GUAM MASTER PLAN

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PHASE 1: PROBLEMS, OPPORTUNITIES, AND ALTERNATIVES JUNE 1972

PREPARED FOR THE TERRITORY OF GUAM BY GREENLEAF/TELESCA-AHN SUPPLEMENTAL MATERIAL: QUINTON-BUDLONG

GUAM MASTER PLAN

PHASE 1: PROBLEMS, OPPORTUNITIES, AND ALTERNATIVES

prepared for

THE TERRITORY OF GUAM

BUREAU OF PLANNING
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Supplemental Material: QUINTON-BUDLONG

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POPULATION

Statistical Summary: Population Characteristics for the Island of Guam.

Derived from the 1970 United States Census and Government of Guam sources, the following tables summarize the characteristics of the Island's population.

1. 1970 Census of Population totals for military and civilian sectors and the total percentage change from the 1960 Census.

   Comments:

   a. Guam experienced a 29.7% increase in its total population in the last ten years. It is an even more substantial change for the civilian population, as the military level declined somewhat.

   b. Dededo, Tamuning, and Mongmong-Toto-Maite experienced the greatest increase; 113%, 80%, and 116%, respectively.

   c. Asan, Piti, Santa Rita, and Sinajana lost population.

CENSUS

Election Districts	1970 Civilian	1970 Military	1970 Total	1960 Total	% Change
Agana	2,119		2,119	1,642	29.8
Agana Heights	2,737	419	3,156	3,210	2.4
Agat	4,270	38	4,308	3,107	42.9
Asan	1,734	535	2,269	3,053	-1.8
Barrigada	5,251	1,105	6,356	5,430	18.7
Chalan Pago-Ordot	2,931		2,931	1,835	60.2
Dededo	9,083	1,697	10,780	5,126	112.8
Iranajan	1,897		1,897	1,730	15.0
Mangilao	3,228		3,228	1,965	63.6
Merizo	1,529		1,529	1,398	9.6
Mongmong-Toto-Maite	4,031	2,026	6,057	3,015	115.7
Piti	1,284		1,284	1,467	-12.1
Santa Rita	2,604	5,505	8,109	12,126	128.0
Sinajana	3,506		3,506	3,862	-8.4
Talofofo	1,935		1,935	1,352	46.2
Tamuning	9,983	235	10,218	5,944	80.2
Umatac	813		813	744	9.4
Yigo	2,786	8,756	11,542	7,682	40.9
Yona	2,599		2,599	2,356	12.6
Total	64,320	20,316	84,636	67,044	29.7

Source: U.S. Department of Commerce, Bureau of the Census
"1970 Census of Housing: General Housing Characteristics-Guam"
Publication HC(1)-A54

2. Estimates by other agencies of Guam's 1970 civilian population size.

Note: Statistically these vary substantially from the Bureau of the Census totals. Apparently many agencies in the Government of Guam place validity in these estimates rather than the U.S. Census. It is the consensus of many Island officials that the "taking of the Census" failed to contact a statistically significant number of Island residents. If accurate analysis of Guam's existing conditions and remedial programs are to be pursued, it is imperative that these discrepancies be rectified. Without accurate demographic statements, effectuation of public service programs of education, renewal, health care, and so on, and implementation of equitable taxation procedures will be hindered, a complete new census may be required.

OTHER CIVILIAN POPULATION ESTIMATES

	SOURCE: Economic Research Center, Department of Commerce 5-13-70		SOURCE: Chief Commissioner's Office Government of Guam	
Election Districts	Number	% Variance from Census	Number	% Variance from Census
Agana	2,000	-5.6	2,030	-4.2
Agana Heights	3,900	42.5	3,190	16.6
Agat	5,200	21.8	4,340	1.6
Asan	2,800	61.5	2,900	67.2
Barrigada	5,600	6.6	6,340	20.7
Chalan Pago-Ordot	2,500	-14.7	2,840	-3.1
Dededo	9,000	-0.9	10,750	18.4
Inarajan	2,300	21.2	1,890	-0.4
Mangilao	4,000	23.9	3,110	3.7
Merizo	2,000	30.8	1,430	-6.5
Mongmong-Toto-Maite	2,800	-30.5	2,900	-28.1
Piti	1,500	16.8	1,190	-7.3
Santa Rita	2,700	3.7	2,900	11.4
Sinajana	5,200	48.3	3,440	-1.9
Talofofo	1,900	-1.8	1,880	-2.8
Tamuning	10,000	0.2	10,610	6.3
Umatac	1,000	23.0	810	-0.4
Yigo	2,500	-10.3	2,400	-13.9
Yona	3,100	19.3	2,550	-1.9
Total	70.000	8.8	67.500	4.9

3. Age-Sex characteristics of the total population.

Note: Listings in the age-sex categories are for the total population of Guam and are not differentiated for military and civilian sectors. The presence of a large number of males on the Island without wives in the military heavily distorts the male-female sex ratios, particularly in the twenty to forty-nine year old categories. The military population has been disaggregated from the civilian in the census count totals in the first table, but summaries of other population characteristics are not separated into these groups. This makes it extremely difficult to ascertain the true male-female and age profiles for the civilian population thus hindering population projections on these bases.

Comments:

a. The median age is quite low, 20.4. Guam's large families, with many children, and the presence of the military contribute to this figure.

b. A very small percentage of Guam's population, 1.7%, is over 65 years of age.

4. Ethnic, citizenship, and immigration characteristics of the total population.

Note: Again, these totals are not disaggregated into military and civilian populations. However, the totals do lend some understanding to the proportionate size of the native population in reference to all others. In addition, the dominant origin of foreign-born residents, the Republic of the Philippines, is indicated. The scale of foreign-born immigration is noted; of particular importance is its rapid escalation.

5. Income characteristics of the total population.

Note: Listings, again, include both civilian and military populations. As most military personnel would occupy the medium to higher income levels on the chart, the income spread for the Island's native population is somewhat distorted. However, the relatively high medium income is partially attributable to the large percentage of the civilian labor force employed by the Federal and Territorial Governments.

AGE-SEX CHARACTERISTICS

(TOTAL POPULATION)

AGE GROUP	MALE NUMBER	%	FEMALE NUMBER	%	TOTAL
Under 5	5,962	51.2	5,673	48.8	11,636
5-9	6,054	51.5	5,708	48.5	11,762
10-14	5,362	52.0	4,942	48.0	10,304
15-19	4,148	51.5	3,901	48.5	8,049
20-24	6,642	64.7	3,628	35.3	10,270
25-29	3,569	55.7	2,837	44.3	6,406
30-34	3,538	57.3	2,633	42.7	6,171
35-39	3,267	59.7	2,207	40.3	5,474
40-44	3,038	63.4	1,754	36.6	4,792
45-49	2,192	62.1	1,338	37.9	3,530
50-54	1,334	57.9	971	42.1	2,305
55-59	1,015	58.1	733	41.9	1,748
60-64	577	53.9	493	46.1	1,070
65-69	324	47.0	365	53.0	689
70-74	160	45.6	191	54.4	351
75-79	104	42.3	142	57.7	246
80-84	42	40.0	63	60.0	105
85+	34	38.2	55	61.8	89
TOTAL	47,362	55.7	37,634	44.3	84,996
Under 18	19,815	51.4	18,759	48.6	38,574
% Total	41.8		49.9		45.4
65+	664	44.9	816	55.1	1,480
% Total	1.4		2.2		1.7
Median Age	21.6		18.2		20.4

ETHNIC, CITIZENSHIP, AND IMMIGRATION CHARACTERISTICS
(TOTAL POPULATION)

CHARACTERISTIC	NUMBER	% TOTAL	% CATEGORY
TOTAL POPULATION	84,996	100.0	
NATIVE	71,512	84.1	100.0
Place of Birth:			
Guam	47,472	55.9	66.4
United States	23,934	28.2	33.5
Puerto Rico	106	0.1	0.1
FOREIGN BORN	13,484	15.9	100.0
Place of Birth			
Europe	821	1.0	6.1
Philippines	10,172	12.0	75.4
Japan	487	0.6	3.6
Other Asia	732	0.9	5.4
Canada	127	0.1	0.9
Others	221	0.3	1.6
CITIZENSHIP			100.0
Naturalized	3,491		25.9
Permanent Alien	5,027		37.3
Temporary Alien	4,045		30.0
Born Abroad of American Parents	921		6.8
			100.0

YEAR OF IMMIGRATION

1969-1970	5,672	42.1
1967-1968	2,950	21.9
1965-1966	1,083	8.0
1960-1964	1,647	12.2
1955-1959	451	3.3
1950-1954	304	6.0
1940-1949	837	6.2
1930-1939	20	0.1
Before 1930	22	0.2

Source: U.S. Department of Commerce, Bureau of the Census

INCOME

(TOTAL POPULATION)

	FAMILIES NUMBER	% TOTAL	UNRELATED INDIVIDUALS NUMBER	% TOTAL	TOTAL NUMBER	% TOTAL
Less Than $250	387	2.7	1,099	9.3	1,486	5.7
$250-$499	97	0.7	323	2.7	420	1.6
$500-$699	67	0.5	251	2.1	318	1.2
$700-$999	87	0.6	306	2.6	393	1.5
$1,000-$1,499	159	1.1	842	7.1	1,001	3.8
$1,500-$1,999	150	1.0	1,376	11.6	1,526	5.8
$2,000-$2,999	412	2.9	2,346	19.8	2,758	10.5
$3,000-$3,999	804	5.6	2,252	19.0	3,056	11.7
$4,000-$4,999	1,099	7.7	1,170	9.9	2,269	8.7
$5,000-$5,999	1,442	10.1	588	5.0	2,030	7.8
$6,000-$7,999	2,602	18.2	618	5.2	3,220	12.3
$8,000-$9,999	1,960	13.7	278	2.3	2,238	8.6
$10,000-$14,999	2,930	20.5	239	2.0	3,169	12.1
$15,000-$24,999	1,751	12.2	114	1.0	1,865	7.1
$25,000 +	368	2.6	34	0.3	402	1.5
TOTAL	14,315		11,836		26,151	
MEADIAN	$ 7,886		$ 2,734		$ 4,933	
MEAN	$ 9,245		$ 3,233		$ 6,524	
MEAN PER CAPITA	$ 1,820					
FAMILIES WITH FEMALE HEAD	1,354					
MEAN	$ 5,089					
FEMALE UNRELATED INDIVID.			1,216			
MEAN			$ 2,560			

Source: U.S. Department of Commerce, Bureau of the Census.

General Observations

Information generated by the Bureau of the Census is satisfactory for planning purposes in most jurisdictions. Guam, being an Island, would appear to offer almost ideal conditions for analyzing population, housing, etc. However, it is less than ideal from the statistician's viewpoint owing to one major problem.

That problem is that there are several different populations on Guam:

a. The natives.

b. The military and their dependents.

c. The contract workers.

d. Alien laborers.

Each of these groups have different demographic characteristics, for example:

a. The natives have higher birth and mortality rates than the servicemen, dependent families, and contract workers.

b. Only a portion of the servicemen have dependents on the Island. The Census gives no information about numbers of service families.

c. The contract workers fluctuate in number from year to year.

d. Little is known about the demographic characteristics of alien workers. Their numbers also fluctuate yearly.

Despite these great differences, all Census descriptions of population characteristics, excepting listings of military population count totals, combine all populations into a single total; therefore some of the statistical information must be used with care.

Ideally, one would hope to be able to separate these several populations for planning purposes. It is not altogether logical, for example, to combine the low birth rate of a very transient population with the high birth rate of a stable, resident population, unless one assumes that the transient population(s) are "permanent" in the sense that although the individuals may change from one year to the next, the total will remain about the same, as will the age-sex characteristics. This is not a totally satisfactory assumption considering that:

a. The military population is subject to great variations depending on U.S. foreign policy.

b. The number of contract and alien workers should decline if vocational training programs are widespread and successful.

It is not possible, however, to separate these populations into age-sex or marital status categories based on direct evidence from the Census. It is possible to make some assumptions based upon indirect evidence. These are discussed in following sections.

Specific Issues

1. The Military Population

The Census lists 9,878 men and 119 women on active duty in the armed forces living on Guam; a total of 9,997[1]. While there is no direct evidence as to how many of these are married, it is known that 5,468 live in military barracks[2] and that approximately 3,731 live in homes located throughout the Island.[3] Although this latter figure is considered somewhat unreliable, it will nevertheless be used owing to a lack of anything more definitive.

The following assumptions can then be made:

a. There are 4,529 military personnel not living in barracks (9,997-5,468). These 4,529 occupy 3,731 homes. Assuming that the difference (798 people) occupy homes in pairs as roommates, then 399 homes are occupied by military personnel but not by dependent families.

[1]Bureau of Census, PC (1) - B54, Table 12.
[2]Census, op. cit. Table 11.
[3]Derived from difference between total housing units, preliminary Census data, and consultant's survey of civilian housing.

b. Assume that the remaining 3,332 homes (3,731-399) are occupied by servicemen and their dependent families.

c. Assuming three dependents per family, then there are approximately 9,996 dependents on the Island. Adding these to the military personnel results in a total of 19,993 in the "military population."

The total derived in this manner is not too different from the 19,027 listed in the Guam Statistical Abstract for 1970, on the 20,316 total listed by the U.S. Census. The difference could be attributable either to:

a. An inaccurate count of houses.

b. An average of less (or more) than two children per military family, or

c. Both of the above.

In any case, the method described above appears to offer the opportunity to examine the military segment of the population apart from the total.

2. Temporary Aliens

The Census lists 4,045 temporary aliens on the Island.[4] These are presumed to be imported laborers. Of these, only 106 are 18 years old and younger. Assuming these are children of alien families, and using an average of three children per family, then there are approximately 35 alien families on the Island. The remaining 4,010 are probably males, 19 years of age and older, and of unknown marital status but without dependents on Guam.

[4]Census, op. cit., Table 6.

3. Contract Workers

In 1970 there were approximately 2,055 contract workers in all sectors.[5] Assuming that 63.8% are married,[6] that all the married workers have their families with them, and that each family has an average of two children, then the "contract population" is 744 single men, 1,311 married men, and 3,933 dependents, for a total of 4,988

$$(2,055 \times 63.8) \times 4 + (2,055 - 1,311).$$

This appears to offer a satisfactory formula for working with the "contract population" separately from the total population.

Note on Methodology

The sex ratio of males to females is very high on Guam. Examination of the population characteristics[7] reveals some interesting facts about this ratio.

a. In the age groups from under one year to eighteen years of age, there are 20,584 males and 19,530 females (51.3% to 48.7%). This would seem to indicate that for many years the ratio of males to females born and surviving has remained at about 1:1.

b. In the age groups from nineteen to fifty-nine, there are 25,537 males and 16,795 females. This group, which includes employment and military service ages, has a very different ratio from that displayed by the younger group. This would seem to indicate that the disproportionate number of males is attributable to the influx of military personnel, and contract and alien workers. If the male/female ratio is adjusted to the 51.3% to 48.7% rate prevailing in the younger group, the resultant numbers would be 17,692 males and 16,795 females. Subtracting 17,692 from 25,537 produces a "surplus" of 7,845 males.

[5]Department of Commerce, Government of Gua, 1970.
[6]See Note on Methodology.
[7]Table 5, PC(1)-B54, Bureau of Census.

c. There are 5,009 more married males than females on the Island (19,310 to 14,301).[8] It would seem to indicate that of the 7,845 "surplus" males from 19 to 59, 5,009 are married but their wives are not on Guam.

d. Given a probable "surplus" of 7,845 males in the 19-59 age group, and the fact that there are 5,009 more married males than females on the Island, it can be hypothesized that the marital rate is 63.8% $\left(\frac{5,009 \times 100}{7,845}\right)$ in this group.

4. Persons born in the U.S.

If one assumes that all servicemen and their dependents as well as all contract workers and their dependents now living on Guam were born in the U.S., the total - 24,981 - is somewhat higher than the 23,773 listed in the Census.[9] These assumptions are not altogether warranted, however, since some members of both groups were obviously born in places other than the U.S. (Some contract workers were born in Guam, trained in the U.S., and returned to Guam under contract.) There is, however, sufficient correlation between the figures to substantiate the validity of the projections postulated in Sections 1 and 3.

5. Native Population

By separating the military, temporary alien, and contract worker populations (Sections 1, 2, and 3 above), all of which have different age, sex, fertility and survival characteristics, the native population can be examined as a separate segment.

6. Education Characteristics

As pointed out in the Public Education element, there appears to be close correlation between the Census and locally generated statistics related to the number of children in public schools, despite the fact that the Census uses a different grade segmentation. There is, however, a large discrepancy between the two sources relative to the number of students enrolled in the University.

[8]Census, op. cit., Table 6.
[9]Census, op. cit., Table 7.

7. Mobility

Residents of Guam are very mobile. About 54% of those over 5 years old lived (in 1970) in a different house from the one they occupied in 1965.[10] This is not completely reliable, however, since some people may have moved several times during the five-year period, and returned to the house they occupied in 1965 by the time the Census was taken. Additionally, the mobility figures include the different population groups discussed in Sections 1, 2, and 3 above, all of which are highly mobile.

Projection of Guam's Population

Due to the aforementioned problems of statistically isolating Guam's diverse populations and the discrepancies among population estimates and the U.S. Census totals, traditional methods of projecting future population totals must be considered inappropriate. In addition, Guam's growth may be affected by so many variables, including scope of military operations, tourism expansion, development of new industries, and vocational training programs, that a single estimate would have little validity. Rather, projection of a range of alternative population totals based on a credible range of alternate futures and existing conditions would be of greater appropriateness.

Of the many forecasting methods in use, which include various trend analyses, economic growth generators, and land use capacity projections, the "Cohort-Survival" method is one of the most reliable. This technique examines a population in terms of cohorts, or groups, such as women of childbearing age, and based on survival rates of each cohort, follows the population through its life span and into future generations. Migration rates of the population are evaluated and become an input to the program. Outputs are in terms of yearly totals of people by age and sex. Groups such as the following can then be analyzed: school age children, labor force, voter age groups, older age groups, and purchasing power of various groups.

For the purposes of the forecasts, only the civilian population was used. As the growth or decline of the military is highly variable, being influenced by factors exogenous to the model, this sector was withdrawn from the total population. For purposes of planning, this sector can be held as a constant, influenced little by birth, mortality, or migration rates. Rather, its constancy or change is dictated by Federal policies

[10] Census, op. cit. Table 9.

and actions. As American forces continue to pull back from Southeast Asia and surrounding areas, it is likely that the military population of Guam will grow somewhat and stabilize.

Twenty-four iterations of the population model were run to describe a range of alternative populations based on varying criteria. These were derived from the credible potential futures that Guam may assume. The criteria includes:

1. Population base/1970.
   Due to the discrepancies between the U.S. Census and Government of Guam population estimates, two 1970 populations were used. A low population of 64,510 civilians was derived from the U.S. Census totals and a high of 67,890 from Government of Guam estimates, male-female ratios in the Age-Sex characteristics were adjusted to reflect removal of the military population, including their dependents.

2. Survival rates.
   Existing survival rates, derived from the U.S. Census and the Guam Statistical Abstract, published by the Department of Commerce, were held constant throughout all model iterations.

3. Birth (fertility) rates.
   Three alternative estimate sets were utilized. Existing fertility rates derived from the U.S. Census and the Guam Statistical Abstract were utilized as the "Medium" range estimate. Assuming a reduction in birth rates, due to increased use of contraceptive methods and societal attitudes regarding family size, the "Low" estimate was established. A "High" estimate was developed to examine the effects of increasing family size.

4. Migration rates.
   Potentially, migration rates may have a profound effect upon Guam's population growth. However, they are far less predictable than the factors affecting natural population growth. Many variables contribute to the dominance of outmigration or immigration. Some of these include:

   a. Tourism.

      1) As the level of tourism escalates, a larger worldwide populace will become familiar with the Island of Guam. As this occurs, it is likely that an increasing number will seek the

Island as their residence because of its tropical beauty and unique characteristics. Initially, residency will be feasible for retiring individuals or couples or those easily absorbed in the existing labor market. As job opportunities expand, a larger number will find it feasible to seek residency.

2) Increased tourism connotes greater jobs. Employment directly associated with tourist-oriented industries, including hotels, restaurants, and water-oriented recreational activities, will expand rapidly. In addition, supporting job opportunities will multiply for hotel-associated cleaners, apparel shops, beauty shops, barbers, and so on. Tertiary jobs will also be affected positively, including increased construction, governmental services, and so on. If, as is the present case, local labor is not sufficient to supply these enterprises, outside labor will be required. Assuming that tourism grows at projected rates, a large influx of labor could be supported in the near future.

b. Industry.

1) Large-scale expansion of existing industries or development of new enterprises, including fishing, manufacturing, and others, would require extensive additions to the present labor force. If personnel cannot be drawn from the present supply, labor will have to be imported. Potentially, this could attract a very large number of new residents to Guam.

2) Secondary and tertiary opportunities will increase as a result of expansion of the industrial base. Each industry will require supporting services and products, thus further expanding the demand for labor. Again, due to the scarcity of labor, particularly in the skilled and semiskilled professions, increased demand will require labor from outside sources. As the breadth of job opportunities multiply, an increasingly large number of persons may be attracted to the Island.

c. Education.

1) Migration rates may be affected in any one of several ways by the increasing educational level of the native Guamanian. With the limited number of existing job opportunities on the Island, the educated Guamanian would likely leave, unless able to attain a position reflecting his attainment and abilities. To prevent a large outmigration of the educated, it will be necessary to provide a wider diversity of employment opportunity. As Guamanians assume positions currently occupied by contract employees or other stateside Americans, the influx of outsiders will be reduced. However, development of new industries by the Guamanian or others may reverse this condition.

2) Programs to train the Guamanian for skilled labor positions may reduce the need for the importation of outside labor. For instance, as the native populace becomes skilled in the construction trades, the necessity of Filipino, Korean, or Japanese labor in these fields will be reduced. However, those positions vacated by Guamanians entering skilled likely would have to be filled by others.

d. Military and governmental employment.

1) Increases in operations of each of these major employers would require additional manpower. Because of the job-security and -benefit nature of these positions, they are likely to be filled from the existing labor force. However, new job opportunities in these professions would leave many existing jobs unfilled. Potentially, these could attract outside labor.

2) Reductions in military and governmental employment, by adding substantially to the available pool of labor, would tend to encourage outmigration and discourage immigration. Generally, fewer jobs would be available and new industries would be required or existing ones expanded.

Reflecting the complexity and interrelated impacts of these variables, from alternative migration futures have been hypothesized for the population model. These include:

a. "Zero (or balanced) Migration," immigration and outmigration are balanced, wherein the net gain or loss is zero.

b. "Low Migration," based on net gains of:
8 persons per 1000 residents in 1970-1974,
12 persons per 1000 residents in 1975-1979,
14 persons per 1000 residents in 1980-1984, and
18 persons per 1000 residents in 1985-1990.

c. "Medium Migration," based on net gains of:
14 persons per 1000 residents in 1970-1974,
25 persons per 1000 residents in 1975-1979,
28 persons per 1000 residents in 1980-1984, and
36 persons per 1000 residents in 1985-1990.

d. "High Migration," based on net gains of:
25 persons per 1000 residents in 1970-1974,
40 persons per 1000 residents in 1975-1979,
60 persons per 1000 residents in 1980-1984, and
65 persons per 1000 residents in 1985-1990.

Each of these sets assumes a number of potential combinations of impacts of the discussed variables. For instance, one set may hypothesize a condition of high industrial development, low educational advancement, and moderate military expansion, or moderate industrial development, high tourism, moderate educational advancement, and heavy military expansion for the same migration rates.

The magnitude and range of the rates reflect credible extremes for each of the variable conditions and their interrelated impacts.

Each criteria alternative, for census base, fertility rates, and migration rates, are combined with all others to produce the range of twenty-four population projection alternatives. Graphically, these iterations include:

ALTERNATIVE POPULATION PROJECTIONS
(Civilian Only)

Criteria:

Alternative	Census Base	Birth Rates	Migration Rates	Parametric Selections
1A1	Low (64, 510)	Low	Zero (Balanced)	Series A
1A2			Low	
1A3			Medium	
1A4			High	
1B1		Medium	Zero (Balanced)	
1B2			Low	
1B3			Medium	
1B4			High	

(Contd. on next page)

Criteria: (Contd.)

Alternative	Census Base	Birth Rates	Migration Rates	Parametric Selections
1C1		High	Zero (Balanced)	
1C2			Low	
1C3			Medium	
1C4			High	
2A1	High (67, 890)	Low	Zero (Balanced)	
2A2			Low	
2A3			Medium	
2A4			High	
2B1		Medium	Zero (Balanced)	
2B2			Low	
2B3			Medium	Series B
2B4			High	
2C1		High	Zero (Balanced)	
2C2			Low	
2C3			Medium	
2C4			High	Series C

Criteria alternatives utilized in the population model are summarized in the following computer print-out sheets. These include:

1. Average survivial rates.

2. Fertility rates (low, medium, and high estimates).

3. Annual net migration (low, medium, and high rates).

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

AVERAGE SURVIVAL RATES

C91

	1960 - 1965	1965 - 1970	1970 - 1975	1975 - 1980	1980 - 1985	1985 - 1990
0- 4	0.965	0.965	0.965	0.965	0.965	0.965
5- 9	0.997	0.997	0.997	0.997	0.997	0.997
10-14	0.986	0.986	0.986	0.986	0.986	0.986
15-19	0.986	0.986	0.986	0.986	0.986	0.986
20-24	0.986	0.986	0.986	0.986	0.986	0.986
25-29	0.974	0.974	0.974	0.974	0.974	0.974
30-34	0.974	0.974	0.974	0.974	0.974	0.974
35-39	0.974	0.974	0.974	0.974	0.974	0.974
40-44	0.916	0.916	0.916	0.916	0.916	0.916
45-49	0.916	0.916	0.916	0.916	0.916	0.916
50-54	0.916	0.916	0.916	0.916	0.916	0.916
55-59	0.696	0.696	0.696	0.696	0.696	0.696
60-64	0.696	0.696	0.696	0.696	0.696	0.696
65-69	0.696	0.696	0.696	0.696	0.696	0.696
70-74	0.696	0.696	0.696	0.696	0.696	0.696
75-79	0.627	0.627	0.627	0.627	0.627	0.627
80-84	0.394	0.394	0.394	0.394	0.394	0.394
85+	0.000	0.000	0.000	0.000	0.000	0.000

06/05/72 GUAM-SUR

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

FERTILITY RATES (LOW ESTIMATE)

	1960 - 1965	1965 - 1970	1970 - 1975	1975 - 1980	1980 - 1985	1985 - 1990
0- 4	0.000	0.000	0.000	0.000	0.000	0.000
5- 9	0.000	0.000	0.000	0.000	0.000	0.000
10-14	0.000	0.000	0.000	0.000	0.000	0.000
15-19	0.554	0.554	0.454	0.454	0.454	0.454
20-24	0.954	0.954	0.854	0.854	0.854	0.854
25-29	1.868	1.868	1.768	1.768	1.768	1.768
30-34	1.868	1.868	1.768	1.768	1.768	1.768
35-39	1.300	1.300	1.200	1.200	1.200	1.200
40-44	0.828	0.828	0.728	0.728	0.728	0.728
45-49	0.000	0.000	0.000	0.000	0.000	0.000
50-54	0.000	0.000	0.000	0.000	0.000	0.000
55-59	0.000	0.000	0.000	0.000	0.000	0.000
60-64	0.000	0.000	0.000	0.000	0.000	0.000
65-69	0.000	0.000	0.000	0.000	0.000	0.000
70-74	0.000	0.000	0.000	0.000	0.000	0.000
75-79	0.000	0.000	0.000	0.000	0.000	0.000
80-84	0.000	0.000	0.000	0.000	0.000	0.000
85+	0.000	0.000	0.000	0.000	0.000	0.000

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TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

FERTILITY RATES (MEDIUM ESTIMATE)

	1960 - 1965	1965 - 1970	1970 - 1975	1975 - 1980	1980 - 1985	1985 - 1990
0- 4	0.000	0.000	0.000	0.000	0.000	0.000
5- 9	0.000	0.000	0.000	0.000	0.000	0.000
10-14	0.000	0.000	0.000	0.000	0.000	0.000
15-19	0.554	0.554	0.554	0.554	0.554	0.554
20-24	0.954	0.954	0.954	0.954	0.954	0.954
25-29	1.868	1.868	1.868	1.868	1.868	1.868
30-34	1.868	1.868	1.868	1.868	1.868	1.868
35-39	1.300	1.300	1.300	1.300	1.300	1.300
40-44	0.828	0.828	0.828	0.828	0.828	0.828
45-49	0.000	0.000	0.000	0.000	0.000	0.000
50-54	0.000	0.000	0.000	0.000	0.000	0.000
55-59	0.000	0.000	0.000	0.000	0.000	0.000
60-64	0.000	0.000	0.000	0.000	0.000	0.000
65-69	0.000	0.000	0.000	0.000	0.000	0.000
70-74	0.000	0.000	0.000	0.000	0.000	0.000
75-79	0.000	0.000	0.000	0.000	0.000	0.000
80-84	0.000	0.000	0.000	0.000	0.000	0.000
85+	0.000	0.000	0.000	0.000	0.000	0.000

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

FERTILITY RATES (HIGH ESTIMATE)

	1960 - 1965	1965 - 1970	1970 - 1975	1975 - 1980	1980 - 1985	1985 - 1990
0- 4	0.000	0.000	0.000	0.000	0.000	0.000
5- 9	0.000	0.000	0.000	0.000	0.000	0.000
10-14	0.000	0.000	0.000	0.000	0.000	0.000
15-19	0.554	0.554	0.654	0.654	0.654	0.654
20-24	0.954	0.954	1.054	1.054	1.054	1.054
25-29	1.868	1.868	1.928	1.928	1.928	1.928
30-34	1.868	1.868	1.928	1.928	1.928	1.928
35-39	1.300	1.300	1.400	1.400	1.400	1.400
40-44	0.828	0.828	0.928	0.928	0.928	0.928
45-49	0.000	0.000	0.000	0.000	0.000	0.000
50-54	0.000	0.000	0.000	0.000	0.000	0.000
55-59	0.000	0.000	0.000	0.000	0.000	0.000
60-64	0.000	0.000	0.000	0.000	0.000	0.000
65-69	0.000	0.000	0.000	0.000	0.000	0.000
70-74	0.000	0.000	0.000	0.000	0.000	0.000
75-79	0.000	0.000	0.000	0.000	0.000	0.000
80-84	0.000	0.000	0.000	0.000	0.000	0.000
85+	0.000	0.000	0.000	0.000	0.000	0.000

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

AVERAGE ANNUAL NET MIGRATION (LOW RATES)

	1960 - 1965		1965 - 1970		1970 - 1975		1975 - 1980		1980 - 1985		1985 - 1990	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
0- 4	0	0	0	0	8	8	12	12	14	14	16	16
5- 9	0	0	0	0	8	8	12	12	14	14	16	16
10-14	0	0	0	0	8	8	12	12	14	14	16	16
15-19	0	0	0	0	8	8	12	12	14	14	16	16
20-24	0	0	0	0	8	8	12	12	14	14	16	16
25-29	0	0	0	0	8	8	12	12	14	14	16	16
30-34	0	0	0	0	8	8	12	12	14	14	16	16
35-39	0	0	0	0	8	8	12	12	14	14	16	16
40-44	0	0	0	0	8	8	12	12	14	14	16	16
45-49	0	0	0	0	8	8	12	12	14	14	16	16
50-54	0	0	0	0	8	8	12	12	14	14	16	16
55-59	0	0	0	0	8	8	12	12	14	14	16	16
60-64	0	0	0	0	8	8	12	12	14	14	16	16
65-69	0	0	0	0	8	8	12	12	14	14	16	16
70-74	0	0	0	0	8	8	12	12	14	14	16	16
75-79	0	0	0	0	8	8	12	12	14	14	16	16
80-84	0	0	0	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	128	128	192	192	224	224	256	256

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TERRITORY OF GUAM MASTER PLAN
POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD
AVERAGE ANNUAL NET MIGRATION (MEDIUM RATES)

	1960 - 1965		1965 - 1970		1970 - 1975		1975 - 1980		1980 - 1985		1985 - 1990	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
0- 4	0	0	0	0	14	14	25	25	28	28	36	36
5- 9	0	0	0	0	14	14	25	25	28	28	36	36
10-14	0	0	0	0	14	14	25	25	28	28	36	36
15-19	0	0	0	0	14	14	25	25	28	28	36	36
20-24	0	0	0	0	14	14	25	25	28	28	36	36
25-29	0	0	0	0	14	14	25	25	28	28	36	36
30-34	0	0	0	0	14	14	25	25	28	28	36	36
35-39	0	0	0	0	14	14	25	25	28	28	36	36
40-44	0	0	0	0	14	14	25	25	28	28	36	36
45-49	0	0	0	0	14	14	25	25	28	28	36	36
50-54	0	0	0	0	14	14	25	25	28	28	36	36
55-59	0	0	0	0	14	14	25	25	28	28	36	36
60-64	0	0	0	0	14	14	25	25	28	28	36	36
65-69	0	0	0	0	14	14	25	25	28	28	36	36
70-74	0	0	0	0	14	14	25	25	28	28	36	36
75-79	0	0	0	0	14	14	25	25	28	28	36	36
80-84	0	0	0	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	224	224	400	400	448	448	576	576

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TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

AVERAGE ANNUAL NET MIGRATION (HIGH RATES)

	1960 - 1965		1965 - 1970		1970 - 1975		1975 - 1980		1980 - 1985		1985 - 1990	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
0- 4	0	0	0	0	25	25	40	40	60	60	65	65
5- 9	0	0	0	0	25	25	40	40	60	60	65	65
10-14	0	0	0	0	25	25	40	40	60	60	65	65
15-19	0	0	0	0	25	25	40	40	60	60	65	65
20-24	0	0	0	0	25	25	40	40	60	60	65	65
25-29	0	0	0	0	25	25	40	40	60	60	65	65
30-34	0	0	0	0	25	25	40	40	60	60	65	65
35-39	0	0	0	0	25	25	40	40	60	60	65	65
40-44	0	0	0	0	25	25	40	40	60	60	65	65
45-49	0	0	0	0	25	25	40	40	60	60	65	65
50-54	0	0	0	0	25	25	40	40	60	60	65	65
55-59	0	0	0	0	25	25	40	40	60	60	65	65
60-64	0	0	0	0	25	25	40	40	60	60	65	65
65-69	0	0	0	0	25	25	40	40	60	60	65	65
70-74	0	0	0	0	25	25	40	40	60	60	65	65
75-79	0	0	0	0	25	25	40	40	60	60	65	65
80-84	0	0	0	0	0	0	0	0	0	0	0	0
85+	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	400	400	640	640	960	960	1040	1040

Population iterations were run in five-year increments for each alternative. A summary of their projections follows:

ALTERNATIVE CIVILIAN POPULATION TOTALS

Alternative	1970	1975	1980	1985	1990
1A1 low census, low birth, zero mig.	64,510	76,089	89,938	105,706	123,157
1A2 low census, low birth, low mig.	64,510	77,504	93,584	112,085	133,169
1A3 low census, low birth, med. mig.	64,510	78,566	97,021	118,254	142,958
1A4 low census, low birth, high mig.	64,510	80,509	101,765	128,995	159,586
1B1 low census, med. birth, zero mig.	64,510	77,444	92,816	110,332	129,692
1B2 low census, med. birth, low mig.	64,510	78,871	96,515	116,843	139,960
1B3 low census, med. birth, med. mig.	64,510	79,942	99,998	123,133	149,990
1B4 low census, med. birth, high mig.	64,510	81,901	104,813	134,068	167,021
1C1 low census, high birth, zero mig.	64,510	78,633	95,316	114,343	135,365
1C2 low census, high birth, low mig.	64,510	80,071	99,062	120,968	145,854
1C3 low census, high birth, med. mig.	64,510	81,149	102,584	127,364	156,097
1C4 low census, high birth, high mig.	64,510	83,122	107,461	138,467	173,478
2A1 high census, low birth, zero mig.	67,890	80,380	94,709	112,234	130,047
2A2 high census, low birth, low mig.	67,890	81,795	98,355	117,625	140,078
2A3 high census, low birth, med. mig.	67,890	82,857	101,790	123,783	149,849
2A4 high census, low birth, high mig.	67,890	84,800	106,539	134,535	166,495
2B1 high census, med. birth, zero mig.	67,890	81,819	97,775	116,178	137,052
2B2 high census, med. birth, low mig.	67,890	83,246	101,474	122,703	147,339
2B3 high census, med. birth, med. mig.	67,890	84,317	104,956	128,982	157,352
2B4 high census, med. birth, high mig.	67,890	86,276	109,777	139,930	174,407
2C1 high census, high birth, zero mig.	67,890	83,073	100,448	120,492	143,151
2C2 high census, high birth, low mig.	67,890	84,511	104,195	127,131	153,658
2C3 high census, high birth, med. mig.	67,890	85,589	107,715	133,517	163,886
2C4 high census, high birth, high mig.	67,890	87,562	112,597	144,632	180,089

Detailed computer print-out for each alternative follows:

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	7486 (51.2)	7136 (48.8)	14622 (19.2)	8907 (51.2)	8471 (48.8)	17378 (19.3)	10131 (51.2)	9656 (48.8)	19787 (18.7)	11322 (51.2)	10791 (48.8)	22113 (18.0)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4397 (51.2)	4183 (48.8)	8580 (11.3)	7224 (51.2)	6886 (48.8)	14110 (15.7)	8576 (51.2)	8175 (48.8)	16751 (15.8)	9776 (51.2)	9318 (48.8)	19094 (15.5)
10 - 14	3099 (51.4)	2777 (48.6)	7776 (12.1)	4613 (51.5)	4349 (48.5)	8962 (11.8)	4384 (51.3)	4170 (48.7)	8554 (9.5)	7202 (51.2)	6865 (48.8)	14067 (13.3)	8550 (51.2)	8150 (48.8)	16700 (13.6)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3942 (51.4)	3724 (48.6)	7666 (10.1)	4548 (51.5)	4288 (48.5)	8836 (9.8)	4323 (51.3)	4112 (48.7)	8435 (8.0)	7101 (51.2)	6769 (48.8)	13870 (11.3)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3027 (50.7)	2939 (49.3)	5966 (7.8)	3887 (51.4)	3672 (48.6)	7559 (8.4)	4484 (51.5)	4228 (48.5)	8712 (8.2)	4262 (51.5)	4054 (48.7)	8316 (6.8)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4218 (55.9)	3323 (44.1)	7541 (9.9)	2984 (50.7)	2898 (49.3)	5883 (6.5)	3833 (51.4)	3621 (48.6)	7454 (7.1)	4421 (51.5)	4169 (48.5)	8590 (7.0)
30 - 34	2504 (55.4)	2012 (44.5)	4516 (7.0)	2462 (53.2)	2112 (46.2)	4574 (6.0)	4108 (55.9)	3237 (44.1)	7345 (8.2)	2907 (50.7)	2823 (49.3)	5730 (5.4)	3733 (51.4)	3527 (48.6)	7260 (5.9)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2439 (55.4)	1960 (44.6)	4399 (5.8)	2398 (53.8)	2057 (46.2)	4455 (5.0)	4001 (55.9)	3153 (44.1)	7154 (6.8)	2881 (50.7)	2750 (49.3)	5631 (4.6)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2237 (57.7)	1643 (42.3)	3880 (5.1)	2376 (55.4)	1909 (44.6)	4285 (4.8)	2336 (53.8)	2004 (46.2)	4340 (4.1)	3397 (55.9)	3071 (44.1)	6468 (5.3)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1944 (61.3)	1227 (38.7)	3171 (4.2)	2049 (57.7)	1505 (42.3)	3554 (4.0)	2176 (55.4)	1749 (44.6)	3925 (3.7)	2140 (53.8)	1836 (46.2)	3976 (3.2)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1351 (59.0)	937 (41.0)	2288 (3.0)	1781 (61.3)	1124 (38.7)	2906 (3.2)	1677 (57.6)	1379 (42.4)	3056 (3.1)	1993 (55.4)	1602 (44.6)	3595 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	879 (56.4)	680 (43.6)	1559 (2.0)	1238 (59.1)	858 (40.9)	2096 (2.3)	1631 (61.3)	1030 (38.7)	2661 (2.5)	1719 (57.6)	1263 (42.4)	2982 (2.4)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	706 (58.1)	510 (41.9)	1216 (1.6)	612 (56.4)	473 (43.6)	1085 (1.2)	862 (59.1)	597 (40.9)	1459 (1.4)	1138 (61.3)	717 (38.7)	1855 (1.5)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	402 (54.0)	343 (46.0)	745 (1.0)	491 (58.0)	355 (42.0)	846 (0.9)	426 (56.4)	329 (43.6)	755 (0.7)	600 (59.1)	416 (40.9)	1016 (0.8)
70 - 74	150 (45.6)	181 (54.4)	331 (0.5)	226 (47.1)	254 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.5)	342 (58.1)	247 (41.9)	589 (0.6)	296 (55.4)	229 (43.6)	525 (0.4)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.5)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.4)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (45.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	34,671	29,839	64,510	40,522	35,567	76,089	47,501	42,437	89,938	55,428	50,278	105,706	64,175	58,982	123,157

