 children. The current service per population ratio is 7.87 percent. While not officially documented, school, public health, and community personnel claim that a significant number of children are alone before and after school when parents are at work. Projections listed above are based upon the assumption that a more realistic projection of numbers of children needing partial or total day care would be to increase the service ratio to ten percent of the target population. The net effect would be to add 723 day care spaces to better meet the demands for services for the 1978 target population. Projected increases in day care needs for each base case will demand significant additions in the service delivery system.

Low Income Housing. The need for low income housing currently exceeds the supply of adequate units. In 1978, approximately 23 percent (or 14,037 households) earned less than $17,500 and were thus designated

low-moderate income. (Ender, 1978) Current service levels address the needs of only 6.1 percent of the target group. Optimally, housing assistance should be available to serve at least 33 percent of the target group (1978 Housing Assistance Plan). It appears that projections of actual units necessary to serve one-third of the target population go beyond the financial and developmental means available to support such acquisition and construction. Increasing numbers of dollars available for actual rent subsidies and other housing assistance payments may be a more realistic means of achieving some level of service to 33 percent of the target population.

Unemployment. Projected unemployment has been calculated, assuming that the effect of gasline development will have similar effects as the previous oil line development. The average unemployment rate for the previous five years was 6.8 percent, ranging from a low of 5.5 percent and a high of 8.3 percent. Projections are based on the correspondence of an average annual unemployment rate increase of four percent with an average annual unemployment rate of 6.8 percent. For every .1 percent variance in employment rates, the unemployment rate will change .05 percent in the opposite direction.

Development activities will cause rates to fluctuate in a pattern similar to that experienced during previous pipeline development efforts. Unemployment will decline to a low of approximately 5.5 percent in 1981, remain low through 1982 before rising to a moderate 6.9 percent in 1983, and finally a significantly high 8.3 percent in 1985 as pipeline activities wind down. Unemployment reman ns high

through 1985 (8.0 percent) but tapers again to moderate levels, ranging from 6.1 percent to 6.9 percent between 1986 through 1990. The rate raises to over 7.2 percent between 1991 and 1995, returning again to a normal range from 1995 through the year 2000. The low base case follows predominantly the same trend with only slight variations. Fluctuations within the high base case are similar, however, increasing and decreasing trends beg'in and end one or two years later than during the moderate and low base cases.

The period between 1981 and 1985 reflect an era of great fluctuation due primarily to peak development employment, development wind-down, resultant pipeline layoffs coupled with significant - and often late - in-migration of nonemployed workers attempting to take advantage of lucrative gasline jobs. The end of the century should see a return to relatively normal rates of employment and unemployment.

TABLE 71

VARIANCE IN EMPLOYMENT AND UNEMPLOYMENT RATES

Year	Moderate Case		Low Case		High Case	
	Employ Rate Increase	Unemploy Rate	Employ Rate Increase	Unemploy Rate	Employ Rate Increase	Unemploy Rate
1981	7.1%	5.5%	6.8%	5.5%	7.6%	5.5%
1982	9.2	5.5	9.3	5.5	9.2	5.5
1983	3.8	6.9	3.8	6.9	5.8	5.9
1984	-2.1	9.8	-2.4	10.0	1.1	8.3
1985	1.7	8.0	1.2	8.2	4.4	6.6
1986	4.5	6.5	3.6	7.0	4.6	6.5
1987	5.4	6.1	4.3	6.6	4.6	6.5
1988	5.0	6.3	4.3	6.6	4.5	6.5
1989	4.4	6.6	4.3	6.6	3.7	7.0
1990	3.8	6.9	4.3	6.6	3.2	7.2
1991	2.4	7.6	3.7	7.0	3.1	7.3
1992	2.4	7.6	3.3	7.2	2.4	7.6
1993	3.2	7.2	3.9	6.9	3.0	7.3
1994	3.2	7.2	3.7	7.0	3.3	7.2
1995	3.8	6.9	3.8	6.9	3.5	7.1
1996	4.2	6.7	3.7	7.0	3.5	7.1
1997	4.0	6.8	4.0	6.8	4.1	6.8
1998	4.0	6.8	4.1	6.8	4.1	6.8
1999	4.5	6.5	4.5	6.5	4.5	6.5
2000	4.1	6.8	4.1	6.8	4.0	6.8

Transportation

The population projections for the non-OCS base cases are similar to the estimates used for transportation planning. The high base case is equivalent to the planning estimates, while the low base case is 25,000 below estimates by 1995. This would suggest that goals set by the plan would meet the transportation needs of the population estimates of the base cases. The weakness lies primarily in that the Anchorage Metropolitan Area Transportation Study (AFIATS) plan will very likely not be fully implemented.

Also, since 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 system's capacity.

The greatest concern must be that if any major portion of the long-range plan fails to be developed, the impacts on the system will 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 plan to facilitate meeting these goals. If anything, the plan is a good effort to provide for reasonably good auto access but would reduce the viability of a strong transit system. The base cases then would likely result in some serious shortfalls in attaining transportation goals within the Municipality.

Financial Capacity and Capital 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 slowdown 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 base

cases do project a reasonable pattern of growth for most of the period. If a slowdown occurs or continues, local government would have to revise its long-term forecasts and adjust its expenditure patterns to cope with a slower revenue growth. The slower economic growth of the late 1980's and early 1990's could produce some short-term fiscal problems.

- 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 redactions may be somewhat too high during the base case period. Rapid expansion of services now could be caught in a revenue bind within ten years. Presently, the

Municipality is embarking on a very ambitious capacity projection study which should place 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.

SUMMARY OF IMPACTS

The following matrices display 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 each 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 Volume I, Socioeconomic and Physical Baseline.

NON-OCS MODERATE BASE CASE

CUMULATIVE RATIO OF SERVICE i? EQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	207,323	249,962	305,932	357,795	431,026
Education: Primary/Secondary - No. of Manpower/Faci 1 i ties	1,576	1,800	2,447	2,862	3,448
Public Postsecondary - UAA No. of Credits	21,559	33,120	50,479	71,380	103,446
Public Postsecondary - ACC No. of Credits	53,181	61,226	71,496	83,617	98,274
Public Safety: Pol ice - Manpower		415	515	608	739
State Troopers - Manpower	21	25	31	36	43
Fire - Manpower	305	373	464	547	665
Leisure: Play Lots	83	100	122	143	172
Neighborhood Parks	21	25	31		
Softbal 1 Di amends	69	83	110	1;:	1::
Basketbal 1 Courts	104	125	153	179	216
Swimming Pools	8	10	12	14	17
Skating Rinks	14	17	20	24	29
Communi ty Centers	8	10	12	14	17
Utilities: Water - (Million Gallons Per Oay)	32.5	39.2	48.0	56.2	67.7
Sewer - (Million Gallons Per Day)	26.1	31.5	38.5	45.1	54.3
Electricity -(Megawatts)	622	900	1,316	1,825	2,629
Telephone[a]					
Solid Waste -(U.S. Tons per Day)	619	844	1,169	1,547	2,106
Housing: Units	62,212	79,053	99,189	119,822	145,685
Heal th: Bed Needs	385	453	563	665	809
Primary Care Physicians	259	312	382	447	539
Social Services: Day Care Space	3,732	4,499	5,507	6,440	7,758
Unemployment rates		8.0		6.9	6.8
Low Income Housing Units	4,722	6,000	7,%:	9,094	11,057
Transportation[a]					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

NON-OCS LOW BASE CASE

CUMULAT VE RATIO OF SERVICE REQUIREMENTS TO POPULATION

		1980	1985	1990	1995	2000
		206,423	246,587	292,848	347,596	418,972
Education:	Primary/Secondary - No. of Manpower/Facilities	1,569	1,775	2,343	2,781	3,352
	Public Postsecondary - UAA No. of Credits	21,466	32,673	48,320	69,345	100,554
	Public Postsecondary - ACC No. of Credits	52,947	60,438	68,440	81,233	95,526
	State Troopers -		409	492	590	718
	Fire - Manpower	21	25	29	35	42
		303	368	443	531	646
	[illegible]	83	99	117	139	168
	Neighborhood Parks	21	25	29	35	42
	Softball Diamonds	69	82	98	116	140
	Basketball Courts	103	123	146	174	209
	Swimming Pools	8	10	12	14	17
	Skating Rinks	14	16	20	23	28
	Community Centers	8	10	12	14	17
Utilities:	Water - (Million Gallons Per Day)	32.4	38.7	46.0	54.6	65.8
	Sewer - (Million Gallons Per Day)	26.0	31.1	36.9	43.8	52.8
	Electricity - (Megawatts)	619	888	1,259	1,773	2,556
	Telephonea					
	Solid Waste - (U.S. tons per day)	616	832	1,119	1,503	2,047
		61,910	77,909	94,712	6,246	14 ,453
	[illegible]					
	Primary Care Physicians	367	446	537	645	786
		258	308	366	434	524
	[illegible] Day Care Space	3,716	4,439	5,271	6,257	7,542
	Unemployment rates		8.2	6.6	6.9	6.8
	Low Income Housing Units	4,699	5,913	7,189	8,823	10,736
	[illegible] Capacity and Capital Requirements					

"See Section on Overview of Infrastructure Standards

NON-OCS HIGH BASE CASE

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1985	1990	1995	2000
	206,423	262,688	319,229	373,896	447,941
Education: Primary/Secondary - No. of Manpower/Facilities	1,569	1,891	2,554	2,991	3,584
Public Postsecondary - UAA No. of Credits	21,466	34,806	52,673	74,592	107,506
Public Postsecondary - ACC No. of Credits	52,947	64,385	74,604	87,379	102,131
Public Safety: Police - Manpower		438	539	637	770
State Troopers - Manpower	21	26	32	37	45
Fire - Manpower	303	394	485	573	692
Leisure: Play Lots	83	105	128	150	179
Neighborhood Parks	21	26	32	37	45
Softball Diamonds	69	88	106	125	149
Basketball Courts	103	131	160	187	224
Swimming Pools	8	11	13	15	18
Skating Rinks	14	18	24	25	30
Community Centers	8	11	13	15	18
Utilities: Water - (Million Gallons Per Day)	32.4	41.2	50.1	58.7	70.3
Sewer - (Million Gallons Per Day)	26.0	33.1	40.2	47.1	56.4
Electricity - (Megawatts)	619	946	1,373	1,907	2,732
Telephone [a]					
Solid Waste - (U.S. tons per day)	616	887	1,219	1,617	2,188
Housing: Units	61,916	83,372	103,740	125,466	151,623
Health: Bed Needs	367	478	589	698	842
Primary Care Physicians	258	328	399	467	560
Social Services: Day Care Space	3,716	4,728	5,746	6,730	8,063
Unemployment rates		6.6	7.2	7.1	6.8
Low Income Housing Units	4,699	6,328	7,874	9,523	11,508
Transportation					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

Impact Assessment of Western Gulf of Alaska OCS Scenarios

INTRODUCTION

The purpose of this section is to assess impact on specific indicators in the Anchorage community commensurate with OCS petroleum development in the Western Gulf of Alaska.

From the infrastructure which developed as a result of the construction of the trans-Alaska pipeline, Anchorage, in general, is in a position to more easily absorb continued growth than was the case in the pre-pipeline years. Nevertheless, certain indicators, such as utilities and transportation, were impacted so tremendously and require such capital intensive expansion that they are still of somewhat tenuous character. This will continue to be the case with or without OCS development until long-range plans can be fully implemented. Other indicators which will show an increased demand include education, public safety, recreation, health, social services, housing, and financial capacity and capital requirements. However, the capacity of the community infrastructure will, for the most part, be able to expand proportionately to meet the incremental effects of each of the Western Gulf of Alaska OCS scenarios.

Of the five scenarios developed to assess impact from the Western Gulf lease sale, only two display impacts of significant levels to affect the service infrastructure. The forecasts of population and employment (measured as change from a specified base case) are shown in table 72.

This section focuses on a detailed service impact analysis of the five percent-moderate scenario with additional information presented on the five percent-high scenario as the only other reflecting significant impact.

In presenting quantitative data to describe the incremental service demand required by the five percent-moderate scenario, five dates were used rather than the twenty separate years the scenarios occur over. This was done to simplify the presentation without distorting the events which occur. In addition, the annual cumulative demand is a poor and unreliable predictive tool. While the model produces annualized predictions and annual change can be calculated using the standards established, key dates would better provide an understanding of the service demands by not focusing on the more speculative annual data.

The benchmark dates used are 1985, 1987, 1990, 1995, and 2000. The five percent-moderate scenario begins in 1981 and reaches a plateau of initial major gains in 1985 and peaks between 1987 and 1990. The scenario then slowly loses strength arid declines to lows in 1995 and some, but not all, of this loss is regained by the year 2000. The dates selected provide the scenario with the key benchmarks required for a full description of the incremental and cumulative demand that is discussed in the remainder of this section.