06/05/72 GUAM-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE LOW MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	7596 (51.2)	7241 (48.8)	14837 (19.1)	9190 (51.2)	8762 (48.8)	17952 (19.2)	10666 (51.2)	10169 (48.8)	20835 (18.6)	12146 (51.2)	11581 (48.8)	23727 (17.8)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4437 (51.2)	4223 (48.8)	8660 (11.2)	7390 (51.2)	7048 (48.8)	14438 (15.4)	8938 (51.2)	8525 (48.8)	17463 (15.6)	10383 (51.2)	9903 (48.8)	20286 (15.2)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4653 (51.5)	4389 (48.5)	9042 (11.7)	4484 (51.2)	4270 (48.8)	8754 (9.4)	7438 (51.2)	7097 (48.8)	14535 (13.0)	9001 (51.2)	8559 (48.8)	17560 (13.2)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3982 (51.4)	3764 (48.6)	7746 (10.0)	4648 (51.4)	4388 (48.6)	9036 (9.7)	4491 (51.2)	4280 (48.8)	8771 (7.8)	7424 (51.2)	7088 (48.8)	14512 (10.9)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3067 (50.7)	2979 (49.3)	6046 (7.8)	3980 (51.4)	3771 (48.6)	7757 (8.3)	4663 (51.4)	4397 (48.6)	9060 (8.1)	4815 (51.2)	4610 (48.8)	9425 (7.1)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4258 (55.9)	3363 (44.1)	7621 (9.8)	3084 (50.7)	2997 (49.3)	6081 (6.5)	4000 (51.4)	3788 (48.6)	7788 (6.9)	4678 (51.4)	4425 (48.6)	9103 (6.9)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2502 (55.8)	2152 (46.2)	4654 (6.0)	4207 (55.8)	3336 (44.2)	7543 (8.1)	3074 (50.7)	2989 (49.3)	6063 (5.4)	3986 (51.3)	3780 (48.7)	7766 (5.9)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2479 (55.3)	2000 (44.7)	4479 (5.8)	2497 (53.7)	2156 (46.3)	4653 (5.0)	4168 (55.7)	3319 (44.3)	7487 (6.7)	3084 (50.7)	3001 (49.3)	6085 (4.6)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2277 (57.5)	1683 (42.5)	3960 (5.1)	2475 (55.2)	2008 (44.8)	4483 (4.8)	2502 (53.6)	2170 (46.4)	4672 (4.2)	4150 (55.5)	3323 (44.5)	7473 (5.6)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1984 (61.0)	1267 (39.0)	3251 (4.2)	2146 (57.3)	1602 (42.7)	3748 (4.0)	2337 (55.0)	1909 (45.0)	4246 (3.8)	2882 (53.4)	2078 (46.6)	4960 (3.7)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1391 (58.7)	977 (41.3)	2368 (3.1)	1877 (60.6)	1221 (39.4)	3098 (3.3)	2036 (57.0)	1537 (43.0)	3573 (3.2)	2231 (54.8)	1839 (45.2)	4070 (3.1)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	919 (56.1)	720 (43.9)	1639 (2.1)	1334 (58.3)	955 (41.7)	2289 (2.4)	1789 (60.1)	1188 (39.9)	2977 (2.7)	1955 (56.6)	1498 (43.4)	3453 (2.6)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	746 (57.6)	550 (42.4)	1296 (1.7)	700 (55.5)	561 (44.5)	1261 (1.3)	998 (57.6)	735 (42.4)	1733 (1.5)	1335 (59.3)	917 (40.7)	2252 (1.7)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	442 (53.6)	383 (46.4)	825 (1.1)	579 (56.7)	443 (43.3)	1022 (1.1)	557 (54.8)	460 (45.2)	1017 (0.9)	765 (56.8)	602 (43.4)	1367 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	266 (47.5)	294 (52.5)	560 (0.7)	368 (52.9)	327 (47.1)	695 (0.7)	473 (55.6)	378 (44.4)	851 (0.8)	478 (53.5)	410 (46.2)	888 (0.7)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	151 (46.6)	173 (53.4)	324 (0.4)	245 (48.0)	265 (52.0)	510 (0.5)	326 (52.2)	298 (47.8)	624 (0.6)	419 (54.3)	353 (45.7)	772 (0.6)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	95 (46.8)	108 (53.2)	203 (0.2)	154 (48.1)	166 (51.9)	320 (0.3)	204 (52.2)	187 (47.8)	391 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	37 (46.3)	43 (53.8)	80 (0.1)	61 (48.4)	65 (51.6)	126 (0.1)
	34,671	29,839	64,510	41,232	36,272	77,504	49,331	44,253	93,584	58,637	53,448	112,085	69,220	63,949	133,169

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (49.8)	8891 (13.8)	7678 (51.2)	7321 (48.8)	14999 (19.1)	9470 (51.2)	9032 (48.8)	18502 (19.1)	11185 (51.2)	10667 (48.8)	21852 (18.5)	12956 (51.2)	12358 (48.8)	25314 (17.7)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4467 (51.2)	4253 (48.8)	8720 (11.1)	7534 (51.2)	7190 (48.8)	14724 (15.2)	9279 (51.2)	8856 (48.8)	18135 (15.3)	10974 (51.2)	10474 (48.8)	21448 (15.0)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4683 (51.5)	4419 (48.5)	9102 (11.6)	4579 (51.2)	4365 (48.8)	8944 (9.2)	7651 (51.1)	7308 (48.9)	14959 (12.6)	9431 (51.1)	9009 (48.9)	18440 (12.9)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	4012 (51.4)	3794 (48.6)	7806 (9.9)	4742 (51.4)	4482 (48.6)	9224 (9.5)	4655 (51.2)	4444 (48.8)	9099 (7.7)	7724 (51.1)	7386 (48.9)	15110 (10.6)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3097 (50.7)	3009 (49.3)	6106 (7.8)	4081 (51.4)	3866 (48.6)	7947 (8.2)	4816 (51.4)	4559 (48.6)	9375 (7.9)	4770 (51.1)	4562 (48.9)	9332 (6.5)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4288 (55.8)	3393 (44.2)	7681 (9.8)	3179 (50.7)	3092 (49.3)	6271 (6.5)	4164 (51.3)	3952 (48.7)	8116 (6.9)	4929 (51.3)	4675 (48.7)	9604 (6.7)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2532 (53.7)	2182 (46.3)	4714 (6.0)	4302 (55.6)	3430 (44.4)	7732 (8.0)	3236 (50.7)	3152 (49.3)	6388 (5.4)	4236 (51.3)	4029 (48.7)	8265 (5.8)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2509 (55.3)	2030 (44.7)	4539 (5.8)	2591 (53.5)	2250 (46.5)	4841 (5.0)	4330 (55.4)	3481 (44.6)	7811 (6.6)	3332 (50.6)	3250 (49.4)	6582 (4.6)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2307 (57.4)	1713 (42.6)	4020 (5.1)	2569 (55.0)	2102 (45.0)	4671 (4.8)	2664 (53.3)	2331 (46.7)	4995 (4.2)	4397 (55.2)	3570 (44.8)	7967 (5.6)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	2014 (60.8)	1297 (39.2)	3311 (4.2)	2239 (56.9)	1694 (43.1)	3932 (4.1)	2493 (54.7)	2065 (45.3)	4558 (3.9)	2620 (53.1)	2315 (46.9)	4935 (3.5)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1421 (58.5)	1007 (41.5)	2428 (3.1)	1970 (60.0)	1313 (40.0)	3283 (3.4)	2190 (56.4)	1692 (43.6)	3882 (3.3)	2464 (54.3)	2072 (45.7)	4536 (3.2)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	949 (55.9)	750 (44.1)	1699 (2.2)	1427 (57.7)	1047 (42.3)	2474 (2.5)	1945 (59.2)	1343 (40.8)	3288 (2.8)	2186 (55.8)	1730 (44.2)	3916 (2.7)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	776 (57.2)	580 (42.8)	1356 (1.7)	786 (54.8)	647 (45.2)	1433 (1.5)	1133 (56.6)	869 (43.4)	2002 (1.7)	1534 (57.9)	1115 (42.1)	2649 (1.9)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	472 (53.3)	413 (46.7)	885 (1.1)	665 (55.7)	529 (44.3)	1194 (1.2)	687 (53.8)	590 (46.2)	1277 (1.1)	969 (55.2)	785 (44.8)	1754 (1.2)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.8)	454 (52.4)	412 (47.6)	866 (0.9)	603 (54.3)	508 (45.7)	1111 (0.9)	658 (52.7)	591 (47.3)	1249 (0.9)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.5)	331 (48.5)	351 (51.5)	682 (0.7)	456 (51.6)	427 (48.4)	883 (0.7)	600 (52.9)	534 (47.1)	1134 (0.8)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	208 (48.6)	220 (51.4)	428 (0.4)	268 (51.6)	268 (48.4)	536 (0.4)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	82 (48.5)	87 (51.5)	169 (0.1)
	34,671	29,839	64,510	41,764	36,802	78,566	51,057	45,964	97,021	61,740	56,514	118,254	74,148	68,810	142,958

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	7827 (51.2)	7465 (48.8)	15292 (19.0)	9867 (51.2)	9414 (48.8)	19281 (18.9)	12068 (51.2)	11517 (48.8)	23585 (18.3)	14343 (51.2)	13685 (48.8)	28028 (17.6)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4522 (51.2)	4308 (48.8)	8830 (11.0)	7753 (51.2)	7404 (48.8)	15157 (14.9)	9822 (51.1)	9385 (48.9)	19207 (14.9)	11971 (51.1)	11439 (48.9)	23410 (14.7)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4736 (51.4)	4474 (48.6)	9212 (11.4)	4708 (51.2)	4495 (48.8)	9203 (9.0)	8030 (51.1)	7682 (48.9)	15712 (12.2)	10118 (51.1)	9682 (48.9)	19800 (12.4)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	4067 (51.4)	3849 (48.6)	7916 (9.8)	4872 (51.4)	4611 (48.6)	9483 (9.3)	4942 (51.1)	4732 (48.9)	9674 (7.5)	8244 (51.1)	7899 (48.9)	16142 (10.1)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3152 (50.7)	3064 (49.3)	6216 (7.7)	4210 (51.3)	3995 (48.7)	8205 (8.1)	5104 (51.3)	4846 (48.7)	9950 (7.7)	5198 (51.0)	4991 (49.0)	10189 (6.4)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4343 (55.7)	3448 (44.3)	7791 (9.7)	3308 (50.7)	3221 (49.3)	6529 (6.4)	4451 (51.2)	4239 (48.8)	8690 (6.7)	5358 (51.2)	5103 (48.8)	10461 (6.6)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2587 (53.6)	2237 (46.4)	4824 (6.0)	4430 (55.5)	3558 (44.5)	7988 (7.8)	3522 (50.5)	3437 (49.4)	6959 (5.4)	4660 (51.1)	4454 (48.9)	9114 (5.7)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2564 (55.2)	2085 (44.8)	4649 (5.8)	2720 (53.3)	2379 (46.7)	5099 (5.0)	4615 (55.1)	3765 (44.9)	8380 (6.5)	3755 (50.6)	3673 (49.4)	7428 (4.7)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2362 (57.2)	1768 (42.8)	4130 (5.1)	2687 (54.7)	2231 (45.3)	4928 (4.8)	2949 (53.0)	2617 (47.0)	5566 (4.3)	4820 (54.7)	3992 (45.3)	8812 (5.5)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	2069 (60.5)	1352 (39.5)	3421 (4.2)	2364 (56.5)	1819 (43.5)	4183 (4.1)	2770 (54.2)	2344 (45.8)	5114 (4.0)	5026 (52.6)	2722 (47.4)	5748 (3.6)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1476 (58.2)	1062 (41.8)	2538 (3.2)	2095 (59.3)	1438 (40.7)	3533 (3.5)	2465 (55.6)	1966 (44.4)	4431 (3.4)	2862 (53.7)	2472 (46.3)	5334 (3.3)
55 - 59	1015 (56.1)	733 (41.9)	1748 (2.7)	1004 (55.5)	805 (44.5)	1809 (2.2)	1552 (57.0)	1173 (43.0)	2725 (2.7)	2219 (57.8)	1617 (42.2)	3836 (3.0)	2583 (54.9)	2126 (45.1)	4709 (3.0)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	831 (56.7)	635 (43.3)	1466 (1.8)	899 (54.2)	760 (45.8)	1659 (1.6)	1380 (55.3)	1116 (44.7)	2496 (1.9)	1669 (56.3)	1450 (43.7)	3119 (2.0)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	527 (53.0)	468 (47.0)	995 (1.2)	778 (54.8)	642 (45.2)	1420 (1.4)	926 (52.8)	829 (47.2)	1755 (1.4)	1285 (55.8)	1102 (46.2)	2387 (1.5)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.9)	567 (51.9)	526 (48.1)	1093 (1.1)	841 (53.0)	747 (47.0)	1588 (1.2)	969 (51.9)	902 (48.2)	1871 (1.2)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.9)	695 (51.1)	666 (48.9)	1361 (1.1)	910 (51.9)	845 (48.1)	1755 (1.1)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	418 (48.9)	854 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	34,671	29,839	64,510	42,738	37,771	80,509	53,438	48,327	101,765	67,135	61,860	128,995	82,516	77,070	159,586

06/05/72 QUIN-SUB

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	8180 (51.2)	7797 (48.8)	15977 (20.6)	9691 (51.2)	9237 (48.8)	18928 (20.4)	11056 (51.2)	10538 (48.8)	21594 (19.6)	12343 (51.2)	11764 (48.8)	24107 (18.6)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4397 (51.2)	4183 (48.8)	8580 (11.1)	7894 (51.2)	7524 (48.8)	15418 (16.6)	9352 (51.2)	8914 (48.8)	18266 (16.6)	10669 (51.2)	10169 (48.8)	20838 (16.1)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4613 (51.6)	4349 (48.5)	8962 (11.6)	4384 (51.3)	4170 (48.7)	8554 (9.2)	7870 (51.2)	7501 (49.8)	15371 (13.9)	9324 (51.2)	8887 (48.8)	18211 (14.0)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3942 (51.4)	3724 (48.6)	7666 (9.9)	4548 (51.5)	4288 (48.5)	8836 (9.5)	4323 (51.3)	4112 (48.7)	8435 (7.6)	7760 (51.2)	7396 (48.8)	15156 (11.7)
20 - 24	4278 (56.9)	3370 (44.1)	7648 (11.9)	3027 (50.7)	2939 (49.3)	5966 (7.7)	3897 (51.4)	3672 (48.6)	7569 (8.1)	4484 (51.5)	4228 (48.5)	8712 (7.9)	4262 (51.3)	4054 (48.7)	8316 (6.4)
25 - 29	2529 (53.9)	2169 (46.2)	4696 (7.3)	4218 (55.9)	3323 (44.1)	7541 (9.7)	2985 (50.7)	2898 (49.3)	5883 (6.3)	3833 (51.4)	3621 (48.6)	7454 (6.9)	4421 (51.5)	4168 (48.5)	8590 (6.6)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2462 (53.8)	2112 (46.2)	4574 (5.9)	4108 (55.9)	3237 (44.1)	7345 (7.9)	2907 (50.7)	2823 (49.3)	5730 (5.2)	3733 (51.4)	3527 (48.6)	7260 (5.6)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2439 (55.4)	1960 (44.6)	4399 (5.7)	2398 (53.8)	2057 (46.2)	4455 (4.8)	4001 (55.9)	3153 (44.1)	7154 (6.5)	2831 (50.7)	2759 (49.3)	5591 (4.3)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2237 (57.7)	1643 (42.3)	3880 (5.0)	2376 (55.4)	1909 (44.6)	4285 (4.6)	2336 (53.8)	2004 (46.2)	4340 (3.9)	2897 (55.9)	2071 (44.1)	4968 (3.8)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1944 (61.3)	1227 (38.7)	3171 (4.1)	2049 (57.7)	1505 (42.3)	3554 (3.8)	2176 (55.4)	1749 (44.6)	3925 (3.6)	2140 (53.8)	1836 (46.2)	3976 (3.1)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1351 (59.0)	937 (41.0)	2288 (3.0)	1781 (61.3)	1124 (38.7)	2905 (3.1)	1877 (57.6)	1379 (42.4)	3256 (3.0)	1893 (55.4)	1602 (44.6)	3495 (2.6)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	879 (56.4)	680 (43.6)	1559 (2.0)	1239 (59.1)	855 (40.9)	2096 (2.3)	1631 (61.3)	1030 (38.7)	2661 (2.4)	1719 (57.6)	1263 (42.4)	2982 (2.3)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	706 (58.1)	510 (41.9)	1216 (1.6)	612 (56.4)	473 (43.6)	1085 (1.2)	862 (59.1)	597 (40.9)	1459 (1.3)	1135 (61.3)	717 (38.7)	1852 (1.4)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	402 (54.0)	343 (46.0)	745 (1.0)	491 (58.0)	355 (42.0)	846 (0.9)	426 (56.4)	329 (43.6)	755 (0.7)	600 (59.1)	416 (40.9)	1016 (0.8)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	226 (47.1)	254 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.6)	342 (58.1)	247 (41.9)	589 (0.5)	296 (56.4)	229 (43.6)	525 (0.4)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.5)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.4)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (45.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	34,671	29,839	64,510	41,216	36,228	77,444	48,975	43,841	92,816	57,797	52,535	110,332	67,522	62,170	129,692

06/05/72 GUAM-BUS

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE LOW MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	8295 (51.2)	7909 (48.8)	16204 (20.5)	10015 (51.2)	9549 (48.8)	19564 (20.3)	11632 (51.2)	11090 (48.8)	22722 (19.4)	13233 (51.2)	12616 (48.8)	25849 (18.5)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4437 (51.2)	4223 (48.8)	8660 (11.0)	8065 (51.2)	7692 (48.8)	15757 (16.3)	9734 (51.2)	9285 (48.8)	19019 (16.3)	11315 (51.2)	10792 (48.8)	22107 (15.8)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4653 (51.5)	4389 (48.5)	9042 (11.5)	4484 (51.2)	4270 (46.8)	8754 (9.1)	8111 (51.2)	7739 (48.8)	15850 (13.6)	9795 (51.2)	9347 (48.8)	19142 (13.7)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3982 (51.4)	3764 (48.6)	7746 (9.8)	4646 (51.4)	4388 (48.6)	9036 (9.4)	4491 (51.2)	4280 (48.8)	8771 (7.5)	6087 (51.2)	7721 (48.8)	15808 (11.3)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3067 (50.7)	2979 (49.3)	6046 (7.7)	3986 (51.4)	3771 (48.6)	7757 (8.0)	4653 (51.4)	4397 (48.6)	9050 (7.7)	4618 (51.2)	4010 (48.8)	8628 (6.3)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4258 (55.9)	3363 (44.1)	7621 (9.7)	3084 (50.7)	2997 (49.3)	6081 (6.3)	4000 (51.4)	3788 (48.6)	7788 (6.7)	4678 (51.4)	4425 (48.6)	9103 (6.5)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2502 (53.8)	2152 (46.2)	4654 (5.9)	4207 (55.8)	3336 (44.2)	7543 (7.8)	3074 (50.7)	2989 (49.3)	6063 (5.2)	3986 (51.3)	3780 (48.7)	7766 (5.5)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2479 (55.3)	2000 (44.7)	4479 (5.7)	2497 (53.7)	2156 (46.3)	4653 (4.8)	4169 (55.7)	3319 (44.3)	7487 (6.4)	3054 (50.7)	3001 (49.3)	6055 (4.3)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2277 (57.5)	1683 (42.5)	3960 (5.0)	2475 (55.2)	2008 (44.8)	4483 (4.6)	2502 (53.6)	2170 (46.4)	4672 (4.0)	4150 (55.5)	3323 (44.5)	7473 (5.3)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1984 (61.0)	1267 (39.0)	3251 (4.1)	2146 (57.3)	1602 (42.7)	3748 (3.9)	2337 (55.0)	1909 (45.0)	4246 (3.6)	2382 (53.4)	2078 (46.6)	4460 (3.2)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1391 (58.7)	977 (41.3)	2368 (3.0)	1877 (60.6)	1221 (39.4)	3098 (3.2)	2036 (57.0)	1537 (43.0)	3573 (3.1)	2231 (54.8)	1839 (45.2)	4070 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	919 (56.1)	720 (43.9)	1639 (2.1)	1334 (58.3)	955 (41.7)	2289 (2.4)	1789 (60.1)	1186 (39.9)	2977 (2.5)	1955 (56.6)	1498 (43.4)	3453 (2.5)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	746 (57.6)	550 (42.4)	1296 (1.6)	700 (55.5)	561 (44.5)	1261 (1.3)	998 (57.6)	735 (42.4)	1733 (1.5)	1335 (59.3)	917 (40.7)	2252 (1.6)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	442 (53.6)	383 (46.4)	825 (1.0)	579 (56.7)	443 (43.3)	1022 (1.1)	557 (54.9)	460 (45.2)	1017 (0.9)	785 (56.6)	602 (43.4)	1387 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	266 (47.5)	294 (52.5)	560 (0.7)	368 (52.9)	327 (47.1)	695 (0.7)	473 (55.6)	378 (44.4)	851 (0.7)	476 (53.8)	410 (46.2)	886 (0.6)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	151 (46.6)	173 (53.4)	324 (0.4)	245 (48.0)	265 (52.0)	510 (0.5)	326 (52.2)	298 (47.8)	624 (0.5)	419 (54.3)	353 (45.7)	772 (0.6)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	95 (46.8)	108 (53.2)	203 (0.2)	154 (48.1)	166 (51.9)	320 (0.3)	204 (52.2)	187 (47.8)	391 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	37 (46.3)	43 (53.8)	80 (0.1)	61 (46.4)	65 (51.6)	126 (0.1)
	34,671	29,839	64,510	41,931	36,940	78,871	50,831	45,624	96,515	61,072	55,771	116,843	72,696	67,264	139,960

06/05/72 QUIK-SOC

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	8382 (51.2)	7993 (48.8)	16375 (20.5)	10314 (51.2)	9837 (48.8)	20151 (20.2)	12190 (51.2)	11626 (48.8)	23816 (19.3)	14106 (51.2)	13454 (48.8)	27560 (18.4)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4467 (51.2)	4253 (48.8)	8720 (10.9)	8214 (51.2)	7838 (48.8)	16052 (16.1)	10093 (51.2)	9633 (48.8)	19726 (16.0)	11949 (51.2)	11399 (48.8)	23342 (15.6)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4683 (51.5)	4419 (48.5)	9102 (11.4)	4579 (51.2)	4365 (48.8)	8944 (8.9)	8329 (51.2)	7954 (48.8)	16283 (13.2)	10243 (51.1)	9784 (48.9)	20027 (13.4)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	4012 (51.4)	3794 (48.6)	7806 (9.8)	4742 (51.4)	4482 (48.6)	9224 (9.2)	4655 (51.2)	4444 (48.8)	9099 (7.4)	8392 (51.1)	8023 (48.9)	16415 (10.9)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3097 (50.7)	3009 (49.3)	6106 (7.6)	4081 (51.4)	3866 (48.6)	7947 (7.9)	4816 (51.4)	4559 (48.6)	9375 (7.6)	4770 (51.1)	4562 (48.9)	9332 (6.2)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4296 (55.8)	3393 (44.2)	7691 (9.6)	3179 (50.7)	3092 (49.3)	6271 (6.3)	4164 (51.3)	3952 (48.7)	8116 (6.6)	4929 (51.5)	4675 (48.7)	9604 (6.4)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2532 (53.7)	2182 (46.3)	4714 (5.9)	4302 (55.6)	3430 (44.4)	7732 (7.7)	3236 (50.7)	3152 (49.3)	6388 (5.2)	4236 (51.3)	4029 (48.7)	8265 (5.5)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2509 (55.3)	2030 (44.7)	4539 (5.7)	2591 (53.5)	2250 (46.5)	4841 (4.8)	4330 (55.4)	3481 (44.6)	7811 (6.3)	3332 (50.6)	3250 (49.4)	6582 (4.4)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2307 (57.4)	1713 (42.6)	4020 (5.0)	2569 (55.0)	2102 (45.0)	4671 (4.7)	2664 (53.3)	2331 (46.7)	4995 (4.1)	4397 (55.2)	3570 (44.8)	7967 (5.3)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	2014 (60.8)	1297 (39.2)	3311 (4.1)	2238 (56.9)	1694 (43.1)	3932 (3.9)	2493 (54.7)	2065 (45.3)	4558 (3.7)	2620 (53.1)	2315 (46.9)	4935 (3.3)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1421 (58.5)	1007 (41.5)	2428 (3.0)	1970 (60.0)	1313 (40.0)	3283 (3.3)	2190 (56.4)	1692 (43.6)	3882 (3.2)	2464 (54.3)	2072 (45.7)	4536 (3.0)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	949 (55.9)	750 (44.1)	1699 (2.1)	1407 (57.7)	1067 (42.3)	2474 (2.5)	1946 (59.2)	1343 (40.8)	3289 (2.7)	2166 (55.8)	1730 (44.2)	3916 (2.5)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	776 (57.2)	580 (42.8)	1356 (1.7)	786 (54.8)	647 (45.2)	1433 (1.4)	1133 (56.6)	869 (43.4)	2002 (1.6)	1554 (57.9)	1115 (42.1)	2669 (1.8)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	472 (53.3)	413 (46.7)	885 (1.1)	665 (55.7)	529 (44.3)	1194 (1.2)	687 (53.8)	590 (46.2)	1277 (1.0)	969 (55.2)	785 (44.8)	1754 (1.2)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.8)	454 (52.4)	412 (47.5)	866 (0.9)	603 (54.3)	508 (45.7)	1111 (0.9)	658 (52.7)	591 (47.3)	1249 (0.8)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.5)	331 (48.5)	351 (51.5)	682 (0.7)	456 (51.6)	427 (48.4)	883 (0.7)	600 (52.9)	534 (47.1)	1134 (0.8)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	208 (48.6)	220 (51.4)	428 (0.3)	288 (51.6)	268 (48.4)	554 (0.4)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	82 (48.5)	87 (51.5)	169 (0.1)
	34,671	29,839	64,510	42,468	37,474	79,942	52,581	47,417	99,998	64,237	58,896	123,133	77,747	72,243	149,990

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	8539 (51.2)	8145 (48.8)	16684 (20.4)	10740 (51.2)	10246 (48.8)	20986 (20.0)	13138 (51.2)	12537 (48.8)	25675 (19.2)	15603 (51.2)	14886 (48.8)	30489 (18.3)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4522 (51.2)	4308 (48.8)	8830 (10.8)	8440 (51.2)	8060 (48.8)	16500 (15.7)	10664 (51.1)	10187 (48.9)	20851 (15.6)	13003 (51.1)	12425 (48.9)	25428 (15.2)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4738 (51.4)	4474 (48.6)	9212 (11.2)	4708 (51.2)	4495 (48.8)	9203 (8.8)	8715 (51.1)	8336 (48.9)	17051 (12.7)	10957 (51.1)	10481 (48.9)	21438 (12.8)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	4067 (51.4)	3849 (48.6)	7916 (9.7)	4872 (51.4)	4611 (48.6)	9483 (9.0)	4942 (51.1)	4732 (48.9)	9674 (7.2)	8918 (51.1)	8544 (48.9)	17462 (10.5)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3152 (50.7)	3064 (49.3)	6216 (7.6)	4210 (51.3)	3995 (48.7)	8205 (7.8)	5104 (51.3)	4846 (48.7)	9950 (7.4)	5198 (51.0)	4991 (49.0)	10189 (6.1)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4343 (55.7)	3448 (44.3)	7791 (9.5)	3308 (50.7)	3221 (49.3)	6529 (6.2)	4451 (51.2)	4239 (48.8)	8690 (6.5)	5356 (51.2)	5103 (48.8)	10461 (6.3)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2587 (53.6)	2237 (46.4)	4824 (5.9)	4430 (55.5)	3558 (44.5)	7988 (7.6)	3522 (50.6)	3437 (49.4)	6959 (5.2)	4660 (51.1)	4454 (48.9)	9114 (5.5)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2564 (55.2)	2085 (44.8)	4649 (5.7)	2720 (53.3)	2379 (46.7)	5099 (4.9)	4615 (55.1)	3768 (44.9)	8383 (6.3)	3755 (50.6)	3673 (49.4)	7428 (4.4)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2362 (57.2)	1768 (42.8)	4130 (5.0)	2697 (54.7)	2231 (45.3)	4928 (4.7)	2949 (53.0)	2617 (47.0)	5566 (4.2)	4820 (54.7)	3992 (45.3)	8812 (5.3)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	2069 (60.5)	1352 (39.5)	3421 (4.2)	2364 (56.5)	1819 (43.5)	4183 (4.0)	2770 (54.2)	2344 (45.8)	5114 (3.8)	3026 (52.6)	2722 (47.4)	5748 (3.4)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1476 (58.2)	1062 (41.8)	2538 (3.1)	2095 (59.3)	1438 (40.7)	3533 (3.4)	2465 (55.6)	1966 (44.4)	4431 (3.3)	2862 (53.7)	2472 (46.3)	5334 (3.2)
55 - 59	1015 (59.1)	733 (41.9)	1748 (2.7)	1004 (55.5)	805 (44.5)	1809 (2.2)	1552 (57.0)	1173 (43.0)	2725 (2.6)	2219 (57.8)	1617 (42.2)	3836 (2.9)	2553 (54.9)	2126 (45.1)	4709 (2.8)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	831 (56.7)	635 (43.3)	1466 (1.8)	899 (54.2)	760 (45.8)	1659 (1.6)	1380 (55.3)	1116 (44.7)	2496 (1.9)	1809 (56.3)	1450 (43.7)	3317 (2.0)
65 - 69	424 (47.0)	365 (53.0)	689 (1.1)	527 (53.0)	463 (47.0)	995 (1.2)	778 (54.8)	642 (45.2)	1420 (1.4)	926 (52.8)	829 (47.2)	1755 (1.3)	1285 (53.8)	1102 (46.2)	2387 (1.4)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.9)	567 (51.9)	526 (48.1)	1093 (1.0)	841 (53.0)	747 (47.0)	1588 (1.2)	969 (51.8)	902 (48.2)	1871 (1.1)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.9)	695 (51.1)	666 (48.9)	1361 (1.0)	910 (51.9)	845 (48.1)	1755 (1.1)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	418 (48.9)	854 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	34,671	29,839	64,510	43,450	38,451	81,901	54,998	49,815	104,813	69,732	64,336	134,068	86,322	80,699	167,021

06/05/72 GUAM-SUB

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	8789 (51.2)	8377 (48.8)	17166 (21.8)	10394 (51.2)	9887 (48.8)	20281 (21.3)	11855 (51.2)	11299 (48.8)	23154 (20.2)	13232 (51.2)	12611 (48.8)	25843 (19.2)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4397 (51.2)	4193 (48.8)	8590 (10.9)	8481 (51.2)	8084 (48.8)	16565 (17.4)	10021 (51.2)	9551 (48.8)	19572 (17.1)	11440 (51.2)	10904 (48.8)	22344 (16.6)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4613 (51.5)	4349 (48.5)	8962 (11.4)	4384 (51.3)	4170 (48.7)	8554 (9.0)	8456 (51.2)	8060 (48.8)	16516 (14.4)	9991 (51.2)	9522 (48.8)	19513 (14.4)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3942 (51.4)	3724 (48.6)	7666 (9.7)	4548 (51.5)	4288 (48.5)	8836 (9.3)	4323 (51.3)	4112 (48.7)	8435 (7.4)	8038 (51.2)	7947 (48.8)	15985 (11.8)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3027 (50.7)	2939 (49.3)	5966 (7.5)	3887 (51.4)	3672 (48.6)	7559 (7.9)	4484 (51.5)	4228 (48.5)	8712 (7.6)	4262 (51.3)	4056 (48.7)	8318 (6.1)
25 - 29	2528 (53.8)	2169 (46.2)	4696 (7.3)	4219 (55.9)	3323 (44.1)	7541 (9.6)	2995 (50.7)	2898 (49.3)	5893 (6.2)	3833 (51.4)	3621 (48.6)	7454 (6.5)	4421 (51.5)	4169 (48.5)	8590 (6.3)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2462 (53.8)	2112 (46.2)	4574 (5.8)	4106 (55.9)	3237 (44.1)	7345 (7.7)	2907 (50.7)	2823 (49.3)	5730 (5.0)	3733 (51.4)	3527 (48.6)	7260 (5.4)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2439 (55.4)	1960 (44.6)	4399 (5.6)	2398 (53.8)	2057 (46.2)	4455 (4.7)	4201 (55.9)	3153 (44.1)	7154 (6.3)	2831 (50.7)	2750 (49.3)	5581 (4.1)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2237 (57.7)	1643 (42.3)	3880 (4.9)	2376 (55.4)	1909 (44.6)	4285 (4.5)	2336 (53.8)	2004 (46.2)	4340 (3.8)	3897 (55.9)	3071 (44.1)	6968 (5.1)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1944 (61.3)	1227 (38.7)	3171 (4.0)	2049 (57.7)	1505 (42.3)	3554 (3.7)	2176 (55.4)	1749 (44.6)	3925 (3.4)	2140 (53.8)	1836 (46.2)	3976 (2.9)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1351 (59.0)	937 (41.0)	2288 (2.9)	1781 (61.3)	1124 (38.7)	2905 (3.0)	1877 (57.6)	1379 (42.4)	3256 (2.8)	1993 (55.4)	1602 (44.6)	3595 (2.7)
55 - 59	1015 (58.1)	733 (41.9)	1749 (2.7)	879 (56.4)	680 (43.6)	1559 (2.0)	1238 (59.1)	858 (40.9)	2096 (2.2)	1631 (61.3)	1030 (38.7)	2661 (2.3)	1719 (57.6)	1263 (42.4)	2982 (2.2)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	706 (58.1)	510 (41.9)	1216 (1.5)	612 (56.4)	473 (43.6)	1085 (1.1)	862 (59.1)	597 (40.9)	1459 (1.3)	1135 (61.3)	717 (38.7)	1852 (1.4)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	402 (54.0)	343 (46.0)	745 (0.9)	491 (58.0)	355 (42.0)	846 (0.9)	426 (56.4)	329 (43.6)	755 (0.7)	600 (59.1)	416 (40.9)	1016 (0.8)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	224 (47.1)	256 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.5)	342 (58.1)	247 (41.9)	589 (0.5)	296 (56.4)	229 (43.6)	525 (0.4)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.6)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.4)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (46.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	34,671	29,839	64,510	41,825	36,808	78,633	50,255	45,061	95,316	59,851	54,492	114,343	70,427	64,935	135,362

06/05/72 QUIK-BOO

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE LOW MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	8910 (51.2)	8494 (48.8)	17404 (21.7)	10726 (51.2)	10227 (48.8)	20953 (21.2)	12467 (51.2)	11855 (48.8)	24362 (20.1)	14178 (51.2)	13517 (48.8)	27695 (19.0)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4437 (51.2)	4223 (48.8)	8660 (10.8)	8658 (51.2)	8257 (48.8)	16915 (17.1)	10421 (51.2)	9939 (48.8)	20360 (16.8)	12121 (51.2)	11559 (48.8)	23680 (16.2)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4653 (51.5)	4389 (48.5)	9042 (11.3)	4484 (51.2)	4270 (48.8)	8754 (8.8)	8702 (51.2)	8302 (48.8)	17004 (14.1)	10458 (51.2)	9959 (48.8)	20417 (14.0)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3982 (51.4)	3764 (48.6)	7746 (9.7)	4648 (51.4)	4388 (48.6)	9036 (9.1)	4491 (51.2)	4280 (48.8)	8771 (7.3)	8670 (51.2)	8276 (48.8)	16946 (11.6)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3067 (50.7)	2979 (49.3)	6046 (7.6)	3986 (51.4)	3771 (48.6)	7757 (7.8)	4653 (51.4)	4397 (48.6)	9050 (7.5)	4518 (51.2)	4310 (48.8)	8828 (6.1)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4258 (55.9)	3363 (44.1)	7621 (9.5)	3084 (50.7)	2997 (49.3)	6081 (6.1)	4000 (51.4)	3788 (48.6)	7788 (5.4)	4678 (51.4)	4425 (48.6)	9103 (6.2)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2502 (53.8)	2152 (46.2)	4654 (5.8)	4207 (55.8)	3336 (44.2)	7543 (7.6)	3074 (50.7)	2989 (49.3)	6063 (5.0)	3966 (51.3)	3750 (48.7)	7716 (5.3)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2479 (55.3)	2000 (44.7)	4479 (5.6)	2497 (53.7)	2156 (46.3)	4653 (4.7)	4168 (55.7)	3319 (44.3)	7487 (6.2)	3084 (50.7)	3001 (49.3)	6085 (4.2)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2277 (57.5)	1683 (42.5)	3960 (4.9)	2475 (55.2)	2008 (44.8)	4483 (4.5)	2502 (53.6)	2170 (46.4)	4672 (3.9)	4150 (55.5)	3323 (44.5)	7473 (5.1)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1984 (61.0)	1267 (39.0)	3251 (4.1)	2146 (57.3)	1602 (42.7)	3748 (3.8)	2837 (55.0)	1909 (45.0)	4246 (3.5)	2382 (55.4)	2078 (44.6)	4460 (3.1)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1391 (58.7)	977 (41.3)	2368 (3.0)	1877 (60.6)	1221 (39.4)	3098 (3.1)	2036 (57.0)	1537 (43.0)	3573 (3.0)	2231 (54.8)	1839 (45.2)	4070 (2.8)
55 - 59	1015 (58.1)	733 (41.9)	1749 (2.7)	919 (56.1)	720 (43.9)	1639 (2.0)	1334 (58.3)	955 (41.7)	2289 (2.3)	1789 (60.1)	1188 (39.9)	2977 (2.5)	1955 (56.6)	1498 (43.4)	3453 (2.4)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	746 (57.6)	550 (42.4)	1296 (1.6)	700 (55.5)	561 (44.5)	1261 (1.3)	998 (57.6)	735 (42.4)	1733 (1.4)	1335 (59.3)	917 (40.7)	2252 (1.5)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	442 (53.6)	383 (46.4)	825 (1.0)	579 (56.7)	443 (43.3)	1022 (1.0)	557 (54.8)	460 (45.2)	1017 (0.8)	765 (56.9)	602 (43.4)	1367 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	266 (47.5)	294 (52.5)	560 (0.7)	368 (52.9)	327 (47.1)	695 (0.7)	473 (55.6)	378 (44.4)	851 (0.7)	478 (53.8)	410 (46.2)	888 (0.6)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	151 (46.6)	173 (53.4)	324 (0.4)	245 (48.0)	265 (52.0)	510 (0.5)	326 (52.2)	298 (47.8)	624 (0.5)	419 (54.3)	353 (45.7)	772 (0.5)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	95 (46.8)	108 (53.2)	203 (0.2)	154 (48.1)	166 (51.9)	320 (0.3)	204 (52.2)	187 (47.8)	391 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	37 (46.3)	43 (53.8)	80 (0.1)	61 (48.4)	65 (51.6)	126 (0.1)
	34,671	29,839	64,510	42,546	37,525	80,071	52,135	46,927	99,062	63,185	57,783	120,968	75,715	70,139	145,854

06/05/72 QUIK-ECO

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	9000 (51.2)	8582 (48.8)	17582 (21.7)	11042 (51.2)	10530 (48.8)	21572 (21.0)	13059 (51.2)	12454 (48.8)	25513 (20.0)	15107 (51.2)	14408 (48.8)	29515 (19.9)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4467 (51.2)	4253 (48.8)	8720 (10.7)	8810 (51.2)	8407 (48.8)	17217 (16.8)	10796 (51.2)	10301 (48.8)	21097 (16.5)	12782 (51.2)	12198 (48.8)	24980 (16.8)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4683 (51.5)	4419 (48.5)	9102 (11.2)	4579 (51.2)	4365 (48.8)	8944 (8.7)	8924 (51.2)	8522 (48.8)	17446 (13.7)	10944 (51.2)	10450 (48.8)	21394 (13.7)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	4012 (51.4)	3794 (48.6)	7806 (9.6)	4742 (51.4)	4482 (48.6)	9224 (9.0)	4655 (51.2)	4444 (48.8)	9099 (7.1)	8979 (51.1)	8583 (48.9)	17562 (11.3)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3097 (50.7)	3009 (49.3)	6106 (7.5)	4061 (51.4)	3866 (48.6)	7947 (7.7)	4815 (51.4)	4559 (48.6)	9375 (7.4)	4770 (51.1)	4562 (48.9)	9332 (6.0)
25 - 29	2528 (53.8)	2169 (46.2)	4696 (7.3)	4288 (55.8)	3393 (44.2)	7681 (9.5)	3179 (50.7)	3092 (49.3)	6271 (6.1)	4164 (51.3)	3952 (48.7)	8116 (6.4)	4929 (51.3)	4675 (48.7)	9604 (6.2)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2532 (53.7)	2182 (46.3)	4714 (5.8)	4302 (55.6)	3430 (44.4)	7732 (7.5)	3236 (50.7)	3152 (49.3)	6388 (5.0)	4236 (51.3)	4029 (48.7)	8265 (5.3)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2509 (55.3)	2030 (44.7)	4539 (5.6)	2591 (53.5)	2250 (46.5)	4841 (4.7)	4330 (55.4)	3481 (44.6)	7811 (6.1)	3332 (50.6)	3250 (49.4)	6582 (4.2)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2307 (57.4)	1713 (42.6)	4020 (5.0)	2569 (55.0)	2102 (45.0)	4671 (4.6)	2664 (53.3)	2331 (46.7)	4995 (3.9)	4397 (55.2)	3570 (44.8)	7967 (5.1)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	2014 (60.8)	1297 (39.2)	3311 (4.1)	2236 (56.9)	1694 (43.1)	3932 (3.8)	2493 (54.7)	2065 (45.3)	4558 (3.6)	2620 (53.1)	2315 (46.9)	4936 (3.2)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1421 (58.5)	1007 (41.5)	2428 (3.0)	1970 (60.0)	1313 (40.0)	3283 (3.2)	2190 (56.4)	1692 (43.6)	3882 (3.0)	2464 (54.3)	2072 (45.7)	4536 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	949 (55.9)	750 (44.1)	1699 (2.1)	1427 (57.7)	1047 (42.3)	2474 (2.4)	1945 (59.2)	1343 (40.8)	3288 (2.6)	2186 (55.8)	1730 (44.2)	3916 (2.5)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	776 (57.2)	580 (42.8)	1356 (1.7)	786 (54.8)	647 (45.2)	1433 (1.4)	1133 (56.6)	869 (43.4)	2002 (1.6)	1554 (57.9)	1115 (42.1)	2669 (1.7)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	472 (53.3)	413 (46.7)	885 (1.1)	665 (55.7)	529 (44.3)	1194 (1.2)	687 (53.8)	590 (46.2)	1277 (1.0)	969 (55.2)	785 (44.8)	1754 (1.1)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.8)	454 (52.4)	412 (47.6)	866 (0.8)	603 (54.3)	508 (45.7)	1111 (0.9)	658 (52.7)	591 (47.3)	1249 (0.8)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.5)	331 (48.5)	351 (51.5)	682 (0.7)	456 (51.6)	427 (48.4)	883 (0.7)	666 (52.9)	534 (47.1)	1134 (0.7)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	208 (48.5)	220 (51.4)	428 (0.3)	286 (51.6)	268 (48.4)	554 (0.4)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	82 (48.5)	87 (51.5)	169 (0.1)
	34,671	29,839	64,510	43,086	38,063	81,149	53,905	48,679	102,584	66,404	60,960	127,364	80,875	75,222	156,097

06/05/72 QUIK-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	9164 (51.2)	8741 (48.8)	17905 (21.5)	11493 (51.2)	10963 (48.8)	22456 (20.9)	14068 (51.2)	13418 (48.8)	27481 (19.8)	16699 (51.2)	15931 (48.8)	32630 (18.8)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4522 (51.2)	4308 (48.8)	8830 (10.6)	9043 (51.2)	8635 (48.8)	17678 (16.5)	11091 (51.1)	10679 (48.9)	22270 (16.1)	13896 (51.1)	13273 (48.9)	27169 (15.7)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4738 (51.4)	4474 (48.6)	9212 (11.1)	4708 (51.2)	4495 (48.8)	9203 (8.6)	9316 (51.1)	8909 (48.9)	18225 (13.2)	11682 (51.1)	11171 (48.9)	22853 (13.2)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	4067 (51.4)	3849 (48.6)	7916 (9.5)	4872 (51.4)	4611 (48.6)	9483 (8.8)	4942 (51.1)	4732 (48.9)	9674 (7.0)	9511 (51.1)	9109 (48.9)	18620 (10.7)
20 - 24	4272 (55.9)	3370 (44.1)	7648 (11.9)	3152 (50.7)	3064 (49.3)	6216 (7.5)	4210 (51.3)	3995 (48.7)	8205 (7.6)	5104 (51.3)	4846 (48.7)	9950 (7.2)	5198 (51.3)	4991 (49.3)	10189 (5.9)
25 - 29	2526 (53.8)	2169 (46.2)	4696 (7.3)	4343 (55.7)	3448 (44.3)	7791 (9.4)	3308 (50.7)	3221 (49.3)	6529 (6.1)	4451 (51.2)	4239 (48.8)	8690 (6.3)	5358 (51.2)	5103 (48.8)	10461 (6.0)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2557 (53.6)	2237 (46.4)	4824 (5.8)	4430 (55.6)	3558 (44.5)	7988 (7.4)	3522 (50.6)	3437 (49.4)	6959 (5.0)	4660 (51.1)	4454 (48.9)	9114 (5.3)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2564 (55.2)	2085 (44.8)	4649 (5.6)	2720 (53.3)	2379 (46.7)	5099 (4.7)	4615 (55.1)	3765 (44.9)	8380 (5.1)	2755 (50.6)	3673 (49.4)	7428 (4.3)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2362 (57.2)	1768 (42.8)	4130 (5.0)	2697 (54.7)	2231 (45.3)	4928 (4.6)	2949 (53.3)	2617 (47.0)	5566 (4.0)	4620 (54.7)	3992 (45.3)	8612 (5.1)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	2069 (60.5)	1352 (39.5)	3421 (4.1)	2364 (56.5)	1819 (43.5)	4183 (3.9)	2770 (54.2)	2344 (45.8)	5114 (3.7)	3026 (52.6)	2722 (47.4)	5748 (3.3)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1476 (58.2)	1062 (41.8)	2538 (3.1)	2095 (59.3)	1438 (40.7)	3533 (3.3)	2465 (55.6)	1966 (44.4)	4431 (3.2)	2862 (53.7)	2472 (46.3)	5334 (3.1)
55 - 59	1015 (59.1)	733 (41.9)	1748 (2.7)	1004 (55.5)	805 (44.5)	1809 (2.2)	1552 (57.0)	1173 (43.0)	2725 (2.5)	2219 (57.8)	1617 (42.2)	3836 (2.8)	2583 (54.9)	2126 (45.1)	4709 (2.7)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	831 (56.7)	635 (43.3)	1466 (1.8)	899 (54.2)	760 (45.8)	1659 (1.5)	1380 (55.3)	1116 (44.7)	2496 (1.8)	1669 (56.3)	1450 (43.7)	3319 (1.9)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	527 (53.0)	468 (47.0)	995 (1.2)	778 (54.8)	642 (45.2)	1420 (1.3)	926 (52.8)	829 (47.2)	1755 (1.3)	1285 (53.8)	1102 (46.2)	2387 (1.4)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.9)	567 (51.9)	526 (48.1)	1093 (1.0)	841 (53.0)	747 (47.0)	1588 (1.1)	969 (51.8)	902 (48.2)	1871 (1.1)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.8)	695 (51.1)	666 (48.9)	1361 (1.0)	910 (51.9)	845 (48.1)	1755 (1.0)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	415 (48.9)	851 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	34,671	29,839	64,510	44,075	39,047	83,122	56,354	51,107	107,461	71,985	66,482	138,467	89,629	83,849	173,478

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	7489 (47.8)	8179 (52.2)	15668 (19.5)	8659 (47.8)	9457 (52.2)	18116 (19.1)	9963 (47.8)	10880 (52.2)	20843 (18.7)	11379 (47.8)	12426 (52.2)	23805 (18.1)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4259 (47.8)	4646 (52.2)	8905 (11.1)	7227 (47.8)	7893 (52.2)	15120 (16.0)	8356 (47.8)	9126 (52.2)	17482 (15.7)	9614 (47.8)	10499 (52.2)	20113 (15.3)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.01)	4468 (48.1)	4829 (51.9)	9297 (11.6)	4246 (47.8)	4632 (52.2)	8878 (9.4)	7205 (47.8)	7869 (52.2)	15074 (13.6)	8381 (47.8)	9099 (52.2)	17480 (13.4)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3913 (48.6)	4135 (51.4)	8048 (10.0)	4405 (48.1)	4761 (51.9)	9166 (9.7)	4187 (47.8)	4567 (52.2)	8754 (7.9)	7104 (47.8)	7759 (52.2)	14863 (11.4)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3027 (48.1)	3264 (51.9)	6291 (7.8)	3858 (48.6)	4077 (51.4)	7935 (8.4)	4343 (48.1)	4694 (51.9)	9037 (8.1)	4128 (47.8)	4503 (52.2)	8631 (6.6)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4454 (59.6)	3036 (40.5)	7490 (9.3)	2985 (48.1)	3218 (51.9)	6203 (6.5)	3804 (48.6)	4020 (51.4)	7824 (7.0)	4262 (48.1)	4628 (51.9)	8890 (6.9)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2573 (52.3)	2344 (47.7)	4917 (6.1)	4339 (59.5)	2957 (40.5)	7295 (7.7)	2907 (48.1)	3134 (51.9)	6041 (5.4)	3705 (48.6)	3915 (51.4)	7620 (5.9)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2551 (54.0)	2176 (46.0)	4727 (5.9)	2506 (52.3)	2283 (47.7)	4789 (5.1)	4225 (59.5)	2880 (40.5)	7105 (6.4)	2831 (48.1)	3053 (51.9)	5884 (4.5)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2356 (56.4)	1824 (43.6)	4179 (5.2)	2485 (54.0)	2119 (46.0)	4604 (4.9)	2441 (52.3)	2224 (47.7)	4665 (4.2)	4115 (59.5)	2805 (40.5)	6920 (5.3)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2060 (60.2)	1363 (39.8)	3423 (4.3)	2157 (56.3)	1671 (43.7)	3828 (4.0)	2276 (54.0)	1941 (46.0)	4217 (3.8)	2236 (52.3)	2037 (47.7)	4273 (3.3)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1487 (58.9)	1040 (41.2)	2527 (3.1)	1887 (60.2)	1249 (39.8)	3136 (3.3)	1976 (56.3)	1531 (43.7)	3507 (3.2)	2085 (54.0)	1778 (46.0)	3863 (3.0)
55 - 59	1016 (58.1)	733 (41.9)	1748 (2.6)	1271 (62.7)	756 (37.3)	2027 (2.5)	1362 (58.8)	953 (41.2)	2315 (2.4)	1728 (60.2)	1144 (39.8)	2872 (2.6)	1810 (56.4)	1402 (43.6)	3212 (2.5)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	706 (58.1)	510 (41.9)	1216 (1.5)	885 (62.7)	526 (37.3)	1411 (1.5)	948 (58.8)	663 (41.2)	1611 (1.4)	1203 (60.2)	796 (39.8)	1999 (1.5)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	402 (54.0)	343 (46.0)	745 (0.9)	491 (58.0)	355 (42.0)	846 (0.9)	616 (62.7)	366 (37.3)	982 (0.9)	660 (58.9)	461 (41.1)	1121 (0.9)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	226 (47.1)	254 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.5)	342 (58.1)	247 (41.9)	589 (0.5)	429 (62.7)	255 (37.3)	684 (0.5)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.5)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.4)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (45.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	35,645	32,245	67,890	41,434	38,946	80,380	48,024	46,685	94,709	55,638	55,596	111,234	64,311	65,736	130,047

06/05/72 GUAM-BUS

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE LOW MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	7594 (47.8)	8289 (52.2)	15883 (19.4)	8946 (47.5)	9764 (52.2)	18710 (19.0)	10468 (47.8)	11425 (52.2)	21893 (18.6)	12159 (47.8)	13270 (52.2)	25429 (18.2)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4299 (47.8)	4686 (52.2)	8985 (11.0)	7388 (47.9)	8059 (52.2)	15447 (15.7)	8703 (47.8)	9492 (52.2)	18195 (15.5)	10192 (47.8)	11115 (52.2)	21307 (15.2)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4508 (48.1)	4869 (51.9)	9377 (11.5)	4346 (47.9)	4732 (52.1)	9078 (9.2)	7436 (47.8)	8105 (52.2)	15541 (13.2)	8767 (47.9)	9554 (52.1)	18321 (13.1)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3953 (48.6)	4175 (51.4)	8128 (9.9)	4505 (48.1)	4861 (51.9)	9366 (9.5)	4355 (47.9)	4736 (52.1)	9091 (7.7)	7422 (47.9)	8082 (52.1)	15504 (11.1)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3067 (48.1)	3304 (51.9)	6371 (7.8)	3958 (48.7)	4177 (51.3)	8135 (8.3)	4512 (49.1)	4863 (51.9)	9375 (8.0)	4384 (47.9)	4760 (52.1)	9144 (6.5)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4494 (59.4)	3076 (40.6)	7570 (9.3)	3084 (48.2)	3318 (51.8)	6402 (6.5)	3973 (48.7)	4189 (51.3)	8162 (6.9)	4539 (48.2)	4885 (51.8)	9424 (6.7)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2613 (52.3)	2384 (47.7)	4997 (6.1)	4437 (59.2)	3056 (40.8)	7493 (7.6)	3074 (45.2)	3302 (51.8)	6376 (5.4)	3980 (46.7)	4170 (53.3)	8150 (5.8)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2591 (53.9)	2216 (46.1)	4807 (5.9)	2605 (52.2)	2382 (47.8)	4987 (5.1)	4392 (59.0)	3047 (41.0)	7439 (6.3)	3084 (46.5)	3556 (51.7)	6641 (4.8)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2395 (56.2)	1864 (43.8)	4259 (5.2)	2584 (53.8)	2218 (46.2)	4802 (4.9)	2607 (52.2)	2390 (47.8)	4997 (4.2)	4366 (55.8)	3458 (41.2)	7826 (5.5)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2100 (59.9)	1403 (40.1)	3503 (4.3)	2254 (56.1)	1767 (43.9)	4021 (4.1)	2437 (53.7)	2102 (46.3)	4539 (3.9)	2478 (52.1)	2279 (47.9)	4757 (3.4)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1527 (58.6)	1080 (41.4)	2607 (3.2)	1984 (59.6)	1345 (40.4)	3329 (3.4)	2135 (55.3)	1689 (44.2)	3824 (3.3)	2322 (53.5)	2015 (46.5)	4337 (3.1)
55 - 59	1015 (59.1)	733 (41.9)	1748 (2.6)	1311 (62.2)	796 (37.8)	2107 (2.6)	1459 (58.2)	1049 (41.8)	2508 (2.5)	1887 (59.2)	1302 (40.8)	3189 (2.7)	2046 (55.6)	1637 (44.4)	3683 (2.6)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	746 (57.6)	550 (42.4)	1296 (1.6)	972 (61.3)	614 (38.7)	1586 (1.6)	1085 (57.6)	800 (42.4)	1885 (1.6)	1403 (58.5)	996 (41.5)	2399 (1.7)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	442 (53.6)	383 (46.4)	825 (1.0)	579 (56.7)	443 (43.3)	1022 (1.0)	747 (60.0)	497 (40.0)	1244 (1.1)	845 (58.6)	647 (41.4)	1492 (1.1)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	266 (47.5)	294 (52.5)	560 (0.7)	368 (52.9)	327 (47.1)	695 (0.7)	473 (55.6)	378 (44.4)	851 (0.7)	610 (58.3)	436 (41.7)	1046 (0.7)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	151 (46.6)	173 (53.4)	324 (0.4)	245 (48.0)	265 (52.0)	510 (0.5)	326 (52.2)	298 (47.8)	624 (0.5)	419 (54.3)	353 (45.7)	772 (0.6)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	95 (46.8)	108 (53.2)	203 (0.2)	154 (48.1)	166 (51.9)	320 (0.3)	204 (52.2)	187 (47.8)	391 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	37 (46.3)	43 (53.8)	80 (0.1)	61 (48.4)	65 (51.6)	126 (0.1)
	35,645	32,245	67,890	42,139	39,656	81,795	49,835	48,520	98,355	55,801	58,824	117,625	69,263	70,815	140,078

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	7673 (47.8)	8372 (52.2)	16045 (19.4)	9212 (47.8)	10048 (52.2)	19260 (18.9)	10956 (47.5)	11952 (52.2)	22908 (16.5)	12918 (47.8)	14090 (52.2)	27008 (16.3)
5 - 9	4481 (49.1)	4644 (51.9)	9325 (13.7)	4329 (47.9)	4716 (52.1)	9045 (10.9)	7529 (47.9)	8204 (52.1)	15733 (15.5)	9030 (47.9)	9836 (52.1)	18866 (15.2)	10753 (47.9)	11714 (52.1)	22467 (15.3)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4538 (48.1)	4899 (51.9)	9437 (11.4)	4441 (47.9)	4827 (52.1)	9268 (9.1)	7646 (47.9)	8319 (52.1)	15965 (12.9)	9183 (47.9)	9986 (52.1)	19169 (12.9)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3983 (48.6)	4205 (51.4)	8188 (9.9)	4599 (48.1)	4955 (51.9)	9554 (9.4)	4519 (48.0)	4899 (52.0)	9418 (7.6)	7719 (47.9)	8383 (52.1)	16102 (10.7)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3097 (48.2)	3334 (51.8)	6431 (7.8)	4052 (48.7)	4271 (51.3)	8323 (8.2)	4675 (48.2)	5026 (51.8)	9701 (7.8)	4836 (49.1)	5010 (50.9)	9846 (6.6)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4524 (59.3)	3106 (40.7)	7630 (9.2)	3179 (48.2)	3412 (51.8)	6591 (6.5)	4135 (47.7)	4351 (51.3)	8486 (6.9)	4790 (48.5)	5136 (51.7)	9926 (6.6)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2643 (52.3)	2414 (47.7)	5057 (6.1)	4531 (59.0)	3150 (41.0)	7681 (7.6)	3236 (48.3)	3469 (51.7)	6699 (5.4)	4207 (48.8)	4418 (51.2)	8625 (5.8)
35 - 39	2416 (56.4)	1874 (43.6)	4291 (6.3)	2621 (53.9)	2246 (46.1)	4867 (5.9)	2699 (52.2)	2476 (47.8)	5175 (5.1)	4553 (58.7)	3208 (41.3)	7761 (6.3)	3832 (49.4)	3926 (50.6)	7758 (5.2)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2425 (56.1)	1894 (43.9)	4319 (5.2)	2675 (53.7)	2313 (46.3)	4991 (4.9)	2769 (55.0)	2552 (45.0)	5321 (4.3)	4015 (53.3)	3508 (46.7)	7523 (5.0)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2130 (59.8)	1433 (40.2)	3563 (4.3)	2346 (55.8)	1860 (44.2)	4206 (4.1)	2593 (53.4)	2259 (46.6)	4852 (3.9)	2716 (51.9)	2518 (48.1)	5234 (3.5)
50 - 54	1392 (62.7)	825 (37.3)	2217 (3.3)	1557 (58.4)	1110 (41.6)	2667 (3.2)	2076 (59.1)	1438 (40.9)	3514 (3.5)	2239 (55.4)	1844 (44.6)	4133 (3.3)	2395 (53.2)	2449 (46.8)	4844 (3.3)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1341 (61.9)	826 (38.1)	2167 (2.6)	1551 (57.6)	1142 (42.4)	2693 (2.6)	2042 (58.4)	1457 (41.6)	3499 (2.8)	2277 (54.9)	1869 (45.1)	4146 (2.8)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	776 (57.2)	580 (42.8)	1356 (1.6)	1058 (60.2)	700 (39.8)	1758 (1.7)	1219 (56.6)	935 (43.4)	2154 (1.7)	1601 (57.3)	1194 (42.7)	2795 (1.9)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	472 (53.3)	413 (46.7)	885 (1.1)	665 (55.7)	529 (44.3)	1194 (1.2)	876 (58.3)	627 (41.7)	1503 (1.2)	1048 (55.3)	831 (44.7)	1879 (1.3)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.7)	454 (52.4)	412 (47.6)	866 (0.9)	603 (54.3)	508 (45.7)	1111 (0.9)	790 (56.2)	616 (43.8)	1406 (0.9)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.5)	331 (48.5)	351 (51.5)	682 (0.7)	456 (51.6)	427 (48.4)	883 (0.7)	600 (52.9)	534 (47.1)	1134 (0.8)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	205 (48.6)	220 (51.4)	424 (0.3)	298 (51.6)	286 (48.4)	584 (0.4)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	62 (48.5)	67 (51.5)	129 (0.1)
	35,645	32,245	67,890	42,668	40,189	82,857	51,540	50,250	101,790	61,850	61,933	123,783	74,088	75,761	149,849

06/05/72 GUAM-300

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	7815 (47.8)	8523 (52.2)	16338 (19.3)	9587 (47.8)	10452 (52.2)	20039 (18.8)	11794 (47.9)	12851 (52.1)	24645 (18.3)	14225 (47.8)	15504 (52.2)	29729 (17.9)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4384 (47.9)	4771 (52.1)	9155 (10.8)	7741 (47.9)	8425 (52.1)	16166 (15.2)	9551 (47.9)	10386 (52.1)	19937 (14.8)	11706 (47.9)	12726 (52.1)	24432 (14.7)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4593 (48.1)	4954 (51.9)	9547 (11.3)	4571 (48.0)	4957 (52.0)	9528 (8.9)	8018 (48.0)	8700 (52.0)	16718 (12.4)	9547 (48.0)	10980 (52.0)	20527 (12.3)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	4038 (48.7)	4260 (51.3)	8298 (9.8)	4729 (48.2)	5085 (51.8)	9814 (9.2)	4807 (48.1)	5188 (51.9)	9995 (7.4)	8231 (48.0)	8903 (52.0)	17134 (10.3)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3152 (48.2)	3389 (51.8)	6541 (7.7)	4181 (48.7)	4400 (51.3)	8581 (8.1)	4963 (48.3)	5314 (51.7)	10277 (7.6)	5065 (48.2)	5440 (51.8)	10505 (6.3)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4579 (59.2)	3161 (40.8)	7740 (9.1)	3308 (48.3)	3542 (51.7)	6850 (6.4)	4432 (48.5)	4639 (51.2)	9060 (6.7)	5219 (48.4)	5566 (51.6)	10784 (6.5)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2698 (52.2)	2469 (47.8)	5167 (6.1)	4650 (58.7)	3279 (41.3)	7939 (7.5)	3522 (48.4)	3750 (51.6)	7272 (5.4)	4632 (48.9)	4842 (51.1)	9474 (5.7)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2676 (53.8)	2301 (46.2)	4977 (5.9)	2828 (52.1)	2605 (47.9)	5433 (5.1)	4839 (58.1)	3494 (41.9)	8333 (6.2)	3755 (48.6)	3977 (51.4)	7732 (4.6)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2480 (56.0)	1949 (44.0)	4429 (5.2)	2806 (53.5)	2441 (46.5)	5247 (4.9)	3054 (51.6)	2837 (48.2)	5891 (4.4)	5036 (57.5)	3728 (42.5)	8764 (5.3)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2185 (59.5)	1488 (40.5)	3673 (4.3)	2472 (55.5)	1985 (44.5)	4457 (4.2)	2870 (53.1)	2536 (46.9)	5406 (4.0)	3122 (51.6)	2924 (48.4)	6046 (3.6)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1612 (58.0)	1165 (42.0)	2777 (3.3)	2201 (58.5)	1563 (41.5)	3764 (3.5)	2564 (54.8)	2118 (45.2)	4682 (3.5)	2994 (52.7)	2688 (47.3)	5682 (3.4)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1396 (61.3)	881 (38.7)	2277 (2.7)	1677 (57.0)	1267 (43.0)	2944 (2.8)	2316 (57.2)	1732 (42.8)	4048 (3.0)	2674 (54.1)	2265 (45.9)	4939 (3.0)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	831 (56.7)	635 (43.3)	1466 (1.7)	1172 (59.0)	813 (41.0)	1985 (1.9)	1467 (55.4)	1182 (44.6)	2649 (2.0)	1937 (55.9)	1530 (44.1)	3467 (2.1)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	527 (53.0)	468 (47.0)	995 (1.2)	778 (54.8)	642 (45.2)	1420 (1.3)	1116 (56.8)	846 (43.7)	1962 (1.5)	1346 (54.0)	1147 (46.0)	2494 (1.5)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.9)	567 (51.9)	526 (48.1)	1093 (1.0)	841 (53.0)	747 (47.0)	1588 (1.2)	1102 (54.3)	928 (45.7)	2030 (1.2)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.9)	695 (51.1)	666 (48.9)	1361 (1.0)	910 (51.9)	845 (48.1)	1755 (1.1)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	418 (48.9)	854 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	35,645	32,245	67,890	43,635	41,165	84,800	53,896	52,643	106,539	67,175	67,360	134,535	82,309	84,186	166,495

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.9)	4814 (52.1)	9227 (13.6)	8177 (47.8)	8930 (52.2)	17107 (20.9)	9462 (47.8)	10332 (52.2)	19794 (20.2)	10891 (47.8)	11893 (52.2)	22784 (19.6)	12407 (47.8)	13550 (52.2)	25957 (18.9)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4259 (47.8)	4646 (52.2)	8905 (10.9)	7991 (47.8)	8617 (52.2)	16608 (16.9)	9131 (47.8)	9970 (52.2)	19101 (16.4)	10510 (47.8)	11477 (52.2)	21987 (16.0)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4468 (49.1)	4629 (50.9)	9097 (11.4)	4246 (47.8)	4632 (52.2)	8878 (9.1)	7867 (47.8)	8591 (52.2)	16458 (14.2)	9104 (47.8)	9940 (52.2)	19044 (13.9)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3913 (48.6)	4135 (51.4)	8048 (9.8)	4405 (48.1)	4761 (51.9)	9166 (9.4)	4187 (47.8)	4567 (52.2)	8754 (7.5)	7757 (47.8)	8471 (52.2)	16228 (11.8)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3027 (48.1)	3264 (51.9)	6291 (7.7)	3858 (48.6)	4077 (51.4)	7935 (8.1)	4343 (48.1)	4694 (51.9)	9037 (7.8)	4128 (47.8)	4503 (52.2)	8631 (6.3)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4454 (59.5)	3036 (40.5)	7490 (9.2)	2985 (48.1)	3218 (51.9)	6203 (6.3)	3804 (48.6)	4020 (51.4)	7824 (6.7)	4282 (48.1)	4628 (51.9)	8910 (6.5)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2573 (52.3)	2344 (47.7)	4917 (6.0)	4338 (59.5)	2957 (40.5)	7295 (7.5)	2907 (48.1)	3134 (51.9)	6041 (5.2)	3705 (48.6)	3915 (51.4)	7620 (5.6)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2551 (54.0)	2176 (46.0)	4727 (5.8)	2506 (52.3)	2283 (47.7)	4789 (4.9)	4225 (59.5)	2880 (40.5)	7105 (6.1)	2831 (48.1)	3053 (51.9)	5884 (4.3)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2355 (56.4)	1824 (43.6)	4179 (5.1)	2485 (54.0)	2119 (46.0)	4604 (4.7)	2441 (52.3)	2224 (47.7)	4665 (4.0)	4115 (59.5)	2805 (40.5)	6920 (5.1)
45 - 49	1623 (59.8)	1135 (41.2)	2758 (4.1)	2060 (60.2)	1363 (39.8)	3423 (4.2)	2157 (56.3)	1671 (43.7)	3828 (3.9)	2276 (54.0)	1941 (46.0)	4217 (3.6)	2236 (52.3)	2037 (47.7)	4273 (3.1)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1487 (59.8)	1040 (41.2)	2527 (3.1)	1887 (60.2)	1249 (39.8)	3136 (3.2)	1976 (56.3)	1531 (43.7)	3507 (3.0)	2088 (54.0)	1778 (46.0)	3869 (2.8)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1271 (62.7)	756 (37.3)	2027 (2.5)	1362 (58.8)	953 (41.2)	2315 (2.4)	1728 (60.2)	1144 (39.8)	2872 (2.5)	1810 (56.4)	1402 (43.6)	3210 (2.3)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	706 (58.1)	510 (41.9)	1216 (1.5)	885 (62.7)	526 (37.3)	1411 (1.4)	948 (58.8)	663 (41.2)	1611 (1.4)	1203 (60.2)	796 (39.8)	1999 (1.5)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	402 (54.0)	343 (46.0)	745 (0.9)	491 (58.0)	355 (42.0)	846 (0.9)	616 (62.7)	366 (37.3)	982 (0.8)	660 (58.9)	461 (41.1)	1121 (0.8)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	226 (47.1)	254 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.5)	342 (58.1)	247 (41.9)	589 (0.5)	429 (62.7)	255 (37.3)	684 (0.5)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.5)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.3)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (45.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	35,645	32,245	67,890	42,122	39,697	81,819	49,491	48,284	97,775	58,003	58,175	116,178	67,661	69,391	137,052

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE LOW MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8287 (47.8)	9047 (52.2)	17334 (20.8)	9765 (47.8)	10661 (52.2)	20429 (20.1)	11435 (47.8)	12481 (52.2)	23916 (19.5)	13248 (47.6)	14460 (52.2)	27708 (18.8)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4299 (47.8)	4686 (52.2)	8985 (10.8)	8057 (47.8)	8790 (52.2)	16847 (16.6)	9496 (47.8)	10358 (52.2)	19854 (16.2)	11125 (47.8)	12134 (52.2)	23259 (15.8)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4508 (48.1)	4869 (51.9)	9377 (11.3)	4346 (47.9)	4732 (52.1)	9078 (8.9)	8103 (47.8)	8834 (52.2)	16937 (13.8)	9554 (47.8)	10417 (52.2)	19970 (13.6)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3953 (48.6)	4175 (51.4)	8128 (9.8)	4505 (48.1)	4861 (51.9)	9366 (9.2)	4355 (47.9)	4736 (52.1)	9091 (7.4)	8080 (47.9)	8800 (52.1)	16880 (11.5)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3067 (48.1)	3304 (51.9)	6371 (7.7)	3958 (48.7)	4177 (51.3)	8135 (8.0)	4512 (48.1)	4863 (51.9)	9375 (7.6)	4384 (47.9)	4760 (52.1)	9144 (6.2)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4494 (59.4)	3076 (40.6)	7570 (9.1)	3084 (48.2)	3318 (51.8)	6402 (6.3)	3973 (48.7)	4189 (51.3)	8162 (6.7)	4559 (48.2)	4865 (51.8)	9424 (6.4)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2613 (52.3)	2384 (47.7)	4997 (6.0)	4437 (59.2)	3056 (40.8)	7493 (7.4)	3074 (48.2)	3302 (51.8)	6376 (5.2)	3952 (48.7)	4170 (51.3)	8122 (5.5)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2591 (53.9)	2216 (46.1)	4807 (5.8)	2605 (52.2)	2382 (47.8)	4987 (4.9)	4392 (59.0)	3047 (41.0)	7439 (6.1)	3084 (48.3)	3306 (51.7)	6390 (4.3)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2395 (56.2)	1864 (43.8)	4259 (5.1)	2524 (53.8)	2218 (46.2)	4802 (4.7)	2607 (52.2)	2390 (47.8)	4997 (4.1)	4186 (58.8)	3054 (41.2)	7240 (5.0)
45 - 49	1623 (58.8)	1135 (41.2)	2759 (4.1)	2100 (59.9)	1403 (40.1)	3503 (4.2)	2254 (56.1)	1767 (43.9)	4021 (4.0)	2437 (53.7)	2102 (46.3)	4539 (3.7)	2476 (52.1)	2279 (47.9)	4755 (3.2)
50 - 54	1398 (62.7)	825 (37.3)	2223 (3.3)	1527 (58.6)	1080 (41.4)	2607 (3.1)	1984 (59.6)	1345 (40.4)	3329 (3.3)	2139 (55.2)	1669 (44.2)	3824 (3.1)	2322 (53.5)	2015 (46.5)	4337 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1311 (62.2)	796 (37.8)	2107 (2.5)	1459 (58.2)	1049 (41.8)	2508 (2.5)	1887 (59.2)	1302 (40.8)	3189 (2.6)	2046 (55.6)	1637 (44.4)	3683 (2.5)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	746 (57.6)	550 (42.4)	1296 (1.6)	972 (61.3)	614 (38.7)	1586 (1.6)	1085 (57.6)	800 (42.4)	1885 (1.5)	1403 (58.5)	996 (41.5)	2399 (1.6)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	442 (53.6)	383 (46.4)	825 (1.0)	579 (56.7)	443 (43.3)	1022 (1.0)	747 (60.3)	497 (40.0)	1244 (1.0)	845 (56.5)	647 (43.4)	1492 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	266 (47.5)	294 (52.5)	560 (0.7)	368 (52.9)	327 (47.1)	695 (0.7)	473 (55.6)	378 (44.4)	851 (0.7)	610 (58.5)	434 (41.7)	1044 (0.7)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	151 (46.6)	173 (53.4)	324 (0.4)	245 (48.0)	265 (52.0)	510 (0.5)	326 (52.2)	298 (47.8)	624 (0.5)	419 (54.3)	353 (45.7)	772 (0.5)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	95 (46.8)	108 (53.2)	203 (0.2)	154 (48.1)	166 (51.9)	320 (0.3)	204 (52.2)	187 (47.8)	391 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	37 (46.3)	43 (53.8)	80 (0.1)	61 (48.4)	65 (51.6)	126 (0.1)
	35,645	32,245	67,890	42,832	40,414	83,246	51,326	50,148	101,474	61,228	61,475	122,703	72,734	74,605	147,339

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8370 (47.8)	9135 (52.2)	17505 (20.8)	10052 (47.8)	10965 (52.2)	21017 (20.0)	11960 (47.8)	13047 (52.2)	25007 (19.4)	14067 (47.8)	15345 (52.2)	29412 (18.7)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4329 (47.9)	4716 (52.1)	9045 (10.7)	8202 (47.8)	8940 (52.2)	17142 (16.3)	9840 (47.9)	10721 (52.1)	20561 (15.9)	11721 (47.9)	12770 (52.1)	24491 (15.6)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4538 (48.1)	4899 (51.9)	9437 (11.2)	4441 (47.9)	4827 (52.1)	9268 (8.8)	8317 (47.9)	9053 (52.1)	17370 (13.5)	9990 (47.9)	10869 (52.1)	20859 (13.3)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3983 (48.6)	4205 (51.4)	8188 (9.7)	4599 (48.1)	4955 (51.9)	9554 (9.1)	4519 (48.0)	4899 (52.0)	9418 (7.3)	8381 (47.9)	9106 (52.1)	17487 (11.1)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3097 (48.2)	3334 (51.8)	6431 (7.6)	4052 (48.7)	4271 (51.3)	8323 (7.9)	4675 (48.2)	5026 (51.8)	9701 (7.5)	4636 (48.1)	5013 (51.9)	9648 (6.1)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4524 (59.3)	3106 (40.7)	7630 (9.0)	3179 (48.2)	3412 (51.8)	6591 (6.3)	4135 (47.7)	4351 (51.3)	8486 (6.6)	4790 (48.3)	5136 (51.7)	9926 (6.3)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2643 (52.3)	2414 (47.7)	5057 (6.0)	4531 (59.0)	3150 (41.0)	7681 (7.3)	3236 (48.3)	3463 (51.7)	6699 (5.2)	4207 (48.6)	4410 (51.2)	8620 (5.5)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2621 (53.9)	2246 (46.1)	4867 (5.8)	2699 (52.2)	2476 (47.8)	5175 (4.9)	4553 (58.7)	3208 (41.3)	7761 (6.0)	3332 (48.4)	3553 (51.6)	6885 (4.4)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2425 (56.1)	1894 (43.9)	4319 (5.1)	2674 (53.7)	2313 (46.3)	4991 (4.8)	2769 (52.0)	2552 (48.0)	5321 (4.1)	4615 (58.3)	3305 (41.7)	7920 (5.0)
45 - 49	1623 (59.8)	1135 (41.2)	2758 (4.1)	2130 (59.8)	1433 (40.2)	3563 (4.2)	2346 (55.8)	1860 (44.2)	4206 (4.0)	2593 (53.4)	2259 (46.6)	4852 (3.8)	2716 (51.9)	2518 (48.1)	5234 (3.3)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1557 (58.4)	1110 (41.6)	2667 (3.2)	2076 (59.1)	1438 (40.9)	3514 (3.3)	2289 (55.4)	1844 (44.6)	4133 (3.2)	2555 (53.2)	2249 (46.8)	4804 (3.1)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1341 (61.9)	826 (38.1)	2167 (2.6)	1551 (57.6)	1142 (42.4)	2693 (2.6)	2042 (58.4)	1457 (41.6)	3499 (2.7)	2277 (54.9)	1869 (45.1)	4146 (2.6)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	776 (57.2)	580 (42.8)	1356 (1.6)	1058 (60.2)	700 (39.8)	1758 (1.7)	1219 (56.5)	935 (43.4)	2154 (1.7)	1601 (57.3)	1194 (42.7)	2795 (1.8)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	472 (53.3)	413 (46.7)	885 (1.0)	665 (55.7)	529 (44.3)	1194 (1.1)	876 (58.3)	627 (41.7)	1503 (1.2)	1048 (55.5)	791 (44.7)	1839 (1.2)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.7)	454 (52.4)	412 (47.6)	866 (0.8)	603 (54.3)	508 (45.7)	1111 (0.9)	790 (56.2)	616 (43.8)	1406 (0.9)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.5)	331 (48.5)	351 (51.5)	682 (0.6)	456 (51.6)	427 (48.4)	883 (0.7)	680 (52.9)	934 (47.1)	1134 (0.7)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	208 (48.6)	220 (51.4)	428 (0.3)	288 (51.6)	268 (48.4)	556 (0.4)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	82 (48.5)	87 (51.5)	169 (0.1)
	35,645	32,245	67,890	43,365	40,952	84,317	53,053	51,903	104,956	64,335	64,647	128,982	77,674	79,678	157,352

06/05/72 CUIK-EDC

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8521 (47.8)	9293 (52.2)	17814 (20.6)	10454 (47.8)	11398 (52.2)	21852 (19.9)	12857 (47.8)	14013 (52.2)	26870 (19.2)	15477 (47.8)	16871 (52.2)	32348 (18.5)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4384 (47.9)	4771 (52.1)	9155 (10.6)	8423 (47.9)	9168 (52.1)	17591 (16.0)	10386 (47.9)	11299 (52.1)	21687 (15.5)	12732 (47.9)	13848 (52.1)	26580 (15.2)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4593 (48.1)	4954 (51.9)	9547 (11.1)	4571 (48.0)	4957 (52.0)	9528 (8.7)	8698 (48.0)	9440 (52.0)	18138 (13.0)	10682 (48.0)	11590 (52.0)	22272 (12.8)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	4036 (48.7)	4260 (51.3)	8298 (9.6)	4729 (48.2)	5085 (51.8)	9814 (8.9)	4807 (48.1)	5188 (51.9)	9995 (7.1)	8901 (48.0)	9633 (52.0)	18534 (10.6)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3152 (48.2)	3389 (51.8)	6541 (7.6)	4191 (48.7)	4400 (51.3)	8591 (7.8)	4963 (48.3)	5314 (51.7)	10277 (7.3)	5065 (48.2)	5440 (51.8)	10505 (6.0)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4579 (59.2)	3161 (40.8)	7740 (9.0)	3308 (49.3)	3542 (51.7)	6850 (6.2)	4422 (48.8)	4638 (51.2)	9060 (6.5)	5219 (45.4)	5565 (51.6)	10784 (6.2)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2698 (52.2)	2469 (47.8)	5167 (6.0)	4660 (58.7)	3279 (41.3)	7939 (7.2)	3522 (48.4)	3750 (51.6)	7272 (5.2)	4632 (48.9)	4842 (51.1)	9474 (5.4)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2676 (53.8)	2301 (46.2)	4977 (5.8)	2828 (52.1)	2605 (47.9)	5433 (4.9)	4639 (58.1)	3494 (41.9)	8333 (6.0)	3755 (48.6)	3977 (51.4)	7732 (4.4)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2480 (56.0)	1949 (44.0)	4429 (5.1)	2806 (53.5)	2441 (46.5)	5247 (4.8)	3054 (51.8)	2837 (48.2)	5891 (4.2)	5036 (57.5)	3725 (42.5)	8760 (5.0)
45 - 49	1523 (58.8)	1135 (41.2)	2758 (4.1)	2185 (59.5)	1488 (40.5)	3673 (4.3)	2472 (55.5)	1985 (44.5)	4457 (4.1)	2870 (53.1)	2536 (46.9)	5406 (3.9)	3122 (51.6)	2924 (48.4)	6046 (3.5)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1612 (58.0)	1165 (42.0)	2777 (3.2)	2201 (58.5)	1563 (41.5)	3764 (3.4)	2564 (54.8)	2118 (45.2)	4682 (3.3)	2954 (52.7)	2648 (47.3)	5602 (3.2)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1396 (61.3)	881 (38.7)	2277 (2.6)	1677 (57.0)	1267 (43.0)	2944 (2.7)	2316 (57.2)	1732 (42.8)	4048 (2.9)	2674 (54.1)	2265 (45.9)	4939 (2.8)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	831 (56.7)	635 (43.3)	1466 (1.7)	1172 (59.0)	813 (41.0)	1985 (1.8)	1467 (55.4)	1182 (44.6)	2649 (1.9)	1937 (55.9)	1530 (44.1)	3467 (2.0)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	527 (53.0)	468 (47.0)	995 (1.2)	778 (54.8)	642 (45.2)	1420 (1.3)	1116 (56.3)	866 (43.7)	1982 (1.4)	1346 (54.0)	1148 (46.0)	2494 (1.4)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.8)	567 (51.9)	526 (48.1)	1093 (1.0)	841 (53.0)	747 (47.0)	1588 (1.1)	1102 (54.3)	926 (45.7)	2028 (1.2)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.8)	695 (51.1)	666 (49.9)	1361 (1.0)	910 (51.9)	845 (48.1)	1755 (1.0)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	418 (48.9)	854 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	35,645	32,245	67,890	44,341	41,935	86,276	55,445	54,332	109,777	69,755	70,175	139,930	86,092	88,315	174,407

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8777 (47.8)	9584 (52.2)	18361 (22.1)	10160 (47.8)	11096 (52.2)	21256 (21.2)	11701 (47.8)	12778 (52.2)	24479 (20.3)	13299 (47.8)	14524 (52.2)	27823 (19.4)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4259 (47.8)	4646 (52.2)	8905 (10.7)	5470 (47.8)	9249 (52.2)	17719 (17.6)	9804 (47.8)	10708 (52.2)	20512 (17.0)	11291 (47.8)	12331 (52.2)	23622 (16.5)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4462 (49.1)	4920 (51.9)	9287 (11.2)	4246 (47.8)	4632 (52.2)	8878 (8.8)	8445 (47.8)	9221 (52.2)	17666 (14.7)	9775 (47.8)	10676 (52.2)	20451 (14.3)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3913 (48.6)	4135 (51.4)	8048 (9.7)	4405 (48.1)	4761 (51.9)	9166 (9.1)	4187 (47.8)	4567 (52.2)	8754 (7.3)	8327 (47.8)	9092 (52.2)	17419 (12.2)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3027 (48.1)	3264 (51.9)	6291 (7.6)	3858 (48.6)	4077 (51.4)	7935 (7.9)	4343 (48.1)	4694 (51.9)	9037 (7.5)	4128 (47.8)	4503 (52.2)	8631 (6.0)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4454 (59.5)	3036 (40.5)	7490 (9.0)	2985 (48.1)	3218 (51.9)	6203 (6.2)	3804 (48.6)	4020 (51.4)	7824 (6.5)	4282 (48.1)	4628 (51.9)	8910 (6.2)
30 - 34	2618 (54.0)	2234 (46.0)	4853 (7.1)	2573 (52.3)	2344 (47.7)	4917 (5.9)	4338 (59.5)	2957 (40.5)	7295 (7.3)	2907 (48.1)	3134 (51.9)	6041 (5.0)	3705 (48.6)	3915 (51.4)	7620 (5.3)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2551 (54.0)	2176 (46.0)	4727 (5.7)	2506 (52.3)	2283 (47.7)	4789 (4.8)	4225 (59.5)	2880 (40.5)	7105 (5.9)	2831 (48.1)	3053 (51.9)	5884 (4.1)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2356 (56.4)	1824 (43.6)	4179 (5.0)	2485 (54.0)	2119 (46.0)	4604 (4.6)	2441 (52.3)	2224 (47.7)	4665 (3.9)	4115 (59.5)	2806 (40.5)	6920 (4.8)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2060 (60.2)	1363 (39.8)	3423 (4.1)	2157 (56.3)	1671 (43.7)	3828 (3.8)	2276 (54.0)	1941 (46.0)	4217 (3.5)	2236 (52.3)	2037 (47.7)	4273 (3.0)
50 - 54	1398 (62.7)	825 (37.3)	2223 (3.3)	1487 (58.8)	1040 (41.2)	2527 (3.0)	1887 (60.2)	1249 (39.8)	3136 (3.1)	1976 (56.3)	1531 (43.7)	3507 (2.9)	2085 (54.0)	1778 (46.0)	3863 (2.7)
55 - 59	1016 (58.1)	733 (41.9)	1749 (2.6)	1271 (62.7)	756 (37.3)	2027 (2.4)	1362 (58.8)	953 (41.2)	2315 (2.3)	1728 (60.2)	1144 (39.8)	2872 (2.4)	1810 (56.4)	1402 (43.6)	3212 (2.2)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	706 (58.1)	510 (41.9)	1216 (1.6)	855 (62.7)	526 (37.3)	1411 (1.4)	948 (58.8)	663 (41.2)	1611 (1.3)	1203 (60.2)	796 (39.8)	1999 (1.4)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	402 (54.0)	343 (46.0)	745 (0.9)	491 (58.0)	355 (42.0)	846 (0.8)	616 (62.7)	366 (37.3)	982 (0.8)	660 (58.9)	461 (41.1)	1121 (0.8)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	224 (47.1)	254 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.5)	342 (58.1)	247 (41.9)	589 (0.5)	429 (62.7)	255 (37.3)	684 (0.5)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.5)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.3)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (45.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	35,645	32,245	67,890	42,722	40,351	83,073	50,768	49,680	100,448	60,064	60,428	120,492	70,575	72,576	143,151