TABLE 72

POPULATION ANO EMPLOYMENT IMPACT ON ANCHORAGE DUE TO WESTERN GULF OF ALASKA OCS DEVELOPMENT SCENARIOS[a]

Year	95% Scenario Moderate Base		Mean Scenario Moderate Base		5% Scenario Moderate Base		5% Scenario High Base		95% Scenario Low Base	
	Population	Employment	Population	Employment	Population	Employment	Population	Employment	Population	Employment
1977	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1978	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1979	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1980	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1981	0.102	0.131	0.112	0.124	0.116	0.124	0.116	0.124	0.131	0.100
1982	0.254	0.214	0.247	0.198	0.289	0.290	0.294	0.292	0.212	0.250
1983	0.262	0.149	0.242	0.147	1.378	0.989	1.413	1.068	0.149	0.262
1984	0.183	0.058	1.016	0.613	2.924	2.117	2.871	2.228	0.059	0.186
1985	0.151	0.035	0.726	0.384	4.170	2.745	4.413	3.113	0.035	0.151
1986	0.129	0.023	0.594	0.253	4.237	2.283	4.614	2.691	0.022	0.128
1987	0.115	0.018	0.504	0.123	5.081	2.488	5.580	2.921	0.017	0.113
1988	0.103	0.015	0.393	0.051	4.925	2.247	5.531	2.689	0.013	0.102
1989	0.095	0.013	0.294	-0.015	4,820	2.030	5.470	2.456	0.011	0.092
1990	0.087	0.011	0.221	-0.045	4.911	1.958	5.549	2.335	0.010	0.085
1991	0.081	0.010	0.199	-0.030	4.680	1.682	5.379	2.063	0.008	0.078
1992	0.075	0.009	0.198	-0.014	4.508	1.494	5.212	1.849	0.008	0.072
1993	0.070	0.008	0.201	-0.000	4.199	1.127	4.907	1.458	0.067	0.006
1994	0.066	0.007	0.204	0.010	3.862	0.880	5.483	1.201	0.062	0.005
1995	0.063	0.005	0.207	0.018	3.786	0.918	4.522	1.231	0.058	0.005
1996	0.060	0.006	0.199	0.018	3.837	1.010	4.592	1.319	0.059	0.006
1997	0.058	0.006	0.204	0.025	3.901	1.079	4.698	1.402	0.055	0.006
1998	0.057	0.007	0.187	0.015	3.912	1.092	4.784	1.458	0.054	0.006
1999	0.056	0.008	0.159	-0.008	3.955	1.120	4.880	1.511	0.053	0.006
2000	0.054	0.008	0.005	-0.135	3.977	1.135	4.958	1.551	0.051	0.006

[a]MAP Regional Model

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.

Education

Primary and Secondary. The ratios described in the overview of infrastructure standards were altered to reflect a constant 18 percent student population ratio. This is due to the transient nature of the scenario's population. Table 73 displays the projected student population through the year 2000, and the number of teachers/classrooms necessary to accommodate the population projections for the five percent scenario/moderate base. It should be noted that the scenario produces a peak increment in 1987 which constitutes 1.9 percent of the total projected requirement. By 2000 this declines to 0.8 percent of the projected requirement. The incremental change due to the scenario is not sufficient to suggest that real increase in capability will be necessary to meet the need. It is quantitatively estimated that about 29 permanent teachers/classrooms and eight temporary teachers/classrooms will be required to meet the increment of the five percent scenario. However, it is felt that all the need could be met by the flexibilities of the base case through temporary additions or increased efficiencies in the system.

Even though a two percent increase in permanent capability in 1987 would eventually be used by the increasing permanent population, it may be unwarranted to plan for those additional facilities and manpower at that time and pay for the operation and maintenance costs earlier than a permanent demand warrants.

TABLE 73

ADDITIONAL TEACHER AND CLASSROOM NEEDS

MODERATE BASE - 5% SCENARIO

(cumulative)

Year	Moderate Base Case Projected Student Population	Moderate Base Case Total Number of Classrooms/ Teachers	Additional Projected Student Population	Number of Teachers/ Classrooms Required	Total Teachers/ Classrooms Required
1980	39,391	1,576	0	0	1,576
1985	44,993	1,800	751	30	1,830
1987	48,860	1,954	915	37	1,991
1990	61,186	2,447	884	35	2,482
1995	71,559	2,862	681	27	2,889
2000	86,205	3,448	716	29	3,447

Public Postsecondary and Career/Vocational Training. Table 74 projects the additional public postsecondary student credit hours expected to occur under the five percent scenario/moderate base case. The overall effect is insignificant and peaks at 1.8 percent of the total projection in 1987 dropping to .9 percent by 2000. The postsecondary system is sufficiently flexible that the scenario would not require additional resources over those suggested in the moderate base case. No standards were developed for private college or career/vocational education.

TABLE 74

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC POSTSECONDARY EDUCATION

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Total Credits[a]	Additional Projected Credits	Total Projected Credits
1980	74,740	0	74,740
1985	94,346	1,575	95,921
1987	108,307	1,972	110,.279
1990	121,975	1,986	123,961
1995	154,997	1,640	156.637
2000	201,720	1,861	203,581

[a]Total student enrollment data are not given because adding of institutional enrollment would not give an unduplicated total count.

Public Safety

Police. Using the current ratio of police to the population served (1.79 per 1,000), table 75 indicates the cumulative number of police required during strategic years for the period under study (excludes military personnel).

TABLE 75

POLICE MANPOWER REQUIREMENTS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total Requirements
1985	415	7.5	422.5
1987	454	9.1	463.1
1990	515	8.8	523.8
1995	608	6.8	614.8
2000	739	7.1	746.1

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

Variables which may influence the above projections include fluctuations in the Part I crime index, budgetary restrictions, and the level of urban density characterizing Anchorage through the period under study.

The greatest impact period for the five percent scenario occurs between 1983and 1987. It may not be economically sound to create the infrastructure displayed in the table due to the decrease in the scenario projections after 1988. Instead, a slower rate of increase than that derived from the standard would probably be advisable to avoid a surplus of manpower after the projected peak years.

Alaska State Troopers. Table 76 displays the cumulative increase in the number of commissioned officers necessary to meet population growth under the moderate base case and five percent scenario. The

standard in use is .10 patrol officers per 1,000 in the population.

TABLE 76

TROOPERS MANPOWER REQUIREMENTS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total
1985	25	0.4	25
1987	27	0.5	28
1990	31	0.5	32
1995	36	0.4	36
2000	43	0.4	43

Because of the low standard in use, it is unlikely that impact of additional manpower will occur as a result of the five percent scenario over the moderate base case projections.

Fire. Table 77 displays the cumulative projections of the fire department personnel under the moderate base case and five percent scenario during strategic years through the period under study. The standard in use is the ratio of 1.61 fire department personnel per 1,000 in the population (excludes military personnel).

TABLE 77

FIRE DEPARTMENT PERSONNEL MANPOWER REQUIREMENTS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total
1985	373	5.8	358.8
1987	408	7.1	415.1
1990	464	6.8	470.8
1995	547	5.3	552.3
2000	665	5.5	670.5

Variables which may influence the above projections include such factors as budgetary restrictions, land use patterns, population density and waterflow requirements.

The peak impact years for the five percent scenario occur between 1983 and 1987. In order to avoid a possible surplus of manpower when the scenario projection begins declining after 1987, it may instead be more economically feasible to add manpower at a lesser rate through the peak impact years.

Leisure

The requirements of this scenario for increases in existing inventories of recreational facilities are largely within the normal range for facilities development. Need for new facilities generated by population growth appear to peak by 1987 with the demand for three new play lots, one neighborhood park, two softball diamonds, ten basketball courts, and one swimming pool. While numbers of items evolving from population

projections seem small, the direct impact of their addition to the recreational inventory is measured by the amount of capital necessary to complete their construction or acquisition. Play lots, parks, and softball fields cost relatively little to develop, but scarce suitable real estate forces land acquisition charges to run quite high. Because of their high construction and maintenance costs, there are no new swimming pools planned in the public sector. Efforts to meet the need for pools will have to be born by the private sector. An area within the Ben Boeke (indoor) ice arena has been dedicated, layed out, and plumbed for a third indoor rink. Construction is currently forestalled, pending sufficient building capita? to complete the needed facility.

TABLE 78

RECREATION FACILITIES NEEDS

MODERATE BASE - 5% SCENARIO

	1985		
Facility	Moderate Base Case	5% Scenario	Total Needs
Play Lots	100	2	102
Neighborhood Parks	25	0	25
Softball Diamonds	83	2	85
Basketball Courts	125	2	127
Swimming Pools	10	0	10
Skating Rinks	17	0	17
Community Centers	10	0	10

	1987		
Facility	Moderate Base Case	Scenario	Total Needs
Play Lots	108	3	111
Neighborhood Parks	27	1	28
Softball Diamonds	90	2	92
Basketball Courts	135	3	138
Swimming Pools	11	0	11
Skating Rinks	18	0	18
Community Centers	11	0	11

TABLE 78, continued

Facility	1990 Moderate Base Case	1990 5% Scenario	1990 Total Needs
Play Lots	122	2	124
Neighborhood Parks	31	0	31
Softball Diamonds	101	3	104
Basketball Courts	153	3	156
Swimming Pools	12	0	12
Skating Rinks	20	0	20
Community Centers	12	0	12

Facility	1995 Moderate Base Case	1995 5% Scenario	1995 Total Needs
Play Lots	143	2	145
Neighborhood Parks	36	0	36
Softball Diamond	119	1	120
Basketball Courts	179	2	181
Swimming Pools	14	0	14
Skating Rinks	24	0	24
Community Centers	14	0	14

Facility	2000 Moderate Base Case	2000 5% Scenario	2000 Total Needs
Play Lots	172	2	174
Neighborhood Parks	43	1	44
Softball Diamonds	144	1	145
Basketball Courts	216	2	218
Swimming Pools	17	0	17
Skating Rinks	29	0	29
Community Centers	17	0	17

Uti 1 i ties

Water. Table 79 indicates water needs for the moderate base case, the five percent scenario, and the total demand for water under this OCS development. The figures are based on per capita consumption as discussed in the overview of infrastructure standards.

TABLE 79

WATER CONSUMPTION - MILLION LITERS PER DAY

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case, mld[a]	mgd[b]	5% Scenario mld	mgd	Total mld	mgd
1985	148.4	39.2	2.6	0.7	151.0	39.9
1987	161.2	42.6	3.0	0.8	164.3	43.4
1990	181.7	48.0	3.0	0.8	184.7	48.8
1995	212.7	56.2	2.3	0.6	215.0	56.8
2000	256.2	67.7	2.3	0.6	258.5	68.3

[a]mld = Million Liters per Day
[b]mgd = Million Gallons per Day

Either the development of Eagle River or Eklutna diversion as the major water resource for the Anchorage area would accommodate the effect of this scenario if the project can be implemented in the timeframe proposed by the Army Corps of Engineers. For additional information on water resources, refer to the Volume I, Socioeconomic and Physical Baseline.

Sewer. The per capita wastewater generation figure in use is 477 liters per capita per day (126 gallons per capita per day). Table 80 displays the moderate base case wastewater generation, the five percent scenario, and the total wastewater generation dictating service requirements for the period under study.

TABLE 80

WASTEWATER Generation - MILLION LITERS PER DAY

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case mld[a]	mgd[c]	5% Scenario mld	mgd	Total ml d	mgd
1985	119.2	31.5	1.9	0.5	121.1	32.0
1987	129.4	34.2	2.3	0.6	131.7	34.8
1990	145.7	38.5	2.3	0.6	148.0	39.1
1995	171.0	45.1	1.9	0.5	172.6	45.6
2000	205.5	54.3	1.9	0.5	207.4	54.8

aThese figures do not reflect the additional 20% infiltration/inflow problem as discussed in the baseline analysis.

[b]mld = Million Liters per Day

cmgd = Million Gallons per Day

If plans for expansion are. implemented in a timely manner, the Municipality should be geared to handle approximately 44.5 million gallons per day of wastewater generation (does not include the 20 percent infiltration/inflow problem) based on the municipal planning population projection of 353,184 by the year 1995. Plans for expansion of the system will have to be stepped up prior to 1995 to accommodate the effect of this scenario. In addition, if time delays are encountered in completing construction/installation of planned facilities, the overall effectiveness of the system would be of major concern.

Electricity. The per capita kilowatt factors described in the overview of infrastructure standards are offered to assess the load

requirements for the five percent scenario and the moderate base case. Table 81 displays the projections in megawatts at strategic years through the period under study.

TABLE 81

ELECTRICAL LOAD REQUIREMENTS - MEGAWATTS

MODERATE BASE - 5% SCENARIO

Year	Factor kw[a]	Moderate Base Case (row)[b]	5% Scenario (row)	Total (mw)
1985	3.6	900	15.0	915.0
1987	3.8	1,031	19.3	1,050.3
1990	4.3	1,316	21.1	1,337.1
1995	5.1	1,825	19.3	1,844.3
2000	6.1	2,629	24.3	2,653.3

[a]kw - Kilowatts
[b]mw = Megawatts

The level of commercial/industrial development is one of the key determinants in assessing future power demand. At this point in time, the level and type of activity in this sector is somewhat speculative over the period under study, resulting in projections which either could be high or low. However, the overall affect of the five percent scenario is marginal and will probably not affect the timeframes for planned installation of new generation facilities if implementation can proceed in a timely manner.

Solid Waste. Table 82 displays the solid waste generation for the moderate base case, the five percent scenario, and the total effect of these projections for the period under study. The figures are

based on an increasing factor of per capita solid waste generation as projected by the Department of Public Works.

TABLE 82

DAILY SOLID WASTE GENERATION

MODERATE BASE - 5% SCENARIO

Year	Per Capita Per Day		Moderate Base Case		5% Scenario		Total	
	kgms[a]	lbs.	Metric Ton	U.S. Ton	Metric Ton	U.S. Ton	Metric Ton	U.S. Ton
1985	3.06	6.75	766	844	12.8	14.1	799	858
1987	3.22	7.09	873	962	16.3	18.0	889	980
1990	3.47	7.64	1,060	1,169	17.1	18.8	1,077	1,188
1995	3.92	8.65	1,403	1,547	14.9	16.4	1,418	1,563
2000	4.43	9.77	1,910	2,106	17.6	19.4	1,928	2,125

[a]kgms = Kilograms

With the introduction of new processing techniques commensurate with reducing fill and assuming the site targeted for the new sanitary landfill is obtained as discussed in the baseline report, the five percent scenario will pose no impact on the management of solid waste.

Housing

Table 83 shows the incremental effects of the five percent scenario on the housing demand of the moderate base case. The overall increase is very modest but does occur in a short time span and is strongest during the slack economic period of the moderate base case following the construction of the gas pipeline. The timeliness of the demand may result in a minor stimulant to the market. This acts as a buffer for moderating

economic trends in the base case. However, all or most of the increment could be absorbed by increasing household size and reducing the vacancy rate. It is possible that the peak demand can be met in the short term without adding to the housing stock as projected.

TABLE 83

CUMULATIVE HOUSING DEMAND

MODERATE BASE CASE - 5% SCENARIO

	Moderate Base Case			
Year	Single Family	Multi-Family	Mobile Home	Total
1985	40,651	30,741	7,661	79,053
1987	43,690	35,010	7,967	86,667
1990	49,001	41,564	8,624	99,189
1995	56,776	53,820	9,226	119,822
2000	69,011	66,897	9,777	145,685

	5% Scenario			
Year	Single Family	Multi-Family	Mobile Home	Total
1985	714	524	134	1,372
1987	855	666	156	1,677
1990	814	670	143	1,627
1995	617	568	100	1,285
2000	648	611	92	1,351

	Total Projected Housing			
Year	Single Family	Multi-Family	Mobile Home	Total
1985	41,365	31,265	7,795	80,425
1987	44,545	35,676	8,123	88,344
1990	49,815	42,234	8,767	100,816
1995	57,393	54,388	9,326	121,107
2000	69,659	67,508	9,869	147,036

Health

Acute Care Bed Need. Utilizing the standards as described in the overview of infrastructure standards, the requirements of the five percent scenario, moderate base case are such that the need for increased numbers of licensed acute care beds will occur by 1985. Several considerations must be taken into account prior to recommending the construction of a third acute care facility, however. First, current occupancy rates at both existing civilian, non-native facilities are not consistently at maximum levels in all specialty areas. As the composition of the local population changes, reallocation of beds by specialty may help meet demand. In addition, expansion/construction of existing facilities is more cost-effective than constructing a third, small hospital. Second, the development of increased reliance on outpatient services, surgicenters, home health care and support services, and other alternatives to institutional care may serve to shorten average lengths of stay, and subsequently, free acute care beds for greater acute and emergent needs. Third, research has demonstrated that maximum cost efficiencies occur within acute care facilities with 200 to 300 beds.

Therefore, based upon the elements discussed above, construction of a third (minimum 200-bed) hospital would not appear to be cost-effective until 1995.

TABLE 84

ACUTE CARE BED NEED[a]

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Bed Needs	5% Scenario Bed Needs	Total Needs
1985	461	8	469
1987	505	8	513
1990	573	10	583
1995	673	8	701
2000	817	8	825

[a]Projections are based on civilian, non-native population, deducting 19,000 as a constant military population and 4.2% of the population representing the native group.

Primary Care Physicians. Using the standards discussed in the overview of infrastructure standards, the five percent scenario-moderate base reflects a need for primary care physicians in excess of the current local supply by 1985, increasing slightly through 1987 and 1990, then dropping again in the year 2000.

While the task of adding six or seven new primary care physicians to the health care delivery system above requirements of the moderate base case every three to five years may not be difficult or unreasonable, the addition of over 100 doctors to the system to attain the appropriate level of medical manpower is totally unlikely. Increased manpower needs will be met partially through the expansion of other health personnel, e.g. physician's assistants, nurse practitioners, paramedics, and other allied health personnel.

TABLE 85

PRIMARY CARE PHYSICIAN NEEDS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Physician Needs	5% Scenario Physician Needs	Total Needs
1985	312	6	318
1987	339	7	346
1990	382	7	389
1995	447	5	452
2000	539	5	544

Social Services

Day Care. Table 86 projects the number of day care spaces required in the five percent scenario-moderate base case based upon the ratio described in the overview of infrastructure standards section. Demand for day care spaces will exceed anticipated supplies by 1985 and remain relatively high through the year 2000. To meet the needs specified by population projections would require the addition of two to three new day care centers and ten to 12 new licensed day care homes, beyond those required in the base case, every three to five years. Identification of new spaces and implementation of new centers should be based on the goal of achieving service levels required by the year 2000. Because the proportion of childbearing age residents will remain high and the economic demands of living in Alaska necessitate a second income, one can assume that demands for child care services described in the projections reflect true demands for services.

Low Income Housing. Table 86 depicts the requirements for low income housing assistance to meet population projections under the five percent scenario applied to the moderate base case. Using the service to population ratio described in the overview of infrastructure standards, the demand for either low income housing units or housing assistance payments will rise steadily through the year 2000. It may be more practical to focus assistance efforts on increasing rent and payment subsidy programs as opposed to costly construction projects. Considering the high cost of construction and the relatively high vacancy rate in multifamily dwellings, direct cash subsidies may have a more positive and long lasting effect on the local economy in addition to the benefits of free choice to the recipient.

TABLE 86

DAY CARE SPACES AND LOW INCOME HOUSING NEEDS

MODERATE BASE - 5% SCENARIO

	Moderate Base Case				
Service	1985	1987	1990	1995	2000
Day Care Spaces	4,499	4,886	5,507	6,440	7,758
Low Income Housing	6,000	6,578	7,528	9,094	11,057
	5% Scenario				
Service	1985	1987	1990	1995	2000
Day Care Spaces	75	91	88	68	72
Low income Housing	104	127	124	98	103
	Total Projected Needs				
Service	1985	1987	1990	1995	2000
Day Care Spaces	4,574	4,977	5,595	6,508	7,830
Low Income Housing	6,104	6,705	7,652	9,192	11,160

Employment/Unemployment. Using the standards and methods illustrated in the overviewof infrastructure standards, table 87 displays the average rate of growth of persons employed and the corresponding percent of the projected population which will be unemployed. As one indication of potential demand for social services, i.e. unemployment insurance, food stamps, and other additional public assistance, average unemployment rates become relatively critical to a description of impact of population growth.

TABLE 87

AVERAGE EMPLOYMENT RATE OF GROWTH COMPARED TO

AVERAGE UNEMPLOYMENT RATE

MODERATE BASE - 5% SCENARIO

	Moderate Base		Base With 5% Scenario	
Year	Avg Empl Rate of Growth	Avg Unempl Rate	Avg Empl Rate of Growth	Avg Unempl Rate
1981	7.1%	5.5%	7.3%	5*5%
1982	9.2	5.5	9.4	5.5
1983	3.8	6.9	4.4	6.6
1984	-2.1	9.8	-1.1	9.3
1985	1.7	8.0	2.3	7.6
1986	4.5	6:5	4.0	6.8
1987	5.4	6.1	5.4	6.1
1988	5.0	6.3	4.7	6.4
1989	4.4	6.6	4.2	6.7
1990	3.8	6.9	3.6	7.0
1991	2.4	7.6	2.1	7.7
1992	2.4	7.6	2.2	7.7
1993	3.2	7.2	2.9	7.4
1994	3.2	7.2	3.2	7.2
1995	3.8	6.9	3.7	7.0
1996	4.2	6.7	4.1	6.7
1997	4.0	6.8	3.9	6.9
1998	4.0	6.8	3.9	6.9
1999	4.5	6.5	4.4	6.6
2000	4.1	6.8	4.0	6.8

The five-year interval ending in 1985 represents a period of erratic employment activity due to the peak and wind-down of pipeline development activities. The rate of unemployment varies from a lowof 5.5 percent in 1982, at peak production, to a high of 9.3 percent in 1984 upon cessation of major construction efforts. This high post-development rate probably reflects the tendency of pipeline workers to remain available for other potential and lucrative work, as well as a significant number of those who in-migrated too late to secure work and who are staying and seeking other job opportunities.

Unemployment remains at and below a normal rate of 6.8 percent from 1986 through 1989, reflecting a normalizing trend in employment activities in the post-development era. Potential for surges in the economy as a spinoff of production begins to decrease in 1990 as unemployment rates climb to 7.0 percent and remain significantly above 7.0 percent through 1995. From 1996 through 2000, unemployment rates reflect a return to a relatively normal employment growth pattern.

Comparison of the average unemployment rate described in the five percent scenario to that of the moderate base indicates relatively insignificant differences between the two. With exception of the period between 1982 and 1985, the requirements of the five percent scenario remain consistently 0.1 percent higher than those of the moderate base case.

Overall, the scenario's affect is to decrease the unemployment rate

during the peak impact years. Subsequent effects of the scenario imply heightened unemployment levels during the wind-down of OCS activity, followed by a return to levels equal to those of the high base case.

Transportation

Planning for long-range transportation needs is geared for a population of 372,081 (includes military living on bases) through 1995. This figure is equivalent to the 1995 population projections for the moderate base case, five percent scenario. Because the impact from the five percent scenario occurs largely after 1983, the short-range improvements should be completed and available. The overall impact is not sufficient to alter any of the short- or long-range transportation plans. If the road and transit long-range plans are not carried out, the additional growth from this scenario would accentuate the adverse effects on the system that would occur under the projected moderate base. There is a strong possibility that long-range plans of the system will not be implemented in a expeditious fashion. This could make the impact of the five percent scenario a negative factor on this service sector.

Financial Capacity and Capital Requirements

The five percent scenario-moderate base case adds 5,081 people to the population between 1981 and 1987. This increase adds to the moderate base case at a time when the latter's growth rate is slowing. This scenario is not of sufficient size to generate serious or adverse service demands. However, the increases are spread over a four-year period of

the study period and show real declines in the early 1990's. Because the scenario is incremental in its effects and adds to a slower growth period in the moderate base case, the impact, if any, are likely to be marginally positive. This is because the stimulated economy would produce a more improved revenue capacity compared to the service demands made on it. The scenario is unlikely to alter the service demand structure even on a temporary basis.

SUMMARY OF IMPACTS

The following matrices displays the services likely to be impacted due to impacts of selected Western Gulf OCS scenarios. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrices. When qualitative standards were the only means of determining impact for a particular service, the conditional qualifiers are discussed in the respective sections in overview of infrastructure standards and Volume I, Socioeconomic and Physical Baseline. The 95 percent scenario, moderate base case produces no significant or measurable effects on the service infrastructure, and therefore no matrix is produced. The mean scenario, moderate base case produces no significant effects on the service infrastructure, and therefore no matrix is produced. The five percent scenario, moderate base case was analyzed thoroughly in this section and its summary of impacts is shown in the first matrix. The five percent scenario, high base case produces a pattern of impacts almost identical to the five percent scenario, moderate base case. A summary of its impacts are described in the second matrix. The 95 percent, low base case produces no significant or measurable effects on the service infrastructure, and therefore no matrix is produced.