06/05/72 GUAM-BJO

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE LOW MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8892 (47.6)	9707 (52.2)	16599 (22.0)	10485 (47.8)	11444 (52.2)	21929 (21.0)	12278 (47.5)	13402 (52.2)	25680 (20.2)	14193 (47.5)	15491 (52.2)	29684 (19.3)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4299 (47.8)	4686 (52.2)	8985 (10.6)	8641 (47.8)	9427 (52.2)	18068 (17.3)	10198 (47.8)	11113 (52.2)	21301 (16.8)	11938 (47.8)	13023 (52.2)	24961 (16.2)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4508 (48.1)	4869 (51.9)	9377 (11.1)	4346 (47.9)	4732 (52.1)	9078 (8.7)	8655 (47.8)	9469 (52.2)	18154 (14.3)	10247 (47.8)	11170 (52.2)	21417 (13.9)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3953 (48.6)	4175 (51.4)	8129 (9.6)	4505 (48.1)	4861 (51.9)	9366 (9.0)	4355 (47.9)	4736 (52.1)	9091 (7.2)	5653 (47.9)	6426 (52.1)	11079 (7.2)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3067 (48.1)	3304 (51.9)	6371 (7.5)	3958 (48.7)	4177 (51.3)	8135 (7.8)	4512 (48.1)	4863 (51.9)	9375 (7.4)	4384 (47.9)	4760 (52.1)	9144 (6.0)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4494 (59.4)	3076 (40.6)	7570 (9.0)	3084 (48.2)	3318 (51.8)	6402 (6.1)	3973 (48.7)	4189 (51.3)	8162 (6.4)	4539 (48.2)	4885 (51.8)	9424 (6.1)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2619 (52.3)	2384 (47.7)	4997 (5.9)	4427 (59.2)	3056 (40.8)	7483 (7.2)	3074 (48.2)	3302 (51.8)	6376 (5.0)	3960 (48.7)	4170 (51.3)	8130 (5.3)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2591 (53.9)	2216 (46.1)	4807 (5.7)	2605 (52.2)	2382 (47.8)	4987 (4.8)	4392 (59.0)	3047 (41.0)	7439 (5.9)	3084 (48.3)	3306 (51.7)	6390 (4.2)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2395 (56.2)	1864 (43.8)	4259 (5.0)	2584 (53.8)	2218 (46.2)	4802 (4.6)	2607 (52.2)	2390 (47.8)	4997 (3.9)	4366 (58.8)	3059 (41.2)	7426 (4.8)
45 - 49	1623 (58.8)	1135 (41.2)	2759 (4.1)	2100 (59.9)	1403 (40.1)	3503 (4.1)	2254 (56.1)	1767 (43.9)	4021 (3.9)	2437 (53.7)	2102 (46.3)	4539 (3.6)	2478 (52.1)	2279 (47.9)	4757 (3.1)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1527 (58.6)	1080 (41.4)	2607 (3.1)	1984 (59.6)	1345 (40.4)	3329 (3.2)	2135 (55.8)	1689 (44.2)	3824 (3.0)	2322 (53.5)	2015 (46.5)	4337 (2.8)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1311 (62.2)	796 (37.8)	2107 (2.5)	1459 (58.2)	1049 (41.8)	2508 (2.4)	1887 (59.2)	1302 (40.8)	3189 (2.5)	2046 (55.6)	1637 (44.4)	3683 (2.4)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	746 (57.6)	550 (42.4)	1296 (1.5)	972 (61.3)	614 (38.7)	1586 (1.5)	1085 (57.6)	800 (42.4)	1885 (1.5)	1403 (58.5)	994 (41.5)	2397 (1.6)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	442 (53.6)	383 (46.4)	825 (1.0)	579 (56.7)	443 (43.3)	1022 (1.0)	747 (60.0)	497 (40.0)	1244 (1.0)	845 (56.6)	647 (43.4)	1492 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	266 (47.5)	294 (52.5)	560 (0.7)	368 (52.9)	327 (47.1)	695 (0.7)	473 (55.6)	378 (44.4)	851 (0.7)	610 (58.3)	436 (41.7)	1046 (0.7)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	151 (46.6)	173 (53.4)	324 (0.4)	245 (48.0)	265 (52.0)	510 (0.5)	326 (52.2)	298 (47.8)	624 (0.5)	419 (54.3)	353 (45.7)	772 (0.5)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	95 (46.8)	108 (53.2)	203 (0.2)	154 (48.1)	166 (51.9)	320 (0.3)	204 (52.2)	187 (47.8)	391 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	37 (46.3)	43 (53.8)	80 (0.1)	61 (48.4)	65 (51.6)	126 (0.1)
	35,645	32,245	67,890	43,437	41,074	84,511	52,627	51,568	104,195	63,345	63,786	127,131	75,754	77,904	153,658

06/05/72 QUIK-BUD

TERRITORY OF GUAM MASTER PLAN
POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD
(PROJECTION SUMMARY)
HIGH BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8978 (47.8)	9799 (52.2)	18777 (21.9)	10783 (47.8)	11765 (52.2)	22548 (20.9)	12835 (47.8)	14004 (52.2)	26839 (20.1)	15063 (47.8)	16433 (52.2)	31496 (19.2)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4329 (47.9)	4716 (52.1)	9045 (10.6)	8789 (47.8)	9581 (52.2)	18370 (17.1)	10546 (47.9)	11493 (52.1)	22039 (16.5)	12566 (47.9)	13694 (52.1)	26260 (16.0)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4539 (48.1)	4899 (51.9)	9437 (11.0)	4441 (47.9)	4827 (52.1)	9268 (8.6)	8903 (47.9)	9692 (52.1)	18595 (13.9)	10694 (47.9)	11639 (52.1)	22333 (13.6)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3953 (48.6)	4205 (51.4)	8158 (9.6)	4599 (48.1)	4955 (51.9)	9554 (8.9)	4519 (48.0)	4899 (52.0)	9418 (7.1)	8958 (47.9)	9736 (52.1)	18694 (11.4)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3097 (48.2)	3334 (51.8)	6431 (7.5)	4052 (48.7)	4271 (51.3)	8323 (7.7)	4675 (48.2)	5026 (51.8)	9701 (7.3)	4636 (48.1)	5010 (51.9)	9646 (5.9)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4524 (59.3)	3106 (40.7)	7630 (8.9)	3179 (48.2)	3412 (51.8)	6591 (6.1)	4135 (48.7)	4351 (51.3)	8486 (6.4)	4790 (48.3)	5136 (51.7)	9926 (6.1)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2643 (52.3)	2414 (47.7)	5057 (5.9)	4531 (59.0)	3150 (41.0)	7681 (7.1)	3236 (48.3)	3463 (51.7)	6699 (5.0)	4207 (48.8)	4418 (51.2)	8625 (5.3)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2621 (53.9)	2246 (46.1)	4867 (5.7)	2699 (52.2)	2476 (47.8)	5175 (4.8)	4553 (58.7)	3208 (41.3)	7761 (5.8)	3332 (48.4)	3553 (51.6)	6885 (4.2)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2425 (56.1)	1894 (43.9)	4319 (5.0)	2678 (53.7)	2313 (46.3)	4991 (4.6)	2769 (52.0)	2552 (48.0)	5321 (4.0)	4615 (58.3)	3305 (41.7)	7920 (4.9)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2130 (59.8)	1433 (40.2)	3563 (4.2)	2346 (55.8)	1860 (44.2)	4206 (3.9)	2593 (53.4)	2259 (46.6)	4852 (3.6)	2716 (51.9)	2518 (48.1)	5234 (3.2)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1557 (58.4)	1110 (41.6)	2667 (3.1)	2076 (59.1)	1438 (40.9)	3514 (3.3)	2289 (55.4)	1844 (44.6)	4133 (3.1)	2555 (53.2)	2249 (46.8)	4804 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1341 (61.9)	826 (38.1)	2167 (2.5)	1551 (57.6)	1142 (42.4)	2693 (2.5)	2042 (55.4)	1457 (41.6)	3499 (2.6)	2277 (54.9)	1869 (45.1)	4146 (2.5)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	776 (57.2)	580 (42.8)	1356 (1.6)	1058 (60.2)	700 (39.8)	1758 (1.6)	1219 (56.6)	935 (43.4)	2154 (1.6)	1601 (57.3)	1194 (42.7)	2795 (1.7)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	472 (53.3)	413 (46.7)	885 (1.0)	665 (55.7)	529 (44.3)	1194 (1.1)	876 (58.3)	627 (41.7)	1503 (1.1)	1048 (55.3)	831 (44.7)	1879 (1.1)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.7)	454 (52.4)	412 (47.6)	866 (0.8)	603 (54.3)	508 (45.7)	1111 (0.8)	790 (56.2)	616 (43.8)	1406 (0.9)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.4)	331 (48.5)	351 (51.5)	682 (0.6)	456 (51.6)	427 (48.4)	883 (0.7)	600 (52.9)	534 (47.1)	1134 (0.7)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	208 (48.6)	220 (51.4)	428 (0.3)	286 (51.6)	268 (48.4)	554 (0.3)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	82 (48.5)	87 (51.5)	169 (0.1)
	35,645	32,245	67,890	43,973	41,616	85,589	54,371	53,344	107,715	66,502	67,015	133,517	80,796	83,090	163,886

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	9135 (47.8)	9965 (52.2)	19100 (21.8)	11209 (47.8)	12223 (52.2)	23432 (20.8)	13784 (47.8)	15026 (52.2)	28810 (19.9)	15955 (****)	17429 (****)	***** (****)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4384 (47.9)	4771 (52.1)	9155 (10.5)	9015 (47.9)	9816 (52.1)	18831 (16.7)	11117 (47.9)	12095 (52.1)	23212 (16.0)	13627 (47.9)	14825 (52.1)	28452 (15.8)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4593 (48.1)	4954 (51.9)	9547 (10.9)	4571 (48.0)	4957 (52.0)	9528 (8.5)	9288 (47.9)	10087 (52.1)	19375 (13.4)	11409 (48.0)	12384 (52.0)	23793 (13.2)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	4038 (48.7)	4260 (51.3)	8298 (9.5)	4729 (48.2)	5085 (51.8)	9814 (8.7)	4807 (48.1)	5188 (51.9)	9995 (6.9)	9483 (48.0)	10271 (52.0)	19754 (11.0)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3152 (48.2)	3389 (51.8)	6541 (7.5)	4181 (48.7)	4400 (51.3)	8581 (7.6)	4963 (48.3)	5314 (51.7)	10277 (7.1)	5066 (48.2)	5440 (51.8)	10506 (5.8)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4579 (59.2)	3161 (40.8)	7740 (8.8)	3308 (48.3)	3542 (51.7)	6850 (6.1)	4422 (48.8)	4638 (51.2)	9060 (6.3)	5219 (48.4)	5565 (51.6)	10784 (6.0)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2698 (52.2)	2469 (47.8)	5167 (5.9)	4660 (58.7)	3279 (41.3)	7939 (7.1)	3522 (48.4)	3750 (51.6)	7272 (5.0)	4632 (48.9)	4842 (51.1)	9474 (5.3)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2676 (53.8)	2301 (46.2)	4977 (5.7)	2828 (52.1)	2605 (47.9)	5433 (4.8)	4839 (58.1)	3494 (41.9)	8333 (5.8)	4755 (48.6)	5077 (51.4)	7732 (4.3)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2480 (56.0)	1949 (44.0)	4429 (5.1)	2806 (53.5)	2441 (46.5)	5247 (4.7)	3054 (51.8)	2837 (48.2)	5891 (4.1)	5038 (57.5)	3726 (42.5)	8764 (4.9)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2185 (59.5)	1488 (40.5)	3673 (4.2)	2472 (55.5)	1985 (44.5)	4457 (4.0)	2870 (53.1)	2536 (46.9)	5406 (3.7)	3122 (51.6)	2924 (48.4)	6046 (3.4)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1612 (58.0)	1165 (42.0)	2777 (3.2)	2201 (58.5)	1563 (41.5)	3764 (3.3)	2564 (54.8)	2118 (45.2)	4682 (3.2)	2954 (52.7)	2648 (47.3)	5602 (3.1)
55 - 59	1015 (59.1)	733 (41.9)	1748 (2.6)	1396 (61.3)	881 (38.7)	2277 (2.6)	1677 (57.0)	1267 (43.0)	2944 (2.6)	2316 (57.2)	1732 (42.8)	4048 (2.8)	2674 (54.1)	2265 (45.9)	4939 (2.7)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	831 (56.7)	635 (43.3)	1466 (1.7)	1172 (59.0)	813 (41.0)	1985 (1.8)	1467 (55.4)	1182 (44.6)	2649 (1.8)	1907 (55.9)	1506 (44.1)	3407 (1.9)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	527 (53.0)	468 (47.0)	995 (1.1)	778 (54.8)	642 (45.2)	1420 (1.3)	1116 (56.3)	866 (43.7)	1982 (1.4)	1346 (54.0)	1148 (46.0)	2494 (1.4)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.8)	567 (51.9)	526 (48.1)	1093 (1.0)	841 (53.0)	747 (47.0)	1588 (1.1)	1102 (54.3)	928 (45.7)	2030 (1.1)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.8)	695 (51.1)	666 (48.9)	1361 (0.9)	910 (51.9)	846 (48.1)	1756 (1.0)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	418 (48.9)	854 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	35,645	32,245	67,890	44,955	42,607	87,562	55,792	55,805	112,597	72,001	72,631	144,632	88,307	91,282	180,089

PARAMETRIC POPULATION SELECTIONS

For the purposes of further planning efforts, three population alternatives were selected from among the twenty-four iterations. These reflect the potential range of credible future civilian population totals for the Island of Guam. They include:

	Criteria	1970	1975	1980	1985	1990
Series A	1A1 low census, low birth, zero migration	64,510	76,089	89,938	105,706	123,157
Series B	2B3 high census, medium birth, medium migration	67,890	84,317	104,956	128,982	157,352
Series C	2C4 high census, high birth, high migration	67,890	87,562	112,597	144,597	180,089

Yearly print-out for age-sex and population totals for each series follows:

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

LOW BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1971 MALE	1971 FEMALE	1971 TOTAL	1972 MALE	1972 FEMALE	1972 TOTAL	1973 MALE	1973 FEMALE	1973 TOTAL	1974 MALE	1974 FEMALE	1974 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	5142 (51.2)	4895 (48.8)	10037 (15.0)	6728 (51.2)	5455 (48.8)	11183 (16.2)	6314 (51.2)	6015 (48.8)	12329 (17.2)	6900 (51.2)	6575 (48.8)	13475 (18.3)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4582 (51.4)	4327 (48.6)	8909 (13.3)	4537 (51.4)	4292 (48.6)	8829 (12.8)	4492 (51.3)	4257 (48.7)	8749 (12.2)	4447 (51.3)	4222 (48.7)	8669 (11.7)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4121 (51.4)	3891 (48.6)	8012 (12.0)	4244 (51.4)	4005 (48.6)	8249 (11.9)	4367 (51.5)	4119 (48.5)	8486 (11.9)	4490 (51.5)	4235 (48.5)	8725 (11.8)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3244 (50.9)	3130 (49.1)	6374 (9.5)	3415 (51.0)	3279 (49.0)	6697 (9.7)	3592 (51.2)	3428 (48.8)	7020 (9.8)	3766 (51.3)	3577 (48.7)	7343 (9.9)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	4029 (55.1)	3285 (44.9)	7314 (10.9)	3780 (54.2)	3200 (45.8)	6980 (10.1)	3531 (53.1)	3115 (46.9)	6646 (9.3)	3282 (52.0)	3030 (48.0)	6312 (8.5)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	2866 (54.4)	2399 (45.6)	5265 (7.9)	3204 (54.9)	2630 (45.1)	5834 (8.4)	3542 (55.3)	2861 (44.7)	6403 (9.0)	3880 (55.7)	3092 (44.3)	6971 (9.4)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2497 (55.1)	2032 (44.9)	4529 (6.8)	2490 (54.8)	2052 (45.2)	4542 (6.6)	2486 (54.5)	2072 (45.5)	4558 (6.4)	2476 (54.2)	2092 (45.8)	4568 (6.2)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2325 (57.2)	1742 (42.8)	4067 (6.1)	2353 (56.7)	1797 (43.3)	4150 (6.0)	2381 (56.2)	1852 (43.8)	4233 (5.9)	2409 (55.8)	1907 (44.2)	4316 (5.8)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2145 (60.5)	1401 (39.5)	3546 (5.3)	2168 (59.7)	1462 (40.3)	3630 (5.2)	2191 (59.0)	1523 (41.0)	3714 (5.2)	2214 (58.3)	1584 (41.7)	3798 (5.1)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1569 (59.6)	1064 (40.4)	2633 (3.9)	1663 (60.1)	1105 (39.9)	2768 (4.0)	1757 (60.5)	1146 (39.5)	2903 (4.1)	1851 (60.9)	1187 (39.1)	3038 (4.1)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1038 (57.1)	781 (42.9)	1819 (2.7)	1116 (57.6)	820 (42.4)	1936 (2.8)	1194 (58.2)	859 (41.8)	2053 (2.9)	1272 (58.6)	898 (41.4)	2170 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	989 (57.8)	723 (42.2)	1712 (2.6)	963 (57.5)	713 (42.5)	1676 (2.4)	937 (57.1)	703 (42.9)	1640 (2.3)	911 (56.8)	693 (43.2)	1604 (2.2)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	603 (54.9)	496 (45.1)	1099 (1.6)	629 (55.8)	499 (44.2)	1128 (1.6)	655 (56.6)	502 (43.4)	1157 (1.6)	681 (57.4)	505 (42.6)	1186 (1.6)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	340 (48.4)	362 (51.6)	702 (1.1)	356 (49.8)	359 (50.2)	715 (1.0)	372 (51.1)	356 (48.9)	728 (1.0)	385 (52.4)	353 (47.6)	741 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	173 (45.9)	204 (54.1)	377 (0.6)	186 (46.2)	217 (53.8)	403 (0.6)	199 (46.4)	230 (53.6)	429 (0.6)	212 (46.6)	243 (53.4)	455 (0.6)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	105 (42.7)	141 (57.3)	246 (0.4)	106 (43.1)	140 (56.9)	246 (0.4)	107 (43.5)	139 (56.5)	246 (0.3)	108 (43.9)	138 (56.1)	246 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	47 (40.9)	65 (59.1)	115 (0.2)	52 (41.6)	73 (58.4)	125 (0.2)	57 (42.2)	78 (57.8)	135 (0.2)	62 (42.8)	83 (57.2)	146 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	32 (39.0)	50 (61.0)	82 (0.1)	30 (40.0)	45 (60.0)	75 (0.1)	28 (41.2)	40 (58.8)	68 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)
	34,671	29,839	64,510	35,847	30,991	66,838	37,023	32,143	69,166	38,199	33,295	71,494	39,375	34,447	73,822

06/05/72 QUIK-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

LOW BIRTH RATE ZERO MIGRATION

AGE GROUP	1975 MALE	1975 FEMALE	1975 TOTAL	1976 MALE	1976 FEMALE	1976 TOTAL	1977 MALE	1977 FEMALE	1977 TOTAL	1978 MALE	1978 FEMALE	1978 TOTAL	1979 MALE	1979 FEMALE	1979 TOTAL
0 - 4	7486 (51.2)	7136 (48.8)	14622 (19.2)	7766 (51.2)	7403 (48.8)	15169 (19.2)	8046 (51.2)	7670 (48.8)	15716 (19.2)	8326 (51.2)	7937 (48.8)	16263 (19.3)	8606 (51.2)	8204 (48.8)	16810 (19.3)
5 - 9	4397 (51.2)	4183 (48.8)	8580 (11.3)	4962 (51.2)	4724 (48.8)	9686 (12.3)	5527 (51.2)	5265 (48.8)	10792 (13.2)	6092 (51.2)	5806 (48.8)	11898 (14.1)	6657 (51.2)	6347 (48.8)	13004 (14.9)
10 - 14	4613 (51.5)	4349 (48.5)	8962 (11.8)	4569 (51.4)	4314 (48.6)	8882 (11.3)	4523 (51.4)	4279 (48.6)	8802 (10.8)	4478 (51.3)	4244 (48.7)	8722 (10.3)	4433 (51.3)	4209 (48.7)	8642 (9.9)
15 - 19	3942 (51.4)	3724 (48.6)	7666 (10.1)	4063 (51.4)	3837 (48.6)	7900 (10.0)	4184 (51.4)	3950 (48.6)	8134 (10.0)	4305 (51.4)	4063 (48.6)	8368 (9.9)	4426 (51.3)	4176 (48.5)	8602 (9.9)
20 - 24	3027 (50.7)	2939 (49.3)	5966 (7.8)	3199 (50.9)	3086 (49.1)	6285 (8.0)	3371 (51.0)	3233 (49.0)	6604 (8.1)	3543 (51.2)	3380 (48.8)	6923 (8.2)	3715 (51.3)	3527 (48.7)	7242 (8.3)
25 - 29	4218 (55.9)	3323 (44.1)	7541 (9.9)	3972 (55.1)	3239 (44.9)	7211 (9.1)	3726 (54.1)	3155 (45.9)	6881 (8.4)	3480 (53.1)	3071 (46.9)	6551 (7.8)	3234 (52.0)	2987 (48.0)	6221 (7.1)
30 - 34	2462 (53.8)	2112 (46.2)	4574 (6.0)	2791 (54.4)	2337 (45.6)	5128 (6.5)	3120 (54.9)	2562 (45.1)	5682 (7.0)	3449 (55.3)	2787 (44.7)	6236 (7.4)	3778 (55.6)	3012 (44.4)	6790 (7.8)
35 - 39	2439 (55.4)	1960 (44.6)	4399 (5.8)	2432 (55.1)	1979 (44.9)	4411 (5.6)	2425 (54.8)	1998 (45.2)	4423 (5.4)	2416 (54.5)	2017 (45.5)	4435 (5.3)	2411 (54.2)	2036 (45.8)	4447 (5.1)
40 - 44	2237 (57.7)	1643 (42.3)	3880 (5.1)	2265 (57.2)	1696 (42.8)	3961 (5.0)	2293 (56.7)	1749 (43.3)	4042 (5.0)	2321 (56.3)	1802 (43.7)	4123 (4.9)	2349 (55.9)	1855 (44.1)	4204 (4.8)
45 - 49	1944 (61.3)	1227 (38.7)	3171 (4.2)	1965 (60.5)	1283 (39.5)	3248 (4.1)	1986 (59.7)	1339 (40.3)	3325 (4.1)	2007 (59.0)	1395 (41.0)	3402 (4.0)	2028 (58.3)	1451 (41.7)	3479 (4.0)
50 - 54	1351 (59.0)	937 (41.0)	2288 (3.0)	1437 (59.6)	974 (40.4)	2411 (3.1)	1523 (60.1)	1011 (39.9)	2534 (3.1)	1609 (60.6)	1048 (39.4)	2657 (3.1)	1695 (61.0)	1085 (39.0)	2780 (3.2)
55 - 59	879 (56.4)	680 (43.6)	1559 (2.0)	951 (57.0)	716 (43.0)	1667 (2.1)	1023 (57.6)	752 (42.4)	1775 (2.3)	1095 (58.2)	788 (41.8)	1883 (2.2)	1167 (58.6)	824 (41.4)	1991 (2.3)
60 - 64	706 (58.1)	510 (41.9)	1216 (1.6)	688 (57.7)	504 (42.3)	1192 (1.5)	670 (57.4)	498 (42.6)	1168 (1.4)	652 (57.0)	492 (43.0)	1144 (1.4)	634 (56.6)	486 (43.4)	1120 (1.3)
65 - 69	402 (54.0)	343 (46.0)	745 (1.0)	420 (54.9)	345 (45.1)	765 (1.0)	438 (55.8)	347 (44.2)	785 (1.0)	456 (56.6)	349 (43.4)	805 (1.0)	474 (57.5)	351 (42.5)	825 (0.9)
70 - 74	226 (47.1)	254 (52.9)	480 (0.6)	237 (48.5)	252 (51.5)	489 (0.6)	248 (49.8)	250 (50.2)	498 (0.6)	259 (51.1)	248 (48.9)	507 (0.6)	270 (52.3)	246 (47.7)	516 (0.6)
75 - 79	111 (45.5)	133 (54.5)	244 (0.3)	120 (45.8)	142 (54.2)	262 (0.3)	129 (46.1)	151 (53.9)	280 (0.3)	138 (46.3)	160 (53.7)	298 (0.4)	147 (46.5)	169 (53.5)	316 (0.4)
80 - 84	65 (42.2)	89 (57.8)	154 (0.2)	66 (42.6)	89 (57.4)	155 (0.2)	67 (42.9)	89 (57.1)	156 (0.2)	68 (43.3)	89 (56.7)	157 (0.2)	69 (43.7)	89 (56.3)	158 (0.2)
85 +	17 (40.5)	25 (59.5)	42 (0.1)	19 (41.3)	27 (58.7)	46 (0.1)	21 (42.0)	29 (58.0)	50 (0.1)	23 (42.6)	31 (57.4)	54 (0.1)	25 (43.1)	33 (56.9)	58 (0.1)
	40,522	35,567	76,089	41,921	36,947	78,868	43,320	38,327	81,647	44,719	39,707	84,426	46,118	41,087	87,205

1980

06/05/72 CUIA-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

LOW BIRTH RATE ZERO MIGRATION

AGE GROUP	1980 MALE	1980 FEMALE	1980 TOTAL	1981 MALE	1981 FEMALE	1981 TOTAL	1982 MALE	1982 FEMALE	1982 TOTAL	1983 MALE	1983 FEMALE	1983 TOTAL	1984 MALE	1984 FEMALE	1984 TOTAL
0 - 4	8867 (51.2)	8471 (48.8)	17338 (19.3)	9136 (51.2)	8708 (48.8)	17844 (19.2)	9385 (51.2)	8945 (48.8)	18330 (19.0)	9634 (51.2)	9182 (48.8)	18816 (18.9)	9883 (51.2)	9419 (48.8)	19302 (18.8)
5 - 9	7224 (51.2)	6886 (48.8)	14110 (15.7)	7494 (51.2)	7144 (48.8)	14638 (15.7)	7764 (51.2)	7402 (48.8)	15166 (15.8)	8034 (51.2)	7660 (48.8)	15694 (15.8)	8304 (51.2)	7918 (48.8)	16222 (15.8)
10 - 14	4384 (51.3)	4170 (48.7)	8554 (9.5)	4948 (51.2)	4709 (48.8)	9657 (10.4)	5512 (51.2)	5248 (48.8)	10760 (11.2)	6076 (51.2)	5787 (48.8)	11863 (11.9)	6640 (51.2)	6326 (48.8)	12966 (12.6)
15 - 19	4548 (51.5)	4288 (48.5)	8836 (9.8)	4504 (51.4)	4254 (48.6)	8758 (9.4)	4460 (51.4)	4220 (48.6)	8680 (9.0)	4416 (51.3)	4186 (48.7)	8602 (8.7)	4372 (51.3)	4152 (48.7)	8524 (8.3)
20 - 24	3887 (51.4)	3672 (48.6)	7559 (8.4)	4006 (51.4)	3783 (48.6)	7789 (8.4)	4125 (51.4)	3894 (48.6)	8019 (8.3)	4244 (51.4)	4005 (48.6)	8249 (8.3)	4363 (51.5)	4116 (48.5)	8479 (8.3)
25 - 29	2985 (50.7)	2898 (49.3)	5883 (6.5)	3155 (50.9)	3043 (49.1)	6198 (6.7)	3325 (51.1)	3188 (48.9)	6513 (6.8)	3495 (51.2)	3333 (48.8)	6828 (6.9)	3665 (51.3)	3478 (48.7)	7143 (7.0)
30 - 34	4108 (55.9)	3237 (44.1)	7345 (8.2)	3869 (55.1)	3155 (44.9)	7024 (7.5)	3630 (54.2)	3073 (45.8)	6703 (7.0)	3391 (53.1)	2991 (46.9)	6382 (6.4)	3152 (52.0)	2909 (48.0)	6061 (5.9)
35 - 39	2398 (53.8)	2057 (46.2)	4455 (5.0)	2719 (54.4)	2276 (45.6)	4995 (5.4)	3040 (54.9)	2495 (45.1)	5535 (5.7)	3361 (55.3)	2714 (44.7)	6075 (6.1)	3682 (55.7)	2933 (44.3)	6615 (6.4)
40 - 44	2376 (55.4)	1909 (44.6)	4285 (4.8)	2369 (55.1)	1928 (44.9)	4297 (4.6)	2362 (54.8)	1947 (45.2)	4309 (4.5)	2355 (54.5)	1966 (45.5)	4321 (4.3)	2348 (54.2)	1988 (45.8)	4336 (4.2)
45 - 49	2049 (57.7)	1505 (42.3)	3554 (4.0)	2074 (57.2)	1554 (42.8)	3628 (3.9)	2099 (56.7)	1603 (43.3)	3702 (3.8)	2124 (56.3)	1652 (43.8)	3776 (3.8)	2149 (55.8)	1701 (44.2)	3850 (3.8)
50 - 54	1781 (61.3)	1124 (38.7)	2905 (3.2)	1800 (60.5)	1175 (39.5)	2975 (3.2)	1819 (59.7)	1226 (40.3)	3045 (3.2)	1838 (59.0)	1277 (41.0)	3115 (3.1)	1857 (58.3)	1328 (41.7)	3185 (3.1)
55 - 59	1238 (59.1)	858 (40.9)	2096 (2.3)	1317 (59.6)	892 (40.4)	2209 (2.4)	1396 (60.1)	926 (39.9)	2322 (2.4)	1475 (60.6)	960 (39.4)	2435 (2.4)	1554 (61.0)	994 (39.0)	2548 (2.5)
60 - 64	612 (56.4)	473 (43.6)	1085 (1.2)	662 (57.1)	498 (42.9)	1160 (1.2)	712 (57.7)	523 (42.3)	1235 (1.3)	762 (58.2)	548 (41.8)	1310 (1.3)	812 (58.6)	573 (41.4)	1385 (1.3)
65 - 69	491 (58.0)	355 (42.0)	846 (0.9)	479 (57.7)	351 (42.3)	830 (0.9)	467 (57.4)	347 (42.6)	814 (0.8)	455 (57.0)	343 (43.0)	798 (0.8)	443 (56.6)	339 (43.4)	782 (0.8)
70 - 74	280 (53.9)	239 (46.1)	519 (0.6)	292 (54.8)	241 (45.2)	533 (0.6)	304 (55.6)	243 (44.4)	547 (0.6)	316 (56.3)	245 (43.7)	561 (0.6)	328 (57.0)	247 (43.0)	575 (0.6)
75 - 79	157 (47.0)	177 (53.0)	334 (0.4)	165 (48.4)	176 (51.6)	341 (0.4)	173 (49.7)	175 (50.3)	348 (0.4)	181 (51.0)	174 (49.0)	355 (0.4)	189 (52.2)	173 (47.8)	362 (0.4)
80 - 84	70 (45.8)	83 (54.2)	153 (0.2)	76 (46.1)	89 (53.9)	165 (0.2)	82 (46.3)	95 (53.7)	177 (0.2)	88 (46.6)	101 (53.4)	189 (0.2)	94 (46.8)	107 (53.2)	201 (0.2)
85 +	26 (42.6)	35 (57.4)	61 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)
	47,501	42,437	89,938	49,091	44,011	93,102	50,681	45,585	96,266	52,271	47,159	99,430	53,861	48,733	102,594

06/05/72 QUIN-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

LOW BIRTH RATE — ZERO MIGRATION

AGE GROUP	1985 MALE	1985 FEMALE	1985 TOTAL	1986 MALE	1986 FEMALE	1986 TOTAL	1987 MALE	1987 FEMALE	1987 TOTAL	1988 MALE	1988 FEMALE	1988 TOTAL	1989 MALE	1989 FEMALE	1989 TOTAL
0 - 4	10131 (51.2)	9656 (48.8)	19787 (18.7)	10369 (51.2)	9883 (48.8)	20252 (18.5)	10607 (51.2)	10110 (48.8)	20717 (18.4)	10845 (51.2)	10337 (48.8)	21182 (18.2)	11083 (51.2)	10564 (48.8)	21647 (18.1)
5 - 9	8576 (51.2)	8175 (48.8)	16751 (15.8)	8816 (51.2)	8404 (48.8)	17220 (15.8)	9056 (51.2)	8633 (48.8)	17689 (15.7)	9296 (51.2)	8862 (48.8)	18158 (15.6)	9536 (51.2)	9091 (48.8)	18627 (15.6)
10 - 14	7202 (51.2)	6865 (48.8)	14067 (13.3)	7472 (51.2)	7122 (48.8)	14594 (13.4)	7742 (51.2)	7379 (48.8)	15121 (13.4)	8012 (51.2)	7636 (48.8)	15648 (13.5)	8282 (51.2)	7893 (48.8)	16175 (13.5)
15 - 19	4323 (51.3)	4112 (48.7)	8435 (8.0)	4879 (51.2)	4643 (48.8)	9522 (8.7)	5435 (51.2)	5174 (48.8)	10609 (9.4)	6991 (51.2)	5705 (48.8)	11696 (10.1)	6547 (51.2)	6236 (48.8)	12783 (10.7)
20 - 24	4484 (51.5)	4228 (48.5)	8712 (8.2)	4441 (51.4)	4194 (48.6)	8635 (7.9)	4398 (51.4)	4160 (48.6)	8558 (7.6)	4355 (51.4)	4126 (48.6)	8481 (7.3)	4312 (51.5)	4092 (48.7)	8404 (7.0)
25 - 29	3833 (51.4)	3621 (48.6)	7454 (7.1)	3951 (51.4)	3731 (48.6)	7682 (7.0)	4069 (51.4)	3841 (48.6)	7910 (7.0)	4187 (51.4)	3951 (48.6)	8138 (7.0)	4305 (51.5)	4061 (48.5)	8366 (7.0)
30 - 34	2907 (50.7)	2823 (49.3)	5730 (5.4)	3072 (50.9)	2964 (49.1)	6036 (5.5)	3237 (51.0)	3105 (49.0)	6342 (5.6)	3402 (51.2)	3246 (48.8)	6648 (5.7)	3567 (51.3)	3387 (48.7)	6954 (5.8)
35 - 39	4001 (55.9)	3153 (44.1)	7154 (6.8)	3768 (55.1)	3073 (44.9)	6841 (6.3)	3535 (54.2)	2993 (45.8)	6528 (5.8)	3302 (53.1)	2913 (46.9)	6215 (5.3)	3069 (52.0)	2833 (48.0)	5902 (4.9)
40 - 44	2336 (53.8)	2004 (46.2)	4340 (4.1)	2648 (54.4)	2217 (45.6)	4865 (4.5)	2960 (54.9)	2430 (45.1)	5390 (4.8)	3272 (55.3)	2643 (44.7)	5915 (5.1)	3584 (55.7)	2856 (44.3)	6440 (5.4)
45 - 49	2176 (55.4)	1749 (44.6)	3925 (3.7)	2170 (55.1)	1766 (44.9)	3936 (3.6)	2164 (54.8)	1783 (45.2)	3947 (3.5)	2158 (54.5)	1800 (45.5)	3958 (3.4)	2152 (54.2)	1817 (45.8)	3969 (3.3)
50 - 54	1877 (57.6)	1379 (42.4)	3256 (3.1)	1900 (57.2)	1424 (42.8)	3324 (3.0)	1923 (56.7)	1469 (43.3)	3392 (3.0)	1946 (56.2)	1514 (43.8)	3460 (3.0)	1969 (55.8)	1559 (44.2)	3528 (2.9)
55 - 59	1631 (61.3)	1030 (38.7)	2661 (2.5)	1649 (60.5)	1077 (39.5)	2726 (2.5)	1667 (59.7)	1124 (40.3)	2791 (2.5)	1685 (59.0)	1171 (41.0)	2856 (2.5)	1703 (58.3)	1218 (41.7)	2921 (2.4)
60 - 64	862 (59.1)	597 (40.9)	1459 (1.4)	917 (59.6)	621 (40.4)	1538 (1.4)	972 (60.1)	645 (39.9)	1617 (1.4)	1027 (60.6)	669 (39.4)	1696 (1.5)	1082 (61.0)	693 (39.0)	1775 (1.5)
65 - 69	426 (56.4)	329 (43.6)	755 (0.7)	461 (57.1)	346 (42.9)	807 (0.7)	496 (57.7)	363 (42.3)	859 (0.8)	551 (58.3)	380 (41.7)	911 (0.8)	566 (58.8)	397 (41.2)	963 (0.8)
70 - 74	342 (58.1)	247 (41.9)	589 (0.6)	334 (57.8)	244 (42.2)	578 (0.5)	326 (57.5)	241 (42.5)	567 (0.5)	318 (57.2)	238 (42.8)	556 (0.5)	310 (56.9)	235 (43.1)	545 (0.5)
75 - 79	195 (54.0)	166 (46.0)	361 (0.3)	204 (55.0)	167 (45.0)	371 (0.3)	213 (55.9)	168 (44.1)	381 (0.3)	222 (56.8)	169 (43.2)	391 (0.3)	231 (57.6)	170 (42.4)	401 (0.3)
80 - 84	98 (46.9)	111 (53.1)	209 (0.2)	103 (48.1)	111 (51.9)	214 (0.2)	108 (49.3)	111 (50.7)	219 (0.2)	113 (50.4)	111 (49.6)	224 (0.2)	118 (51.5)	111 (48.5)	229 (0.2)
85 +	28 (45.9)	33 (54.1)	61 (0.1)	30 (46.2)	35 (53.8)	65 (0.1)	32 (46.4)	37 (53.6)	69 (0.1)	34 (46.6)	39 (53.4)	73 (0.1)	36 (46.8)	41 (53.2)	77 (0.1)
	55,428	50,278	105,706	57,184	52,022	109,206	58,940	53,766	112,706	60,696	55,510	116,206	62,452	57,254	119,706

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

LOW BIRTH RATE ZERO MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4556 (51.2)	4335 (48.8)	8891 (13.8)	7486 (51.2)	7136 (48.8)	14622 (19.5)	8887 (51.2)	8471 (48.8)	17358 (19.3)	10131 (51.2)	9656 (48.8)	19787 (18.7)	11322 (51.2)	10791 (48.8)	22113 (17.9)
5 - 9	4627 (51.5)	4362 (48.5)	8989 (13.9)	4397 (51.2)	4183 (48.8)	8580 (11.3)	7224 (51.2)	6886 (48.8)	14110 (15.7)	8576 (51.2)	8175 (48.8)	16751 (15.8)	9776 (51.2)	9318 (48.8)	19094 (15.5)
10 - 14	3998 (51.4)	3777 (48.6)	7775 (12.1)	4613 (51.5)	4349 (48.5)	8962 (11.8)	4384 (51.3)	4170 (48.7)	8554 (9.5)	7202 (51.2)	6865 (48.8)	14067 (13.3)	8550 (51.2)	8150 (48.8)	16700 (13.6)
15 - 19	3070 (50.7)	2981 (49.3)	6051 (9.4)	3942 (51.4)	3724 (48.6)	7666 (10.1)	4548 (51.5)	4288 (48.5)	8836 (9.8)	4323 (51.3)	4112 (48.7)	8435 (8.0)	7101 (51.2)	6769 (48.8)	13870 (11.3)
20 - 24	4278 (55.9)	3370 (44.1)	7648 (11.9)	3027 (50.7)	2939 (49.3)	5966 (7.8)	3887 (51.4)	3672 (48.6)	7559 (8.4)	4484 (51.5)	4228 (48.5)	8712 (8.2)	4262 (51.5)	4054 (48.7)	8316 (6.8)
25 - 29	2528 (53.8)	2168 (46.2)	4696 (7.3)	4218 (55.9)	3323 (44.1)	7541 (9.9)	2985 (50.7)	2898 (49.3)	5883 (6.5)	3833 (51.4)	3621 (48.6)	7454 (7.1)	4421 (51.5)	4169 (48.5)	8590 (7.0)
30 - 34	2504 (55.4)	2012 (44.6)	4516 (7.0)	2462 (53.8)	2112 (46.2)	4574 (6.0)	4108 (55.9)	3237 (44.1)	7345 (8.2)	2907 (50.7)	2823 (49.3)	5730 (5.4)	3733 (51.4)	3527 (48.6)	7260 (5.9)
35 - 39	2297 (57.7)	1687 (42.3)	3984 (6.2)	2439 (55.4)	1960 (44.6)	4399 (5.8)	2398 (53.8)	2057 (46.2)	4455 (5.0)	4001 (55.9)	3153 (44.1)	7154 (6.8)	2831 (50.7)	2750 (49.3)	5581 (4.5)
40 - 44	2122 (61.3)	1340 (38.7)	3462 (5.4)	2237 (57.7)	1643 (42.3)	3880 (5.1)	2376 (55.4)	1909 (44.6)	4285 (4.8)	2336 (53.8)	2004 (46.2)	4340 (4.1)	3697 (55.9)	3071 (44.1)	6768 (5.4)
45 - 49	1475 (59.0)	1023 (41.0)	2498 (3.9)	1944 (61.3)	1227 (38.7)	3171 (4.2)	2049 (57.7)	1505 (42.3)	3554 (4.0)	2176 (55.4)	1749 (44.6)	3925 (3.7)	2140 (53.8)	1836 (46.2)	3976 (3.2)
50 - 54	960 (56.4)	742 (43.6)	1702 (2.6)	1351 (59.0)	937 (41.0)	2288 (3.0)	1781 (61.3)	1124 (38.7)	2905 (3.2)	1877 (57.6)	1379 (42.4)	3256 (3.1)	1993 (55.4)	1602 (44.6)	3595 (2.9)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.7)	879 (56.4)	680 (43.6)	1559 (2.0)	1238 (59.1)	858 (40.9)	2096 (2.3)	1631 (61.3)	1030 (38.7)	2661 (2.5)	1719 (57.6)	1263 (42.4)	2982 (2.4)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.7)	706 (58.1)	510 (41.9)	1216 (1.6)	612 (56.4)	473 (43.6)	1085 (1.2)	862 (59.1)	597 (40.9)	1459 (1.4)	1135 (61.3)	717 (38.7)	1852 (1.5)
65 - 69	324 (47.0)	365 (53.0)	689 (1.1)	402 (54.0)	343 (46.0)	745 (1.0)	491 (58.0)	355 (42.0)	846 (0.9)	426 (56.4)	329 (43.6)	755 (0.7)	600 (59.1)	414 (40.9)	1016 (0.8)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	226 (47.1)	254 (52.9)	480 (0.6)	280 (53.9)	239 (46.1)	519 (0.6)	342 (58.1)	247 (41.9)	589 (0.6)	296 (56.4)	229 (43.6)	525 (0.4)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	111 (45.5)	133 (54.5)	244 (0.3)	157 (47.0)	177 (53.0)	334 (0.4)	195 (54.0)	166 (46.0)	361 (0.3)	238 (58.0)	172 (42.0)	410 (0.3)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	70 (45.8)	83 (54.2)	153 (0.2)	98 (46.9)	111 (53.1)	209 (0.2)	122 (54.0)	104 (46.0)	226 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)	28 (45.9)	33 (54.1)	61 (0.1)	39 (47.0)	44 (53.0)	83 (0.1)
	34,671	29,839	64,510	40,522	35,567	76,089	47,501	42,437	89,938	55,428	50,278	105,706	64,175	58,982	123,157