MODERATE BASE CASE - 5% SCENAR10

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO IMPACT PROJECTIONS

	1985	1987	1990	1995	2000
	4,170	5,081	4,911	3,786	3,977
Education: Primary/Secondary - No. of Manpower/Facilities	30	37	35	27	29
Public Postsecondary - No. of Credits	1,575	1,972	1,986	1,640	2,861
Public Safety: Police - Manpower	7.5	9.1	8.8	6.6	7.1
State Troopers - Manpower	0.4	0.5	0.5	0.4	0.4
Fire - Manpower	5.8	7.1	6.8	5.3	5.5
Leisure: Play Lots	2	3	2	2	2
Neighborhood Parks	0	1	0	0	1
Softball Diamonds	2	2	3	1	1
Basketball Courts	2	3	3	2	2
Swimming Pools	0	0	0	0	0
Skating Rinks	0	0	0	0	0
Community Centers	0	0	0	0	0
Utilities: Water - (Million Gallons Per Day)	0.7	0.8	0.8	0.6	0.6
Sewer - (Million Gallons Per Day)	0.5	0.6	0.6	0.5	0.5
Electricity - (Megawatts)	15.0	19.3	21.1	19.3	24.3
Telephone[a]					
Solid Waste - (Tons per day)	14.1	18.0	18.8	16.4	19.4
Housing: Units	1,372	1,677	1,627	1,285	1,351
Health: Bed Needs	8	8	10	8	8
Primary Care Physicians	6	7	7	5	5
Social Services: Day Care Space	75	91	88	68	72
Unemployment rates (cumulative)	7.6	6.1	7.0	7.0	6.8
Low Income Housing Units	104	127	124	98	103
Transportation[a]					
Financial Capacity and Capital Requirements[a]					

[a]See Section on Overview of Infrastructure standards

HIGH BASE CASE - 5% SCENARIO

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO IMPACT PROIIECTIONS

	1985	1987	1990	1995	2000
	4,413	5,580	5,549	4,522	4,958
Education: Primary/Secondary - No. of Manpower/Faci lities	32	40	40	33	36
Public Postsecondary - No. of Credits	1,714	2,166	2,244	1,959	2,320
Public Safety: Police - Manpower	7.9	10.0	9.9	8.1	8.9
State Troopers - Manpower	0.4	0.5	0.5	0.4	0.4
Fire - Manpower	7.1	9.0	8.9	7.3	8.0
Leisure: Play Lots	2	2	2	1	2
Neighborhood Parks	1	0	0	1	0
Softball Diamonds	1	2	2	1	2
Basketball Courts	3	3	2	2	2
Swimming Pools	0	0	0	0	0
Skating Rinks	0	1	1	0	0
Community Centers	0	0	0	0	0
Utilities: Water - (Million Gallons Per Day)	0.7	0.9	0.9	0.7	0.8
Sewer - (Million Gallons Per Day)	0.6	0.7	0.7	0.6	0.6
Electricity - (Megawatts)	15.9	21.2	23.9	23.1	30.2
Tel ephone[a]					
Solid Waste - (Tons per day)	14.9	19.8	21.2	19.6	24.2
Housing: Units	1,452	1,842	1,839	1,534	1,684
Health: Bed Needs	9	10	11	8	10
Primary Care Physicians	6	7	7	6	6
Social Services: Day Care Space	80	101	100	82	89
Unemployment rates (cumulative)	6.3	6.5	7.7	7.1	6.8
Low Income Housing Units	110	140	139	116	128
Transportation[a]					
Financial Capacity and Capital Requirements					

[a]See Section on Overview of Infrastructure Standards

V. LOWER COOK INLET IMPACT ANALYSIS

Baseline Conditions and Forecasts of Conditions Without the Planned Lease Sale

SIGNIFICANT FACTORS AFFECTING CHANGE

Change in the three Anchorage Lower Cook Inlet non-OCS base cases 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.

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

The following basic assumptions were made in forecasting employment and population in Anchorage in the Lower Cook Inlet (LCI) non-OCS cases:

- Employment rises only 74 percent between 1980 and 2000 with the most rapid growth experienced during construction of the ALCAN gasline in 1981-83. This causes a bulge in the projection during this period and results in a stagnant growth situation in employ- in all three base cases from 1983 to 1985. Growth in employment

improves in the later 1980's and achieves a 1.9 to 3.1 percent annual growth rate in the 1990's.

- Population grows by 57.8 percent, somewhat below employment. This could be reflective of the decreasing household size and increasing number of employed spouses. This trend has already been observed in Anchorage's population in the 197'0's. The employment force rises from 47.3 percent of the population in 1980 to 52.2 percent in 2000.

- Since population is tied to employment, Anchorage is expected to increase its share of the state's population from 45.7 percent of the population in 1980 to 48.6 percent in 2000.

- Growth in Anchorage is the 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. Real disposable personal income is shown in table 88 and projects per capita increases from $3,303 to $4,486 in real dollars over the base case period.

- The structure of the Anchorage economy cushions the effects of seasonality of employment when comparing it to other areas of the state.

- Employment within specific industrial sectors is noted in tables

89 through 90. Two sectors are relatively stable or show only modest growth - mining/exogenous construction and government. The other areas all show stronger rates of growth. Mining/exogenous construction are reduced from 1.8 to 0.9 percent of the employment, while government declines from 35.5 to 23.5 percent over the analysis period. Trade, services, and finance show the same trend as in the 1970's and increase from 46.6 to 52.3 percent of the work force. Transportation, communications, utilities, and endogenous construction increase from 14.8 to 16.1 percent; and manufacturing, agriculture, forestry, and fisheries continue as a small, but vigorous, sector, growing from 2.1 to 4.1 percent of the work force.

The accompanying tables show the growth and structure of the Anchorage economy to the year 2000 under the assumptions of the non-OCS base cases. It can be noted that the three base cases show only a slight difference in size and almost no difference in the patterns of the data. By the year 2000, the low and high base cases are only 12,796 people apart in projecting population. This is a 4.4 percent difference which in an economy the size of Anchorage's has only a moderate impact on the provision of most services. Any of the three base cases would produce about the same service demand levels and planning in the coming years.

TABLE 88

BASE CASE GROWTH OF ANCHORAGE

REAL DISPOSABLE PERSONAL INCOME - 1977-2000[a]

Year	Moderate Base Case	Low Base Case	High Base Case
1977	606,386	606,176	606,386
1978	540,061	540,548	540,078
1979	530,214	528,881	529,042
1980	555,861	552,083	552,807
1981	596,717	590,847	594,122
1982	664,618	659,263	661,028
1983	718,627	713,612	729,831
1984	718,832	710,130	747,224
1985	718,732	709,389	754,008
1986	740,309	731,567	770,754
1987	771,891	763,069	798,031
1988	808,678	799,488	835,175
1989	846,263	835,526	872,543
1990	881,917	870,770	908,987
1991	913,566	902,251	940,548
1992	946,050	933,682	972,731
1993	982,097	970,063	1,009,000
1994	1,020,780	1,018,450	1,048,320
1995	1,062,120	1,048,720	1,090,510
1996	1,110,520	1,092,370	1,135,740
1997	1,158,050	1,140,450	1,185,470
1998	1,208,720	1,191,170	1,238,030
1999	1,263,810	1,245,980	1,295,900
2030	1,316,800	1,298,570	1,350,330

[a] 1,000's of dollars

TABLE 89

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

Year	Moderate Base Case	Low Base Case	High Base Case
1977	183,606	185,794	183,606
1978	191,871	193,355	191,849
1979	186,555	187,107	186,449
1980	186,047	185,769	185,678
1981	190,653	189,629	190,044
1932	201,016	199,329	199,910
1983	210,524	208,527	211,273
1984	211,796	209,740	215,627
1985	212,656	210,555	218,777
1986	215,219	212,857	222,017
1987	219,367	216,638	226,061
1988	224,793	221,729	231,769
1989	230,401	227,016	237,799
1990	235,413	231,929	243,178
1991	240,336	236,894	248,564
1992	244,878	241,216	253,150
1993	249,792	246,174	258,306
1994	255,067	251,384	263,712
1995	260,682	256,895	269,404
1996	267,068	262,881	275,614
1997	273,659	269,443	282,404
1998	280,757	276,413	289,697
1999	288,230	283,852	297,485
2000	293,554	289,055	303,042

[a]MAP Regional Model for Lower Cook Inlet Base Case Projections

TABLE 90

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

Year	Moderate Base Case	Low Base Case	High Base Case
1977	91,634	91,728	91,634
1978	88,515	88,611	88,518
1979	86,656	86,512	86,540
1980	88,067	87,607	87,735
1981	91,905	91,082	91,486
1982	98,236	97,246	97,731
1983	103,861	102,836	104,739
1984	104,643	103,490	107,548
1985	104,914	103,679	108,999
1986	106,358	105,091	110,318
1987	108,992	107,684	112,349
1988	112,502	111,074	115,821
1989	116,086	114,490	119,496
1990	119,213	117,590	122,726
1991	121,892	120,303	125,502
1992	124,405	122,746	127,941
1993	127,239	125,619	130,782
1994	130,323	128,686	133,864
1995	133,631	131,917	137,211
1996	137,483	135,472	140,889
1997	141,416	139,384	144,912
1998	145,627	143,535	149,207
1999	150,067	147,981	153,824
2000	153,368	151,272	157,277

[a]MAP Regional Model for Lower Cook Inlet Base Case Projections

TABLE 91

MODERATE BASE CASE GROWTH OF ANCHORAGE EMPLOYMENT

SECTORS - 1977-2000

Year	Mining Exogenous Construction	Transportation Communication Public Utilities Endogenous Construction	Trade Service Finance	Manufacturing Agriculture Forestry Fisheries	Local State and Federal Government
1977	1,630	13,520	42,703	1,913	32,521
1978	1,330	12,816	37,811	2,080	34,979
1979	1,366	12,296	35,875	2,230	34,975
1980	1,366	13,052	36,714	2,367	34,563
1981	1,426	13,740	39,557	2,546	34,506
1982	1,443	14,984	44,286	2,687	34,416
1983	1,432	16,135	47,954	2,853	35,163
1984	1,436	16,264	47,993	3,007	36,038
1985	1,418	16,593	47,755	3,172	36,093
1986	1,419	17,011	48,587	3,352	35,909
1987	1,430	17,444	50,427	3,536	35,972
1988	1,453	18,055	52,807	3,723	36,181
1989	1,469	18,668	55,237	3,908	36,480
1990	1,481	19,203	57,306	4,108	36,747
1991	1,476	19,548	59,224	4,302	36,978
1992	1,479	19,898	61,052	4,525	36,860
1993	1,472	20,362	63,111	4,745	36,841
1994	1,472	20,880	65,345	4,953	36,846
1995	1,472	21,424	67,726	5,194	36,862
1996	1,536	22,145	70,408	5,452	36,872
1997	1,471	22,895	73,212	5,722	36,957
1998	1,471	23,695	76,195	5,979	37,029
1999	1,471	24,530	79,333	6,251	37,093
2000	1,452	25,327	82,309	6,522	36,964

TABLE 92

LOW BASE CASE GROWTH OF ANCHORAGE EMPLOYMENT

SECTORS - 1977--2000

Year	Mining Exogenous Construction	Transportation Communication Public Utilities Endogenous Construction	Trade Service Finance	Manufacturing Agriculture Forestry Fisheries	Local State and Federal Government
1977	1,630	13,520	42,703	1,913	32,521
1978	1,330	12,816	37,814	2,080	34,979
1979	1,330	12,291	35,794	2,230	34,985
1980	1,330	13,013	36,449	2,367	34,568
1981	1,367	13,643	39,089	2,546	34,457
1982	1,383	14,850	43,760	2,687	34,313
1983	1,364	16,011	47,469	2,853	359061
1984	1,358	16,148	47,362	3,007	35,978
1985	1,340	16,420	47,018	3,172	36,007
1986	1,338	16,843	47,827	3,352	35,821
1987	1,340	17,256	49,559	3,536	35,890
1988	1,354	17,822	51,740	3,723	36,086
1989	1,369	18,402	54,121	3,908	36,337
1990	1,412	18,951	56,330	4,108	36,598
1991	1,417	19,323	58,393	4,302	36,764
1992	1,395	19,673	60,259	4,525	36,762
1993	1,415	20,157	62,363	4,745	36,747
1994	1,416	20,685	64,615	4,953	36,764
1995	1,391	21,250	66,972	5,194	36,782
1996	1,377	21,930	69,507	5,452	36,809
1997	1,371	22,672	72,275	5,722	36,857
1998	1,371	23,466	75,251	5,979	36,917
1999	1,371	24,309	78,409	6,251	36,990
2030	1,371	25,112	81,411	6,522	36,869

TABLE 93

HIGH BASE CASE GROWTH OF ANCHORAGE EMPLOYMENT

SECTORS - 1977-2000

Year	Mining Exogenous Construction	Transportation Communication Public Utilities Endogenous Construction	Trade Service Finance	Manufacturing Agriculture Forestry Fisheries	Local State and Federal Government
1977	1,630	13,520	42,703	1',913	32,521
1978	1,330	12,816	37,814	2,080	34,979
1979	1,330	12,291	35,794	2,230	34,985
1980	1,330	13,013	36,449	2,367	34,568
1981	1,422	13,651	39,273	2,546	34,434
1982	1,360	14,901	44,165	2,687	34,353
1983	1,482	16,162	48,769	2,853	35,044
1984	1,568	16,649	50,162	3,907	36,237
1985	1,624.	17,207	50,648	3,171	36,548
1986	1,618	17,646	51,284	3,351	36,474
1987	1,584	17,937	52,808	3,535	36,362
1988	1,654	18,563	55,134	3,721	36,512
1989	1,729	19,198	57,567	3,907	36,825
1990	1,785	19,776	59,638	4,107	37,128
1991	1,788	20,158	61,600	4,301	37,284
1992	1,774	20,501	63,374	4,523	37,264
1993	1,760	20,970	65,444	4,743	37,234
1994	1,755	21,489	67,682	4,951	37,228
1995	1,756	22,034	70,096	5,193	37,244
1996	1,753	22,711	72,696	5,450	37,285
1997	1,753	23,470	75,528	5,720	37,333
1998	1,753	24,284	78,594	5,978	37,389
1999	1,754	25,154	81,870	6,250	37,460
2000	1,754	25,980	84,978	6,521	37,336

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 the moderate base case non-OCS scenario.

Education

Primary and Secondary. Applying the ratios as described in the overview of infrastructure standards section, table 94 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 at. strategic years, The data reflected in table 94 are cumulative.

TABLE 94

TEACHER CLASSROOM NEEDS - NON-OCS MODERATE CASE

Year	Projected Student Population	Total # of Classrooms/ Teachers
1980	35,349	1,414
1983	37,894	1,516
1985	38,278	1,531
1990	44,728	1,789
1995	52,136	2,085
2000	58,711	2,348

The projection suggest that the conservative short-term estimates made most recently by the Anchorage School District are realistic. Growth is very slow to 1985 and improves modestly for the following decade, averaging only 3.3 percent annually between 1990 and 1995. This growth slows to only 2.5 percent annually after 1995.

This modest growth pattern is well within the capacity of the Anchorage public school system. If actual growth remains with the base case projection, it would suggest that the district should continue to take a very conservative approach in planning future staff and capital improvements expansion.

Postsecondary and Career Vocational Training. Applying the ratios as described in the standards section, tables 95and 96 display the projected student population and credit hour production through the year 2000. The data are cumulative.

TABLE 95

UAA PUBLIC POSTSECONDARY STUDENT ENROLLMENT PROJECTIONS

NON-OCS MODERATE CASE

Year	UAA Student Populationa	UAA Creditsb
1980	3,723	19,359
1983	4,842	25,663
1985	5,316	28,177
1990	7,062	38,843
1995	9,124	52,006
2000	11,742	70,453

aBased on an increasing percentage of the population of students from 2.0 percent in 1980 to 4.0 percent in 2000.

bAn increase from 5.2 credits in 1980 per student to 6.0 credits in 2000.

TABLE 96

ACC PUBLIC POSTSECONDARY STUDENT ENROLLMENT PROJECTIONS

NON-OCS MODERATE CASE

Year	ACC Student Population[a]	ACC Credits[b]
1980	8,372	47,721
1983	9,263	52,799
1985	9,144	52,122
1990	9,887	56,358
1995	10,688	60,921
2000	11,742	66,930

[a]Based on a peaking percentage of the population at 4.5% in 1980, decreasing slowly to 4.0% by 2000.

[b]Steady 4.7 credits per student.

These projections produce two similar sized institutions by the year 2000 with a combined 137,000 credit hours per semester produced. The University of Alaska, Anchorage shows a growth model of a new four-year institution with an expanding clientele. Anchorage Community College is projected as a mature community/vocational oriented institution whose growth is derived by the expanding population base.

Private university and career/vocational training programs have not been projected. Issues discussing their role in postsecondary education can be found in the standards section and Volume 1, Socioeconomic and Physical Baseline.

Public Safety

Police. Utilizing the present ratio of 1.79 sworn officer per 1,000 in the population as the standard to assess service requirements, table 97 displays manpower needs for the Lower Cook Inlet base case (excludes military personnel).

TABLE 97

ANCHORAGE POLICE DEPARTMENT - CUMULATIVE MANPOWER REQUIREMENTS

NON-OCS MODERATE CASE[a]

Year	Manpower Requirements
1983	345
1985	348
1990	389
1995	434
2000	493

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

As of June 1979, the department will have employed 280 sworn officers. Under the assumption of areawide police service occurring between 1983 and 1985, the department could experience some short-term difficulties in adjusting to police expansion. In addition, problems with the acquisition of new manpower could easily be accentuated with the impact from the proposed gas pipeline. Post-pipeline growth is fairly smooth through the remaining period under study. Other variables which could potentially impact the above figures include fluctuations in the Part I crime index, budgetary restrictions

affecting the acquisition of new personnel, and the level of urban density characterizing Anchorage through the year 2000.

Alaska State Troopers. Table 98 displays the cumulative increase in number of commissioned officers necessary to meet population growth under the moderate case. The standard in use is .10 patrol officers per 1,000 in the population.

TABLE 98

ALASKA STATE TROOPERS - CUMULATIVE MANPOWER REQUIREMENTS

NON-OCS MODERATE CASE

Year	Moderate Requirements
1980	19
1983	21
1985	21
1990	24
1995	26
2000	29

C Detachment is a training center for the Alaska State Troopers; and, as a result, these figures could conceivably fluctuate depending on the number of trainees within the system. However, the above figures, as generated for the Lower Cook Inlet lease sale, are in all probability below what will actually be achieved in manpower acquisition by the year 2000.

Fire. Using the present ratio of fire department personnel to the total population, table 99 indicates cumulative manpower require-

ments necessary to accommodate the population projections for the moderate non-OCS base case. The ratio in use is 1.61 fire department personnel per 1,000 in the population (excludes military personnel).

TABLE 99

ANCHORAGE FIRE DEPARTMENT - CUMULATIVE MANPOWER REQUIREMENTS

NON-OCS MODERATE CASE

Year	Manpower Requirements
1980	271
1983	310
1985	313
1990	350
1995	391
2000	444

With the present ratio, the Anchorage Fire Department would realize an increase of 64 percent for the moderate base case between 1980 and 2000. Other variables which may influence the above projections include budgetary restrictions, 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 Lower Cook Inlet moderate case.

Recreation Facility Needs. Utilizing the standards established by the National Recreation and Park Association described in the overview of infrastructure standards, table 100 illustrates the cumulative requirements based upon population growth as projected under the non-OCS moderate case.

TABLE 100

CUMULATIVE RECREATIONAL FACILITY NEEDS

NON-OCS MODERATE CASE

Facility	1980	1983	1985	1990	1995	2000
Play Lots	74	84	85	94	104	117
Neighborhood Parks	19	21	21	24	26	29
Softball	62	70	70	78	87	98
Basketball	99	105	106	118	130	147
Swimming Pools (25m)	7	8	9	9	10	12
Skating Rinks (Hockey)	12	14	14	16	17	20
Community Center	7	8	9	9	10	12

Projected needs for recreation facilities through the base case require significant additions to the current facility inventory, with exception of basketball courts. Construction of high cost items, such as community centers, indoor skating rinks, and land acquisition for parks and ball diamonds, will have to rely partially on private sector contributions as a supplement to tax supported efforts.

- Swimming Pools. While the Anchorage area falls considerably short of achieving the established standard for number of pools per population, it is unlikely that the number built would reflect the standard within the 20 year projection period,

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 achieve "pool standard."

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

- 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 the 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 locally very well attended. Citizen surveys and polls reflect a high degree of interest in and desire for greater numbers 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 serviced 108,000 people in 1977 and 126,000 in 1978. Off-season services include weekly children's programs, guest lecturers, films, seminars, musical programs 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 16,717 (1978) men, women, and children of the Anchorage area (Municipality of Anchorage, Planning Dept., 1977).

Parkland. Utilizing the recommended standard of devoting approximately 25 percent of a city or planned area to parks, wilderness, open space, the Anchorage area currently exceeds the recommended total displayed in table 101.

TABLE 101

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 Standard	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 acquisition of equipment as opposed to acquisition of additional land.

Utilities

Water. Per capita water consumption has been calculated by the U.S. Army Corps of Engineers for Anchorage consumers at 594 liters

per capita per day (lpcpd) (157 gallons per capita per day [gpcpd]). This figure is offered as the standard to assess water need under the moderate case through the period under study.

TABLE 102

WATER NEED - MILLION LITERS PER DAY

NON-OCS MODERATE CASE

Year	mld	mgd
1980	110.5	29.2
1983	125.3	33.1
1985	126.4	3304
1990	140.0	37,0
1995	154.8	40.9
2000	174.5	46.1

The U. S. Army Corps of Engineers has designed long-range plans that would meet this increasing demand for water in a timely manner. This is primarily due to the Corps' anticipation of a greater population increase than is proposed under the above base case. A complete description of the proposed development under consideration is contained in Volume 1, Socioeconomic and Physical Baseline.

Sewer. Sewer line extension and expansion of sewage treatment plants are based on population projections generated by the Municipal Planning Department. The Planning Department is projecting a tentative population for utility planning purposes of 353,184 by the year 1995. Plans are gearedtoward a high rate of growth in order to avoid the costly problem of paralleling sewer lines.

Using the per capita wastewater generation standard, as explained in the overview of infrastructure standards of 477 lpcpd (126 gpcpd), table 103 displays the cumulative wastewater generation through the year 2000 for the non-OCS moderate case.

TABLE 103

WASTEWATER GENERATION - MILLION LITERS PER DAY

NON-OCS MODERATE CASE[a]

Year	mld	mgd
1980	88.6	23.4
1983	100.3	26.5
1985	101.4	26.8
1990	112.4	29.7
1995	124.1	32.8
2000	140.0	37.0

[a]These figures do not reflect the additional 20% infiltration/inflow problem as discussed in the baseline analysis.

The resultant of the above is that the population forecasts of the moderate case will have no impact on the existing municipal sewer utility planned expansions, if plans can be implemented in a timely manner.

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 experienced the major portion of its development. Although Chugach Electric will feel the most direct impact from future population growth, ML&P will be indirectly impacted due to

the corresponding expansion in their commercial/industrial service sector and redevelopment of areas around the central business district to a higher density urban profile.

Table 104 displays the electrical requirements for the Anchorage area for the period under study.

TABLE 104

ELECTRICAL LOAD REQUIREMENTS - MEGAWATTS

NON-OCS MODERATE CASE

Year	Factor KW	Megawatts
1980	3.0	558
1983	3.5	737
1985	3.6	766
1990	4.3	1,012
1995	5.1	1,329
2000	6.1	1,791

The level of commercial/industrial development is one of the key determinants in assessing future power demand. At this point in time, the level and type of activity in this sector is somewhat speculative over the period under study resulting in projections which could either be high or low. In addition, the overall effect of the Lower Cook Inlet projections is below that of the projections presently being utilized by the utilities for planning purposes. If the timeframe for planned installation of new generation facilities occurs in a timely manner, the utilities will be able to meet the electrical service needs of the Anchorage community.

Telephone. The Anchorage Telephone Utility has demonstrated the capability of coping with massive growth during a short-time frame as a result of the oil pipeline. The utility should be able to accommodate future expansion as a result of natural population increases as well as proposed OCS activity with adequate planning. Economically, as growth occurs and population density in reases, there should be a positive effect on the utilities financial position. One line extension to serve many people will produce a better return in revenue than an extension serving very few when keeping the cost of equipment and line extensions constant. Although population projections under the moderate base case will require adequate planning, the increase could potentially have a positive economic impact. No other impacts resulting from population growth were identified.

Solid Waste. Table 105 displays the solid waste generation projections for the non-OCS moderate case for the Lower Cook Inlet lease sale. The figures are based on an increasing factor of per capita solid waste generation as projected by the Department of Public Works.

TABLE 105

DAILY SOLID WASTE GENERATION - PER CAPITA PER DAY

NON-OCS MODERATE CASE

Year	kgms[a]	lbs[b]	Metric Tons	U.S. Tons
1980	2.71	(5.97)	503	555
1983	2.92	(6.43)	614	677
1985	3.06	(6.75)	651	718
1990	3.47	(7.64)	815	899
1995	3.92	(8.65)	1,022	1,127
2000	4.43	(9.77)	1,301	1,434

[a]kgms = Kilograms
bibs = Pounds

With the introduction of new processing techniques commensurate with increasing the density of the fill and assuming the site targeted for the new sanitary landfill is obtained as discussed in the base-line report, the Lower Cook Inlet projections will pose no impact on the management of solid waste.

Housing

Table 106 projects the civilian housing stock requirements based on the ratio outlined in the overview of infrastructure standards section. The demand for new housing is weak for the moderate case. The pattern shows a short-term demand during the gas pipeline construction after very low demand in the late 1970's and early 1980's. Demand remains below 2,000 units annually prior to 1990, rises to just above 2,000 after 1990. The moderate base case could be handled by the construction industry but at level well below the industry's capacity. The projected housing market

will likely aggravate unemployment in the construction trades and place the construction industry in a difficult economic position. It should be noted that the present estimates of housing stock exceed the projected demand through 1980 suggesting an existing surplus of units.

TABLE 106

HOUSING STOCK PROJECTIONS - NON-OCS MODERATE CASE

Year	Single Family	Multi-Family	Mobile Home	Total
1980	28,594	20,495	5,991	55,080
1983	33,758	25,195	6,687	65,640
1985	34,141	25,818	6,434	66,393
1990	37,083	31,455	6,527	75,065
1995	40,645	38,528	6,605	85,778
2000	46,318	44,899	6,562	97,779

Health Services

The following projections of health service needs are provided in relation to population increases under the Lower Cook Inlet moderate base case.

Acute Care Bed Need. Applying the Hill-Burton formula for acute care bed need, figures in table 107 were derived using the civilian, non-native population figure, a 1978 use rate of 600 (based upon recorded number of inpatient days for 1978) and an 80 percent general hospital occupancy rate.

TABLE 107

PROJECTED ACUTE CARE BED NEED[a]

NON-OCS MODERATE CASE

Year	Bed Need
1980	327
1983	375
1985	380
1990	424
1995	474
2000	539

[a]Based upon civilian non-native population; derived by subtracting 19,000 military and 4.2% of total population from the total population figure provided.

According to the Lower Cook Inlet projections, need for acute care beds beyond the 470 currently available will not occur until approximately 1995 under the moderate base case. Need projections may be extended beyond those dates by the emergence on one or all of the following phenomena:

- implementation of additional alternatives to institutional care (neighborhood clinics, extended and rehabilitative care facilities, home health, and support services, etc.);
- aging of the local population; and
- extension of facility occupancy rates beyond 80 percent.

Under the conditions of the moderate base case, hospital expansion

and/or new construction occurring prior to 1995 could contribute to a rise in operational and subsequently consumer costs of health care.

Ratio of Primary Care Physicians to Population. In 1977 the ratio of primary care physicians to the population was .385 per 1,000. Any level above .4 primary care physicians to 1,000 in the population disqualifies an area from the medically underserved designation. As mentioned earlier in this report, Anchorage currently receives supplemental federal assistance as a result of its qualification as a medically underserved area.