06/05/72 QUIN-BUD

SERIES B

Criteria

1. High Census (67, 890)
2. Medium Birth
3. Medium Migration

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

MEDIUM BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1971 MALE	1971 FEMALE	1971 TOTAL	1972 MALE	1972 FEMALE	1972 TOTAL	1973 MALE	1973 FEMALE	1973 TOTAL	1974 MALE	1974 FEMALE	1974 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	5204 (47.8)	5676 (52.2)	10882 (15.3)	5995 (47.8)	6542 (52.2)	12537 (16.8)	6786 (47.8)	7406 (52.2)	14192 (18.2)	7677 (47.8)	8270 (52.2)	15947 (19.6)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4452 (48.0)	4819 (52.0)	9271 (13.0)	4423 (48.0)	4794 (52.0)	9217 (12.4)	4394 (48.0)	4769 (52.0)	9163 (11.8)	4365 (47.9)	4744 (52.1)	9109 (11.2)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4083 (48.5)	4335 (51.5)	8418 (11.8)	4197 (48.4)	4476 (51.6)	8673 (11.6)	4311 (48.3)	4617 (51.7)	8928 (11.5)	4425 (48.2)	4758 (51.8)	9183 (11.3)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3253 (48.2)	3489 (51.8)	6742 (9.5)	3436 (48.4)	3668 (51.6)	7104 (9.5)	3619 (48.5)	3847 (51.5)	7466 (9.6)	3802 (48.6)	4026 (51.4)	7828 (9.7)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	4234 (57.5)	3130 (42.5)	7364 (10.3)	3951 (55.4)	3181 (44.6)	7132 (9.6)	3668 (53.2)	3232 (46.8)	6900 (8.9)	3385 (50.8)	3283 (49.2)	6668 (8.2)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	3018 (54.2)	2547 (45.8)	5565 (7.8)	3394 (55.8)	2687 (44.2)	6081 (8.2)	3770 (57.1)	2827 (42.9)	6597 (8.5)	4146 (58.3)	2967 (41.7)	7113 (8.8)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2624 (53.6)	2270 (46.4)	4894 (6.9)	2629 (53.3)	2306 (46.7)	4935 (6.6)	2634 (52.9)	2342 (47.1)	4976 (6.4)	2639 (52.6)	2378 (47.4)	5017 (6.2)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2459 (55.8)	1948 (44.2)	4407 (6.2)	2500 (55.3)	2023 (44.7)	4523 (6.1)	2541 (54.8)	2098 (45.2)	4639 (6.0)	2582 (54.5)	2173 (45.7)	4755 (5.9)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2284 (59.3)	1569 (40.7)	3853 (5.4)	2319 (58.4)	1650 (41.6)	3969 (5.3)	2354 (57.6)	1731 (42.4)	4085 (5.3)	2389 (56.9)	1812 (43.1)	4201 (5.2)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	1724 (59.1)	1195 (40.9)	2919 (4.1)	1825 (59.3)	1255 (40.7)	3080 (4.1)	1926 (59.4)	1315 (40.6)	3241 (4.2)	2027 (59.6)	1375 (40.4)	3402 (4.2)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1422 (61.7)	882 (38.3)	2304 (3.2)	1456 (60.8)	939 (39.2)	2395 (3.2)	1490 (59.9)	996 (40.1)	2486 (3.2)	1524 (59.1)	1053 (40.9)	2577 (3.2)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1080 (59.0)	752 (41.0)	1832 (2.6)	1145 (59.8)	771 (40.2)	1916 (2.6)	1210 (60.5)	790 (39.5)	2000 (2.6)	1275 (61.2)	809 (38.8)	2084 (2.6)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	617 (54.7)	510 (45.3)	1127 (1.6)	657 (55.5)	527 (44.5)	1184 (1.6)	697 (56.2)	544 (43.8)	1241 (1.6)	737 (56.8)	561 (43.2)	1298 (1.6)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	354 (48.6)	375 (51.4)	729 (1.0)	384 (49.9)	385 (50.1)	769 (1.0)	414 (51.2)	395 (48.8)	809 (1.0)	444 (52.3)	405 (47.7)	849 (1.0)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	187 (46.2)	218 (53.8)	405 (0.6)	214 (46.6)	245 (53.4)	459 (0.6)	241 (47.0)	272 (53.0)	513 (0.7)	269 (47.3)	299 (52.7)	567 (0.7)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	119 (43.6)	154 (56.4)	273 (0.4)	134 (44.7)	166 (55.3)	300 (0.4)	149 (45.6)	178 (54.4)	327 (0.4)	164 (46.3)	190 (53.7)	354 (0.4)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	47 (40.9)	68 (59.1)	115 (0.2)	52 (41.6)	73 (58.4)	125 (0.2)	57 (42.2)	78 (57.8)	135 (0.2)	62 (42.8)	83 (57.2)	145 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	32 (39.0)	50 (61.0)	82 (0.1)	30 (40.0)	45 (60.0)	75 (0.1)	28 (41.2)	40 (58.8)	68 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)
	35,645	32,245	67,890	37,193	33,989	71,182	38,741	35,733	74,474	40,289	37,477	77,766	41,837	39,221	81,058

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

MEDIUM BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1975 MALE	1975 FEMALE	1975 TOTAL	1976 MALE	1976 FEMALE	1976 TOTAL	1977 MALE	1977 FEMALE	1977 TOTAL	1978 MALE	1978 FEMALE	1978 TOTAL	1979 MALE	1979 FEMALE	1979 TOTAL
0 - 4	8370 (47.8)	9135 (52.2)	17505 (20.8)	8706 (47.8)	9501 (52.2)	18207 (20.6)	9042 (47.8)	9867 (52.2)	18909 (20.4)	9378 (47.8)	10233 (52.2)	19611 (20.3)	9714 (47.8)	10599 (52.2)	20313 (20.1)
5 - 9	4329 (47.9)	4716 (52.1)	9045 (10.7)	5104 (47.9)	5561 (52.1)	10665 (12.1)	5879 (47.9)	6406 (52.1)	12285 (13.3)	6654 (47.9)	7251 (52.1)	13905 (14.4)	7429 (47.9)	8096 (52.1)	15525 (15.4)
10 - 14	4538 (48.1)	4899 (51.9)	9437 (11.2)	4520 (48.1)	4886 (51.9)	9406 (10.6)	4502 (48.0)	4873 (52.0)	9375 (10.1)	4484 (48.0)	4860 (52.0)	9344 (9.7)	4466 (48.0)	4847 (52.0)	9313 (9.2)
15 - 19	3953 (48.6)	4205 (51.4)	8188 (9.7)	4106 (48.5)	4355 (51.5)	8461 (9.6)	4229 (48.4)	4505 (51.6)	8734 (9.4)	4352 (48.3)	4655 (51.7)	9007 (9.3)	4476 (48.2)	4805 (51.8)	9280 (9.2)
20 - 24	3097 (48.2)	3334 (51.8)	6431 (7.6)	3288 (48.3)	3521 (51.7)	6809 (7.7)	3479 (48.4)	3708 (51.6)	7187 (7.6)	3670 (48.5)	3895 (51.5)	7565 (7.8)	3861 (48.6)	4082 (51.4)	7943 (7.9)
25 - 29	4524 (59.3)	3106 (40.7)	7630 (9.0)	4256 (57.3)	3167 (42.7)	7423 (8.4)	3988 (55.3)	3228 (44.7)	7216 (7.8)	3720 (53.1)	3289 (46.9)	7009 (7.2)	3452 (50.7)	3350 (49.3)	6802 (6.7)
30 - 34	2643 (52.3)	2414 (47.7)	5057 (6.0)	3021 (54.1)	2561 (45.9)	5582 (6.3)	3399 (55.7)	2708 (44.3)	6107 (6.6)	3777 (57.0)	2855 (43.0)	6632 (6.9)	4155 (58.1)	3002 (41.9)	7157 (7.1)
35 - 39	2621 (53.9)	2246 (46.1)	4867 (5.8)	2637 (53.5)	2292 (46.5)	4929 (5.6)	2653 (53.2)	2338 (46.8)	4991 (5.4)	2669 (52.8)	2384 (47.2)	5053 (5.2)	2685 (52.5)	2430 (47.5)	5115 (5.1)
40 - 44	2425 (56.1)	1894 (43.9)	4319 (5.1)	2476 (55.6)	1978 (44.4)	4454 (5.0)	2527 (55.1)	2062 (44.9)	4589 (5.0)	2578 (54.6)	2146 (45.4)	4724 (4.9)	2629 (54.1)	2220 (45.9)	4859 (4.8)
45 - 49	2130 (59.8)	1433 (40.2)	3563 (4.2)	2173 (58.9)	1518 (41.1)	3691 (4.2)	2216 (58.0)	1603 (42.0)	3819 (4.1)	2259 (57.2)	1688 (42.8)	3947 (4.1)	2302 (56.5)	1773 (43.5)	4075 (4.0)
50 - 54	1657 (58.4)	1110 (41.6)	2667 (3.2)	1661 (58.5)	1176 (41.5)	2837 (3.2)	1765 (58.7)	1242 (41.3)	3007 (3.2)	1869 (58.8)	1308 (41.2)	3177 (3.3)	1973 (58.9)	1374 (41.1)	3347 (3.3)
55 - 59	1341 (61.9)	826 (38.1)	2167 (2.6)	1383 (60.9)	889 (39.1)	2272 (2.6)	1425 (59.9)	952 (40.1)	2377 (2.6)	1467 (59.1)	1015 (40.9)	2482 (2.6)	1509 (58.3)	1078 (41.7)	2587 (2.6)
60 - 64	776 (57.2)	580 (42.8)	1356 (1.6)	832 (57.9)	604 (42.1)	1436 (1.6)	888 (58.6)	628 (41.4)	1516 (1.6)	944 (59.1)	652 (40.9)	1596 (1.7)	1000 (59.7)	676 (40.3)	1676 (1.7)
65 - 69	472 (53.3)	413 (46.7)	885 (1.0)	511 (54.0)	436 (46.0)	947 (1.1)	550 (54.5)	459 (45.5)	1009 (1.1)	589 (55.0)	482 (45.0)	1071 (1.1)	628 (55.4)	505 (44.6)	1133 (1.1)
70 - 74	296 (47.7)	324 (52.3)	620 (0.7)	328 (49.0)	342 (51.0)	670 (0.8)	360 (50.0)	360 (50.0)	720 (0.8)	392 (50.9)	378 (49.1)	770 (0.8)	424 (51.7)	396 (48.3)	820 (0.8)
75 - 79	181 (47.1)	203 (52.9)	384 (0.5)	211 (47.5)	233 (52.5)	444 (0.5)	241 (47.8)	263 (52.2)	504 (0.5)	271 (48.0)	293 (52.0)	564 (0.6)	301 (48.2)	323 (51.8)	624 (0.6)
80 - 84	65 (42.2)	89 (57.8)	154 (0.2)	75 (43.6)	97 (56.4)	172 (0.2)	85 (44.7)	105 (55.3)	190 (0.2)	95 (45.7)	113 (54.3)	208 (0.2)	105 (46.5)	121 (53.5)	226 (0.2)
85 +	17 (40.5)	25 (59.5)	42 (0.0)	19 (41.3)	27 (58.7)	46 (0.1)	21 (42.0)	29 (58.0)	50 (0.1)	23 (42.6)	31 (57.4)	54 (0.1)	25 (43.1)	33 (56.9)	58 (0.1)
	43,365	40,952	84,317	45,307	43,144	88,451	47,249	45,336	92,585	49,191	47,528	96,719	51,133	49,720	100,853

06/05/72 GUAM-BUD

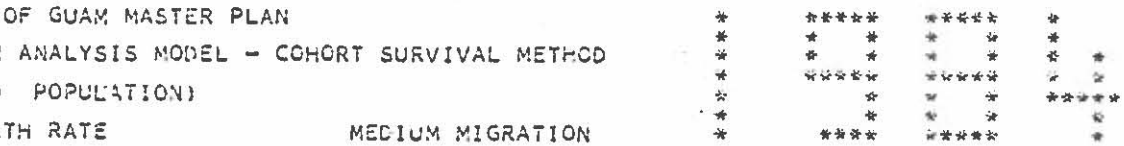


TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

MEDIUM BIRTH RATE MEDIUM MIGRATION



AGE GROUP	1980 MALE	1980 FEMALE	1980 TOTAL	1981 MALE	1981 FEMALE	1981 TOTAL	1982 MALE	1982 FEMALE	1982 TOTAL	1983 MALE	1983 FEMALE	1983 TOTAL	1984 MALE	1984 FEMALE	1984 TOTAL
0 - 4	10052 (47.8)	10965 (52.2)	21017 (20.0)	10434 (47.8)	11381 (52.2)	21815 (19.9)	10816 (47.8)	11797 (52.2)	22613 (19.7)	11198 (47.8)	12213 (52.2)	23411 (19.6)	11580 (47.8)	12629 (52.2)	24209 (19.5)
5 - 9	8202 (47.8)	8940 (52.2)	17142 (16.3)	8530 (47.9)	9296 (52.1)	17826 (16.2)	8858 (47.9)	9652 (52.1)	18510 (16.2)	9186 (47.9)	10008 (52.1)	19194 (16.1)	9514 (47.9)	10364 (52.1)	19878 (16.0)
10 - 14	4441 (47.9)	4827 (52.1)	9268 (8.8)	5216 (47.9)	5672 (52.1)	10888 (9.9)	5991 (47.9)	6517 (52.1)	12508 (10.9)	6766 (47.9)	7362 (52.1)	14128 (11.8)	7541 (47.9)	8207 (52.1)	15748 (12.7)
15 - 19	4599 (48.1)	4955 (51.9)	9554 (9.1)	4584 (48.1)	4945 (51.9)	9529 (8.7)	4669 (48.1)	4935 (51.9)	9504 (8.3)	4554 (48.0)	4925 (52.0)	9479 (7.9)	4639 (48.0)	4916 (52.0)	9454 (7.6)
20 - 24	4052 (48.7)	4271 (51.3)	8323 (7.9)	4177 (48.6)	4422 (51.4)	8599 (7.8)	4302 (48.5)	4573 (51.5)	8875 (7.7)	4427 (48.4)	4724 (51.6)	9151 (7.7)	4552 (48.3)	4875 (51.7)	9427 (7.6)
25 - 29	3179 (48.2)	3412 (51.8)	6591 (6.3)	3370 (48.4)	3600 (51.6)	6970 (6.3)	3561 (48.5)	3788 (51.5)	7349 (6.4)	3752 (48.6)	3976 (51.4)	7728 (6.5)	3943 (48.6)	4164 (51.4)	8107 (6.5)
30 - 34	4531 (59.0)	3150 (41.0)	7681 (7.3)	4273 (57.1)	3213 (42.9)	7486 (6.8)	4015 (55.1)	3276 (44.9)	7291 (6.4)	3757 (52.9)	3339 (47.1)	7096 (5.9)	3499 (50.7)	3402 (49.3)	6901 (5.6)
35 - 39	2699 (52.2)	2476 (47.8)	5175 (4.9)	3070 (53.9)	2622 (46.1)	5692 (5.2)	3441 (55.4)	2768 (44.6)	6209 (5.4)	3812 (56.7)	2914 (43.3)	6726 (5.6)	4183 (57.8)	3060 (42.2)	7243 (5.8)
40 - 44	2678 (53.7)	2313 (46.3)	4991 (4.8)	2696 (53.3)	2361 (46.7)	5057 (4.6)	2714 (53.0)	2409 (47.0)	5123 (4.5)	2732 (52.6)	2457 (47.4)	5189 (4.3)	2750 (52.3)	2505 (47.7)	5255 (4.2)
45 - 49	2346 (55.8)	1860 (44.2)	4206 (4.0)	2395 (55.2)	1940 (44.8)	4335 (3.9)	2444 (54.7)	2020 (45.3)	4464 (3.9)	2493 (54.3)	2100 (45.7)	4593 (3.8)	2542 (53.8)	2180 (46.2)	4722 (3.8)
50 - 54	2076 (59.1)	1438 (40.9)	3514 (3.3)	2119 (58.2)	1519 (41.8)	3638 (3.3)	2162 (57.5)	1600 (42.5)	3762 (3.3)	2205 (56.7)	1681 (43.3)	3886 (3.3)	2248 (56.1)	1762 (43.9)	4010 (3.2)
55 - 59	1551 (57.6)	1142 (42.4)	2693 (2.6)	1649 (57.8)	1205 (42.2)	2854 (2.6)	1747 (57.9)	1268 (42.1)	3015 (2.6)	1845 (58.1)	1331 (41.9)	3176 (2.7)	1943 (58.2)	1394 (41.8)	3337 (2.7)
60 - 64	1058 (60.2)	700 (39.8)	1758 (1.7)	1090 (59.3)	747 (40.7)	1837 (1.7)	1122 (58.6)	794 (41.4)	1916 (1.7)	1154 (57.8)	841 (42.2)	1995 (1.7)	1186 (57.2)	888 (42.8)	2074 (1.7)
65 - 69	665 (55.7)	529 (44.3)	1194 (1.1)	707 (56.3)	549 (43.7)	1256 (1.1)	749 (56.3)	569 (43.2)	1318 (1.2)	791 (57.3)	589 (42.7)	1380 (1.2)	833 (57.8)	609 (42.2)	1442 (1.2)
70 - 74	454 (52.4)	412 (47.6)	866 (0.8)	484 (52.9)	431 (47.1)	915 (0.8)	514 (53.3)	450 (46.7)	964 (0.8)	544 (53.7)	469 (46.3)	1013 (0.8)	574 (54.0)	488 (46.0)	1062 (0.9)
75 - 79	331 (48.5)	351 (51.5)	682 (0.6)	356 (49.3)	366 (50.7)	722 (0.7)	381 (50.0)	381 (50.0)	762 (0.7)	406 (50.6)	396 (49.4)	802 (0.7)	431 (51.2)	411 (48.8)	842 (0.7)
80 - 84	113 (47.1)	127 (52.9)	240 (0.2)	132 (47.5)	146 (52.5)	278 (0.3)	151 (47.8)	165 (52.2)	316 (0.3)	170 (48.0)	184 (52.0)	354 (0.3)	189 (48.2)	203 (51.8)	392 (0.3)
85 +	26 (42.6)	35 (57.4)	61 (0.1)	30 (44.1)	38 (55.9)	68 (0.1)	34 (45.3)	41 (54.7)	75 (0.1)	38 (46.3)	44 (53.7)	82 (0.1)	42 (47.2)	47 (52.8)	89 (0.1)
	53,053	51,903	104,956	55,312	54,453	109,765	57,571	57,003	114,574	59,830	59,553	119,383	62,089	62,103	124,192

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

MEDIUM BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1985 MALE	1985 FEMALE	1985 TOTAL	1986 MALE	1986 FEMALE	1986 TOTAL	1987 MALE	1987 FEMALE	1987 TOTAL	1988 MALE	1988 FEMALE	1988 TOTAL	1989 MALE	1989 FEMALE	1989 TOTAL
0 - 4	11960 (47.8)	13047 (52.2)	25007 (19.4)	12381 (47.8)	13507 (52.2)	25888 (19.2)	12802 (47.8)	13967 (52.2)	26769 (19.1)	13223 (47.8)	14427 (52.2)	27650 (18.9)	13644 (47.8)	14887 (52.2)	28531 (18.8)
5 - 9	9840 (47.9)	10721 (52.1)	20561 (15.9)	10216 (47.9)	11131 (52.1)	21347 (15.9)	10593 (47.9)	11541 (52.1)	22133 (15.8)	10968 (47.9)	11951 (52.1)	22919 (15.7)	11344 (47.9)	12361 (52.1)	23705 (15.6)
10 - 14	8317 (47.9)	9053 (52.1)	17370 (13.5)	8652 (47.9)	9416 (52.1)	18068 (13.4)	8987 (47.9)	9779 (52.1)	18766 (13.4)	9322 (47.9)	10142 (52.1)	19464 (13.3)	9657 (47.9)	10505 (52.1)	20162 (13.3)
15 - 19	4519 (48.0)	4899 (52.0)	9418 (7.3)	5291 (48.0)	5740 (52.0)	11031 (8.2)	6063 (48.0)	6581 (52.0)	12644 (9.0)	6835 (47.9)	7422 (52.1)	14257 (9.8)	7607 (47.9)	8263 (52.1)	15870 (10.5)
20 - 24	4675 (48.2)	5026 (51.8)	9701 (7.5)	4668 (48.2)	5024 (51.8)	9692 (7.2)	4667 (48.1)	5022 (51.9)	9689 (6.9)	4654 (48.1)	5020 (51.9)	9674 (6.6)	4647 (48.1)	5015 (51.9)	9662 (6.4)
25 - 29	4135 (48.7)	4351 (51.3)	8486 (6.6)	4266 (48.6)	4508 (51.4)	8774 (6.5)	4397 (48.5)	4665 (51.5)	9062 (6.5)	4529 (48.4)	4822 (51.6)	9350 (6.4)	4659 (48.3)	4979 (51.7)	9638 (6.4)
30 - 34	3236 (48.3)	3463 (51.7)	6699 (5.2)	3430 (48.4)	3654 (51.6)	7084 (5.3)	3624 (48.5)	3845 (51.5)	7469 (5.3)	3816 (48.6)	4036 (51.4)	7854 (5.4)	4012 (48.7)	4227 (51.3)	8239 (5.4)
35 - 39	4553 (58.7)	3208 (41.3)	7761 (6.0)	4310 (56.8)	3277 (43.2)	7587 (5.6)	4067 (54.9)	3346 (45.1)	7413 (5.3)	3824 (52.8)	3415 (47.2)	7239 (5.0)	3581 (50.7)	3484 (49.3)	7065 (4.7)
40 - 44	2769 (52.0)	2552 (48.0)	5321 (4.1)	3138 (53.7)	2703 (46.3)	5841 (4.3)	3507 (55.1)	2854 (44.9)	6361 (4.5)	3876 (56.3)	3005 (43.7)	6881 (4.7)	4245 (57.4)	3156 (42.6)	7401 (4.9)
45 - 49	2593 (53.4)	2259 (46.6)	4852 (3.8)	2618 (53.1)	2311 (46.9)	4929 (3.7)	2643 (52.8)	2363 (47.2)	5006 (3.6)	2668 (52.5)	2415 (47.5)	5083 (3.5)	2693 (52.2)	2467 (47.8)	5160 (3.4)
50 - 54	2289 (55.4)	1844 (44.6)	4133 (3.2)	2342 (54.9)	1925 (45.1)	4267 (3.2)	2395 (54.4)	2006 (45.6)	4401 (3.1)	2448 (54.0)	2087 (46.0)	4535 (3.1)	2501 (53.6)	2165 (46.4)	4669 (3.1)
55 - 59	2042 (58.4)	1457 (41.6)	3499 (2.7)	2089 (57.6)	1539 (42.4)	3628 (2.7)	2136 (56.9)	1621 (43.1)	3757 (2.7)	2183 (56.2)	1703 (43.8)	3886 (2.7)	2230 (55.5)	1785 (44.5)	4015 (2.8)
60 - 64	1219 (56.6)	935 (43.4)	2154 (1.7)	1295 (56.7)	987 (43.3)	2282 (1.7)	1371 (56.9)	1039 (43.1)	2410 (1.7)	1447 (57.0)	1091 (43.0)	2538 (1.7)	1523 (57.1)	1143 (42.9)	2666 (1.8)
65 - 69	876 (58.3)	627 (41.7)	1503 (1.2)	906 (57.6)	668 (42.4)	1574 (1.2)	936 (56.9)	709 (43.1)	1645 (1.2)	966 (56.3)	750 (43.7)	1716 (1.2)	996 (55.7)	791 (44.3)	1787 (1.2)
70 - 74	603 (54.3)	508 (45.7)	1111 (0.9)	640 (54.7)	530 (45.3)	1170 (0.9)	677 (55.1)	552 (44.9)	1229 (0.9)	714 (55.4)	574 (44.6)	1288 (0.9)	751 (55.8)	596 (44.2)	1347 (0.9)
75 - 79	456 (51.6)	427 (48.4)	883 (0.7)	485 (52.0)	448 (48.0)	933 (0.7)	514 (52.3)	469 (47.7)	983 (0.7)	543 (52.6)	490 (47.4)	1033 (0.7)	572 (52.8)	511 (47.2)	1083 (0.7)
80 - 84	208 (48.6)	220 (51.4)	428 (0.3)	224 (49.3)	230 (50.7)	454 (0.3)	240 (50.0)	240 (50.0)	480 (0.3)	256 (50.6)	250 (49.4)	506 (0.3)	272 (51.1)	260 (48.9)	532 (0.4)
85 +	45 (47.4)	50 (52.6)	95 (0.1)	52 (47.7)	57 (52.3)	109 (0.1)	59 (48.0)	64 (52.0)	123 (0.1)	66 (48.2)	71 (51.8)	137 (0.1)	73 (46.3)	78 (51.7)	151 (0.1)
	64,335	64,647	128,982	67,003	67,655	134,658	69,671	70,663	140,334	72,339	73,671	146,010	75,007	76,679	151,686

06/05/72 GUIA-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

MEDIUM BIRTH RATE MEDIUM MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	8370 (47.8)	9135 (52.2)	17505 (20.8)	10052 (47.8)	10965 (52.2)	21017 (20.0)	11960 (47.8)	13047 (52.2)	25007 (19.4)	14067 (47.8)	15345 (52.2)	29412 (18.7)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4329 (47.9)	4716 (52.1)	9045 (10.7)	8202 (47.8)	8940 (52.2)	17142 (16.3)	9840 (47.9)	10721 (52.1)	20561 (15.9)	11721 (47.9)	12770 (52.1)	24491 (15.6)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4538 (48.1)	4899 (51.9)	9437 (11.2)	4441 (47.9)	4827 (52.1)	9268 (8.8)	8317 (47.9)	9053 (52.1)	17370 (13.5)	9990 (47.9)	10869 (52.1)	20859 (13.3)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3983 (48.6)	4205 (51.4)	8188 (9.7)	4599 (48.1)	4955 (51.9)	9554 (9.1)	4519 (48.0)	4899 (52.0)	9418 (7.3)	8381 (47.9)	9106 (52.1)	17487 (11.1)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3097 (48.2)	3334 (51.8)	6431 (7.6)	4052 (48.7)	4271 (51.3)	8323 (7.9)	4675 (48.2)	5026 (51.8)	9701 (7.5)	4836 (48.1)	5010 (51.9)	9846 (6.1)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4524 (59.3)	3106 (40.7)	7630 (9.0)	3179 (48.2)	3412 (51.8)	6591 (6.3)	4135 (48.7)	4351 (51.3)	8486 (6.6)	4790 (48.3)	5136 (51.7)	9926 (6.3)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2643 (52.3)	2414 (47.7)	5057 (6.0)	4531 (59.0)	3150 (41.0)	7681 (7.3)	3236 (48.3)	3463 (51.7)	6699 (5.2)	4207 (48.8)	4418 (51.2)	8625 (5.5)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2621 (53.9)	2246 (46.1)	4867 (5.8)	2699 (52.2)	2476 (47.8)	5175 (4.9)	4553 (58.7)	3208 (41.3)	7761 (6.0)	3332 (48.4)	3553 (51.6)	6885 (4.4)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2425 (56.1)	1894 (43.9)	4319 (5.1)	2678 (53.7)	2313 (46.3)	4991 (4.8)	2769 (52.0)	2552 (48.0)	5321 (4.1)	4615 (58.3)	3305 (41.7)	7920 (5.0)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2130 (59.8)	1433 (40.2)	3563 (4.2)	2346 (55.8)	1860 (44.2)	4206 (4.0)	2593 (53.4)	2259 (46.6)	4852 (3.8)	2716 (51.9)	2513 (48.1)	5229 (3.3)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1557 (58.4)	1110 (41.6)	2667 (3.2)	2076 (59.1)	1438 (40.9)	3514 (3.3)	2289 (55.4)	1844 (44.6)	4133 (3.2)	2555 (55.2)	2249 (46.8)	4804 (3.1)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1341 (61.9)	826 (38.1)	2167 (2.6)	1551 (57.6)	1142 (42.4)	2693 (2.6)	2042 (58.4)	1457 (41.6)	3499 (2.7)	2277 (54.9)	1869 (45.1)	4146 (2.6)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	776 (57.2)	580 (42.8)	1356 (1.6)	1058 (60.2)	700 (39.8)	1758 (1.7)	1219 (56.6)	935 (43.4)	2154 (1.7)	1601 (57.3)	1194 (42.7)	2795 (1.8)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	472 (53.3)	413 (46.7)	885 (1.0)	665 (55.7)	529 (44.3)	1194 (1.1)	876 (58.3)	627 (41.7)	1503 (1.2)	1028 (55.3)	831 (44.7)	1859 (1.2)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	296 (47.7)	324 (52.3)	620 (0.7)	454 (52.4)	412 (47.6)	866 (0.8)	603 (54.3)	508 (45.7)	1111 (0.9)	790 (56.2)	616 (43.8)	1406 (0.9)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	181 (47.1)	203 (52.9)	384 (0.5)	331 (48.5)	351 (51.5)	682 (0.6)	456 (51.6)	427 (48.4)	883 (0.7)	600 (52.9)	534 (47.1)	1134 (0.7)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	113 (47.1)	127 (52.9)	240 (0.2)	208 (48.6)	220 (51.4)	428 (0.3)	286 (51.6)	268 (48.4)	554 (0.4)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	45 (47.4)	50 (52.6)	95 (0.1)	82 (48.5)	87 (51.5)	169 (0.1)
	35,645	32,245	67,890	43,365	40,952	84,317	53,053	51,903	104,956	64,335	64,647	128,982	77,674	79,678	157,352

06/05/72 GUAM-BUD

SERIES C

Criteria

1. High Census (67, 890)
2. High Birth
3. High Migration

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1971 MALE	1971 FEMALE	1971 TOTAL	1972 MALE	1972 FEMALE	1972 TOTAL	1973 MALE	1973 FEMALE	1973 TOTAL	1974 MALE	1974 FEMALE	1974 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	5357 (47.8)	5844 (52.2)	11201 (15.6)	6301 (47.8)	6874 (52.2)	13175 (17.4)	7245 (47.8)	7904 (52.2)	15149 (19.0)	8189 (47.8)	8934 (52.2)	17123 (20.5)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4463 (48.0)	4830 (52.0)	9293 (12.9)	4445 (48.0)	4816 (52.0)	9261 (12.2)	4427 (48.0)	4802 (52.0)	9229 (11.6)	4409 (47.9)	4788 (52.1)	9197 (11.0)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4094 (48.5)	4346 (51.5)	8440 (11.7)	4219 (48.4)	4498 (51.6)	8717 (11.5)	4344 (48.3)	4650 (51.7)	8994 (11.3)	4469 (48.2)	4802 (51.8)	9271 (11.1)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	3264 (48.3)	3500 (51.7)	6764 (9.4)	3458 (48.4)	3690 (51.6)	7148 (9.4)	3652 (48.5)	3880 (51.5)	7532 (9.4)	3846 (48.6)	4070 (51.4)	7916 (9.5)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	4245 (57.5)	3141 (42.5)	7386 (10.3)	3973 (55.4)	3203 (44.6)	7176 (9.5)	3701 (53.1)	3265 (46.9)	6966 (8.7)	3429 (50.8)	3327 (49.2)	6756 (8.1)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	3029 (54.2)	2558 (45.8)	5587 (7.8)	3416 (55.8)	2709 (44.2)	6125 (8.1)	3503 (57.1)	2660 (42.9)	6163 (8.4)	4190 (58.2)	3011 (41.8)	7201 (8.7)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2635 (53.6)	2281 (46.4)	4916 (6.8)	2651 (53.2)	2328 (46.8)	4979 (6.6)	2667 (53.9)	2375 (47.1)	5042 (6.5)	2683 (52.6)	2422 (47.4)	5105 (6.1)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2470 (55.8)	1959 (44.2)	4429 (6.2)	2522 (55.2)	2045 (44.8)	4567 (6.0)	2574 (54.7)	2131 (45.3)	4705 (5.9)	2626 (54.2)	2217 (45.8)	4843 (5.9)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2295 (59.2)	1580 (40.8)	3875 (5.4)	2341 (58.3)	1672 (41.7)	4013 (5.3)	2387 (57.5)	1764 (42.5)	4151 (5.2)	2433 (56.7)	1856 (43.3)	4289 (5.2)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	1735 (59.0)	1206 (41.0)	2941 (4.1)	1847 (59.1)	1277 (40.9)	3124 (4.1)	1959 (59.2)	1348 (40.8)	3307 (4.1)	2071 (59.3)	1419 (40.7)	3490 (4.2)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1433 (61.6)	893 (38.4)	2326 (3.2)	1478 (60.6)	961 (39.4)	2439 (3.2)	1523 (59.7)	1029 (40.3)	2552 (3.2)	1568 (58.8)	1097 (41.2)	2665 (3.2)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1091 (58.8)	763 (41.2)	1854 (2.6)	1167 (59.5)	793 (40.5)	1960 (2.6)	1243 (60.2)	823 (39.8)	2066 (2.6)	1319 (60.7)	853 (39.3)	2172 (2.6)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	628 (54.7)	521 (45.3)	1149 (1.6)	679 (55.3)	549 (44.7)	1228 (1.6)	730 (55.9)	577 (44.1)	1307 (1.6)	781 (56.3)	605 (43.7)	1386 (1.7)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	365 (48.6)	386 (51.4)	751 (1.0)	406 (49.9)	407 (50.1)	813 (1.1)	447 (51.1)	428 (48.9)	875 (1.1)	488 (52.1)	449 (47.9)	937 (1.1)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	198 (46.4)	229 (53.6)	427 (0.6)	236 (46.9)	267 (53.1)	503 (0.7)	274 (47.3)	305 (52.7)	579 (0.7)	312 (47.6)	343 (52.4)	655 (0.8)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	130 (44.1)	165 (55.9)	295 (0.4)	156 (45.3)	188 (54.7)	344 (0.5)	182 (46.3)	211 (53.7)	393 (0.5)	208 (47.1)	234 (52.9)	442 (0.5)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	47 (40.9)	68 (59.1)	115 (0.2)	52 (41.6)	73 (58.4)	125 (0.2)	57 (42.2)	78 (57.8)	135 (0.2)	62 (42.8)	83 (57.2)	145 (0.2)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	32 (39.0)	50 (61.0)	82 (0.1)	30 (40.0)	45 (60.0)	75 (0.1)	28 (41.2)	40 (58.8)	68 (0.1)	26 (42.6)	35 (57.4)	61 (0.1)
	35,645	32,245	67,890	37,511	34,320	71,831	39,377	36,395	75,772	41,243	38,470	79,713	43,109	40,545	83,654

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1975 MALE	1975 FEMALE	1975 TOTAL	1976 MALE	1976 FEMALE	1976 TOTAL	1977 MALE	1977 FEMALE	1977 TOTAL	1978 MALE	1978 FEMALE	1978 TOTAL	1979 MALE	1979 FEMALE	1979 TOTAL
0 - 4	9135 (47.8)	9965 (52.2)	19100 (21.8)	9550 (47.8)	10417 (52.2)	19967 (21.6)	9965 (47.8)	10869 (52.2)	20834 (21.4)	10380 (47.8)	11321 (52.2)	21701 (21.2)	10795 (47.8)	11773 (52.2)	22568 (21.0)
5 - 9	4384 (47.9)	4771 (52.1)	9155 (10.5)	5310 (47.9)	5780 (52.1)	11090 (12.0)	6236 (47.9)	6789 (52.1)	13025 (13.3)	7162 (47.9)	7798 (52.1)	14960 (14.6)	8088 (47.9)	8807 (52.1)	16895 (15.7)
10 - 14	4593 (48.1)	4954 (51.9)	9547 (10.9)	4590 (48.1)	4955 (51.9)	9545 (10.3)	4587 (48.1)	4956 (51.9)	9543 (9.8)	4584 (48.0)	4957 (52.0)	9541 (9.3)	4581 (48.0)	4958 (52.0)	9539 (8.9)
15 - 19	4039 (48.7)	4260 (51.3)	8298 (9.5)	4176 (48.6)	4425 (51.4)	8601 (9.3)	4314 (48.5)	4590 (51.5)	8904 (9.1)	4452 (48.4)	4755 (51.6)	9207 (9.0)	4590 (48.3)	4920 (51.7)	9510 (8.8)
20 - 24	3152 (48.2)	3389 (51.8)	6541 (7.5)	3358 (48.3)	3591 (51.7)	6949 (7.5)	3564 (48.4)	3793 (51.6)	7357 (7.5)	3770 (48.6)	3995 (51.4)	7765 (7.6)	3976 (48.6)	4197 (51.4)	8173 (7.6)
25 - 29	4579 (59.2)	3161 (40.8)	7740 (8.8)	4326 (57.2)	3237 (42.8)	7563 (8.2)	4073 (55.1)	3313 (44.9)	7386 (7.6)	3820 (53.0)	3389 (47.0)	7209 (7.0)	3567 (50.7)	3466 (49.3)	7032 (6.5)
30 - 34	2698 (52.2)	2469 (47.8)	5167 (5.9)	3090 (54.0)	2631 (46.0)	5721 (6.2)	3482 (55.5)	2793 (44.5)	6275 (6.4)	3874 (56.7)	2955 (43.3)	6829 (6.7)	4266 (57.8)	3117 (42.2)	7383 (6.9)
35 - 39	2676 (53.8)	2301 (46.2)	4977 (5.7)	2706 (53.4)	2362 (46.6)	5068 (5.5)	2736 (53.0)	2423 (47.0)	5159 (5.3)	2766 (52.7)	2484 (47.3)	5250 (5.1)	2796 (52.9)	2545 (47.7)	5341 (5.0)
40 - 44	2480 (56.0)	1949 (44.0)	4429 (5.1)	2545 (55.4)	2047 (44.6)	4592 (5.0)	2610 (54.9)	2145 (45.1)	4755 (4.9)	2675 (54.4)	2243 (45.6)	4918 (4.8)	2740 (53.9)	2341 (46.1)	5081 (4.7)
45 - 49	2185 (59.5)	1488 (40.5)	3673 (4.2)	2242 (58.6)	1587 (41.4)	3829 (4.1)	2299 (57.7)	1686 (42.3)	3985 (4.1)	2356 (56.9)	1785 (43.1)	4141 (4.0)	2413 (56.2)	1884 (43.8)	4297 (4.0)
50 - 54	1612 (58.0)	1165 (42.0)	2777 (3.2)	1730 (58.2)	1245 (41.8)	2975 (3.2)	1848 (58.2)	1325 (41.8)	3173 (3.3)	1966 (58.3)	1405 (41.7)	3371 (3.3)	2084 (58.4)	1485 (41.6)	3569 (3.3)
55 - 59	1396 (61.3)	881 (38.7)	2277 (2.6)	1452 (60.2)	958 (39.8)	2410 (2.6)	1508 (59.3)	1035 (40.7)	2543 (2.6)	1564 (58.4)	1112 (41.6)	2676 (2.6)	1620 (57.7)	1189 (42.3)	2809 (2.6)
60 - 64	831 (56.7)	635 (43.3)	1466 (1.7)	899 (57.3)	671 (42.7)	1570 (1.7)	967 (57.8)	707 (42.2)	1674 (1.7)	1035 (58.2)	743 (41.8)	1778 (1.7)	1103 (58.6)	779 (41.4)	1882 (1.7)
65 - 69	527 (53.0)	468 (47.0)	995 (1.1)	577 (53.4)	503 (46.6)	1080 (1.2)	627 (53.8)	538 (46.2)	1165 (1.2)	677 (54.2)	573 (45.8)	1250 (1.2)	727 (54.5)	608 (45.5)	1335 (1.2)
70 - 74	351 (48.1)	379 (51.9)	730 (0.8)	394 (49.1)	408 (50.9)	802 (0.9)	437 (50.0)	437 (50.0)	874 (0.9)	480 (50.7)	466 (49.3)	946 (0.9)	523 (51.4)	495 (48.6)	1018 (0.9)
75 - 79	236 (47.8)	258 (52.2)	494 (0.6)	278 (48.2)	299 (51.8)	577 (0.6)	320 (48.5)	340 (51.5)	660 (0.7)	362 (48.7)	381 (51.3)	743 (0.7)	404 (48.9)	422 (51.1)	826 (0.8)
80 - 84	65 (42.2)	89 (57.8)	154 (0.2)	82 (44.1)	104 (55.9)	186 (0.2)	99 (45.4)	119 (54.6)	218 (0.2)	116 (46.4)	134 (53.6)	250 (0.2)	133 (47.2)	149 (52.8)	282 (0.3)
85 +	17 (40.5)	25 (59.5)	42 (0.0)	19 (41.3)	27 (58.7)	46 (0.0)	21 (42.0)	29 (58.0)	50 (0.1)	23 (42.6)	31 (57.4)	54 (0.1)	25 (43.1)	33 (56.9)	58 (0.1)
	44,955	42,607	87,562	47,324	45,247	92,571	49,693	47,887	97,580	52,062	50,527	102,589	54,431	53,167	107,598

06/05/72 QUIN-BJD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1980 MALE	1980 FEMALE	1980 TOTAL	1981 MALE	1981 FEMALE	1981 TOTAL	1982 MALE	1982 FEMALE	1982 TOTAL	1983 MALE	1983 FEMALE	1983 TOTAL	1984 MALE	1984 FEMALE	1984 TOTAL
0 - 4	11209 (47.8)	12223 (52.2)	23432 (20.8)	11724 (47.8)	12784 (52.2)	24508 (20.6)	12239 (47.8)	13345 (52.2)	25584 (20.4)	12754 (47.8)	13906 (52.2)	26660 (20.2)	13269 (47.8)	14467 (52.2)	27736 (20.1)
5 - 9	9015 (47.9)	9816 (52.1)	18831 (16.7)	9435 (47.9)	10272 (52.1)	19707 (16.6)	9855 (47.9)	10728 (52.1)	20583 (16.4)	10275 (47.9)	11184 (52.1)	21459 (16.3)	10695 (47.9)	11640 (52.1)	22335 (16.2)
10 - 14	4571 (48.0)	4957 (52.0)	9528 (8.5)	5514 (48.0)	5983 (52.0)	11497 (9.7)	6457 (48.0)	7009 (52.0)	13466 (10.7)	7400 (47.9)	8035 (52.1)	15435 (11.7)	8343 (47.9)	9061 (52.1)	17404 (12.6)
15 - 19	4729 (48.2)	5085 (51.8)	9814 (8.7)	4745 (48.2)	5106 (51.8)	9851 (8.3)	4761 (48.1)	5127 (51.9)	9888 (7.9)	4777 (48.1)	5148 (51.9)	9925 (7.5)	4793 (48.1)	5169 (51.9)	9962 (7.2)
20 - 24	4181 (48.7)	4400 (51.3)	8581 (7.6)	4337 (48.6)	4583 (51.4)	8920 (7.5)	4493 (48.5)	4766 (51.5)	9259 (7.4)	4649 (48.4)	4949 (51.6)	9598 (7.3)	4805 (48.4)	5132 (51.6)	9937 (7.2)
25 - 29	3308 (48.3)	3542 (51.7)	6850 (6.1)	3531 (48.4)	3761 (51.6)	7292 (6.1)	3754 (48.5)	3980 (51.5)	7734 (6.2)	3977 (48.6)	4199 (51.4)	8176 (6.2)	4200 (48.7)	4418 (51.3)	8618 (6.2)
30 - 34	4660 (58.7)	3279 (41.3)	7939 (7.1)	4433 (56.8)	3373 (43.2)	7806 (6.6)	4206 (54.8)	3467 (45.2)	7673 (6.1)	3979 (52.8)	3561 (47.2)	7540 (5.7)	3752 (50.7)	3655 (49.3)	7407 (5.4)
35 - 39	2828 (52.1)	2605 (47.9)	5433 (4.8)	3230 (53.7)	2783 (46.3)	6013 (5.1)	3632 (55.1)	2961 (44.9)	6593 (5.3)	4034 (56.2)	3139 (43.8)	7173 (5.4)	4436 (57.2)	3317 (42.8)	7753 (5.5)
40 - 44	2806 (53.5)	2441 (46.5)	5247 (4.7)	2656 (53.1)	2520 (46.9)	5376 (4.5)	2906 (52.8)	2599 (47.2)	5505 (4.4)	2956 (52.5)	2678 (47.5)	5634 (4.3)	3006 (52.2)	2757 (47.8)	5763 (4.2)
45 - 49	2472 (55.5)	1985 (44.5)	4457 (4.0)	2552 (54.9)	2095 (45.1)	4647 (3.9)	2632 (54.4)	2205 (45.6)	4837 (3.9)	2712 (53.9)	2315 (46.1)	5027 (3.8)	2792 (53.5)	2425 (46.5)	5217 (3.8)
50 - 54	2201 (58.5)	1563 (41.5)	3764 (3.3)	2274 (57.6)	1674 (42.4)	3948 (3.3)	2347 (56.8)	1785 (43.2)	4132 (3.3)	2420 (56.1)	1896 (43.9)	4316 (3.3)	2493 (55.4)	2007 (44.6)	4500 (3.3)
55 - 59	1677 (57.0)	1267 (43.0)	2944 (2.6)	1805 (57.0)	1360 (43.0)	3165 (2.7)	1933 (57.1)	1453 (42.9)	3386 (2.7)	2061 (57.1)	1546 (42.9)	3607 (2.7)	2189 (57.2)	1639 (42.8)	3828 (2.8)
60 - 64	1172 (59.0)	813 (41.0)	1985 (1.8)	1231 (58.1)	887 (41.9)	2118 (1.8)	1290 (57.3)	961 (42.7)	2251 (1.8)	1349 (56.6)	1035 (43.4)	2384 (1.8)	1408 (55.9)	1109 (44.1)	2517 (1.8)
65 - 69	778 (54.8)	642 (45.2)	1420 (1.3)	846 (55.2)	687 (44.8)	1533 (1.3)	914 (55.5)	732 (44.5)	1646 (1.3)	982 (55.8)	777 (44.2)	1759 (1.3)	1050 (56.1)	822 (43.9)	1872 (1.4)
70 - 74	567 (51.9)	526 (48.1)	1093 (1.0)	622 (52.2)	570 (47.8)	1192 (1.0)	677 (52.4)	614 (47.6)	1291 (1.0)	732 (52.7)	658 (47.3)	1390 (1.1)	787 (52.9)	702 (47.1)	1489 (1.1)
75 - 79	444 (48.9)	464 (51.1)	908 (0.8)	494 (49.5)	504 (50.5)	998 (0.8)	544 (50.0)	544 (50.0)	1088 (0.9)	594 (50.4)	584 (49.6)	1178 (0.9)	644 (50.8)	624 (49.2)	1268 (0.9)
80 - 84	148 (47.7)	162 (52.3)	310 (0.3)	174 (48.1)	188 (51.9)	362 (0.3)	200 (48.3)	214 (51.7)	414 (0.3)	226 (48.5)	240 (51.5)	466 (0.4)	252 (48.6)	266 (51.4)	518 (0.4)
85 +	26 (42.6)	35 (57.4)	61 (0.1)	32 (43.8)	41 (56.2)	73 (0.1)	38 (44.7)	47 (55.3)	85 (0.1)	44 (45.4)	53 (54.6)	97 (0.1)	50 (45.9)	59 (54.1)	109 (0.1)
	56,792	55,805	112,597	59,835	59,171	119,006	62,878	62,537	125,415	65,921	65,903	131,824	68,964	69,269	138,233