The optimum ratio, established as a national norm, is one primary care physician per 800 in the population. Table 108 describes the numbers of physicians needed locally, based upon base case population projections, to achieve the optimum ratio.

TABLE 108

PROJECTED PRIMARY CARE PHYSICIAN NEEDS

NON-OCS MODERATE CASE

Year	Physician Needs
1980	233
1983	263
1985	256
1990	294
1995	326
2000	367

Based upon the one per 800 ratio, Anchorage is currently over 100

primary care physicians short of the 244 (195,654 population) recommended. Demands for increased numbers of doctors may be increased slightly by the number of non-Anchorage users of local services and the number of physicians. Access to primary care physicians is currently a critical problem in the local health care system and promises to remain so for the foreseeable future. The significantly high proportion of childbearing age females within the Anchorage population profile is a major causative factor.

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 amounts of targeted state and federal dollars) may be effective in relieving the "street inebriates" problem and may also contribute to the decline of alcohol related crimes. However, the predominant causes for alcohol abuse will likely remain, e.g. remoteness, long dark winter syndrome, 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 the need for and subsequent acquisition of modern equipment and service units. For example, recent efforts were successful by both civilian and non-native hospitals to justify addition of a head and full body computerized axial

tomography (C.A.T.) scanner. The result will be the emergence of a sophisticated Anchorage" health system.

Social Services

There are no nationally accepted nor locally adopted quantifiable standards for levels of social service 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 significantly 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 tend to be 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 peep"le may seek employment, income, and housing assistance, raising the level of need for those services.

Based upon population trends since thecompletion 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, proportional"ly greater numbers of state dollars being allocated for social services as agencies and interest groups become more effective lobbyists.

Table 109 depicts projected increase in levels of service for day care and low income housing assistance, based upon annual population growth rates of the Lower Cook Inlet moderate base case.

TABLE 109

CUMULATIVE GROWTH IN SELECTED SOCIAL SERVICE AREAS

NON-OCS MODERATE CASE

Service	1980	1983	1985	1990	1995	2000
Day Care	3,293	3,726	3,764	4,167	4,614	5,196
Low Income Housing	4,362	5,199	5,258	5,945	6,794	7,744

Day Care Spaces. There are currently spaces within day care centers and homes for 2,675 children. The target group for such services is all children from age zero to 14 years or 33,984 children. This, the current service per population, ratio is 7.87 percent. While not officially documented, school, public health, and community personnel claim that a significant number of children are alone before and after school when parents are at work. Projections listed above are based upon the assumption that a more realistic projection of numbers of children needing partial or total day care would be to increase the service ratio to ten percent of the target population. The net effect would be to add 723 day care spaces to better meet the demands for services for the 1978 target population. Projected increases in day care needs for each base case will demand significant additions in the service delivery system.

Low Income Housing. The need for low income housing currently exceeds the supply of adequate units. In 1978, approximately 23 percent (or 14,037 households) earned less than $17,500, and were thus designated low-moderate income (Ender, 1978). Current service

levels address the needs of only 6.1 percent of the target group. Optimally, housing assistance should be available to serve at least 33 percent of the target group (1978 Housing Assistance Plan). It appears that projections of actual units necessary to serve one-third of the target population go beyond the financial and developmental means available for support for such acquisition and construction. Increasing numbers of dollars available for actual rent subsidies and other housing assistance payments may be a more realistic means of achieving some level of service to 33 percent of the target population.

Unemployment. Projected unemployment has been calculated, assuming that the effect of gasline development will have similar effects as the previous oil pipeline development. Table 110 illustrates the annual changes in the rate of employment growth and unemployment. "

The average unemployment rate for the previous five years was 6.8 percent, ranging from a low of 5.5 percent and a high of 8.3 percent. Projections are based on the correspondence of an average annual employment rate increase of four percent with an average annual unemployment rate of 6.8 percent. For every .1 percent variance in employment rates, the unemployment rate will change .05 percent in the opposite direction. Rates under the moderate base case and low base case will respond consistently to development activities, unemployment declining dramatically in 1982 and 1983, rising to 8.2 percent thereafter as activity terminates in 1984, 1985 and 1986 and

stabilizing finally at seven plus percent from 1987 through 1999 with a slight dip in the year 2000.

Trends within the moderate base case consistently reflect 1) relatively low unemployment during peak development activities in 1982 and 1983; 2) extremely high unemployment rates immediately following development in 1984 through 1986; and 3) a relatively stable and heightened unemployment rate (6.8 percent average) from 1987 through the year 2000.

TABLE 110

EMPLOYMENT GROWTH RATES AND CORRESPONDING UNEMPLOYMENT RATES

NON-OCS MODERATE CASE

Year	Growth Rate	Unemployment Rate
1978	-3.4	10.5
1979	-2.1	9.8′
1980	1.6	8.0
1981	4.4	6.6
1982	6.9	5.5
1983	5.7	5.9
1984	0.7	8.2
1985	0.2	8.2
1986	1.4	8.1
1987	2.5	7.6
1988	3.2	7.2
1989	3.2	7.2
1990	2.7	7.5
1991	2.2	7.7
1992	2.1	7.8
1993	2.3	7.7
1994	2.4	7.6
1995	2.5	7.6
1996	2.9	7.4
1997	2.9	7.4
1998	3.0	7.3
1999	3.0	7.3
2000	2.2	7.7

Transportation

The population projections for the non-OCS base cases are well below the estimates used for transportation planning, falling 102,000 to 114,000 below by 1995. This would suggest that goals set by the plan would exceed the transportation needs of the population estimates of the base cases. The weakness lies primarily in that the Anchorage

Metropolitan Area Transportation Study (AMATS) plan will very likely not be fully implemented. Since the transportation plan is designed to meet a much larger population projection, it is likely that a moderate shortfall in the plan would not be detrimental to the system.

The greatest concern must be that if any major portion of the long-range plan fails to be developed, the impacts on the system could be negative. 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 progress of implementation. If anything, the plan is a good effort to provide for reasonably good auto access but would reduce the viability of a strong transit system.

Financial Capacity and Capital 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 slowdown of the economy could cripple local government's capacity to meet rising service demands. The projected non-OCS moderate case falls well below the Municipality's forecasts, suggesting economic difficulties except for a short period in the mid-1980's. The non-OCS moderate base case did not project a reasonable

pattern of growth for most of the period. If a slowdown occurs as projected, 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 vigorously pursue a more 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 fiscal problems. A massive bond obligation or inflationary employee contract would seriously impact municipal figures if (or when) the economy slows down. Slow growth in the population implies slow expansion of the revenue base of the community.

- 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. If the local revenue base expands slowly as projected, the dependency on intergovernmental transfers should grow.

In summary, it appears that municipal economic predictions are significantly higher than the moderate base case. Rapid expansion of services now could be caught in a revenue bind within ten years. If this happens, it appears that the Municipality will lack the long-term financial capacity to deal with them with growing service demands over the projected base period.

SUMMARY OF IMPACTS

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 qualifers are discussed in the respective sections on overview of infrastructure standards and Volume I, Socioeconomic and Physical Baseline.

NON-OCS MODERATE BASE CASE

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO POPULATION

	1980	1983	1985	1990	1995	2000
	185,678	211,273	218,777	243,178	269,404	303,042
ducation: Primary/Secondary - No. of Manpower/Faci l ities	1,414	1,516	1,531	1,789	2,085	2,348
Publ ic Postsecondary - UAA No. of (h-edits	19,359	25,663	28,177	38,843	52,006	70,453
Public Postsecondary - ACC No. of Credits	47,721	52,799	52,122	56,358	60,921	66,930
ubl ic Safety: Police - Manpower		345	348	389	434	493
State Troopers - Manpower	19	21	21	24	26	29
Fire - Manpower	271	310	313	350	391	444
eisure: Pl ay Lots	74	84	85	94	104	117
Neighborhood Parks	19	21	21	24	26	29
Softba l l Diamonds	62	70	70	78	87	98
Basketball Courts	99	105	106	118	130	147
Swimming Pools	7	8	9	9	10	12
Skating Rinks	12	14	14	16	17	20
Community Centers	7	8	9	9	10	12
tilities: Water - (Million Gallons Per Day)	29.2	33.1	33.4	37.0	40.9	46.1
Sewer - (Mi l l ion Gal lons Per Day)	23.4	26.5	26.8	29.7	32.6	37.0
Electricity - [Megawatts)	558	737	766	1,012	1,329	1,791
Telephone a						
Solid Waste - (Tons per day)	555	677	718	899	1,127	1,434
ousing: Units	55,080	65,640	66,393	75,065	85,778	97,779
Health: Bed Needs	327	375	380	424	474	539
Primary Care Physicians	233	263	256	294	326	367
Social Services: Day Care Space	3,293	3,726	3,764	4,167	4,614	5,196
Unemployment rates	8.0	5.9	8.2	7.5	7.6	6.7
Low Income Housing Uni ts	4,362	5,199	5,258	5,945	6,794	7,744
Transportati on a						
Financial Capacity and Capital Requirements a						

Impact Assessment of Lower Cook Inlet OCS Scenarios

INTRODUCTION

The purpose of this section is to assess impact on specific indicators in the Anchorage community commensurate with OCS petroleum development in the Lower Cook Inlet.

9

From the infrastructure which developed as a result of the construction of the trans-Alaska pipeline, Anchorage, in general, is in a position to more easily absorb continued growth than was the case in the pre-pipeline years. Nevertheless, certain indicators such as utilities and transportation were impacted so tremendously and require such capital intensive expansion that they are still of somewhat tenuous character. This will continue to be the case with or without OCS development until long-range plans can be fully implemented. Other indicators which will show an increased demand include education, public safety, recreation, health, social services, housing, and financial capacity and capital requirements. However, the capacity of the community infrastructure will be able to expand proportionality to meet the incremental effects of each of the Lower Cook Inlet OCS scenarios.

Of the five scenarios developed to assess impact from the Lower Cook Inlet lease sale, none display impacts of significant levels to affect the service infrastructure. Two scenarios, however, the moderate and high base with five percent, do produce measurable effects which may alter somewhat the service demand mix which was projected in the base case analysis. The

forecasts of population and employment (measured as change from a specified base case) are shown in table111.

This section focuses on a detailed service impact analysis of the five percent-moderate scenario. This was selected because it did produce measurable effects which the mean and 95 percent scenarios do not do.

In presenting quantitative data to describe the incremental service demand required by the five percent-moderate scenario, four dates were used rather than the twenty separate years the scenarios occur over. This was done to simplify the presentation without distorting the events which occur. In addition, the annual cumulative demand is a poor and unreliable predictive tool. While the model produces annualized predictions and annual change can be calculated using the standards established, key dates would better provide an understanding of the service demands by not focusing on the more speculative annual data.

The benchmark dates used are 1985, 1990, 1995, and 2000. The five percent-moderate scenario begins in 1981 and reaches a pleateau of initial major gains in 1985 and continues to grow slowly through the year 2000. This implies a slow but steady increase of impact throughout the study period, producing a fairly stable pattern of incremental growth. The dates selected provide the scenario with the key benchmarks required for a full description of the incremental and cumulative demand that is discussed in the remainder of this section.

TABLE 111

POPULATION AND EMPLOYMENT IMPACT ON ANCHORAGE DUE TO LOWER COOK INLET OCS DEVELOPMENT SCENARIOS

Year	95% Scenario Moderate Base		Mean Scenario Moderate Base		5% Scenario Moderate 8ase		5% Scenario High Base		95% Scenario Low Base	
	Population	Employment	Population	Employment	Population	Employment	Population	Employment	Population	Employment
1977	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1978	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1979	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1980	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1932	0.017	0.081	0.034	0.091	0.024	0.086	0.0%4	0.084	0.027	0.087
1933	0.159	0.189	0.191	0.198	0.192	0.225	0.181	0.193	0.192	0.230
1934	0.255	0.155	G. 320	0.261	0.348	0.302	0.256	0.157	0.346	0.308
1985	0.174	0.074	0.463	0.279	0.457	0.343	0.176	0.073	0.451	0.345
1986	0. 115	0.034	0.564	0.274	0.651	0.402	0.116	0.034	0.642	0.406
1987	0.088	0.020	0. 545	0..319	0.821	0.467	0.091	0.021	0.811	0.472
1988	0.086	0.015	0.961	0.566	1.199	0.728	0.074	0.015	1.205	0.740
1989	0.079	0.014	1.276	0.787	2.164	1.543	0.066	0.012	2.187	1.562
1990	0.073	0.014	1.418	0.857	3.404	2.316	0.060	0.011	3.409	2.324
1991	0.068	0.012	1.534	0.882	4.032	2.527	0.056	0.011	4.008	2.520
1992	0.062	0.012	1.637	0.842	4.302	2.484	0.052	0.011	4.258	2,466
1993	0.058	0.011	1.612	0.775	4,451	2.379	0.056	0.011	4.398	2.358
1994	0.063	0.011	1.664	0.802	4.562	2.313	0.061	0.011	4.509	2.292
1995	0.061	0.011	1.800	0.865	4.735	2.333	0.061	0.011	4 . 6 8 1	2.311
1996	0.062	0.012	1.892	0.907	4.985	2.416	0.060	0.011	4.936	2.394
1997	0.071	0.014	2.004	0.947	5.285	2.534	0.061	0.012	5.223	2.507
1998	0.071	0.015	2.109	0,589	5.563	2.613	0.063	0.013	5.501	2.585
1593	0.072	0.017	2.213	1.030	5.749	2.638	0.067	0.015	5.690	2.609
2000	0.076	0.017	2.293	1.057	5.831	2.620	0.038	0.010	5.776	2.591

[a]MAP Regional Model

TABLE 112

REAL DISPOSABLE PERSONAL INCOME IMPACT ON ANCHORAGE DUE TO

LOWER COOK NLET OCS DEVELOPMENT SCENARIOS[a]

Year	95% Scenario-Moderate Base	Mean Scenario-Moderate Base	5% Scenario-Moderate Base	95% Scenario-Low Base	5% Scenario High Base
1977	0.000	0.000	0.000	0.000	0.000
1978	0.000	0.000	0.000	0.000	0.000
1979	0.000	0.000	0.000	0.000	0.000
1980	0.000	0.000	0.000	0.000	0.000
1981	0.000	0.000	0.000	0.000	0.000
1982	0.558	0.647	0.595	0.574	0.604
1983	1.333	1.425	1.632	1.372	1.579
1984	0.995	1.863	2.104	1.012	2.087
1985	0.362	2.383	2.380	0.487	2.401
1986	0.235	2.370	3.452	0.225	3.454
1987	0.153	2.918	4.050	0.161	4.056
1988	0.176	5.394	7.078	0.110	7.163
1989	0.104	6.308	13.900	0.112	14.014
1990	0.117	6.381	18.265	0.096	18.260
1991	0.115	6.562	19,846	0.106	18,712
1992	0.110	6.395	18.671	0.093	18.460
1993	0.109	6.049	18.213	0.144	17.980
1994	0.160	6.380	18.040	0.140	17.840
1995	0.110	6.890	18.450	0.120	18.220
1996	0.130	7.230	19.410	0.110	19.190
1997	0.180	7.820	20.670	0.130	20.320
1998	0.130	5.870	21.550	0.140	21.250
1999	0.160	8.680	22.150	0.160	21.850
2000	0.180	9.180	22.710	0.040	22.410

[a]MAP Regional Model

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.

Education

Primary and Secondary. The ratios described in the overview of infrastructure standards were altered to reflect a constant 18 percent student population ratio. This is due to the transient nature of the scenario's population. Table 113 displays the projected student population through the year 2000 and the number of teacher/ classrooms necessary to accommodate the population projections for the five percent scenario-moderate base. It should be noted that the scenario produces a slowly increasing increment through the year 2000, beginning in 1982. In the year 2000 this produces an impact which is only 1.8 percent of the total demand. The incremental change due to the scenario is not sufficient to suggest that a real increase in the capability would be necessary to meet the need. While the effects are long term and, therefore, are relatively permanent, they are not strong enough to alter plans which normally builds in a reasonable level of flexibility capable of coping with the impacts expected under this scenario.

TABLE 113

ADDITIONAL TEACHER AND CLASSROOM NEEDS

MODERATE BASE - 5% SCENARIO

(cumulative)

	Moderate Base Case		5% Scenario		Total Requirement	
Year	Projected Student Population	Total # of Classrooms/ Teachers	Projected Student Population	Total # of Classrooms/ Teachers	Projected Student Population	Total # of Classrooms/ Teachers
1980	35,349	1,414	0	0	35,349	1,414
1985	38,278	1,531	82	3	38,360	1,534
1990	44,728	1,789	613	25	45,341	1,814
1995	52,136	2,085	852	34	52,988	2,119
2000	58,711	2,348	1,050	42	59,761	2,390

Public Postsecondary and Career/Vocational Training. Table 114 projects the additional public postsecondary student credit hours expected to occur under the five percent scenario-moderate base case. The overall effect is insignificant and peaks at 1.9 percent of the total demand in the year 2000. While this could mean the addition of ten faculty and corresponding support staff and space, the projections from the moderate base case and efficiencies within the system would likely cope with the additional demand, No standards were developed for private college or career/vocational education.

TABLE 114

ADDITIONAL STUDENT CREDIT HOURS IN PUBLIC POSTSECONDARY EDUCATION

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Total Credits[a]	Additional Projected Credits	Total Projected Credits
1980	67,080	0	67,080
1985	80,299	173	80,472
1990	95,201	1,377	96,578
1995	112,927	2,051	114,978
2000	137,383	2,729	140,112

[a]Total student enrollment data are not given because adding of institutional enrollment would not give an unduplicated total count.

Public Safety

Police. Using the current ratio of police to the population served (1.79 per 1,000), table 115 indicates the cumulative number of police required during strategic years for the period under study (excludes military personnel).

TABLE 115

POLICE MANPOWER Requirements

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total Requirement
1985	348	0.8	348.8
1990	389	6.1	395.1
1995	434	8.5	442.5
2000	493	10.4	503.4

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

Variables which may influence the above projections include fluctuations in Part I crime index, budgetary restrictions, and the level of urban density characterizing Anchorage through the period under study.

Areawide police service can be anticipated in the early 1980's. Although the moderate base case will probably have a two-fold impact with police expansion as well as the proposed gas pipeline, the five percent scenario should pose only a minimal effect. If service can be adequately met for the moderate base case, acquisition of additional manpower to meet the need of the five percent scenario should not pose any problems.

Alaska State Troopers. Table 116 displays the cumulative increase in the number of commissioned officers necessary to meet population growth under the moderate base case and five percent scenario. The standard in use is .10 patrol officers per 1,000 in the population.

TABLE 116

TROOPERS MANPOWER REQUIREMENTS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total Requirement
1980	19	.0	19.0
1985	21	.0	21.1
1990	24	.3	24.3
1995	26	.5	26.5
2000	29	.6	29.6

Because of the low numeric standard in use as well as the level of the base case projections, it is unlikely that impact of additional manpower will occur as a result of the five percent scenario over the moderate base case.

Fire. Table 117 displays the cumulative projections of the fire department personnel under the moderate base case and five percent scenario during strategic years through the period under study. The standard in use is the ratio of 1.61 fire department personnel per 1,000 in the population.

TABLE 117

FIRE DEPARTMENT PERSONNEL MANPOWER REQUIREMENTS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case	5% Scenario	Total Requirement
1980	271	0.0	271.0
1985	313	0.7	313.7
1990	350	5.5	355.5
1995	391	7.6	398.6
2000	444	9.4	453.4

Variables which may influence the above projections include such factors as budgetary restrictions, land use patterns, population density, and waterflow requirements.

If manpower acquisition can be adequately met under the moderate base case projections, the five percent scenario will pose minimal impact over the projected non-OCS development.

Leisure

The following projections are provided in relation to population increases under the Lower Cook Inlet moderate base case and five percent scenario.

Recreation Facility Needs. Utilizing the standards established by the National Recreation and Park Association described in the overview of infrastructure standards, table 118 illustrates the cumulative requirements based upon population growth as projected under the Lower Cook Inlet moderate base case and five percent scenario.

TABLE 118

RECREATIONAL, FACILITIES NEEDS

MODERATE BASE - 5% SCENARIO

	1985		
Facility	Moderate Base	5% Scenario	Total Needs
Play Lots	85	0	85
Neighborhood Parks	21	0	21
Softball	70	0	71
Basketball	106	0	107
Swimming Pools (25m)	9	0	9
Skating Rinks (Hockey)	14	0	14
Community Centers	9	0	9

	1990		
Facility	Moderate Base	5% Scenario	Total Needs
Play Lots	94	1	96
Neighborhood Parks	24	0	24
Softball	78	1	80
Basketball	118	1	119
Swimming Pools (25m)	9	0	10
Skating Rinks (Hockey)	16	0	16
Community Centers	9	0	10

TABLE 118, continued

Facility	1985 Moderate Base	1985 5% Scenario	1985 Total Needs
Play Lots	104	2	106
Neighborhood Parks	26	0	27
Softball	87	2	
Basketball	130	2	1;!
Swimming Pools (25m)	10	0	11
Skating Rinks (Hockey)	17	0	18
Community Centers	10	0	11

Facility	2000 Moderate Base	2000 5% Scenario	2000 Total Needs
Play Lots	117	2	120
Neighborhood Parks	29	1	30
Softball	98	2	100
Basketball	147	2	150
Swimming Pools (25m)	12	0	12
Skating Rinks (Hockey)	20	0	20
Community Centers	12	0	12

Projected needs for recreation facilities under this scenario do not require significant additions to the current facility inventory until 1990. Needs continue to remain moderate through the year 2000. Construction of high cost items, such as community centers, indoor skating rinks, and land acquisition for neighborhood parks and ball diamonds, will have to rely partially on private sector contributions as a supplement to tax support efforts.

Utilities

Water. Table 119 indicates water needs for the moderate base case, the five percent scenario, and the total demand for water under this OCS development. The figures are based on per capita consumption as

discussed in the overview of infrastructure standards.

TABLE 119

WATER CONSUMPTION - MILLION LITERS PER DAY

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case mld[a]	mgd[b]	5% Scenario mld	mgd	Total mld	mgd
1980	110.5	29.2	0.0	0.0	110.5	29.2
1985	126.4	33.4	0.4	0.1	126.8	33.5
1990	140.0	37.0	1.9	0.5	141.9	37.5
1995	154.8	40.9	2.6	0.7	157.4	41.6
2000	174.5	46.1	3.4	0.9	177.9	47.0

amid = Million Liters per Day
bmgd = Million Gallons per Day

Either the development of Eagle River or Eklutna diversion as the major water resource for the Anchorage area would accommodate the effect of this scenario if the projects can be implemented in the timeframe proposed by the U.S. Army Corps of Engineers. For additional information on water resources, refer to Volume 1, Socioeconomic and Physical Baseline.

Sewer. The per capita wastewater generation figure in use is 477 liters per capita per day (126 gallons per capita per day). Table 120 displays the moderate base case wastewater generation, the five percent scenario, and the total wastewater generation dictating service requirements for the period under study.

TABLE 120

WASTEWATER Generation - **MILLION** LITERS PER DAY

MODERATE BASE - 5% SCENARIO

Year	Moderate Base Case mld[b]	mgdc	5% Scenario mld	mgd	Total mld	mgd
1980	88.6	23.4	0.0	0.0	88.6	23.4
1985	101.4	26.8	0.4	0.1	101.8	26.9
1990	112.4	29.7	1.5	0.4	113.9	30.1
1995	124.1	32.8	2.3	0.6	126.4	33.4
2000	140.0	37.0	2.6	0.7	142.6	37.7

aThese figures do not reflect the additional 20% infiltration/inflow problem as discussed in the baseline analysis.

9

[b]mld = Million Liters per Day

cmgd = Million Gallons per Day

If plans for expansion are implemented in a timely manner, the Municipality should be geared to handle approximately 44.5 million gallons per day of wastewater generation (does not include the 20 percent infiltration/inflow problem) based on a municipal planning population projection of 353,184 by the year 1995 (excludes military). Impact from this scenario can be considered nominal, at best, and should pose no real effect on the actual facilities plan.

Electricity. The per capita kilowatt factors described in the overview of infrastructure standards are offered to assess the load requirements for the five percent scenario and the moderate base case. Beginning in 1985, table 121 displays the projections in megawatts at strategic years through the period under study.

TABLE 121

ELECTRICAL LOAD REQUIREMENTS - MEGAWATTS

MODERATE BASE - 5% SCENARIO

Year	Factor kw[a]	Moderate Base Case (mw)[b]	5% Scenario (row)	Total (row)
1985	3.6	766	1.6	767.6
1990	4.3	1,012	14.6	1,026.6
1995	5.1	1,329	24.1	1,353.1
2000	6.1	1,791	35.6	1,826.6

a kw = kilowatts
b mw = megawatts

The level of commercial/industrial development is one of the key determinants in assessing future power demand. At this point in time, the level and type of activity in this sector is somewhat speculative over the period under study, resulting in projections which either could be high or low. However, the overall effect of the five percent scenario is marginal and will probably not affect the timeframes for planned installation of new generation facilities if implementation can proceed in a timely manner.

Solid Waste. Table 122 displays the solid waste generation for the moderate base case, the five percent scenario, and the total effect of these projections, beginning in 1983, for the period under study. The figures are based on an increasing factor of per capita solid waste generation as projected by the Department of Public Works.

TABLE 122

DAILY SOLID WASTE GENERATION

MODERATE BASE - 5% SCENARIO

Year	Per Capita Per Day		Moderate Base Case		5% Scenario		Total	
	kgms[a]	lbs.	Metric Ton	U.S. Ton	Metric Ton	U.S. Ton	Metric Ton	U.S. Ton
1980	2.71	5.97	504	555	0	0	504.0	555.0
1985	3.06	6.75	651	718	1.4	1.5	652.4	719.5
1990	3.47	7.64	815	899	11.8	13.0	826.8	912.0
1995	3.92	8.65	1,022	1,127	18.6	20.5	1,040.6	1,147.5
2000	4.43	9.77	1,301	1,434	25.8	28.5	1,326.8	1,462.5

[a]kgms = Kilograms

With the introduction of new processing techniques commensurate with reducing fill and assuming the site targeted for the new sanitary landfill is obtained as discussed in the baseline report, the five percent scenario will pose no impact on the management of solid waste.