06/05/72 GUIM-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTED POPULATION)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1985 MALE	1985 FEMALE	1985 TOTAL	1986 MALE	1986 FEMALE	1986 TOTAL	1987 MALE	1987 FEMALE	1987 TOTAL	1988 MALE	1988 FEMALE	1988 TOTAL	1989 MALE	1989 FEMALE	1989 TOTAL
0 - 4	13784 (47.8)	15026 (52.2)	28810 (19.9)	14225 (47.8)	15507 (52.2)	29732 (19.6)	14666 (47.8)	15988 (52.2)	30654 (19.3)	15107 (47.8)	16469 (52.2)	31576 (19.0)	15548 (47.8)	16950 (52.2)	32498 (18.8)
5 - 9	11117 (47.9)	12095 (52.1)	23212 (16.0)	11619 (47.9)	12641 (52.1)	24260 (16.0)	12121 (47.9)	13187 (52.1)	25308 (15.9)	12623 (47.9)	13733 (52.1)	26356 (15.9)	13125 (47.9)	14279 (52.1)	27404 (15.8)
10 - 14	9288 (47.9)	10087 (52.1)	19375 (13.4)	9712 (47.9)	10546 (52.1)	20258 (13.4)	10136 (47.9)	11005 (52.1)	21141 (13.3)	10560 (47.9)	11464 (52.1)	22024 (13.3)	10984 (48.0)	11923 (52.0)	22907 (13.2)
15 - 19	4807 (48.1)	5189 (51.9)	9995 (6.9)	5742 (48.1)	6205 (51.9)	11947 (7.9)	6677 (48.0)	7222 (52.0)	13899 (8.8)	7612 (48.0)	8239 (52.0)	15851 (9.6)	8547 (48.0)	9256 (52.0)	17803 (10.3)
20 - 24	4963 (48.3)	5314 (51.7)	10277 (7.1)	4983 (48.3)	5339 (51.7)	10322 (6.8)	5003 (48.3)	5364 (51.7)	10367 (6.5)	5023 (48.2)	5389 (51.8)	10412 (6.3)	5043 (48.2)	5414 (51.8)	10457 (6.0)
25 - 29	4422 (48.8)	4638 (51.2)	9060 (6.3)	4581 (48.7)	4823 (51.3)	9404 (6.2)	4740 (48.6)	5008 (51.4)	9748 (6.1)	4899 (48.5)	5193 (51.5)	10092 (6.1)	5058 (48.5)	5378 (51.5)	10436 (6.0)
30 - 34	3522 (48.4)	3750 (51.6)	7272 (5.0)	3744 (48.5)	3968 (51.5)	7712 (5.1)	3956 (48.7)	4196 (51.3)	8152 (5.1)	4168 (48.7)	4404 (51.3)	8592 (5.2)	4410 (48.8)	4622 (51.2)	9032 (5.2)
35 - 39	4039 (58.1)	3494 (41.9)	8333 (5.8)	4623 (56.3)	3591 (43.7)	8214 (5.4)	4407 (54.4)	3688 (45.6)	8095 (5.1)	4191 (52.5)	3785 (47.5)	7976 (4.8)	3975 (50.6)	3882 (49.4)	7857 (4.5)
40 - 44	3054 (51.2)	2837 (48.2)	5891 (4.1)	3451 (53.4)	3015 (46.6)	6466 (4.3)	3848 (54.7)	3193 (45.3)	7041 (4.4)	4245 (55.7)	3371 (44.3)	7616 (4.6)	4642 (56.7)	3549 (43.3)	8191 (4.7)
45 - 49	2870 (53.1)	2536 (46.9)	5406 (3.7)	2920 (52.8)	2614 (47.2)	5534 (3.6)	2970 (52.5)	2692 (47.5)	5662 (3.6)	3020 (52.2)	2770 (47.8)	5790 (3.5)	3070 (51.9)	2843 (48.1)	5913 (3.4)
50 - 54	2564 (54.8)	2118 (45.2)	4682 (3.2)	2642 (54.3)	2224 (45.7)	4866 (3.2)	2720 (53.9)	2330 (46.1)	5050 (3.2)	2798 (53.5)	2436 (46.5)	5234 (3.2)	2876 (53.1)	2542 (46.9)	5418 (3.1)
55 - 59	2316 (57.2)	1732 (42.8)	4048 (2.8)	2388 (56.5)	1839 (43.5)	4227 (2.8)	2460 (55.8)	1946 (44.2)	4406 (2.8)	2532 (55.2)	2053 (44.8)	4585 (2.8)	2604 (54.7)	2160 (45.3)	4764 (2.8)
60 - 64	1467 (55.4)	1182 (44.6)	2649 (1.8)	1561 (55.5)	1252 (44.5)	2813 (1.9)	1655 (55.6)	1322 (44.4)	2977 (1.9)	1749 (55.7)	1392 (44.3)	3141 (1.9)	1843 (55.8)	1462 (44.2)	3305 (1.9)
65 - 69	1116 (56.3)	866 (43.7)	1982 (1.4)	1162 (55.8)	922 (44.2)	2084 (1.4)	1208 (55.3)	978 (44.7)	2186 (1.4)	1254 (54.8)	1034 (45.2)	2288 (1.4)	1300 (54.4)	1090 (45.6)	2390 (1.4)
70 - 74	841 (53.0)	747 (47.0)	1588 (1.1)	893 (53.3)	783 (46.7)	1676 (1.1)	945 (53.6)	819 (46.4)	1764 (1.1)	997 (53.8)	855 (46.2)	1852 (1.1)	1049 (54.1)	891 (45.9)	1940 (1.1)
75 - 79	695 (51.1)	666 (48.9)	1361 (0.9)	738 (51.3)	702 (48.8)	1440 (0.9)	781 (51.4)	738 (48.6)	1519 (1.0)	824 (51.6)	774 (48.4)	1598 (1.0)	867 (51.7)	810 (48.3)	1677 (1.0)
80 - 84	278 (48.9)	291 (51.1)	569 (0.4)	310 (49.5)	316 (50.5)	626 (0.4)	342 (50.1)	341 (49.9)	683 (0.4)	374 (50.5)	366 (49.5)	740 (0.4)	406 (50.9)	391 (49.1)	797 (0.5)
85 +	58 (47.5)	64 (52.5)	122 (0.1)	68 (47.9)	74 (52.1)	142 (0.1)	78 (48.1)	84 (51.9)	162 (0.1)	86 (48.4)	94 (51.6)	182 (0.1)	98 (48.5)	104 (51.5)	202 (0.1)
	72,001	72,631	144,632	75,362	76,361	151,723	78,723	80,091	158,814	82,084	83,821	165,905	85,445	87,551	172,996

06/05/72 GUIN-BUD

TERRITORY OF GUAM MASTER PLAN

POPULATION ANALYSIS MODEL - COHORT SURVIVAL METHOD

(PROJECTION SUMMARY)

HIGH BIRTH RATE HIGH MIGRATION

AGE GROUP	1970 MALE	1970 FEMALE	1970 TOTAL	1975 MALE	1975 FEMALE	1975 TOTAL	1980 MALE	1980 FEMALE	1980 TOTAL	1985 MALE	1985 FEMALE	1985 TOTAL	1990 MALE	1990 FEMALE	1990 TOTAL
0 - 4	4413 (47.8)	4814 (52.2)	9227 (13.6)	9135 (47.8)	9965 (52.2)	19100 (21.8)	11209 (47.8)	12223 (52.2)	23432 (20.8)	13784 (47.6)	15026 (52.2)	28810 (19.9)	15968 (****)	17429 (****)	***** (****)
5 - 9	4481 (48.1)	4844 (51.9)	9325 (13.7)	4384 (47.9)	4771 (52.1)	9155 (10.5)	9015 (47.9)	9816 (52.1)	18831 (16.7)	11117 (47.9)	12095 (52.1)	23212 (16.0)	13627 (47.9)	14825 (52.1)	28452 (13.5)
10 - 14	3969 (48.6)	4194 (51.4)	8163 (12.0)	4593 (48.1)	4954 (51.9)	9547 (10.9)	4571 (48.0)	4957 (52.0)	9528 (8.5)	9288 (47.9)	10087 (52.1)	19375 (13.4)	11409 (48.0)	12384 (52.0)	23793 (11.2)
15 - 19	3070 (48.1)	3310 (51.9)	6380 (9.4)	4038 (48.7)	4260 (51.3)	8298 (9.5)	4729 (48.2)	5085 (51.8)	9814 (8.7)	4807 (48.1)	5128 (51.9)	9935 (6.9)	9483 (48.0)	10271 (52.0)	19754 (11.0)
20 - 24	4517 (59.5)	3079 (40.5)	7596 (11.2)	3152 (48.2)	3389 (51.8)	6541 (7.5)	4181 (48.7)	4400 (51.3)	8581 (7.6)	4963 (48.3)	5314 (51.7)	10277 (7.1)	5065 (48.2)	5440 (51.8)	10505 (5.8)
25 - 29	2642 (52.3)	2407 (47.7)	5049 (7.4)	4579 (59.2)	3161 (40.8)	7740 (8.8)	3308 (48.3)	3542 (51.7)	6850 (6.1)	4422 (48.8)	4638 (51.2)	9060 (6.3)	5219 (48.4)	5565 (51.6)	10784 (6.0)
30 - 34	2619 (54.0)	2234 (46.0)	4853 (7.1)	2698 (52.2)	2469 (47.8)	5167 (5.9)	4660 (58.7)	3279 (41.3)	7939 (7.1)	3522 (48.4)	3750 (51.6)	7272 (5.0)	4632 (48.9)	4842 (51.1)	9474 (5.3)
35 - 39	2418 (56.4)	1873 (43.6)	4291 (6.3)	2676 (53.8)	2301 (46.2)	4977 (5.7)	2828 (52.1)	2605 (47.9)	5433 (4.8)	4639 (58.1)	3494 (41.9)	8333 (5.8)	3755 (48.6)	3977 (51.4)	7732 (4.3)
40 - 44	2249 (60.2)	1488 (39.8)	3737 (5.5)	2480 (56.0)	1949 (44.0)	4429 (5.1)	2806 (53.5)	2441 (46.5)	5247 (4.7)	3054 (51.8)	2837 (48.2)	5891 (4.1)	5038 (57.5)	3728 (42.5)	8766 (4.9)
45 - 49	1623 (58.8)	1135 (41.2)	2758 (4.1)	2185 (59.5)	1488 (40.5)	3673 (4.2)	2472 (55.5)	1985 (44.5)	4457 (4.0)	2870 (53.1)	2536 (46.9)	5406 (3.7)	3122 (52.6)	2824 (48.4)	5946 (3.4)
50 - 54	1388 (62.7)	825 (37.3)	2213 (3.3)	1612 (58.0)	1165 (42.0)	2777 (3.2)	2201 (58.5)	1563 (41.5)	3764 (3.3)	2564 (54.8)	2118 (45.2)	4682 (3.2)	2954 (52.7)	2648 (47.3)	5602 (3.1)
55 - 59	1015 (58.1)	733 (41.9)	1748 (2.6)	1396 (61.3)	881 (38.7)	2277 (2.6)	1677 (57.0)	1267 (43.0)	2944 (2.6)	2316 (57.2)	1732 (42.8)	4043 (2.8)	2674 (54.1)	2265 (45.9)	4939 (2.7)
60 - 64	577 (53.9)	493 (46.1)	1070 (1.6)	831 (56.7)	635 (43.3)	1466 (1.7)	1172 (59.0)	813 (41.0)	1985 (1.8)	1467 (55.4)	1182 (44.6)	2649 (1.8)	1937 (55.9)	1530 (44.1)	3467 (1.9)
65 - 69	324 (47.0)	365 (53.0)	689 (1.0)	527 (53.0)	468 (47.0)	995 (1.1)	778 (54.8)	642 (45.2)	1420 (1.3)	1116 (56.3)	866 (43.7)	1982 (1.4)	1346 (54.0)	1148 (46.0)	2494 (1.4)
70 - 74	160 (45.6)	191 (54.4)	351 (0.5)	351 (48.1)	379 (51.9)	730 (0.8)	567 (51.9)	526 (48.1)	1093 (1.0)	841 (53.0)	747 (47.0)	1588 (1.1)	1102 (54.3)	928 (45.7)	2030 (1.1)
75 - 79	104 (42.3)	142 (57.7)	246 (0.4)	236 (47.8)	258 (52.2)	494 (0.6)	444 (48.9)	464 (51.1)	908 (0.8)	695 (51.1)	666 (48.9)	1361 (0.9)	910 (51.9)	845 (48.1)	1755 (1.0)
80 - 84	42 (40.0)	63 (60.0)	105 (0.2)	65 (42.2)	89 (57.8)	154 (0.2)	148 (47.7)	162 (52.3)	310 (0.3)	278 (48.9)	291 (51.1)	569 (0.4)	436 (51.1)	418 (48.9)	854 (0.5)
85 +	34 (38.2)	55 (61.8)	89 (0.1)	17 (40.5)	25 (59.5)	42 (0.0)	26 (42.6)	35 (57.4)	61 (0.1)	58 (47.5)	64 (52.5)	122 (0.1)	110 (48.9)	115 (51.1)	225 (0.1)
	35,645	32,245	67,890	44,955	42,607	87,562	56,792	55,805	112,597	72,001	72,631	144,632	88,307	91,282	180,089

06/05/72 QUIK-BUD

LAND USE ELEMENT

Summary of Problems and Opportunities

1. A detailed land use map of the Island of Guam does not exist. Although zoning maps have been adopted for the Island, existing land use varies substantially. To determine the extent of variance and conformance, it will be necessary to conduct a survey of each parcel on the Island identifying all land uses and physical forms of development. Absence of an accurate land use and structural survey makes it nearly impossible to establish a realistic base for property tax valuation and prevents a definitive analysis of land use conflicts. Projections of future development and the assignment of priorities for redevelopment and rehabilitation are hindered by the lack of such a survey. To insure its continuing usefulness, it will be necessary to periodically update to reflect changing land uses and development.

2. Existing block and parcel numbering for lot identification is inadequate. When various parcels of land are subdivided, small identification maps are issued. These smaller maps are not immediately transferred to the large Island map. Consequently, immediate identification of lot parcels is practically impossible.

3. Updated, accurate ownership maps are non-existent. Presently, the only available list of property owners exists within the Department of Taxation. Responsible officials in the Department admitted the list furnished the Consultant may not be correct, as there is no systematic recordation of property transfers presently in use.

4. Descriptive legal recordations of many Island parcel boundaries conflict with one another. Often descriptions of two adjacent parcels indicate differing locations of common property lines. In some cases indicated property lines cannot legally exist. For instance, property descriptions of many shoreline parcels in the south end of the Island, near Merizo, indicate lot boundaries which extend into the ocean, beyond the federal high tide line. Unless these conflicts can be resolved, wherein boundary locations are definitively and consistently plotted, future development will be severely inhibited.

5. Statistical divisions for the Island of Guam are inconsistent. Official statistical village designations and divisions of the Island in the Department of Commerce vary from those listed by the U.S. Census and other branches of the government. Two different sets of boundaries have been used, one based upon a prior governmental declaration. Such Department of Commerce designations as Sumay and Machano are meaningless and are not used by other governmental branches. Therefore, application of statistical information to specific locations for comparative analyses is practically impossible.

6. A central informational and statistical data bank is needed for the Island of Guam which all agencies can use for pooling and retrieving information. A lack of such a facility has resulted in the needless replication of data by various governmental branches and the absence of some much-needed information.

7. There is an absence of real estate controls and recordation of purchase prices, which is resultant in raised values and no benefits to the public through equitable taxation.

8. There is a substantial disparity between fair market value and assessed value for all properties on Guam.

9. Guam Government lands have not been adequately documented and identified on the ground. This land constitutes a valuable and vital resource to the government in future land use policies.

10. A large percentage of Guam's land is held in the public sector: the Government of Guam owns 22% of the land and the federal government controls 45,700 acres, or 34% of the Island. This has tended to over-inflate the value of those lands in private ownership, thus retarding residential, commercial, and industrial development by the private sector. Functioning of free market processes, wherein land uses could be located in response to demand, within the framework of zoning regulations and controls, is almost impossible due to the land's artificial values.

11. A substantial portion of the Territory, 34%, is owned by a relatively autonomous authority, the Federal Government. It is difficult to fully assess its impact on the Island's social, economic, and physical systems as many federal activities are classified or future projections unknown.

This severely impedes the development of planning strategies and policies for the total environment of Guam. It is imperative that the Island, as a closed system, be conceived as an entity; however, this is presently impossible.

12. A clearly defined land use and development policy needs to be adopted and expressed by the Planning Commission. Implementation and enforcement of a zoning code and subdivision regulations must be in concert with this policy. To date, this has not been the case, as a landowner may apply for a land use variance or subdivision; and if the petition is denied, he may merely apply again.

13. No policies or programs have been developed to control and encourage a logical development sequence for the entire Island of Guam, accompanied by the preservation of historic sites and areas of ecological import.

14. Policies to control and shape the sequential future urbanization pattern of Guam have not been developed. In particular, land-holding policies, regulating the timing and sequence of land availability for intensive development are non-existent. Rather, development has been allowed to occur randomly as convenience and economics dictate, with little relationship to or concern for the logical sequence implicit in developing the Island as a total environment.

15. A land use capacity study is required for Guam. The lack of such a tool has produced such problems as exist in Dededo, where over 2,000 dwelling units are currently being developed with services, without regard for the capability of the environment or infrastructural systems to support such uses. Such development is segmented and there has been no consideration of the question of village core, identity, and character.

16. There has been little communication between the military and the local government directed towards the dissemination of information to provide awareness of any social, economic, or environmental impact that may be expected to result from military activities. As the military is a major land-owning and employment factor, it is imperative that their potential impact be comprehended so that the Island's growth may be expedited in a non-disruptive mannner.

17. Few efforts have been pursued to coordinate village development with that of adjacent military property. This has only tended to increase the strong differentiation of military and non-military sectors of the Island. Development of a unified infrastructural utility network and other Island-wide systems has been constrained by the separateness of the two communities.

18. Existence of irregular shaped lots compounds the difficulty in exercising prudent judgment for development. Throughout the Island many mini-sized and irregular shaped lots exist which could not possibly provide economic benefit through development without harming the environment. In essence, these would be considered remnants. Because of this, development and maintenance of dedicated access and road patterns would be very difficult.

19. In certain Island areas, military property divides established neighborhoods and communities limiting their expansion pontential. This hinders, if not in many cases prohibits, the potential for village identity and continuity. Many areas which should be linked are severed.

20. Urban expansion is restricted by the limited capability of existing utility services to support additional development. Presently, the north half of the Island exhibits the greatest potential for immediate development with available and developable water and power capabilities. The south half poses infrastructure development problems primarily because of its rough topography. Throughout the Island sewerage systems are now utilized almost to their capacity. If future development is to occur, it will be necessary to uprgrade and supplement existing systems to meet projected capacity demands as determined by land use densities.

21. Little of Guam's land is utilized efficiently, wherein many structures are dispersed randomly across the urban landscape. In few areas have structures been grouped or interrelated in an attempt to create an urban entity; rather Guam's physical development is characterized by fragmented and dispersed parcel development. In most cases, development has proceeded on the basis of that which is minimally sufficient and acceptable, rather than on the "highest and best use". Developers have paid little regard for the nature of what surrounds, unless its impinging effects are direct. As much of Guam's development has proceeded at this level, little of the Island's potential has been realized.

22. In many Island areas, non-compatible land uses are located directly adjacent to one another (e.g. commercial and residential located within industrial areas). Though a zoning map has been adopted for the Island, many non-conforming uses occur. Largely, this has resulted from a lack of zoning enforcement, eccnomic pressures, and tendency on the part of land owners to develop in a piecemeal fashion.

23. Due to a lack of clearly defined controls and guidelines, development in areas typified by their accelerated rates of growth and change has resulted in chaotic land use mixes. No policies have been established to guide the smooth and orderly transition of land uses or densities.

24. Land use policies to isolate and concentrate future development in an attempt to retain the open and non-urbanized character of the Island are non-existent.

25. In general, transitions have not been developed between land use areas of differing characteristic. Community and land use types are not distinct from one another, rather they tend to bleed into one another. Neighborhood and community identity and cohesiveness are hindered by the absence of transitory buffers,

26. In like manner, areas of differing functional, economic, and social characteristics have not been differentiated from one another. In particular, rural areas have tended to be small-scale replications of urban aggregations. As growth has occurred, many rural villages have "bled" into urban areas, acquiring similar use and functional attributes. The opportunity for the establishment of unique and differing lifestyles has been lost in many cases. Prevailing attitudes suggest that rural villages should possess all the facilities and characteristics of more densely populated communities. Such a premise is highly questionable, as it might tend to destroy many of the unique native social lifestyles.

27. Few controls have been adopted to insure the retntion of the village and community-center as the physical expression of social and economic life of the Island of Guam. Family and neighborhood celebration plays an important role in the life of the Guamanian. Little has been done to physically and activity center for the family unit. Common village meeting areas, outdoor or indoor structured environments, are almost non-existent. Though most villages are too small to provide a full complement of community-oriented facilities (libraries, museums, cultural centers, etc.), multi-purpose village centers could be established to accommodate library vans, public health staff, theater groups, and other traveling activities and services.

28. Techniques of developing varied, well-balanced, amenity-oriented residential communities, such as Planned Unit Development, are under-utilized due to a lack of incentive programs and policies by the Government of Guam. Supporting commercial, cultural, institutional, and recreational facilities are rarely contemplated as necessary adjuncts in the authorization of permits for residential subdivisions.

29. In many Island areas, the relationship of multiple unit dwelling zones, R-2, to the overall zoning pattern is illogical. Few R-2 parcels appear to result from a systematic structuring of land uses into a well-ordered and efficient urban environment. Rather, their location appears to result from developer's whims and short-term economic conditions.

30. As the trend toward multi-family units increases, controls should be established to insure that development is comptible with adjacent land uses, structures are physically sound, and adequate open space and other amenities are provided. Systematic and integrated development of high density areas as total environmental entities is necessary to prevent a haphazard mix of land uses and a bland uniformity of amorphous, land-consuming units. Multi-unit density areas should be planned as a varied environment, incorporating a range of supporting uses, including commercial, institutional, and recreational facilities.

31. Topographic difficulties have limited development in many of the Island's areas. However, as property valuations rise and new building technologies become available, development will likely occur in difficult terrain.

32. It is likely that urban renewal action will be required as the only feasible means of developing open space and enforcing clustered commercial concentrations in the high density areas of Tamuning, Dededo, and Agana, and other Island villages.

33. Many Island structures are randomly scattered across land parcels in a manner prohibiting the implementation of access roadways and their locations are frequently unrelated to any pattern of urbanization. Access and future development is constrained by such inconsistent and chaotic distribution.

34. Due to the poor locations of many Island schools, students are seldom within walking distance, creating an inability on the part of officials to provide maximum safety from traffic movement. As one solution, a costly busing program has been provided. However, better site selection is necessary as a more effective solution. At present, this is hindered by the high cost of land and its general unavailability.

35. In the southern portions of the Island the small population of many of the villages does not justify the provision of full-fledged urban services. However, clustering of service facilities and commercial enterprises may be possible in central locations which could be shared by a number of adjacent villages.

36. At present, there is only minimal utilization of Guam's land for agricultural purposes. Of these, most are small and individually owned. Outside of that intended for the owner or cultivator, the product is sufficient only for a very small market. Importation is required to supply the great bulk of these goods. It is unlikely there exists sufficient acreage of fertile soil to enable the Island to become agriculturally self-sustaining. However, any additions to the agricultural supply would be absorbed and would benefit the Island economically.

37. Policies or controls to guide or limit urban expansion to prevent contamination of the existing water supply in the northern portion of the Island are non-existent.

38. Other than that proposed at Cabras Island, little has been done to systematically control the development of industrial areas on the Island of Guam. Policies and standards to encourage high quality industrial parks are non-existent. Rather, it can be stated that, in general, industrial enterprises are implemented in response to their own requirements and economies, often disregarding the needs of and impact on the total environment.

39. Little has been done to intelligently develop for the public's use the natural recreational opportunities on Guam. In many cases, amenities such as waterfalls and beaches have been closed to the public, as they are on privately-held property. Even in those cases where a tourist attraction may be on public property, access may be difficult as roads or paths have not been developed.

40. Highways are frequently too close to the ocean's edge to permit implementation of a usable beach-oriented recreational strip.

41. There have been few efforts to deal with the problem of the low-income family in Guam. Accommodation of their needs, including provision of housing, community facilities, and recreational activities, require the concerted attention of all relevant governmental agencies. It is possible to accommodate the needs and reflect the lifestyles of the poor through the allocation and distribution of land uses (e.g. provision of low-cost housing and recreational centers).

42. Guam's urban areas retain little identity and imageability. There exists no uniquely identifiable focal activity point for the Island to which residents and non-residents could relate. Generally, few intense concentrations of cultural, economic, and social activities have been developed. Rather than developing a strong Island core, most urban areas have become imperceptible, nondescript entities.

43. Excepting the village clusters in the southern portion of the Island, little sense of place has been developed for Guam. Physical and relational configurations of living, working, and recreational areas are not characterized by their function. Generally, one does not related to a particular area as having a "sense" of its activity and place.

44. Many Island villages lack community meeting and activity centers. Though public facilities do exist on the Island, they are often randomly dispersed and inconvenient for many Island residents. Clustering of public facilities into central activity nodes would likely enhance community life and the interaction patterns of the residents. Reinforcement of family life, considered to be one of the most important social issues on the Island of Guam, is possible through the establishment of multi-purpose centers, which could function as common meeting and participatory centers for the family unit.

45. Physically, many residential and commercial structures are deteriorated or dilapidated. Replacement of these structures is necessary to prevent increasing problems of blight. Stringent controls are necessary to insure that the quality of future construction is sufficient to prevent replication of these conditions.

46. Much of the Island's housing is substandard and should be appropriately replaced or upgraded. Enforcement of existing codes would aid in preventing additional blight.

47. On Guam, physical structural obsolescence generally occurs before functional obsolescence, unlike most other urban areas. Poor structural construction techniques and materials, lack of code enforcement, destructive climatic conditions (temperature, humidity, wind, etc.), and the presence of termits contribute to the rapid structural deterioration. Controls insuring structural maintenance are not sufficiently enforced or are non-existent.

48. Finished buildings are not well regulated presently. Many structures, though complete, have the appearance of being unfinished. In anticipation of future development or expansion, many structures are left with unsightly exposed reinforced steel bars and concrete protrusions.

49. Enforcement of Guam's zoning and building code regulations has been deficient. It has been hindered by a lack of sufficient manpower and formal enforcement procedures. This has resulted in a proliferation of dilapidated and deteriorated structures and mixes of incompatible land uses.

50. The circulation network is functionally inadequate to serve the present land use types, activities, and densities. Its routes were established during and following World War II to serve the then-existing land uses and military activities. Subsequent land use development tended to locate along these established routes. As developments multiplied, user loads increased to the point of congestion. No alternative or back-up routes were established to relieve pressure from these arterials. Hence, accessibility and the network's traffic handling capability is extremely inadequate. In addition, no efforts have been expended to utilize the potential of the circulation network to induce future land use patterns and activities, rather it has only reinforced existing nodes.

51. Distribution of goods from Apra Harbor to all major private and public sectors, including retail commercial and military facilities, occurs along a single highway, Marine Drive. Heavy military use combined with commercial and work-oriented trips contribute to the highway's severe congestion. No alternate routes have been developed along which goods could be distributed from the harbor. This problem is intensified on those occasions when bombs and warheads are transported from the harbor to Andersen Air Force Base engendering the possibility of explosion in areas of high public use.

52. Certain military parcels have been abandoned and left in an unusable state. An example of this is the old Harmon Airfield on which housing units have been constructed without access roads or services. Programs dealing with this problem or utilization of the property are non-existent.

53. Development programs or policies dealing with the utilization of borrow pits subsequent to their abandonment are non-existent. Rather, they often remain open, unfenced or unwalled, as a public hazard at the termination of their useful life.

54. Few policies have been established to regulate and insure the orderly development of Guam's waterfront. Controls have been initiated only for Tumon Bay, where structural heights of new hotels have been restricted. However, no improvement or incentive programs oriented toward greater utilization of the water recreational potential of this area have been adopted. Along the Island's south coast, in the area of Merizo and Cocos Island, marinas have been proposed for small individual parcels. However, there has been no concerted effort to induce development of the area as an environmental entity. Rather, it appears that if development were to progress in the same manner as that occurring to date, the result would likely be a rather haphazard and chaotic aggregation of facilities and uses. There have been no concerted efforts, policies, or incentives to aggregate individual parcels and owners into a number of large or a single development unit(s). Compounding the problems of waterfront utilization is the fact that along many stretches of coast, the legal property description extends, incorrectly, into federal waters. Active development or utilization cannot occur until this is resolved. Many other stretches of beach are at present unusable by the public, as private property owners have fenced them off for their own use. Access is not presently guaranteed for the public along much of Guam's coastline. This is also true in the northern portion of the Island, where many of the good beaches are on military property.

55. A small amount of land in the Agana area is expected to remain in residential use. This area, which was completely destroyed during World War II and divided into small irregular shaped parcels, has evolved into the major governmental and commercial sector for Guam. It is likely that future development will intensify this as the nodal concentration for all governmental and major commercial enterprises for the Island.

56. Present zoning of portions of Agana adjacent to the bluffs dictates an inconsistent mix of medium density residential, R-2, and commercial, C, uses.

57. Development pressures are impinging on the perimeter of Agana swamp. Studies examining the ecological import of this potentially significant area have not been pursued. Before development is permitted, analyses to ascertain the swamp's suitability for development or conservation based on ecological criteria should be undertaken.

58. A prime section of land on the ocean side of Marine Drive in southern Agana is currently zoned M1. Such uses are highly inappropriate for parcels adjacent to the ocean. Development for such purposes would prohibit public access to the water's edge, potentially blight the waterfront, and cannot be considered the "highest and best use" possible.

59. Along several stretches of Marine Drive, particularly south of Agana, cemetaries exist on ocean-front parcels. Again, this is highly inappropriate for such valuable parcels. As the waterfront is a highly important public resource, its utilization should reflect its unique qualities and potentials.

60. Agana and Tamuning, adjacent areas of high density and growth, have not been integrated into a single urban core as their potential might indicate. Other than the linking characteristic of Marine Drive, land use distributions and density concentrations do not reflect the qualities inherent in unified urban centers. Their separateness has been emphasized, rather than integration as a total urban environment and regional focal point. Physically it is apparent that interconnecting linkages would be difficult due to the bluffs. However, through use redistribution, concentration of densities along linear channels, and other similar techniques, a single core identity could be attained. A detailed urban design study should be pursued to explore this potential.

61. Development of Agana and portions of Tamuning has been restricted by the bluffs extending along the coast. Its limitations have induced development of strip commercial and prevented expansion of existing facilities. Physically, the large-scale development would be difficult if not impossible.

62. Agana's location on the ocean has precluded the construction of circumferential highways and encouraged the concentration of development along a linear strip, Marine Drive. Severe traffic congestion has resulted. To facilitate traffic flows through the area, it would be necessary to eliminate or control the strip commercial uses and develop a coordinated limited access and bypass system.

63. Few attempts have been made to alleviate the problems associated with the strip commercial along Marine Drive, by regrouping enterprises into common-use clusters. Rather, the commercial "public" must relate to a single congested corridor, thus reducing the economic potential of each of the enterprises. If the user intends to make a number of purchases or "comparative" shop, he must travel from one retail outlet to another by moving along the corridor, rather than having the ability to localize his movements within a single activity node. Beyond a certain tolerance level, the congestion will become so great that the user will tend to leave the area and not complete his activity. In addition, no provisions have been made to accommodate pedestrian movements within this area.

64. In Tamuning residential areas are mixed with commercial and industrial uses in a manner which defies all logical patterns. Current zoning, if enforced, could rectify this problem in future years; however, rampant non-conformance is the existing situation. Although Tamuning boasts some of the territory's best housing areas, a discouraging 45% of all structures are in poor condition. The presence of a relatively high number of low income families contributes to the persistence of blight in certain subareas. Poorly maintained quonset huts, remaining from World War II, cover a large portion of the area. Deficiencies in recreational facilities and parks are obvious, despite the improvements made at Ipao Beach.

65. Little has been done to develop in a controlled manner the historical and scenic resource of Umatac. Its tremendous recreational potential and the opportunity to develop a tourist attraction of small village commercial handicraft and hobby shops has been ignored.

66. There are no policies to encourage, structure, and control the growth and development of Merizo. Its principal resource, the lagoon and channels with its accessibility to Cocos Island, is under-utilized, though it exhibits a tremendous potential to become the Island's major water-recreational center. The charm of Guam, with its low density, tropical development, is epitomized in Merizo and if sufficient controls are implemented, could be preserved while providing residential areas for a growing permanent population. For the tourists, the novelty of Guam will wear off quickly unless facilities are provided in a somewhat different setting having sufficient activities to maintain diverse and extensive interests. It is important that substandard homes be replaced, utilizing architectural controls to enhance the attraction while providing desirable residences.

67. Little has been done to develop the potential of Inarajan as a prototype of full-fledged village development. It is a logical regional center, due to the presence of support facilities, including a junior high school and health center, in addition to its striking physiographic features conducive to recreational and scenic development. Potential long range developments include a number of residential neighborhoods and breadth of rural uses. Inarajan is the gateway to a comparatively large interior of rolling hills which would become developable if suitable access is provided. Scenic, recreational, and agricultural development of the area may be the most desirable as the costs of urban services required to serve the interior will likely be extremely high. Of particular importance is the fact that the village has some of the few remaining structures that represent the cultural influences of 300 years of Spanish administration. Their preservation, enhanced by the development of supplemental uses, could become an important focal point for the Island. Architectural controls in this and other southern villages could present a picture of Guam unique among tourist destination areas in which high-rise hotels usually dominate.

68. Developmental pressures indicate that Umatac, Merizo, Inarajan, and Talofofo will retain their rural characteristics, while Yona and Yigo will develop much of their usable land.

69. In Barrigada, low density residential development of many land parcels currently zoned for this purpose, R-1, is impossible due to the area's severe topography.

70. In the Mongmong-Toto-Maite area cohesiveness is disrupted by topography, flight zones, poor circulation, and scatteration of existing development. Development of alternate routes and bypasses for Marine Drive and cross-Island roads may, in the future, divide this area to a greater extent.

71. Composed of two separate places, Chalan Pago-Ordot does not have a strong central core. The lack of a focal point has hindered development despite its nearness to the central activities of the Island. Topography has limited development in certain areas; however, substantial acreage remains to be developed. Such land could utilize moderate slopes which normally results in a more interesting and higher grade development.

72. In the Mangilao area a conflict of uses occurs along Route 15 where newer residential uses meet the older industrial uses associated with coral products. No transitions or buffers have been developed to soften their interface. Rather they meet abruptly and clash with one another. In addition, general development is scattered and commercial activities are on an individual basis.

73. As population levels and land use densities continue to increase, Guam Memorial Hospital will likely become less accessible and convenient for the greatest population mass of the Island. Though it is at present in a central location, residential dispersion and expansion will ultimately negate this advantage. In addition, the Hospital is situated on a prime piece of property overlooking Tumon Bay, adjacent to the major resort tourist hotels. As undeveloped parcels along Tumon Bay become scarce, developmental pressures will likely mount to utilize this site for hotel and recreational purposes.

74. International Airport's physical presence, in a highly accessible central Island location, has severely restricted the growth of adjacent Agana and Tamuning areas. As the urbanization of these areas continues to expand, greater pressures will be exerted on the airport's perimeter. It is possible that housing will eventually encroach on each of the airport's sides.

75. Flight approach patterns to Guam International Airport and Naval Air Station pass over the high population concentrations of Agana and Agana Heights. It is likely that International Airport will assume a greater role in the future Pacific flight patterns of the major air carriers, particularly if flights are permitted to China. In this event the airport is likely to become a stopping point on a journey from the United States to the Chinese mainland. As the number of aircraft utilizing the airport increases, noise frequency and levels will likely intensity, potentially becoming a serious problem for the residents of the central Island areas.

ALTERNATIVE POLICIES AND PROGRAMS

1. Conduct a detailed land use survey, examining all physical development on the Island of Guam. Any alteration of a site from its natrual state should be indicated. Land uses should be specified at the lot scale. Basic land use types would be denoted (commercial, residential, industrial, institutional, and recreational). In addition, the survey should ascertain the qualitative condition of the physical development (deteriorated, poor, dilapidated, or good). All existing and proposed circulation routes should be indicated. This survey would serve as a data base from which future community-wide improvement and urban renewal programs could be developed. Analysis of its content would reveal major areas of concern; where problems exist or are likely to develop.

2. Periodically update the land use map to reflect all changing development on the Island of Guam. As building permits are issued, corrections should be made to the map. Site surveys should be conducted at regularly scheduled intervals to determine the extent of non-permit development, update structural condition analyses, and validate compliance to building codes and regulations.

3. Develop a system for better identification of lots through a tax map key-code denoting zone, section, plat, and parcel.

4. Develop a means for immediate identification of lot owners within existing block and parcel numbers.

5. Establish uniform statistical divisions for the Island of Guam. Eliminate inconsistent and conflicting division designations and require all governmental agencies to conform to these in their data collection and interpretation. Reconcile prior statistical information with the designated categories.

6. Establish a central computerized data bank for the Island of Guam in which data may be stored and from which it can be retrieved by all government agencies. This can be accommodated on a time-sharing, instantaneous retrieval basis, and should be available to the public at large. To facilitate this operation all information formats, procedures, and techniques should be standardized.

7. Inventory and evaluate all physical structures on the Island of Guam, identifying unit size and type, density, ownership, rental rates, physical condition (standard, substandard), relationship to surrounding environs, and access to public services. Periodic investigations should be scheduled to update the information.

8. Pursue an Island-wide program to legally define, through land use surveys and court decisions, all parcel and lot boundaries and resolve questions of ownership. Though this is likely to be a costly and time-consuming process, it is necessary if future development is to occur at the pace demanded by population, social, and economic growth. Unless measures are taken to definitevely delimit all property lines and resolve questions of ownership, future development would likely replicate existing haphazard and blighted urban and environmental conditions.

9. Document and adequately identify Guam Government lands and inventory potential land use capabilities.

10. Establish a liaison between the military and the local government to disseminate information concerning any potential social, economic, or environmental impact resulting from military activities. In addition, it would coordinate military and private development of the Island's village and urban areas, so that incompatible and disruptive land uses and facilities may not be located adjacent to one another.

11. Adopt a land use policy to enhance the environmental and socio-economic values of Guam.

12. Create a physical identity for the Island of Guam through land use distribution, controls, and character of development.

13. Adopt a general land use plan which will establish zones and the permitted uses therein. Flexibility should be introduced to permit changes in the respective land use zones and their requirements as the need for alteration becomes evident with the growth of the Territory.

14. Develop and adopt prototype land use configurations for residential neighborhoods, commercial centers, and industrial areas to indicate to prospective builders and developers, and to regulatory governmental agencies the character of development that the Island of Guam is striving to obtain.

15. Prepare a land use capacity map utilizing environmental, social, and economic determinants. Criteria may include topography (degree of slope), drainage courses, erosion, soil stability, ground cover and foilage, agricultural suitability, mineral content, geologic formations, wildlife habitat, inherent value, visual interest, historical import, economic viability, social value, neighborhood cohesiveness, and so on. Values would be developed and assigned to each factor to indicate their relative importance. In determining areas of development suitability these factors would be applied to statistical quadrants and weighed against one another on a cost/benefit basis.

16. Divide the Island into distinct functional areas for long-range planning purposes. These areas should be separated on the basis of functional land use such as areas for living, working, and shopping. The boundaires between functional land use areas should be defined by natural features, major traffic routes, and by existing land uses which are in proper balance with future community development.

17. Subsequent to the adoption of a land use plan for the entire Island of Guam, establish policies to control and encourage a logical development sequence in conformance with the plan's intent. Establish priority areas and identify funding sources for immediate action.

18. Adopt a land-holding policy to control the rate and bounds of urban growth. Subsequent to the identification of a logical sequence of urban growth, those areas which should remain undeveloped for a particular period of time should be designated and withheld from urbanization. These lands should then be leased for agricultural or conservation purposes for a specified period.

19. Strengthen Master Plan procedures, including the adoption of appropriate zoning and subdivision codes and the development and application of performance standards. These should be structured to insure that desired land use and development policies and patterns are achieved. For example, urban development should be discouraged on lots which are judged to have insufficient area and do not meet minimum dimension criteria, while the consolidation of such lots with abutting parcels should be encouraged. Once establish, sufficient surveillance personnel should be assigned to regulate and enforce these policies. Their variance and abuse should be discouraged.

20. Enact necessary enabling legislation for the Planning Commission to perform its duties, regulating and controlling development on the Island of Guam.

21. Require developers to justify land use requests or variances on the basis of submitting to the government qualified market analyses as an indication that these proposed plan uses will in fact be viable.

22. Establish controls that prohibit extensive environmental disruption by physical development. Ecological impact statements should be required for every proposed development to identify and analyze the impact of invironmental modification or enhancement.

23. Schedule the phasing and programming of capital improvements to effectuate land use goals and objectives and provide a consistently high level of public service.

24. Major land use changes should not be allowed unless the proper infrastructure is in place or will be provided either by the Government of Guam or by the developer.

25. Upgrade all utility infrastructural systems to accommodate projected population and land use growth on the Island of Guam. Program capital improvement budgets in anticipation of these patterns and phase implementation in a manner that permits it to shape the pattern of urban growth.

26. Restructure the circulation network to accommodate the flows generated by existing and proposed land uses. Where necessary, provide alternate and bypass routes and widen and improve deteriorated roadways.

27. Utilize the circulation network to structure the form of future urban growth, rather than locating arterials only in critical situations after uses have been developed.

28. Adopt policies controlling urban expansion in the northern portions of the Island directed toward the prevention of contamination of the existing water supply. These restrictions should pertain to the forms of construction, magnitude of development, and resultant impact of the use. If it is evident that contamination may result, the development should be prohibited unless preventative controls can be implemented.

29. Encourage the use of new planning techniques such as planned unit development, cluster housing, and cascading hillside housing, in undeveloped areas of the Island.

30. Establish population capacities and limits for each neighborhood based on their unique characteristics and the physical capacity of the environment to accept growth. Certain Island villages, such as Umatac, should be preserved at their existing population level to retain their small-village characteristics and prevent large-scale modification of the valley.

31. Preserve stable residential, commercial, and industrial areas. Those of a marginal character should be upgraded, modified, or eliminated.

32. Provide density standards to insure adequate space, light, air, safety, and amenities for the residents of Guam.

33. Control the allocation and distribution of urban development so that it is not randomly and haphazardly scattered across the landscape. Where possible, development should be clustered to retain as much open space as possible. Traditionally, in an expanding and growing community, urban forms of development have tended to sprawl across and consume vast amounts of land, leaving few pockets of recreational and open space. This can be prevented by the adoption of rigid conservation and open space standards.

34. Non-conforming uses should be prohibited within specified land use zones, unless regional impact studies indicate their rationale. Only the zoned use designated should be permitted; "step-down" zoning permitting less obnoxious uses, such as residential within industrial zones, should be prohibited.

35. Rezone existing areas of incompatible uses, such as residential located within industrial sectors, to the higher zoning use.

36. In areas of transition, apply zoning controls which will provide for the "higher" use adequate developmental areas, access, open space, and buffering with surrounding uses. On those parcels where this cannot be done, the use should not be permitted unless additional acreage can be acquired.

37. Establish controls to protect each category of land use from the encroachment of conflicting uses. Minimum conflicts in the pattern of city-wide land use distribution can be achieved through the separation and buffering of major land uses. Areas where potential land use conflicts could result should be rezoned or controls of greater stringency applied. Areas where incompatible uses exist should be upgraded through renewal or more intensive development of the "higher" use.

38. Create methods for the orderly transition of land uses from those of a marginal economic basis to those of a higher economic basis.

39. Clarify the transitions between differing land uses by buffers, circulation channels, and open spaces. Prevent the amorphous bleeding of one use into another.

40. Require site developers to demonstrate integration of their project with the surrounding environment through their access to and impact on circulation systems, compatibility and physical harmony with adjacent land uses, and environmental impact. Individual parcel development cannot stand by itself, but must be examined from the viewpoint of how it contributes to the greater community. In some instances it may be necessary to group parcels or establish an overall development plan to insure that urban entities are created. Incentives permitting greater site coverage or tax benefits may be required as means to attain cooperation among developers to achieve a commond end.

41. Develop performance standards specifying the interrelationship between residential land uses and supporting public facilities. Those facilities necessary for living environments, such as health, police and fire, cultural and community activity centers, should be provided on the basis of the minimum population required for support, and be centrally located and easily accessible. In areas where population concentrations are not sufficient to support such facilities, nodal multi-purpose centers serving a number of adjacent villages should be developed.

42. For the more intensely developed urban areas of Guam, establish controls to insure that participants within the environment are able to perceive a sense of "place" and orientation. Uniquely identifiable qualities should be developed for smaller scale sectors of the total urban environment.

Each community sub-area should attain an image which differentiates it from other areas. A physical and activity organizing element, such as a community activity center, should be developed. Living, working, and recreation areas should be structured in a manner which characterizes their function.

43. Differentiate rural and urban areas. Rural areas should be retained as small-scale, intimate examples of native Island development. Their expansion should be limited as a means of retaining the unique social lifestyles present. As a physical expression of the native's lifestyle, centers for community interaction should be established to accommodate village functions, ranging from fiestas to cultural events. On the other hand, the larger urban concentrations in the Central Island area should express a lifestyle unique to living patterns of greater density. Multi-activity centers, museums, arts and crafts centers, sports complexes, and other facilities oriented to the needs of a large population should be located in population-intense areas, serving as focal points for the entire Island.

44. Plan and control existing open space for maximum conservation and recreational purposes. These areas should be identified and permanently withheld from urbanization and development.

45. As hillsides become developed, prohibit their scarification and destructive pad "cut-and-filling". Rather, insist that development conforms to and retains the natural topographic form.

46. Establish action programs to enhance the natural recreational opportunities on Guam. Those physical features endangered by private development or obstructed from public use, in particular, beaches and major waterfalls, should be identified and acquired for preservation as a natural resource or for development as a recreational attraction for residents and tourists. Where necessary, appropriate access (automobile, hiking, bicycle, etc.) should be provided.

47. Denote areas of historical and ecological significance and prevent their development. Insure that these areas are maintained in their natural state.

48. Explore the potential of extensive utilization of those lands considered suitable for agricultural pursuits. Though sufficient lands do not exist to make the Island self-sustaining, additions to the total agricultural product will benefit through the reduced need for imports.

49. Designate certain sections of the Island as special use districts subject to stringent development and land use controls and policies. Such districts could include the governmental and commercial office sector of Central Agana, the educational complex at the University of Guam, the potential recreational concentrations at Merizo and Cocos Island, the existing and potential retail commercial centers, and the villages in the southern portion of the Island.

50. Adopt as a land use policy the establishment of community centers for each village or identifiable social aggregation on the Island of Guam. Each should be structured to reflect the village's unique qualities and lifestyles, providing those facilities which could be supported by the resident population. Urban villages of substantial population could provide a wide range of supporting activities and services, containing commercial, recreational (parks, athletic fields and equipment, etc.), cultural (libraries, museums, theatres, etc.), and institutional (governmental, police, fire, health, etc.) facilities. Those villages of smaller population are not of sufficient size to support such a range. In these cases, centrally-located clusters of these uses could be established to serve a number of adjacent villages, and a multi-purpose meeting and activity center provided within the village itself. Book-mobiles, traveling theatre groups, health vans, and other transient forms of community services should be scheduled to circulate among the smaller village centers on a regular basis. Regardless of the size of the village, the center should be the focal point of all community and family activity.

51. Adopt a series of architectural, planning, aesthetic, and structural controls to regulate and guide the implementation of multiple-unit residential development. High density areas should be structured as environmental entities, harmoniously integrated with adjacent land uses and densities. Haphazard and random mixes of densities should be avoided. Their structural quality, parking requirements, general aesthetics, and supporting social and environmental amenity requirements should be subject to stringent controls.

52. Enact ordinances regulating and serving as a guide for future industrial development on the Island of Guam. Architectural controls and aesthetic guidelines should be set along with standards controlling access and service. Priority development zones for industrial activities should be identified, eliminating potential haphazard and random development of facilities. All industrial areas should be buffered, physically and visually, from adjacent land uses. Heavy industrial development should be minimized. Adequate controls to prevent pollution of the environment by industrial activities should be enforced.

53. Initiate neighborhood planning activities which involve the participation of local residents in the determination of land use configurations and densities for their particular area. A breadth of participatory activities, ranging from man-gaming to educational seminars, may be pursued. These activities can be developed for each individual village, in the cases of those that are isolated and whose actions do not directly impact other villages, or grouping of adjacent villages in the more densely developed portions of the Island.

54. Prevent future development of strip commercial enterprises. Insist upon clustering of all commercial activities around common plazas, activity centers, and parking facilities.

55. Adopt as a policy the replacement of all deteriorated and dilapidated structures on the Island of Guam. Establish incentive programs to encourage developers to construct needed housing and other structures. These may include tax benefits, increased site coverage, and greater height. A detailed structure survey should be performed to identify those units which should be replaced.

56. Enact urban renewal programs directed toward the upgrading of areas where dwellings are randomly located, unrelated to roadway or other infrastructural system locations. Where possible, implement common roadways and utility networks. In those cases where this is not possible, structures should be removed or relocated to permit establishment of such systems.

57. In high density areas, including Tamuning, Dededo, and Agana, utilize urban renewal procedures as a means of developing open space and inducing commercial relocation so that a suitable environment is provided for neighborhood and community activity. For each area, a detailed study should be performed to identify deficiencies and indicate recommended solutions.

58. Where military lands and facilities have been abandoned, initiate programs to restore the sites to their natural condition or a state preparatory to development. As future lands are abandoned or returned to the government, existing physical development should be cleared or modified for other utilization.

59. Develop an alternate route to Marine Drive to accommodate the transport of goods and equipment from Apra Harbor to the commercial sectors of Guam and the military facilities at Andersen Air Force Base. Prohibit the movement of bulk merchandise, heavy equipment, and potentially explosive devices and materials along Marine Drive, limiting all such movements to a bypass route.

60. Relocate those sections of Marine Drive that are so close to the ocean's edge to prohibit use of the water-fronting strip for recreational purposes. Establish and enforce a minimum usable width within which no development could encroach. As necessary, purchase lands to facilitate the relocation of Marine Drive and expansion of the beaches.

61. Adopt a land policy to eliminate residential uses in the Central Agana Government and Business District. Intensify all commercial, office, and governmental activities in this area, deriving an image for Agana as the major focal and activity point for the Island of Guam. Actively pursue and encourage the aggregation of the small irregularly shaped parcels into larger development units.

62. Reconcile the inconsistent mix of commercial and high density residential zoning adjacent to the bluffs in Agana.

63. Conduct an analysis ascertaining the ecological import of Agana swamp, determining its value for preservation or appropriateness for urban uses. If preservation is dictated, controls should be established to prevent further encroachment of surrounding uses. A moritorium should be applied on further development of the swamp until completion of the study.

64. Rezone those parcels currently designated for industrial uses, M1, on the ocean-side of Marine Drive in southern Agana for water-oriented residential, commercial, or recreational uses. Include the establishment of permanent public access corridors from the highway to the water.

65. Adopt as a land use policy the integration of Agana and Tamuning as a single urban concentration, expressing it as the social, economic, and cultural center of the Island. Establishment of a unified land use concept, one which intensifies densities and logically structures their distribution, should be directed toward the establishment of the area as the Island's dominant focal and activity point. Of singular importance, this area should not function as two separate entities.

66. Consider alternative land uses and forms of development within the narrow strip of land constrained by the bluffs and the ocean along Marine Drive, extending between Agana and Tamuning. Intensely used strip commercial facilities should be relocated to areas where sufficient support land is available or in multi-level clusters within the corridor. Consumer and marketing

activities should be concentrated at a limited number of nodal points or removed entirely. Establish urban renewal programs or stringent upgrading procedures requiring their clustering and development of supporting parking and pedestrian spaces. Physical widening of Marine Drive may serve as a means to induce renewal of the area.

67. Enforce zoning ordinances in Tamuning to prevent future expansion of and eliminate the illogical and haphazard mix of commercial, industrial, and residential uses. A uniform land use plan should be adopted to prevent replication and reinforcement of the existing situation. In addition, building codes should be enforced as a means of eliminating the widespread utilization of quonset huts as residential units. Deficiencies in recreational facilities should be eliminated by the provision of new activity nodes within the area.

68. Adopt a policy to retain Umatac, Merizo, Inarajan, and Talofofo as examples of native Island villages. Establish upper limits for their growth. Require adherence to a strict set of architectural and aesthetic controls.

69. Adopt as a land use policy the development of Inarajan as an example of native village life on the Island of Guam. Programs should be erected to identify and retain the few remaining structures that represent the cultural influences of 300 years of Spanish administration. Architectural controls should be established to present a picture of the village as a unique tourist destination area. Site plans should be prepared to guide development of Inarajan's physiographic features for recreational and scenic purposes. Regional facilities should be located here to serve adjacent villages in the southern portion of the Island.

70. Develop policies to regulate waterfront development. In particular, create a development plan for the Merizo-Cocos Island area. The development plan should reflect the high recreational potential of this area wherein larger-scale development would be emphasized over smaller development blocks. In order to achieve this goal, adopt as a policy certain incentives to encourage the aggregation of individual lots into larger units for development. Tax and site coverage benefits, and greater permissible heights are examples of such incentives. Include in the plan allowance for perpetual public access to the waters. Uses incompatible with water-oriented recreation environments, such as heavy industry and cemetaries, should be prohibited. Explore the potential development of marinas, water skiing, skin-diving, snorkeling, fishing, and other water activities, expansion of beaches, and supporting commercial and residential areas. To insure its proper development, establish a set of rigid performance standards controlling architectural and site development.

71. Establish height restrictive zones for the Island's coastal perimeter. Land uses studies should be pursued to delimit areas of low, moderate, and high profile. Rather than applying a uniform limit, height variety should be encouraged as a means of creating visual interest and inducing differing uses along the waterfront.

72. Adopt controls to regulate the ordered and systematic growth of Yona and Yigo. Provide sufficient community-oriented social, cultural, and commercial facilities to support their projected population. These should be structured so that they become the identifying village focal and activity nodal points. While encouraging their growth, an upper limit must be established to prevent land-consuming urban sprawl. By measuring the area's ecological, physical, and social systems, the land capacity may be derived.

73. Conduct a land use capacity survey of Barrigada, particularly examining the appropriateness of high slope property for residential development. If such uses prove to be infeasible, rezone these parcels for agricultural or conservation purposes.

74. Adopt as a land use policy the development of a strong central core for the Chalan Pago-Ordot area. Commercial, recreational, and institutional facilities should be concentrated within the core, serving as the dominant focal and activity point for residents of the two villages. Pursue land use and urban design studies to indicate the character and form that may be developed.

75. Study the feasibility of relocating Guam Memorial Hospital in a more accessible and central location. Pressures for its relocation will heighten as the Island's population grows and disperses and as the current site's value increases due to expansion of Tumon Bay's resort facilities.

76. Engage in a detailed analysis of the potential of relocating International Airport and the Naval Air Station at Northwest Field. In this location, approach patterns would occur over the ocean, minimizing the potential impact of airport operations on the surrounding environment. This would free highly desirable and valuable land for more intensive industrial, governmental, commercial, or residential utilization. In addition, it would eliminate airport approach flights over the densely populated areas of Agana.

77. In those coastal areas where it is blocked by privately-held property, obtain beach access through condemnation or purchase procedures. In addition, prohibit private enclosure of beach-front areas. Negotiations should be initiated with the military to obtain access to beaches within their territory.

78. Prohibit the expansion of existing or implementation of new cemetaries on the ocean-side of Marine Drive.

79. Adopt land use policies to utilize borrow pits, on expiration of their useful life, for recreational or urban uses. They may be filled with solid wastes and covered, permitting construction to occur, or filled with water to create artificial lakes. It should be required that future pits be located on the basis of minimum environmental disruption and the potential viability of utilization subsequent to their useful life. During their period of operation, they should be enclosed by fences and walls to prevent accidental entry or falls into the pits.

80. Enact beautification programs to upgrade the Island's urbanized areas. (a) Street planting programs should be initiated along major highways. (b) Commercial areas, village centers, and public facilities should be intensively landscaped and constantly maintained. (c) All public structures should be physically improved; painting, structural upgrading, etc. (d) Billboards should be prohibited. (e) Sign heights should be limited. (f) An acceptable acreage of building, materials, selected as the basis of their aesthetic integrity and structural soundness, should be established.

ANALYSIS OF EXISTING ZONING

Based on the Official Zoning Map for the Island of Guam, the following table itemizes the land areas currently zoned for residential, commercial, industrial, and conservation and open space uses for each village and the total Island. In addition, the percentage that the use occupies of the total urban use acreage is noted, military lands and their percentage of the total village and Island acreage are calculated. It should be remembered that these computations are approximate, based on map scaling and reading, rather than accurate representations.

Specific Comments:

1. Lands presently zoned for urban uses (residential, commercial, and industrial constitute only 9.2% of Guam's total acreage.

2. The military controls 45,715.6 acres, on approximately 33.7% of Guam's acreage.

3. Most commercial zoning is located in small clusters within each village, and can be characterized as "local" or "neighborhood" commercial. However, major land areas are designated for commercial in Agana and Tamuning (in general conforming to the interconnecting strip along the coast and bluffs, and in the downtown Agana area). Of secondary size are the lands zoned for commercial in Dededo.

4. Major industrial zoning is concentrated in Tamuning and Santa Rita (associated with Apra Harbor). Secondary industrial areas include Mongmong-Tote-Maite, Agana, and Asan. Barrigada and Sinajana have small land parcels zoned for this use.

5. Planned-Unit-Development zoning is almost non-existent, accounting for approximately 1% of the total urban zoned land. Parcels in Chalan Pago-Ovdot, Santa Rita, Tamuning and Yigo have been designated for such uses. As residential development continues at a rapid pace, it is likely that this form of zoning will be sought more frequently.

6. Agriculture, conservation, and open space zoning accounts for approximately 57.1% of the Island's acreage. This places Guam in the relatively unique position of currently having a large portion of land zoned for non-urban uses. Any attempts to reduce its total should be carefully considered, and every effort should be pursued to permanently hold large portions from urbanization or development.

7. Approximately 64.8% of Guam's urban use acreage is zoned for low-density residential uses, while 18.8% for multiple-dwelling residential. Effectively this is a 77.5% low density, 22.5% high density split.

CAPACITY OF THE EXISTING LAND USE ZONING

Based on the acreage currently zoned for residential uses, including single-unit, multi-unit, and planned-unit development, the following table summarizes the population which could be accommodated. For purposes of the analysis it is assumed the low density residential would be developed at five units per gross acre, and high density and planned-unit-development at twelve units per gross acre. It is also assumed that the average of five persons per dwelling unit will exist. Based on these criteria, current residential zoning could accommodate a population of 351,551. This is well above the highest population projection (Series C) of 180,089 in 1990.

POPULATION CAPACITY OF EXISTING LAND USE ZONING

ELECTION DISTRICTS	R1 (5 DU/AC)		R2 (12 DU/AC)		PUD (12 DU/AC)		TOTAL DU CAPACITY	TOTAL POPUL. CAPACITY (5/DU)
	ZONED ACRES	DU CAPACITY	ZONED ACRES	DU CAPACITY	ZONED ACRES	DU CAPACITY		
Agana	51.5	257.5	81.1	973.2			1,230.7	6,154
Agana Heights	301.4	507.0	50.0	600.0			1,107.0	5,535
Agat	230.8	1,154.0	79.4	952.8			2,106.8	10,534
Asan	235.2	1,176.0	50.0	600.0			1,776.0	8,880
Barrigada	845.3	4,226.5	82.3	987.6			5,254.1	26,071
Chalan Pago-Ordot	1,156.9	5,784.5	5.9	70.8	16.2	194.4	6,049.7	30,249
Dededo	1,312.7	6,563.5	17.6	211.2			6,774.7	33,874
Inarajan	154.4	772.0	6.6	79.2			851.2	4,256
Mangilao	1,037.9	5,189.5	201.4	2,416.8			7,606.3	38,032
Merizo	396.9	1,984.5	29.2	350.4			2,334.9	11,675
Mongmong-Toto-Maite	243.9	1,219.5	404.3	4,851.6			6,071.1	30,356
Piti	97.0	485.0	1.5	18.0			503.0	2,515
Santa Rita	232.3	1,161.5			47.0	564.0	1,725.5	8,628
Sinajana	172.0	860.0	39.7	476.4			1,336.4	6,682
Talofofo	268.5	1,342.5					1,342.5	6,713
Tamuning	695.3	3,476.5	1,293.6	15,532.2	2.5	30.0	19,038.7	93,194
Umatac	26.5	132.5	9.6	115.2			247.7	1,239
Yigo	414.5	2,072.5			64.4	772.8	2,845.3	14,227
Yona	272.0	1,360.0					1,360.0	6,800
TOTAL	8,104.5	40,522.5	2,352.2	28,226.4	130.1	1,561.2	70,310.1	351,551

LAND SUITABILITY /SLOPE

Land areas within each village and for the total Island are listed on the basis of their slope in the following table. Total acreages have been divided according to three slope designations, including 0 to 15%, 16 to 35%, and 35% and up. Severally, economic construction, hence urban use, is limited to slopes less than 15%. However, emerging building technologies may permit a somewhat higher utilization of mid-range slopes.

Specific Comments:

1. Approximately 57% of Guam's total acreage falls within the 0 to 15% slope range; 19% in the 16 to 35% acreage; and 24% in the 35% and up range.

2. Several villages have a very limited land area in less than 15% slope, thus, restricting urban growth. These include Agana Heights (89 acres, 12%), Piti (127 acres, 3%), and Unatac (83 acres, 2%).

LAND SUITABILITY

CRITERION: SLOPE

ELECTION DISTRICTS	0-15%		16-35%		35% +	
	ACRES	% TOT	ACRES	% TOTAL	ACRES	% TOT
Agana	698	94	20	3	24	3
Agana Heights	89	12	353	48	300	40
Agat	1,326	19	2,139	30	3,677	51
Asan	1,515	39	919	23	1,508	38
Barrigada	5,567	95	235	4	60	1
Chalan Pago-Ordot	1,506	38	1,160	29	1,276	33
Dededo	18,115	94	571	3	616	3
Inarajan	5,400	44	3,907	32	2,955	24
Mangilao	6,025	93	229	3	248	4
Merizo	910	23	965	24	2,067	53
Mongmong-Toto-Maite	1,137	82	106	14	40	4
Piti	127	3	1,998	44	2,457	53
Santa Rita	5,900	57	1,977	19	2,465	24
Sinajana	518	80	169	23	55	7
Talofofo	4,126	38	3,004	27	3,852	35
Tamuning	3,795	96	62	2	85	2
Umatac	83	2	1,288	33	2,571	65
Yigo	18,127	80	2,616	12	1,759	8
Yona	2,131	17	4,428	34	6,343	49
TOTAL	77,095	57	26,236	19	32,349	24

Source: Territorial Planning Commission, Government of Guam

CIVILIAN LAND USE ANALYSIS

As indicated, no current land use map exists for the Island of Guam. The most recent Island - wide survey occurred in 1966. Attempting to attain some understanding of the current land uses and their distribution, the following table was developed. It is based on the 1966 survey, the 1970 U.S. Census count of dwelling units, and the Guam Department of Commerce estimate of total structures ("Guam Statistical Abstract - 1971).

Methodology:

1. Known statistical information listing:

   a. 1966 land use acreages and structure totals (Columns 1, 2, 7, 8, 11, 12, 15, 16, 19, 20)

   b. 1970 structure totals (Column 21)

   c. 1970 residential structure totals (extrapolated from the U.S. Census) (Column 4)

2. Calculation of percentage changes from 1966 to 1970 of:

   a. Total structures (Column 22)

   b. Residential Structures (Column 5)

3. Estimation of 1970 residential acreage by applying percentage of change factor of residential structures (5) to 1966 residential acreage (2). These computations are listed in parentheses in Column (6).

4. Estimation of 1970 total urban use acreage by applying percentage of change factor of total structures (22) to 1966 total acreage (20). These computations are listed in parentheses in Column (23).

5. Verification of data validity, by isolating those villages where 1970 residential structures exceed the total structure count. These discrepancies are indicated in Column (25).

6. For those villages that do not have inconsistent data, estimation of the acreages of commercial, industrial, and public and semi-public land uses by:

   a. Subtracting the estimated 1970 residential acreage (6) from the estimated 1970 total acreage (23), to derive the remaining urban use acreage.

   b. Applying the 1966 percentage of urban use factors (Columns 9, 13, 17) to the remaining acreage, to derive the estimated 1970 acreages. These estimates are denoted in parentheses in Columns (10), (14), and (18).

It should be remembered that these calculations and the methodology is far from being scientifically or statistically accurate. Growth among urban uses does not occur in a straight line manner, as its assumed here. Many factors may influence the growth of a single use at a much higher rate than all others. In addition, some of the collected data, being derived from two different sources, is contradictory. However, in the absence of a precise land use survey the attempt to ascertain the relative scope of the Island's land uses appears to be a useful analytic tool.

GENERALIZED LAND USE REQUIREMENTS
1970-1990

Utilizing the three alternative population projections, the following tables summarize the land areas required for residential, commercial, industrial, institutional, and park and recreation uses for the civilian population on the Island of Guam for the time periods 1975, 1980, 1985, and 1990. These are intended only as a guideline illustrating the potential magnitude of acreage required for each use. Calculation ratios are derived from generalized planning standards, evolved from a breadth of practical experience and research. However, for this analysis, they are not intended as a precise reflection of Guam's unique conditions. Many forces and impacting conditions peculiar to the Island affect the magnitude and scale of each use, modifying somewhat the calculated total. These forces are discussed at length within each plain element.

Specific comments are appropriate for a number of calculation ratio standard. A percentage of the required industrial acreage would be provided by the Federal Government on military property. Indicated is the total acreage required to support the population for that time period. However, this total cannot be simply reduced by subtracting the percentage of Guamanians supported by the military, as the standard includes factors for minimal tax and revenue contributions to the local government and industry breath and types. Computations for educational institutions are based on existing Guam ratios and age-sex projections of the population model. Park and recreation standards reflect generalized national criteria, and must be modified to reflect Guam's unique Island qualities.

NON-MILITARY LAND USES

POPULATION SERIES A

	RATIO	1970	1975	1980	1985	1990
RESIDENTIAL		2,388.8	2,901.1	3,508.8	4,212.4	4,908.9
Single Family	5 dus/ac	2,223.2	2,658.0	3,177.8	3,757.8	4,310.4
Multi-Unit	12 dus/ac	165.6	243.1	331.0	454.6	598.5
COMMERCIAL		272.9	321.8	380.5	447.2	520.9
Retail	2.4 ac/1000	154.8	182.6	215.9	253.7	295.6
Services	1.1 ac/1000	71.0	83.7	98.9	116.3	135.4
Offices (Banks, Professional, General)	0.23 ac/1000	14.8	17.5	20.7	24.3	28.3
Wholesale	0.5 ac/1000	32.3	38.0	45.0	52.9	61.6
INDUSTRIAL		774.1	913.1	1,079.3	1,268.4	1,477.9
Light	8 ac/1000	516.1	608.7	719.5	845.6	985.3
Heavy	4 ac/1000	258.0	304.4	359.8	422.8	492.6
INSTITUTIONAL		656.2	779.4	926.5	1,069.2	1,234.4
General (Medical Facilities, Libraries, Fire, Police, Museums, Theaters)	1.5 ac/1000	96.8	114.1	134.9	158.6	184.7
Educational						
Elementary (1-6)	1/3000@11 ac	236.5	279.0	330.0	387.6	451.6
Junior High (7-9)	1/13,500@23 ac	110.4	129.6	154.1	180.1	209.8
Senior High (10-12)	1/26,000@45 ac	112.5	131.7	157.5	182.9	213.1
Other (College, Private, etc.)		100.0	125.0	150.0	160.0	175.0
PARKS		903.1	1,065.3	1,255.2	1,479.9	1,724.2
Neighborhood	2 ac/1000	129.0	152.2	179.9	211.4	246.3
Community	2 ac/1000	129.0	152.2	179.9	211.4	246.3
Regional	10 ac/1000	645.1	760.9	899.4	1,057.1	1,231.6
TOTAL URBAN GENERATED USES		4,955.1	5,980.7	7,150.3	8,476.1	9,866.3

POPULATION SERIES B

	RATIO	1970	1975	1980	1985	1990
RESIDENTIAL		2,388.8	3,351.0	4,281.2	5,413.7	6,814.8
Single Family	5 dus/ac	2,223.2	3,043.8	3,807.4	4,706.6	5,782.2
Multi-Unit	12 dus/ac	165.6	307.2	473.8	707.1	1,032.6
COMMERCIAL		287.1	356.7	444.0	545.7	665.6
Retail	2.4 ac/1000	162.9	202.4	251.9	309.6	377.6
Services	1.1 ac/1000	74.7	92.7	115.5	141.9	173.1
Offices (Banks, Professional, General)	0.23 ac/1000	15.6	19.4	24.1	29.7	36.2
Wholesale	0.5 ac/1000	33.9	42.2	52.5	64.5	78.7
INDUSTRIAL		814.7	1,011.8	1,259.4	1,547.8	1,888.2
Light	8 ac/1000	543.1	674.5	839.6	1,031.9	1,258.8
Heavy	4 ac/1000	271.6	337.3	419.8	515.9	629.4
INSTITUTIONAL		683.9	850.1	1,052.6	1,269.3	1,528.2
General (Medical Facilities, Libraries, Fire, Police, Museums, Theaters)	1.5 ac/1000	101.8	126.5	157.4	193.5	236.0
Educational						
Elementary (1-6)	1/3000@ 11 ac	249.2	309.4	385.2	473.4	577.5
Junior High (7-9)	1/13,500@ 23 ac	115.4	143.3	178.4	219.3	267.5
Senior High (10-12)	1/26,000@ 45 ac	117.5	145.9	181.6	223.1	272.2
Other (College, Private, etc.)		100.0	125.0	150.0	160.0	175.0
PARKS		950.5	1,180.4	1,469.4	1,805.8	2,202.9
Neighborhood	2 ac/1000	135.8	168.6	209.9	258.0	314.7
Community	2 ac/1000	135.8	168.6	209.9	258.0	314.7
Regional	10 ac/1000	678.9	843.2	1,049.6	1,289.8	1,573.5
TOTAL URBAN GENERATED USES		5,125.0	6,750.0	8,506.6	10,582.3	13,099.7

POPULATION SERIES C

	RATIO	1970	1975	1980	1985	1990
RESIDENTIAL		2,3888.8	3,505.3	4,633.9	6,139.2	7,920.3
Single Family	5 dus/ac	2,223.2	3,174.6	4,068.8	5,209.0	6,469.0
Multi-Unit	12 dus/ac	165.6	330.7	565.1	930.2	1,451.3
COMMERCIAL		287.1	370.3	476.3	611.7	761.7
Retail	2.4 ac/1000	162.9	210.1	270.2	347.0	432.2
Services	1.1 ac/1000	74.7	96.3	123.9	159.1	198.1
Offices (Banks, Professional, General)	0.23 ac/1000	15.6	20.1	25.9	33.3	41.4
Wholesale	0.5 ac/1000	33.9	43.8	56.3	72.3	90.0
INDUSTRIAL		814.7	1,050.7	1,351.2	1,735.2	2,161.1
Light	8 ac/1000	543.1	700.5	900.8	1,156.8	1,440.7
Heavy	4 ac/1000	271.6	350.2	450.4	578.4	720.4
INSTITUTIONAL		683.9	878.1	1,118.3	1,403.6	1,723.8
General (Medical Facilities, Libraries, Fire, Police, Museums, Theaters)	1.5 ac/1000	101.8	131.3	168.9	216.9	270.1
Educational						
Elementary (1-6)	1/3000@ 11 ac	249.2	321.4	413.2	530.7	660.9
Junior High (7-9)	1/13,500@ 23 ac	115.4	148.9	191.4	245.8	306.2
Senior High (10-12)	1/26,000@ 45 ac	117.5	151.5	194.8	250.2	311.6
Other (College, Private, etc.)		100.0	125.0	150.0	160.0	175.0
PARKS		950.5	1,225.8	1,630.4	2,024.4	2,521.3
Neighborhood	2 ac/1000	135.8	175.1	225.2	289.2	360.2
Community	2 ac/1000	135.8	175.1	225.2	289.2	360.2
Regional	10 ac/1000	678.9	875.6	1,126.0	1,446.0	1,800.9
TOTAL URBAN GENERATED USES		5,125.0	7,030.2	9,201.1	11,914.1	15,088.2

CIVILIAN LAND USE ANALYSIS (1966/1970)

ELECTION DISTRICTS	RESIDENTIAL						COMMERCIAL				INDUSTRIAL				PUBLIC & SEMI-PUBLIC				TOTAL URBAN USES					TOTAL ACREAGE	DATA VALIDITY[1]
	1966			1970			1966			1970	1966			1970	1966			1970	1966		1970				
	* NO. STRUCT	ACRES NO.	% URBAN USES	STRUCTURES NO.	% CHANGE	EST. ACREAGE	NO. STRUCT.	ACRES NO.	% URBAN USES	ESTIMATED ACREAGE	NO. STRUCT	ACRES NO.	% URBAN USES	ESTIMATED ACREAGE	NO. STRUCT	ACRES NO.	% URBAN USES	ESTIMATED ACREAGE	NO. STRUCT	ACRES	STRUCTURES NO.	% CHANGE	ESTIMATED ACREAGE		
Agana	307	51.4	14.2	317	3.3	(53.1)	103	36.8	10.2	1	36	6.1	1.7	1	22	267.4	73.9	1	468	361.7	432	-7.7	(333.8)	742	Inconsistent
Agana Heights	539	116.3	46.8	545	1.1	(117.6)	9	0.5	0.2	(1.0)	5	0.3	0.1	(0.5)	17	131.6	52.9	(135.3)	570	248.7	584	2.6	(255.2)	742	
Agat	727	114.0	30.1	757	4.1	(118.7)	8	1.0	0.3	(2.0)	9	4.1	1.1	(5.1)	5	259.1	68.5	(294.4)	749	378.2	832	11.1	(420.2)	7,142	
Asan	290	51.1	21.4	362	24.8	(63.8)	7	5.5	2.3	(9.2)	6	7.0	2.9	(11.1)	4	175.5	73.4	(224.9)	307	239.1	396	29.0	(308.4)	3,942	
Barrigada	849	150.8	26.6	934	10.0	(165.9)	29	4.0	0.7	(4.9)	5	0.8	0.1	(1.0)	6	410.9	72.5	(498.4)	889	566.5	1,052	18.3	(670.2)	5,862	
Chalan Pago-Ordot	389	89.4	33.4	505	29.8	(116.0)	6	1.8	0.7	(4.2)		0.5	0.2	(2.6)	6	175.7	65.7	(213.3)	401	267.4	504	25.7	(336.1)	3,942	
Dededo	936	144.3	17.1	1,841	96.7	(283.9)	10	2.4	0.3	1	3	3.5	0.4	1	12	692.1	82.2	1	961	842.3	1,754	83.3	(1,543.9)	19,302	Inconsistent
Inarajan	322	39.5	43.7	304	-5.6	(37.3)	7	0.8	0.9	(1.8)		12.8	14.2	(13.0)	10	37.3	41.3	(36.8)	339	90.4	333	- 1.8	(88.8)	12,262	
Mangilao	529	69.2	56.5	640	20.1	(83.1)	8	0.7	0.6	(1.2)	2	40.5	33.1	(51.9)	15	12.0	9.8	(12.5)	554	122.4	672	21.5	(148.7)	6,502	
Merizo	234	46.7	63.4	267	14.1	(53.3)	5	0.6	0.8	(1.0					8	26.4	35.8	(41.8)	247	73.7	322	30.4	(96.1)	3,942	
Mongmong-Toto-Maite	536	151.7	44.5	595	11.0	(168.4)	13	11.7	3.4	(19.2)	14	18.1	5.3	(29.7)	23	159.1	46.7	(260.9)	586	340.6	823	40.4	(478.2)	1,382	Inconsistent
Piti	257	39.2	21.0	208	19.1	(31.7)	8	0.8	0.4	(1.0)	7	1.1	0.6	(1.4)	7	145.2	77.9	(188.2)	279	186.3	333	19.4	(222.4)	4,582	
Santa Rita	415	71.4	28.2	468	12.8	(80.5		0.4	0.2	(1.4)	6	0.1	0.0	(1.2)	6	181.4	71.6	(207.9)	427	253.3	448	14.9	(291.0)	10,342	
Sinajana	664	109.8	41.4	637	4.1	(114.3)	8	2.7	1.0	1	13	3.5	1.3	(4.8)	7	148.9	56.2	(161.3)	692	264.9	743	7.4	(284.5)	742	
Talofofo	287	63.1	46.2	329	14.6	(72.3)	7	1.2	0.9	(24.7)				1	15	72.3	52.9	1	309	136.6	275	-11.0	(121.6)	10,982	Inconsistent
Tamuning	1,651	242.7	25.4	1,788	8.3	(262.8	84	22.1	2.3		74	93.2	9.8	(104.1)	48	595.8	62.5	(665.5)	1,857	953.8	2,058	10.8	(1,056.8)	3,942	
Umatac	123	8.9	19.1	122	-0.8	(8.8)									4	37.6	80.9	(43.0)	127	46.5	133	4.9	(48.8)	3,942	
Yigo	311	78.4	15.5	567	82.3	(142.9)	11	1.4	0.3	1	2	1.0	0.2	1	11	424.2	84.0	1	335	505.0	494	47.5	(744.9)	22,502	Inconsistent
Yona	410	50.7	34.0	458	11.7	(56.6)	8	0.9	0.5	(0.8)	2	1.7	1.1	(1.8)	7	96.1	64.4	(99.2)	427	149.3	453	6.1	(158.4)	12,902	
	9,776	1,688.6	28.0	11,644	19.1	(2,031.0)	331	95.2	1.6		184	194.3	3.2		233	4,048.6	67.2		10,524	6,026.7	12,641	20.1	(7,608.0)	135,680	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)

*Denotes "physically separted structures", not individual dwelling units

[1]-Inconsistent Data: Discrepancies between "Total Residential" and "Total Studies" for 1970

Source: Quinton-Budlong
Territorial Planning Commission, Government of Guam

EXISTING ZONING

ELECTION DISTRICTS	R1		R2		PUD		C		M1		M2		TOTAL URBAN USES		A AND OPEN		MILITARY		TOTAL ACREAGE
	ONE-FAMILY DWELLING	% TOT URBAN USES	MULTIPLE DWELLING	% TOT URBAN USES	PLANNED-UNIT DEVELOPMENT	% TOT URBAN USES	COMMERCIAL	% TOT URBAN USES	LIMITED INDUSTRIAL	% TOT URBAN USES	HEAVY INDUSTRY	% TOT URBAN USES	ACREAGE	% TOT ACREAGE	AGRICULTURE OPEN-CONSERVATION	% TOT ACREAGE	ACREAGE	% TOT ACREAGE	
Agana	51.5	15.6	81.1	24.6			163.2	49.5	33.8	10.3			329.6	44.4	411.6	55.5	0.9	0.1	742
Agana Heights	301.4	84.2	50.0	14.0			6.6	1.8					358.0	48.3	176.0	23.7	208.0	28.0	742
Agat	230.8	67.1	79.4	23.1			33.8	9.8					344.0	4.8	3,229.0	45.2	3,569.0	50.0	7,142
Asan	235.2	71.1	50.0	15.1			26.5	8.0	19.1	5.8			330.8	8.4	2,563.2	65.0	1,048.0	26.6	3,942
Barrigada	845.3	88.4	82.3	8.6			26.5	2.8	2.2	0.2			956.3	16.3	1,068.4	18.2	3,837.3	65.5	5,862
Chalan Pago-Ordot	1,156.9	95.4	5.9	0.5	16.2	1.3	33.8	2.8					1,212.8	30.8	2,729.2	69.2			3,942
Dededo	1,312.7	93.2	17.6	1.2			78.6	5.6					1,408.9	7.3	7,972.6	41.3	9,920.5	51.4	19,302
Inarajan	154.4	93.3	6.6	4.0			4.4	2.7					165.4	1.3	12,096.6	98.7			12,262
Mangilao	1,037.9	69.0	201.4	13.4			35.1	2.3			229.3	15.3	1,503.7	23.2	3,485.2	53.6	1,513.1	23.2	6,502
Merizo	396.9	89.4	29.2	6.6			17.6	4.0					443.7	11.3	3,478.4	88.2	19.9	0.5	3,942
Mongmong-Toto-Maite	243.9	31.9	404.3	53.0			49.3	6.5	66.0	8.6			763.5	55.3	424.7	30.7	193.9	14.0	1,382
Piti	97.0	38.4	1.5	1.4			7.4	6.8			3.7	3.4	109.6	2.4	2,418.9	52.8	2,053.5	44.8	4,582
Santa Rita	232.3	57.7			47.0	11.7			123.5	30.6			402.8	3.9	1,967.2	19.0	7,972.0	77.1	10,342
Sinajana	172.0	74.4	39.7	17.2			13.2	5.7	6.3	2.7			231.2	31.2	490.1	66.0	20.7	2.8	742
Talofofo	268.5	9.37					18.0	6.3					286.5	2.6	9,404.2	85.6	1,291.3	11.8	10,982
Tamuning	695.3	24.2	1,293.6	45.0	2.5	0.1	160.2	5.6	721.8	25.1			2,873.4	72.9	514.6	13.2	554.0	1.4	3,942
Umatac	26.5	66.9	9.6	24.3			3.5	8.8					39.6	1.0	3,889.9	98.7	12.5	0.3	3,942
Yigo	414.5	82.2			64.4	12.8	25.0	5.0					503.9	2.2	8,543.9	38.0	13,452.2	59.8	22,502
Yona	272.0	98.4					4.4	1.6					276.4	2.1	12,578.4	97.5	57.2	0.4	12,902
TOTAL	8,104.5	64.8	2,352.2	18.8	130.1	1.0	707.1	5.7	972.7	7.8	233.0	1.9	12,499.6	9.2	77,464.8	57.1	45,715.6	33.7	135,680 AC.
																			212 Sq. Mi.

HOUSING

HOUSING ELEMENT

STRUCTURE

A. Generalized Statement of Problems.

B. Specific Issues and/or Problems:

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2. Population Characteristics.

3. Existing Stock of Dwelling Units.

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5. Projection of Housing Need.

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HOUSING ELEMENT

A. Generalized Statement of Problems

The following generalized statement of problems related to housing on Guam is quoted or paraphrased from the Initial Housing Element section of the Application for Planning Assistance, dated February 8, 1972, prepared by the Territorial Planning Commission.

Guam's housing problems are of considerably different natures than those found in mainland communities. The Island housing characteristics underwent a severe material change during World War II, when the older style, thatch-roofed, wooden houses were destroyed throughout much of the Island, particularly in Agana, which then contained close to 50% of the total population, and now contains less than 10%. The U.S. Navy administration relocated entire villages, providing the then minimum lot area, roads and water.

The structures themselves were built without benefit of any standards and, for the most part, consisted of wooden frame homes covered with corrugated sheet metal and were usually perched on pillars made of ifil wood. There were few indoor toilets, and much of the cooking was done in outdoor ovens.

As the Island attempted to rebuild from the destructive effects of W. W. II, it remained "closed" by the Navy. This prevented the entry of skilled personnel to the Island, particularly in the civilian construction market. This lack of skilled people, plus the high cost of materials, allowed the population to grow without the benefit of modern housing. The resulting effects were overcrowding and the people became accustomed to living in the poorly constructed shelters which plague the Island today.