Housing

Table 123 shows the incremental effects of the five percent scenario on the housing demand of the moderate base case. The overall increase is relatively small and occurs over a moderate to long time span. During this Period. the slack economic growth of the moderate base case provides ample capacity within the construction industry to respond to the additional demand. Since the impact is relatively long-term rather than transient, traditional housing models rather than specialized temporary housing would meet this need.

TABLE 123

CUMULATIVE HOUSING DEMAND

MODERATE BASE - 5% SCENARIO

	Moderate Base Case			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	28,594	20,495	5,991	55,080
1985	34,141	25,818	6,434	66,393
1990	37,083	31,455	6,527	75,065
1995	40,645	38,528	6,605	85,778
2000	46,318	44,899	6,562	'37,779

	5% Scenario			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	0	0	0	0
1985	78	57	15	150
1990	564	465	99	1,128
1995	772	710	125	1,607
2000	950	895	135	1,980

	Total Requirement			
Year	Single Family	Multi-Family	Mobile Home	Total
1980	28,594	20,495	5,991	55,080
1985	34,219	25,875	6,449	66,543
1990	37,647	31,920	6,626	76,193
1995	41,417	39,238	6,730	87,385
2000	47,268	45,794	6,697	99,759

Health Services

The following projections of' health service needs are provided in relation to population increases under the lower Cook Inlet moderate case-five percent scenario.

Acute Care Bed Need. Applying the Hill-Burton formula for acute care bed need, figures in table 124 were derived using the civilian, non-native population figure, a 1978 use rate of 600 (based upon recorded number of inpatient days for 1978), and an 80 percent general hospital occupancy rate.

TABLE 124

PROJECTED ACUTE CARE BED NEED

MODERATE BASE - 5% SCENARIO

Year	Moderate Base	5% Scenario	Total Needs
1980	327	0	32-7
1985	380	1	381
1990	424	7	431
1995	474	10	484
2000	539	12	551

According to the requirements of this scenario, need for acute care beds beyond the 470 currently available will not occur until approximately 1990 under the moderate base-five percent scenario. Need projections may be extended beyond those dates by the emergence of one or all of the following phenomena:

- Implementation of additional alternatives to institutional care (neighborhood clinics, extended and rehabilitative care facilities, home health and support services, etc.);
- Aging of the local population; and
- Extension of facility occupancy rates beyond 80 percent.

Under the conditions of the moderate base-five percent scenario, hospital expansion and/or new construction occurring prior to 1990 could contribute to a rise in operational and subsequently consumer costs of health care.

Primary Care Physicians. Using the standards discussed in the overview of infrastructure standards (one primary care physician per 800 population), the moderate base-five percent scenario reflects a need for primary care physicians in excess of the current local supply by 1980. Table 125 describes the number of primary care physicians needed locally based upon population projections required under this scenario.

TABLE 125

PROJECTED PRIMARY CARE PHYSICIANS NEEDS

MODERATE BASE - 5% SCENARIO

Year	Moderate Base	5% Scenario	Total Needs
1980	233	0	233
1985	256	1	257
1990	294	4	298
1995	326	6	332
2000	367	7	374

Based upon the one per 800 population ratio, Anchorage is currently 89 physicians short of the 233 recommended under this scenario for 1980. Demands for increased numbers of doctors may be increased slightly by the number of non-Anchorage users of local services and the number of physicians who leave the area.

Access to primary care physicians is currently a critical problem in the local health care system and promises to remain so for the foreseeable future. The significantly high proportion of childbearing age females within the Anchorage population profile is a major causative factor.

Social Services

Day Care. Table 126 displays the requirements for day care spaces needed to meet the demands of population growth in the moderate base-five percent scenario. While the demands of this scenario beyond the requirements of the base case are not substantial, they can be translated into the addition of at least one new day care center and eight to ten new licensed day care homes every three to five years.

Because the proportion of childbearing age residents will remain high and the economic demands of living in Alaska necessitate a second income, one can assume that child care service demands will remain high and that service projections are realistic.

Low Income Housing. Table 126 also displays the requirements for low income housing needed within this scenario. Using the service to population ratio described in the overview of infrastructure standards, the demand for increased numbers of low income housing units or equivalent assistance payments will begin in 1985 and grow continuously through 2000. Needs described as early as 1980 far exceed the current supply of units or financial resources necessary. It may be more

practical to focus assistance efforts on rent payment and subsidy programs, as opposed to implementation of costly construction projects. Considering the high vacancy rate in multifamily dwellings, direct cash subsidies may have a more positive and long lasting effect on the local economy, in addition to providing some free choice of residential location to the recipient.

TABLE 126

CUMULATIVE GROWTH IN SELECTED SOCIAL SERVICES AREAS

MODERATE BASE -5% SCENARIO

	Moderate Base Case				
Service	1980	1985	1990	1995	2000
Day Care	3,293	3,764	4,167	4,614	5,196
Low Income Housing	4,352	5,258	5,945	6,794	7,744

	5% Scenario				
Service	1980	1985	1990	1995	2000
Day Care	0	8	61	85	105
Low Income Housing	0	11	86	122	150

	Total Needs				
Service	1980	1985	1990	1995	2000
Day Care	3,293	3,772	4,228	4,699	5,301
Low Income Housing	4,362	5,269	6,031	6,916	7,894

Unemployment. Projected-unemployment has been calculated, assuming that the effect of gasline development will have similar effects as the previous oil pipeline development. Table 127 illustrates the annual changes in the rate of employment growth and unemployment.

TABLE 127

VARIANCE IN EMPLOYMENT AND UNEMPLOYMENT RATES

Year	Moderate Base		5% Scenario	
	Employ Rate Increase	Unemploy Rate	Employ Rate Increase	Unemploy Rate
1980	1.6	8.0	1.6	8.0
1981	4.4	6.6	4.4	6.6
1982	6.9	5.5	7.7	5.5
1983	5.7	5.9	5.7	5.9
1984	0.7	8.2	0.8	8.2
1985	0.2	8.2	0.3	8.2
1986	1.4	8.1	1.4	8.1
1987	2.5	7.6	2.5	7.6
1988	3.2	7.2	3.4	7.2
1989	3.7	7.2	3.9	6.9
1990	2.7	7.5	3.3	7.2
1991	2.2	7.7	2.4	7.6
1992	2.1	7.8	2.0	7.8
1993	2.3	7.7	2.2	7.7
1994	2.4	7.6	2.3	7.7
1995	2.5	7.6	2.5	7.6
1996	2.9	7.4	2.9	7.4
1997	2.9	7.4	2.9	7.4
1998	3.0	7.3	3.0	7.3
1999	3.0	7.3	3.0	7.3
2000	2.2	7.7	2.2	7.7

The average unemployment rate for the previous five years was 6.8 percent, ranging from a low of 5.5 percent and a high of 8.3 percent. Projections are based on the correspondence of an average annual employment rate increase of four percent with an average annual unemployment rate of 6.8 percent. For every .1 percent variance in employment rates, the unemployment rate will change .05 percent in the opposite direction. Rates under the moderate base case-five

percent scenario will respond consistently to development activities, unemployment declining dramatically in 1982 and 1983 rising to 8.2 percent thereafter as activity terminates in 1984, 1985, and 1986, and stabilizing finally at seven plus percent from 1987 through 2000.

Trends within this scenario consistently reflect 1) relatively low unemployment during peak development activities in 1982 and 1983; 2) extremely high unemployment rates immediately following development in 1984 through 1986; and 3) a relatively stable and heightened unemployment rate (7.5 percent average) from 1987 through the year 2000.

Transportation

Planning for long-range transportation needs is geared for a population of 372,081 (includes military living on bases) through 1995. This figure is substantially above the base case projections and the increment added by the five percent scenario. Because the impact of the scenario does not reach a significant plateau until 1991, the short-range improvements should be completed and available. The overall impact of the scenario is not sufficient to alter the recent long-range plans for transportation improvements. If the road and transit long-range plans are not carried out, the additional growth from this scenario would not be sufficient to accentuate the adverse effects on the system. There is a strong possibility that long-range plans of the system will not be implemented in an expeditious fashion. The effects of this possibility concern the rapidity of growth within the base case rather than the OCS increment.

Financial Capacity and Capital Requirements

The five percent scenario-moderate base case adds 5,831 people to the population between 1982 and 2000. This increase adds to the moderate base case which grows at a very slow rate when the latter's growth rate is slowing. This scenario is not of sufficient size to generate serious or adverse service demands. However, the increases are spread over a four year period of the study period and show real declines in the early 1990's. Because the scenario is incremental in its effects and adds to a slower growth period in the moderate base case, the impacts are, on the balance likely to be positive. 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 on a temporary basis producing short-term service shortfalls and increased spending. The possibility of this problem is seen as a short-term one (1985 to 1987) which smooths itself out in about two years. The fact that about one-quarter of the demand increment is temporary should caution planners from over-reacting by creatinga permanent infrastructure to meet 100 percent of the need.

SUMMARY OF IMPACTS

The following matrix displays the services likely to be impacted due to impacts of the Lower Cook Inlet five percent scenario, moderate base case. When quantifiable standards exist to assess service needs, the actual figures generated are listed in the matrix. Where 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 Volume I, Socioeconomic and Physical Baseline.

MODERATE BASE CASE - 5% SCENAR10

CUMULATIVE RATIO OF SERVICE REQUIREMENTS TO IMPACT PROJECTIONS

	1980	1985	1990	1995	2000
	0	457	3,404	4,735	5,831
Education: Primary/Secondary - No. of Manpower/Facilities			25	34	42
Public Postsecondary - No. of Credits		17:	1, 377	2,051	2,729
Public Safety: Police - Manpower		0.8	6.1	8.5	10.4
State Troopers - Manpower		0.0	0.3	0.5	0.6
Fire - Manpower		0.7	5.5	7.6	9.4
Leisure: Play Lots		0	1	2	2
Neighborhood Parks		0	0	0	1
Softball Diamonds		0	1	2	2
Basketball Courts		0	1	2	2
Swimming Pools		0	0	0	0
Skating Rinks		0	0	0	0
Community Centers		0	0	0	0
Utilities: Water - (Million Gallons Per Day)		0.1	0.5	0.7	0.9
Sewer - (Million Gallons Per Day)		0.1	0.4	0.6	0.7
Electricity		1.6	14.6	24.1	35.6
Telephone [a] - (Megawatts)		1.5	13.0	20.5	28.5
Solid Waste - (Tons per day)		1.5	13.0	20.5	28.5
Housing: Units		50	1,128	1,607	1,980
Health: Bed Needs		1	7	10	12
Primary Care Physicians		1	4	6	7
Social Services: Day Care Space		8	61	85	105
Unemployment rates (emulative)		8.2	7.2	7.6	7.7
Low Income Housing Units		11	86	122	150
Transportation [a]					
Financial Capacity and Capital Requirements [a]					

[a]See Section on Overview of Infrastructure Standards

VI. CONCLUSION

The base case and OCS scenario analysis suggest a number of points which should be noted. The study assumed that the maintenance and operation of service systems and their expansion to meet new population growth are predicted on economic growth, both locally and within the state as a whole. Of the population projections within the three lease sale studies, the Northern and Western Gulf produce a more optimistic and generally vigorous base case from which OCS scenarios are measured. When OCS growth occurs in an environment of solid economic performance, impacts can be negative by overextending the capacity of services. This situation also produces a generally strong financial capacity system to cope with growth that is occurring.

The size of any OCS scenario is important, and the timing and pace of impact predicts the difficulty with which the infrastructure will be able to cope with the growth. In the cases of the two Gulf lease sale areas, most of the OCS scenarios have insignificant impacts. Those that do impact the base case are moderate in intensity.

Service system problems rise for a number of reasons. First, the system may already be under a strain because of existing shortfalls in service provision. Secondly, projected base case growth is sufficiently large to pose a difficulty for services requiring further expansion. Also, the OCS impacts may build up over a relatively short amount of time, straining the infrastructure. Finally, impacts may be transient in nature, permanent, or a combination. Transient impacts lead to alternative service solutions

which do not have long-term system costs. The Western and Northern Gulf OCS scenarios have patterns similar to those outlined above. Thus, while moderate in strength, selected scenarios produce impacts which may adversely affect the community infrastructure. However, these impacts are not sufficiently intense; and since they occur in a relatively strong economic system, the financial and service delivery capacities of the community are generally expected to be sufficient to deal with the projected OCS impacts and minimize the problems suggested in the analysis.

The Lower Cook Inlet lease sale projections produces a different pattern of growth and alter the analysis accordingly. The base case reflects a modest to weak economic environment from which OCS scenarios are compared. A substantially lower base case estimate creates a less vigorous economic base capable of handling services and endangers the long-term fiscal capacity of government to pay for service impacts. OCS scenarios have the capacity of improving the delivery system by taking up the slack in the infrastructure which was idled by the slow pace of base case growth. Problems, however, can arise because the added fiscal strength of OCS impact may not be sufficient to offset the additional service demands. This situation could further erode an already weak financial and service delivery system.

The Lower Cook Inlet lease sale area produces a dilemma as just described. The weak base case is impacted by a modest OCS scenario. Because the impacts occur over a long period, are modest in strength, and take place in an environment of generally excess service capacity, the first conclusion is that the impacts are largely favorable or neutral rather than negative.

This conclusion must be cautioned by the caveat that any impact in a weak economic situation may be fiscally injurious to the delivery system where the economic stimulus is not sufficient to meet or exceed new service needs.

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