As Guam began to grow out of this situation, the housing market suffered two additional setbacks. First, Typhoon Karen damaged or demolished an estimated 75% of the existing structures, many of which have not yet been completely restored. Secondly, and to some extent perhaps more severe as concerns housing, was the Island's becoming infested with a particularly vicious termite combined with an optimum breeding temperature, leading to untold thousands of dollars of damage annually. Complete villages are so infested and damaged that the structures are no longer maintainable, some having gone through an accelerated economic life of as low as five years.

To further complicate the housing situation, a land title problem makes mortgage arrangements difficult. The Naval Administration overlaid subdivisions upon existing subdivisions in an attempt to provide emergency civilian shelters toward the end of the war. Records had been lost during the Japanese occupation and surveys conducted after the War were based on memories, unsupported by salvaged records. Another aspect of the problem is the custom of dividing property among heirs on share-and-share alike basis, which has created fractional lots of unusable sizes.

It is estimated by the 1970 Census that there are 16,680 housing units on the Island. Of this, we estimate that over 5,000 of these are substandard or dilapidated to the point of requiring major corrective action, including demolition. Records are not available for more definitive analysis.

There is some subdivision activity; however, over 80% of all new residential construction is taking place on the outskirts of the village of Dededo under an agreement between the Government of Guam and Kaiser to build over 1200 homes on public lands. This expansion has added to traffic, school and utility problems. The effects that the large concentration of families in one area will have on public schools, streets and facilities must be considered.

Public facilities are either nonexistent or inadequate for the major portion of the Island. Detailed development planning is needed to assure the maximum use and lowest cost of facility extension, rather than a "brush-fire" approach. The territorial government has undertaken a 75 million dollar capital improvement program with Federal rehabilitation funds. New schools, roads, sewer and storm collection systems and treatment plants are, or will be, constructed through most of the population centers. These funds are the result of P. L. 88-170, under a loan and grant arrangement initiated by Congress some six years ago.

B. Specific Issues and/or Problems

1. Summary

a. At present, a full range of housing does not exist on the Island. Information identifying what "full range" means must be developed which responds to the special needs of Guam.

b. The Chamarro life style as it affects housing must be understood in order to develop relevant shelter types.

c. New housing is occupied primarily by mobile families, sometimes with the advantage of subsidized rents. As older housing is vacated, it is immediately occupied by lower income families instead of being demolished.

d. There is little upward mobility in terms of housing quality possible for low income families.

e. Many dwellings are occupied by two or more families, or by extended family groups.

f. The present infrastructure systems could not support many new housing units.

g. Direct physical access to many lots is impossible because they have become "land-locked" by overlapping and conflicting title and subdivision actions.

h. Structural requirements for typhoon-proof housing has so far resulted in a notable lack of imagination in design and execution.

i. Building costs are inflated by the need to import both materials and labor.

j. Many residents may have become culturally adapted to living in overcrowded, sub-standard housing.

k. Many land parcels on Guam are of a size and shape which makes them unusable for proper housing development.

l. Land title problems often make mortgage arrangements difficult.

m. There is a lack of rental housing of all sizes, types, and price ranges.

2. Population Characteristics

A complete exposition of the characteristics of the Guamanian population appears in the Population Element. It was noted there that the statistics could be somewhat misleading

owing to the large transient segment of the population. This has the effect of distorting comparisons between males and females between the ages of 19 to 59, and of complicating the assessment of actual housing need. Military dependents housing and on-base residence facilities also tend to cloud the issue of actual need.

According to the Census, there are 75,233 persons in households, and 15,569 households, for an average of 4.83 persons per household. Since these numbers include households of military and contract worker families, who are presumed to be smaller than the native population's, average native family size is expected to be greater than 5 persons. The number of households is not directly comparable to the number of dwelling units (see following section). The relatively large family size (5+) is, however, an indication of the Chamarro custom of extended families residing together, of larger than typical U.S. family size, and possibly of overcrowding, although one must remember that Continental U.S. standards for measuring overcrowded conditions may not be relevant on Guam, owing to cultural differences.

The median age is a very young 21.6 years. 39.7% of the total population is 14 years of age and younger. Only 1.7% of the total are 65 years and older.

General conclusions to be drawn from these statistics are:

a. Relatively large homes are needed to accommodate the large families;

b. Housing for the elderly does not appear to be of high priority concern;

c. The need for recreation, health, and day care facilities located in neighborhoods or villages is indicated by the large number of young people.

3. Existing Stock of Dwelling Units

Characteristics of the 1970 housing stock are described in the following tables. Statistical information includes:

a. 1970 U.S. Census housing unit count for civilian and military populations and their percentage change from the 1960 Census.

HOUSING UNITS FOR GUAM

Election Districts	Total			Civilian			Military		
	1960	1970	% Change	1960	1970	% Change	1960	1970	% Change
Agana	331	515	55.6	331	515	55.6			
Agana Heights	689	669	-2.9	622	601	-3.4	67	68	1.5
Agat	589	819	39.0	589	813	38.0		6	
Asan	602	581	-3.5	426	431	1.2	176	150	-1.5
Barrigada	1,110	1,307	17.7	803	987	22.9	307	320	4.2
Chalan Pago-Ordot	304	526	73.0	304	526	73.0			
Dededo	1,176	2,295	95.2	597	2,029	239.9	579	266	-54.1
Inarajan	269	321	19.3	269	321	19.3			
Mangilao	355	741	108.7	244	741	203.7	111		-100
Merizo	234	271	15.8	234	271	15.8			
Mongmong-Toto-Maite	667	896	34.3	518	764	47.5	149	132	-11.4
Piti	275	239	-13.1	235	239	1.7	40		-100
Santa Rita	1,356	1,610	18.9	330	519	57.3	1,023	1,091	6.6
Sinajana	696	680	-2.3	696	680	-2.3			
Talofofo	208	350	68.3	208	350	68.3			
Tamuning	1,390	2,208	58.8	1,260	2,151	70.7	130	57	-56.2
Umatac	110	130	18.2	110	130	18.2			
Yigo	1,539	2,056	33.6	326	591	81.3	1,213	1,465	20.8
Total	12,373	16,680	34.8	8,578	13,126	53.0	3,795	3,555	-6.3

Source: U. S. Department of Commerce, Bureau of the Census
Quinton-Budlong

Comments:

1. Civilian housing stock has increased by 53% since 1960, while the military has decreased by 6.3%. The total stock has increased by 34.8%.

2. Dededo and Mangilao have experienced the largest increase in housing, each expanding over 200%. Decreases in housing have occurred in Agana Heights, Sinajana, and Yona.

b. Civilian housing unit totals differentiated as to owner- or renter-occupied, number of units within the structure, and physical type (mobile or static).

Comments:

1. Approximately 57.5% of Guam's dwelling units are owner-occupied, while 42.5% are rental. Agana contains the largest concentration of rental units, 66.7%, while Umatac has the smallest, 7.7%.

2. Single unit structures comprise 84.5% of the total stock, multiple units 15.1%, and mobile units 0.4%.

c. Population per dwelling unit, calculated for both civilian and military populations.

Comments:

1. Within the civilian housing stock, there are approximately 5.08 persons per unit.

2. There are 3.94 persons per unit in military housing units.

d. Vacancy rates, calculated for both civilian and military populations.

Comments:

1. Approximately 7.1% of the civilian housing stock is vacant. However, it is believed that many of these are dilapidated or uninhabitable.

HOUSING UNIT TYPE
(Civilian Population)

Election Districts	Occupancy				Structure Type					
	Owner	% Tot.	Rental	% Tot.	1 Unit	% Tot.	2+ Units	% Tot.	Mobile	% Tot.
Agana	161	33.3	323	66.7	249	48.3	266	51.7		
Agana Heights	338	58.0	244	42.0	513	81.3	117	18.5	1	0.2
Agat	469	58.9	327	41.1	725	89.2	78	9.6	10	1.2
Asan	249	58.9	174	41.1	354	82.5	74	17.2	1	0.3
Barrigada	633	66.1	325	33.9	900	91.3	84	8.5	2	0.2
Chalan Pago-Ordot	361	69.6	158	30.4	492	93.5	32	6.1	2	0.4
Dededo	1,086	58.7	764	41.3	1,873	92.3	155	7.6	1	0.1
Inarajan	255	82.0	56	18.0	290	90.3	30	9.3	1	0.4
Mangilao	381	53.7	328	46.3	612	82.8	126	17.1	1	0.1
Merizo	208	77.6	60	22.4	262	96.7	8	3.0	1	0.3
Mongmong-Toto-Maite	370	49.7	375	50.3	527	69.0	237	31.0		
Piti	122	51.7	114	48.3	208	87.1	29	12.1	2	0.8
Santa Rita	332	67.5	160	32.5	441	85.0	78	15.0		
Sinajana	446	68.4	206	31.6	616	90.6	64	9.4		
Talofofo	226	68.7	103	31.3	321	91.7	28	8.0	1	0.3
Tamuning	822	39.3	1,267	60.7	1,620	75.3	512	23.8	19	0.9
Umatac	120	92.3	10	7.7	116	96.7	14	3.3		
Yigo	350	61.3	221	38.7	549	92.9	36	6.1	6	1.0
Yona	307	69.4	135	30.6	448	95.9	19	4.1		
Total	7,236	57.5	5,350	42.5	11,116	84.5	1,987	15.1	48	0.4

Source: U. S. Department of Commerce, Bureau of the Census
Quinton-Budlong

POPULATION PER DWELLING UNIT

Election Districts	Total			Civilian			Military		
	Pop. in DUS	Occupied DUS	Pop/DU	Pop. in DUS	Occupied DUS	Pop/DU	Pop. in DUS	Occupied DUS	Pop/DU
Agana	1,809	453	3.99	1,809	453	3.99			
Agana Heights	2,889	625	4.62	2,670	563	4.74	219	62	3.53
Agat	4,200	780	5.38	4,175	776	5.38	25	4	6.25
Asan	2,604	552	4.72	2,069	416	4.97	535	136	3.93
Barrigada	6,224	1,230	5.06	5,119	937	5.46	1,105	293	3.77
Chalan Pago-Ordot	2,885	512	5.63	2,885	512	5.63			
Dededo	9,941	2,067	4.81	9,000	1,806	4.99	941	261	3.61
Inarajan	1,879	307	6.12	1,879	307	6.12			
Mangilao	3,095	667	4.64	3,095	667	4.64			
Merizo	1,518	266	5.71	1,518	266	5.71			
Mongmong-Toto-Maite	4,005	843	4.75	3,508	714	4.91	497	129	3.85
Piti	1,247	236	5.28	1,247	236	5.28			
Santa Rita	6,386	1,529	4.18	2,584	481	5.37	3,802	1,048	3.63
Sinajana	3,495	633	5.52	3,495	633	5.52			
Talofofo	1,884	322	5.85	1,884	322	5.85			
Tamuning	9,062	2,039	4.44	8,833	1,988	4.44	229	51	4.49
Umatac	813	130	6.25	813	130	6.25			
Yigo	8,725	1,945	4.48	2,759	551	5.01	5,966	1,394	4.28
Yona	2,572	432	5.95	2,572	432	5.95			
Total	75,233	15,569	4.83	61,914	12,190	5.08	13,319	3,378	3.94

Source: U. S. Department of Commerce, Bureau of the Census
Quinton-Budlong

VACANCY RATES

Election Districts	Total		Civilian		Military	
	Vacant Units	% Total Units	Vacant Units	% Total Units	Vacant Units	% Total Units
Agana	62	12.0	62	12.0		
Agana Heights	44	6.6	38	6.3	6	8.8
Agat	39	4.8	37	4.6	2	33.3
Asan	27	4.6	13	3.0	14	9.3
Barrigada	76	5.8	49	5.0	27	8.4
Chalan Pago-Ordot	14	2.7	14	2.7		
Dededo	228	9.9	223	11.0	5	1.9
Inarajan	14	4.4	14	4.4		
Mangilao	72	9.7	72	9.7		
Merizo	5	1.8	5	1.8		
Mongmong-Toto-Maite	53	5.9	52	6.8	3	2.3
Piti	3	1.3	3	1.3		
Santa Rita	81	5.0	38	7.3	43	3.9
Sinajana	47	6.9	47	6.9		
Talofofo	28	8.0	28	8.0		
Tamuning	169	7.7	163	7.6	6	10.5
Umatac		0		0		
Yigo	110	5.4	39	6.6	71	4.8
Yona	35	7.5	35	7.5		
Total	1,107	6.6	932	7.1	177	5.0

Source: U. S. Department of Commerce, Bureau of the Census
Quinton-Budlong

e. Values of civilian housing units, calculated for each village.

Comments:

1. The median housing value on Guam is $13,500.

2. Chalan Pago-Ordot, Inarajan, Merizo, Santa Rita, Umatac, and Yigo have median housing values of less than $10,000.

3. Highest median values occur in Agana and Tamuning, each exceeding $20,000.

4. The greatest absolute total of high value housing exists in Tamuning and Agana Heights.

5. The greatest number of low-value units exists in Agat and Barrigada.

f. Rental rates of civilian dwellings, calculated for each village.

Comments:

1. The median rental rate is $116.

2. Merizo, Piti, and Yona have median rental rates below $100.

3. Highest median rentals occur in Talofofo, Agana, Inarajan, Mangilao, and Mongmong-Toto-Maite.

4. The relative spread of median rental rates is somewhat less than housing values.

g. New and proposed dwelling unit construction, derived from the FHA, Guam Housing Authority, and Guam Housing and Urban Renewal Authority.

HOUSING VALUE/UNIT AND LAND OWNED

(CIVILIAN POPULATION)

ELECTION DISTRICTS	MEDIAN	LESS THAN $500	% OF UNITS	$500-$999	% OF UNITS	$1,000-$1,999	% OF UNITS	$2,000-$2,999	% OF UNITS	$3,000-$4,999	% OF UNITS	$5,000-$7,499	% OF UNITS	$7,500-$9,999	% OF UNITS	$10,000-$14,999	% OF UNITS	$15,000-$19,999	% OF UNITS	$20,000-$29,000	% OF UNITS	$30,000 OR MORE	% OF UNITS
Agana	$21,900			1	1.1	1	1.1	1	1.1	3	3.2	3	3.2	3	3.2	14	14.0	15	15.8	34	35.2	20	21.1
Agana Heights	18,700	1	0.4			2	0.7	4	1.5	16	5.8	26	9.5	25	9.1	40	14.6	31	11.3	58	21.2	71	25.9
Agat	10,600	13	3.3	4	1.0	12	3.1	15	3.8	31	7.9	74	18.9	36	9.2	85	21.7	53	13.5	34	8.7	35	8.9
Asan	15,000	2	1.0	2	1.0	4	2.0	5	2.5	16	8.0	32	16.1	16	8.0	26	13.1	24	12.1	24	12.1	48	24.1
Barrigada	13,200	9	1.7	8	1.5	12	2.2	8	1.5	21	3.9	64	11.8	75	13.8	119	21.9	116	21.3	66	12.1	46	8.5
Chalan Pago-Ordot	8,000	5	1.8	11	3.9	8	2.9	12	4.3	26	9.3	70	25.1	35	12.6	40	14.3	26	9.3	19	6.8	27	9.7
Dededo	17,000			1	0.1	3	0.3	10	1.1	47	5.0	93	9.8	70	7.4	125	13.2	308	32.5	240	25.3	50	5.3
Inarajan	7,500					5	3.4	6	4.0	19	12.8	45	30.2	20	13.4	11	7.4	17	11.4	10	6.7	16	10.7
Mangilao	13,100	2	0.6	1	0.3	7	2.2	5	1.6	9	2.9	41	13.0	51	16.2	68	21.6	51	16.2	49	15.6	31	9.8
Merizo	7,600	2	1.3	2	1.3	12	7.5	17	10.7	13	8.2	30	18.9	16	10.1	23	14.5	12	7.5	13	8.2	16	10.1
Mongmong-Toto-Maite	14,700			3	1.0	6	1.9	10	3.2	16	5.1	32	10.2	36	11.5	57	18.2	49	15.6	63	20.1	42	13.4
Piti	11,900	1	1.3	3	3.8	4	5.1	3	3.8	9	11.4	6	7.6	4	5.1	25	31.6	9	11.4	9	11.4	6	7.6
Santa Rita	8,500	5	1.8	3	1.1	12	4.2	24	8.5	26	9.2	57	20.1	42	14.8	39	13.7	30	10.6	31	10.9	15	5.3
Sinajana	10,500	2	0.5	1	0.3	8	2.1	11	2.9	43	11.2	69	18.0	51	13.3	65	17.0	60	15.7	37	9.7	36	9.4
Talofofo	11,300			3	1.7	9	5.2	13	7.5	19	11.0	21	12.1	16	9.2	22	12.7	29	16.8	19	11.0	22	12.7
Tamuning	20,600	4	0.6	2	0.3	11	1.6	12	1.8	24	3.5	46	6.8	43	6.3	87	12.8	100	14.7	158	23.3	191	28.2
Umatac	6,300			1	2.3	2	4.5	5	11.4	10	22.7	8	18.2	7	15.9	4	9.1	6	13.6	1	2.3		
Yigo	6,900	6	2.1	5	1.8	12	4.2	21	7.4	52	18.3	60	21.1	23	8.1	32	11.3	31	10.9	23	8.1	19	6.7
Yona	10,800	1	0.4	3	1.3	11	4.6	8	3.3	28	11.7	28	11.7	35	14.6	37	15.4	50	20.8	20	8.3	19	7.9
Total	$13,500	53	0.9	56	0.9	141	2.4	191	3.3	427	7.3	805	13.8	604	10.4	919	15.8	1,017	17.4	908	15.6	710	12.2

Source: U.S. Department of Commerce, Bureau of the Census
Quinton-Budlong

RENTAL VALUE
(CIVILIAN POPULATION)

ELECTION DISTRICTS	MEDIAN	LESS THAN $10	% OF UNITS	$10-$19	% OF UNITS	$20-$29	% OF UNITS	$30-$39	% OF UNITS	$40-$49	% OF UNITS	$50-$59	% OF UNITS	$60-$69	% OF UNITS	$70-$79	% OF UNITS	$80-$89	% OF UNITS	$90-$99	% OF UNITS	$100-$119	% OF UNITS	$120-$149	% OF UNITS	$150-$199	% OF UNITS	$200 OR MORE	% OF UNITS	NO CASH RENT	% OF UNITS
Agana	135			4	1.2	9	2.8	14	4.3	6	1.9	5	1.5	11	3.4	12	3.7	11	3.4	8	2.5	38	11.8	29	9.0	63	19.5	54	16.7	59	18.3
Agana Heights	117	2	0.8	2	0.8	3	1.2	5	2.0	8	3.3	14	5.7	17	7.0	9	3.7	8	3.3	8	3.3	22	9.0	37	15.2	24	9.8	40	16.4	45	18.4
Agat	109			1	0.3	10	3.0	8	2.4	10	3.0	30	0.0	28	8.5	13	3.9	14	4.2	3	0.9	32	9.7	20	6.0	40	12.1	46	13.9	76	23.0
Asan	118	2	1.1	4	2.3	5	2.8	8	4.5	2	1.1	11	6.3	6	3.4	3	1.7	7	4.0	6	3.4	15	8.6	19	10.9	13	7.4	28	16.0	45	25.8
Barrigada	109			5	1.5	12	3.6	14	4.2	13	3.9	31	9.5	15	4.6	16	4.9	5	1.5	4	1.2	35	10.7	25	7.6	35	10.7	29	8.8	87	26.6
Chalan Pago-Ordot	119	2	1.2	1	0.6	6	3.8	6	3.8	5	3.1	5	3.1	3	1.9	5	3.1	5	3.1	3	1.9	8	5.0	16	10.1	16	10.1	16	10.1	60	38.2
Dededo	117	2	0.2			8	1.0	6	0.7	7	0.9	37	4.8	36	4.7	16	2.0	43	5.6	59	7.7	95	12.4	104	13.6	103	13.4	180	23.5	68	8.9
Inarajan	135							4	7.4			2	3.7	1	1.8	3	5.5	1	1.8	1	1.8	1	1.8	1	1.8	3	5.5	10	18.5	27	50.0
Mangilao	138			4	1.2	4	1.2	5	1.5	8	2.4	31	9.4	48	14.6	5	1.5	3	0.9	3	0.9	11	3.4	29	8.8	95	28.9	27	8.2	55	16.7
Merizo	65			1	1.7	2	3.4			1	1.7	3	5.1	6	10.3											6	10.3	1	1.7	38	65.5
Mongmong-Toto-Maite	135	1	0.2	3	0.5	4	1.0	4	1.0	7	1.8	15	3.9	9	2.3	25	6.6	13	3.4	13	3.4	48	12.7	55	14.6	44	11.7	65	17.2	70	18.6
Piti	75	1	0.8	5	4.3	7	6.1	4	3.5	4	3.5	5	4.3	5	4.3	3	2.6	2	1.7	2	1.7	4	3.5	6	5.2	10	8.7	7	6.1	49	42.9
Santa Rita	111		0.8			4	2.5	15	9.3	7	4.3	13	8.1	6	3.7	4	2.5	2	1.2	5	3.1	18	11.2	1	0.6	18	11.2	10	6.2	57	35.6
Sinajana	112			1	0.4	16	7.7	14	6.7	7	3.3	17	8.2	8	3.8	6	2.9	3	1.4	1	0.4	14	6.7	33	16.0	35	16.9	10	4.8	41	19.9
Talofofo	170	1						1	0.8			5	4.4	11	9.7	1	0.8	1	0.8			3	2.6	6	5.3	41	36.2	20	17.6	23	20.3
Tamuning	115			8	0.6	45	3.5	44	3.4	66	5.2	133	10.5	98	7.7	40	3.1	32	2.5	14	1.1	48	3.7	76	6.0	237	18.7	247	19.5	182	14.3
Umatac	N.S.											1	10.0			1	10.0													8	80.0
Yigo	114			1	0.4	3	1.3	5	2.2	5	2.2	25	11.3	8	3.6	4	1.8	10	4.5	15	6.7	29	13.1	17	7.6	35	15.8	24		30	13.5
Yona	82			3	2.2	16	12.2	1	0.7	1	0.7	8	6.1	4	3.0	3	2.2	3	2.2			2	1.5	6	4.5	16	12.2	10		58	44.2
Total	$116	11	0.2	43	0.8	154	2.8	158	2.9	157	2.9	391	7.3	320	5.9	169	3.1	163	3.0	145	2.7	423	7.9	480	8.9	834	15.5	824	15.4	1,077	20.1
Corrected % Excluding "No Cash Rent"			0.2		1.0		3.6		3.6		3.6		9.1		7.4		3.9		3.8		3.3		9.9		11.2		19.5		19.2		

Source: U.S. Department of Commerce
Quinton-Budlong

FHA - (New and Proposed)

		Dwelling Units
1.	Fujita - Yigo	250
2.	Marianas - Yigo (Guam Development & Invest. Corp.)	159
3.	*Yigo (N. W.)	300
4.	*Dededo (N. of Marine Drive)	200
5.	*Dededo (S. of Marine Drive)	150
6.	*Dededo (W. of Village)	200 (140)
7.	Dededo (Existing)	1,025
8.	Kaiser (Hawaii-Kai) Dwellings	1,130
9.	Kaiser (Hawaii-Kai) T Houses	160
10.	Rental Apartment (N. of Marine Drive)	100
11.	Rental Apartment (S. of Marine Drive) Quality Pacific Apartments Martin Close	448
12.	Rental Apartments (Cronin)	40
13.	Jonestown	80
14.	Ada Condominium	214
15.	Rt. 16 AJB Construction Co.	213
16.	Mongmong (Hyundai)	116
17.	Santa Rita (Hyundai)	300
18.	*Talofofo (Land acquired - pending Sobu Development)	100
19.	Sleepy Lagoon Condominium	500
		4,831

*Proposed within 5 years.

This data has been collected from the FHA, Guam Housing and Urban Renewal Authority (GHURA) and the Guam Housing Authority.

4. Condition of Housing

No current survey of housing conditions exists for the Island. The most recent extensive Island-wide survey was completed in 1966. However, certain indices of conditions appear in the 1970 Census of Housing and a "windshield" survey of housing was performed by the consultant. An overall view of the housing stock may be gleaned from review of this information.

This information is summarized in the three succeeding tables. They include:

a. Housing age of the civilian housing supply.

Comments:

1. Only 16.5% of the existing housing supply was constructed prior to 1950. The destructive forces of Typhoons Karen and Olive account for the relatively small percentage, as many dwellings were destroyed. However, many of these units which suffered damage have not been repaired.

2. Approximately 62.2% of the existing housing was constructed between 1960 and 1970; 12.4% of the total units, during 1969 to 1970. Rapid population growth and replacement of typhoon-damaged structures has contributed to this high percentage.

b. Plumbing facilities, and equipment characteristics of the civilian housing supply.

Comments:

1. Approximately one-fourth, or 23.9% of the Island's total housing units are lacking some or all plumbing facilities. These conditions are most severe in the southern villages of Inarajan, Merizo, and Umatac, and in the central island villages of Chalan Pago-Ordot and Yona.

2. Only 2.1% of the total units do not have piped water inside their structure. However, 41.3% only have cold piped water.

3. Bathtub or shower facilities are lacking in 11.9% of the total units. Above 30% of the dwellings in Umatac and Merizo fail to have these facilities.

4. Flush toilets can be found within 78.4% of the Island's dwelling structures. Outdoor privies account for 15.8% of the total. Approximately 4.2% have no toilet facilities. However, this mushrooms to 30% of Umatac's dwellings.

5. Cooking facilities are lacking in 2.3% of the dwelling units; electric lighting in 2.9%; and refrigerators in 1.9%.

c. Consultant survey of the physical condition of civilian dwelling units.

Comments:

1. The survey represents a subjective visual analysis of structural conditions. Obvious external dilapidation, lack of maintenance, and apparent inability of rehabilitation (due to the extensive costs likely to be incurred) account for the units classified as "Bad." Structures classified as "Fair" are characterized by their deteriorating conditions, lack of maintenance, and some potential for rehabilitation.

2. A high 50.8% of the Island"s residential units were classified to be in "Bad" physical condition. In excess of 75% of the dwellings in Inarajan, Merizo, Santa Rita, and Umatac fall within this category. The fewest "Bad" structures occurred in the high growth areas of Agana, Dededo, and Tamuning.

3. Approximately one-third, or 33.0%, of the structures were found to be in "Good" condition. Dededo, with its recent extensive residential construction, has 71.8% of its units in this category. In addition, 45% of the units in Tamuning were considered "Good."

HOUSING AGE

(CIVILIAN POPULATION)

ELECTION DISTRICTS	TOTAL	1969-1970		1965-1968		1960-1964		1950-1959		1940-1949		1939 OR EARLIER	
		NO	% TOT	NO	% TOT	NO	% TOT	NO	% TOT	NO	% TOT	NO	% TOT
Agana	515	44	8.5	67	13.0	59	11.4	178	33.7	79	15.3	88	17.0
Agana Heights	601	37	6.1	113	18.8	158	26.2	159	26.2	123	20.4	12	1.9
Agat	813	70	8.6	172	21.1	236	29.0	181	22.2	143	17.5	11	1.3
Asan	429	27	6.2	98	22.8	114	26.5	117	27.2	73	17.0		
Barrigada	986	69	6.9	161	16.3	265	26.8	292	29.6	190	19.2	9	0.9
Chalan Pago-Ordot	526	51	9.6	185	35.1	144	27.3	99	18.8	45	8.5	2	0.3
Dededo	2,029	645	31.7	651	32.0	452	22.2	188	9.2	87	4.2	6	0.2
Inarajan	321	25	7.7	73	22.7	79	24.6	60	18.6	60	18.6	24	7.4
Mangilao	739	94	12.7	208	28.1	217	29.3	86	11.6	132	17.8	2	0.2
Merizo	271	27	9.9	68	25.0	70	25.8	58	21.4	39	14.3	9	3.3
Mongmong-Toto-Maite	764	81	10.6	177	23.1	194	25.3	182	23.8	98	12.8	32	4.1
Piti	239	23	9.6	38	15.8	73	30.5	69	28.8	34	14.2	2	0.8
Santa Rita	519	40	7.7	76	14.6	138	26.5	183	35.2	81	15.6	1	0.1
Sinajana	680	6	0.8	80	11.7	171	25.1	169	24.8	252	37.0	2	0.2
Talofofo	350	42	12.0	115	32.8	103	29.4	60	17.1	29	8.2	1	0.2
Tamuning	2,151	221	10.2	580	26.9	518	24.0	532	24.7	296	13.7	4	0.1
Umatac	130	12	9.2	28	21.5	20	15.3	31	23.8	30	23.0	9	6.9
Yigo	591	89	15.1	179	30.3	171	28.9	75	12.7	75	12.7	2	0.3
Yona	467	30	6.4	78	16.7	208	44.5	63	13.5	82	17.6	6	1.3
Total	13,121	1,633	12.4	3,147	24.0	3,390	25.8	2,781	21.2	1,948	14.8	222	1.7

Source: U.S. Department of Commerce, Bureau of the Census
Quinton-Budlong

PLUMBING, FACILITIES, AND EQUIPMENT CHARACTERISTICS

(CIVILIAN POPULATION)

ELECTION DISTRICTS	TOTAL DU's	PLUMBING		WATER SUPPLY						BATHTUB OR SHOWER		FLUSH TOILET								COOKING FACILITIES		ELECTRIC LIGHTING		REFRIGERATOR	
		LOCKING SOME OR ALL FACILITIES	% TOTAL DUs	HOT AND COLD PIPED WATER IN STRUCTURE	% TOTAL DUs	ONLY COLD PIPED WATER IN STRUCTURE	% TOTAL DUs	NO PIPED WATER IN STRUCTURE	% TOTAL DUs	NONE	% TOTAL DUs	INSIDE STRUCTURE	% TOTAL DUs	OUTSIDE STRUCTURE	% TOTAL DUs	PRIVY	% TOTAL DUs	OTHER OR NONE	% TOTAL DUs	NONE	% TOTAL DUs	NONE	%TOTAL DUs	NONE	% TOTAL DUs
Agana	515	56	10.9	342	66.4	170	33.0	3	0.6	7	1.4	469	91.1	7	1.4	33	6.4	6	1.2	16	3.1	10	1.9	1	0.2
Agana Heights	601	68	11.3	402	66.9	192	31.9	7	1.2	16	2.7	537	89.4	3	0.5	56	9.3	5	0.8	12	2.0	9	1.5	2	0.3
Agat	813	254	31.2	310	38.1	480	59.0	23	2.8	105	12.9	574	70.6	18	2.2	114	14.0	107	13.2	14	1.7	39	4.8	23	2.8
Asan	431	83	19.3	233	54.1	193	44.8	3	0.7	55	12.8	356	82.6	2	0.5	62	14.4	9	2.1	8	1.9	6	1.4	6	1.4
Barrigada	987	284	28.8	478	48.4	482	48.8	26	2.6	166	16.8	726	73.6	23	2.3	219	22.2	18	1.8	21	2.1	30	3.0	21	2.1
Chalan Pago-Ordot	526	225	42.8	209	39.7	309	58.7	8	1.5	111	21.1	345	65.6	10	1.9	144	27.4	27	5.1	5	1.0	24	4.6	13	2.5
Dededo	2,029	290	14.3	1,547	76.2	415	20.5	67	3.3	180	8.9	1,758	86.6	12	0.6	210	10.3	45	2.2	88	4.3	87	4.3	57	2.8
Inarajan	321	191	59.5	76	23.7	234	72.9	11	3.4	72	22.4	148	46.1	8	2.5	110	34.3	55	17.1	6	1.9	17	5.3	15	4.7
Mangilao	741	173	23.3	441	59.5	281	37.9	17	2.3	73	9.9	578	78.0	34	4.6	102	13.8	25	3.4	13	1.8	18	2.4	7	0.9
Merizo	271	162	59.8	70	25.8	195	72.0	6	2.2	84	31.0	130	48.0	4	1.5	131	48.3	6	2.2	4	1.5	13	4.8	11	4.1
Mongmong-Toto-Maite	764	103	13.5	496	64.9	266	34.8	2	0.3	45	5.9	667	87.3	7	0.9	68	8.9	22	2.9	15	2.0	8	1.0	6	0.8
Piti	239	67	28.0	100	41.8	136	56.9	3	1.3	36	15.1	175	73.2	2	0.8	29	12.1	33	13.8	22	9.2	7	2.9	2	0.8
Santa Rita	519	199	38.3	205	39.5	306	59.0	8	1.5	88	17.0	338	65.1	8	1.5	169	32.6	4	0.8	8	1.5	14	2.7	11	2.1
Sinajana	680	181	26.6	385	56.6	291	42.8	4	0.6	139	20.4	534	78.5	12	1.8	87	12.8	47	6.9	14	2.1	7	1.0	11	1.6
Talofofo	350	130	37.14	144	41.1	189	54.0	17	4.9	82	23.4	229	65.4	5	1.4	88	25.1	28	8.0	13	3.7	18	5.1	18	5.1
Tamuning	2,151	224	10.4	1,507	70.1	610	28.4	34	1.6	151	7.0	1,963	91.3	10	0.5	157	7.3	21	1.0	18	0.8	21	1.0	19	0.9
Umatac	130	86	66.2	20	15.4	101	77.7	9	6.9	52	40.0	54	41.5	4	3.1	33	25.4	39	30.0	4	3.1	3	2.3	4	3.1
Yigo	591	151	25.6	313	53.0	263	44.5	12	2.0	41	6.9	449	76.0	19	3.2	112	19.0	11	1.9	9	1.5	20	3.4	19	3.2
Yona	467	214	45.8	147	31.5	311	66.6	9	1.9	63	13.5	265	56.7	4	0.9	150	32.1	48	10.3	17	3.6	25	5.4	3	0.6
	13,126	3,141	23.9	7,425	56.6	5,424	41.3	269	2.1	1,566	11.9	10,295	78.4	192	1.5	2,074	15.8	556	4.2	307	2.3	376	2.9	249	1.9

CONSULTANT SURVEY:
PHYSICAL CONDITION OF STRUCTURES
(EXCLUDING MILITARY)

ELECTION DISTRICT	GOOD	% TOT	FAIR	% TOT	BAD	% TOT	TOTAL
Agana	233	31.7	148	20.1	148	20.1	736
Agana Heights	168	31.3	54	10.1	315	58.7	537
Agat	189	23.2	104	12.8	522	64.0	815
Asan	82	27.6	33	11.1	182	61.3	297
Barrigada	231	20.6	361	32.3	527	47.1	1,119
Chalan Pago-Ordot	63	13.4	127	27.0	281	59.6	471
Dededo	1,298	71.8	60	3.3	451	24.9	1,809
Inarajan	28	13.1	14	6.5	172	80.4	214
Mangilao	188	23.5	181	22.6	432	53.9	801
Merizo	61	18.0	22	6.5	255	75.4	338
Mongmong-Toto-Maite	191	24.3	110	14.0	485	61.7	786
Piti	66	22.2	31	10.4	200	67.3	297
Santa Rita	49	12.3	25	6.3	323	81.4	397
Sinajana	143	19.8	78	10.8	501	69.4	722
Talofofo	99	32.7	59	19.5	145	47.8	303
Tamuning	1,007	45.0	404	18.0	829	37.0	2,240
Umatac	4	3.3	6	5.0	111	91.7	121
Yigo	71	14.6	145	29.9	269	55.5	485
Yona	190	26.6	169	23.7	355	49.7	714
	4,361	33.0	2,131	16.1	6,710	50.8	13,202

Source: Survey estimates by consultant

EXISTING HOUSING DEMAND BY INCOME

(TOTAL POPULATION)

INCOME	UNIT DEMAND (TOTAL FAMILY & UNRELATED INDIVIDUALS)	VALUE CAPABILITY	
		PURCHASE (2.5 X ANNUAL INCOME)	MONTHLY RENTAL (1/48 ANNUAL INCOME)
Less than $250	1,486	Less than $650	Less than $5.21
$250-$499	420	$650-$1,248	$5-$10
$500-$699	318	$1,250-$1,748	$10-$14
$700-$999	393	$1,750-$2,498	$14-$20
$1,000-$1,499	1,001	$2,500-$3,748	$20-$31
$1,500-$1,999	1,526	$3,750-$4,998	$31-$42
$2,000-$2,999	2,758	$5,000-$7,498	$42-$62
$3,000-$3,999	3,056	$7,500-$9,998	$62-$83
$4,000-$4,999	2,269	$10,000-$12,498	$83-$104
$5,000-$5,999	2,030	$12,500-$14,998	$104-$125
$6,000-$7,999	3,220	$15,000-$19,998	$125-$167
$8,000-$9,999	3,238	$20,000-$24,998	$167-$208
$10,000-$14,999	3,169	$25,000-$37,498	$208-$312
$15,000-$24,999	1,365	$37,500-$62,498	$312-$520
$25,000+	402	$62,500+	$521+

Source: Quinton-Budlong

b. Housing demand for 1975, 1980, 1985, and 1990, based on the three alternative population series.

Methodology:

1) Population estimates for each time period and series are listed (Column 1).

2) Population per dwelling unit rates are estimated (Column 2). These rates decrease as the population increases, due to immigration of small family units and individuals, and a general reduction in family size.

3) Applying the above rates to the population size, the total number of dwellings required, at full occupancy, is determined (Column 3).

4) Multiplying the total required units by an estimated vacancy factor (Column 4), the number of vacant units is calculated (Column 5).

5) Addition of the number of vacant units (5) with the required units (3) results in the total housing demand (Column 6).

6) Single family units and multiple unit percentages are estimated (Columns 7, 9). Multiple unit percentages are assumed to increase due to intensification of land uses and the smaller family characteristics of the immigrating population.

7) Applying these percentages to the total housing demand, the number of single family (Column 8) and multiple units (Column 10) is calculated.

8) For each time period the number of required additional housing units is determined (Column 11).

9) Assuming a policy of elimination of all "Fair" and "Bad" dwellings by 1990, the number of replacement units per time period are calculated (Column 12).

10) Summing the additional units required (11) and the replacement units (12), the total additional unit per time period is determined (Column 13).

HOUSING DEMAND
(CIVILIAN UNITS ONLY)

	(1) POPULATION	(2) POP/DU	(3) DUs REG	(4) VACANCY FACTOR	(5) VACANT DUs	(6) TOTAL DEMAND	(7) SF %	(8) SF DUs	(9) MULTI %	(10) MULTI-UNIT DUs	(11) REQ. ADDIT. UNITS	(12) PERIOD REPLACEMENT	(13) TOTAL ADDITIONAL DUs
SERIES A													
1970	64,510	5.08	12,190	7.1	932	13,126	84.5	11,116	15.5	1,987			
1975	76,089	4.9	15,218	6.5	989	16,207	82.0	13,290	18.0	2,917	3,081	1,706	4,787
1980	89,939	4.8	18,737	6.0	1,124	19,861	80.0	15,889	20.0	3,972	3,654	1,706	5,360
1985	105,706	4.7	22,980	5.5	1,264	24,244	77.5	18,789	22.5	5,455	4,383	1,706	6,089
1990	123,157	4.6	27,368	5.0	1,368	28,736	75.0	21,552	25.0	7,182	4,492	1,706	6,198
SERIES B													
1970	67,890	5.08	12,190	7.1	932	13,126	84.5	11,116	15.5	1,987			
1975	84,317	4.75	17,751	6.5	1,154	18,905	80.5	15,219	19.5	3,686	5,779	1,706	7,485
1980	104,956	4.5	23,324	6.0	1,399	24,723	77.0	19,037	23.0	5,686	5,818	1,706	7,524
1985	128,982	4.25	30,349	5.5	1,669	32,018	73.5	23,533	26.5	8,485	7,295	1,706	9,001
1990	157,352	4.0	39,338	5.0	1,967	41,305	70.0	28,914	30.0	12,391	9,287	1,706	10,993
SERIES C													
1970	67,890	5.08	12,190	7.1	932	13,126	84.5	11,116	15.5	1,987			
1975	87,562	4.7	18,630	6.5	1,211	19,841	80.0	15,873	20.0	3,968	6,715	1,706	8,421
1980	112,597	4.4	25,590	6.0	1,535	27,125	75.0	20,344	25.0	6,781	7,284	1,706	9,990
1985	144,595	4.1	35,267	5.5	1,940	37,207	70.0	26,045	30.0	11,162	10,082	1,706	11,788
1990	180,089	3.8	47,391	5.0	2,370	49,761	65.0	32,345	35.0	17,416	12,554	1,706	14,260

(2) Decreasing population/dwelling unit doe to higher irrigation of non-family units and smaller family size.

(7) (9) Increasing multi-unit percentage due to population growth, smaller family size, and land scarcity.

(12) Period replacement based on policy of elimination of all structures estimated to be in "Fair" or "Bad" condition by 1990 (65% of total existing stock; 13% of 1970 stock per period)

Source: Quinton-Budlong

5. Projections of Housing Needs (Total Population)

a. Housing demand of the existing population, ascertained by annual income.

Methodology

1) Guam's family units and unrelated individuals are listed by their annual income. Potentially each unit would demand a housing unit, either purchase or rental.

2) The potential amount that could be paid by family units for housing purchase or rental is calculated by:

a) For purchase units, multiplying annual income by 2.5 and

b) For rental units, multiplying annual income by 1/48.

3) Military and civilian incomes are not disaggregated in the Census, therefore the indicated demand is somewhat distorted as military personnel are included. Comparison of this demand to the housing available by purchase value and rental rates would be meaningless. However, it is possible to ascertain that there is a large unfulfilled demand for dwelling units in the lower and medium income levels.

The problem is compounded by high land costs and the small size of available lots. Many small individual lots are unsuitable for economic development of parking facilities and must be consolidated into larger parcels. Many lot owners have filed applications with the Territorial parking requirements in order to build on their lots.

What may be future parking space requirements under the law? Under current zoning regulations, commercial buildings of the type usually constructed in the Central Agana Business-Government District must include a minimum of 1 sq. ft. of off-street parking for each square foot of gross floor area. However, because many of the existing buildings were constructed prior to the establishment of this zone regulation, there is already a deficiency in the number of available parking spaces. The extent of deficiency may be determined by conducting a compreshensive study of total floor area in the district.

In addition, modern shopping centers throughout the United States and in Hawaii are providing parking areas ranging from 1 to 4 sq. ft. for each square foot of floor space. Although most zoning regulations require a ratio no higher than 1 to 1, the concensus of experienced opinion suggests a desired or preferred ratio of 3 to 1.

The 3 to 1 ratio should be suitable for Guam's particular situation because there is no public transportation and because the automobile is the only mode of transportation within the islands, for all practical purposes.

The number of spaces required by a 3 to 1 ratio could not be provided on-street without having serious adverse effects on the surrounding area and traffic flow. Consequently, development of parking lots financed, owned and operated by the government offers the most feasible solution. And because of the high land values and lack of suitable sites of adequate size, multi-level parking garages must be considered. Multi-level parking structures offer the most economic method of providing additional parking spaces because they can accommodate large volumes of cars and utilize the least land area.

It is therefore recommended that a comprehensive study be made of the parking problem for the formulation of an integrated parking plan combining peripheral parking areas and the development of public transportation facilities.

POTENTIAL MOTOR VEHICLE REGISTRATION

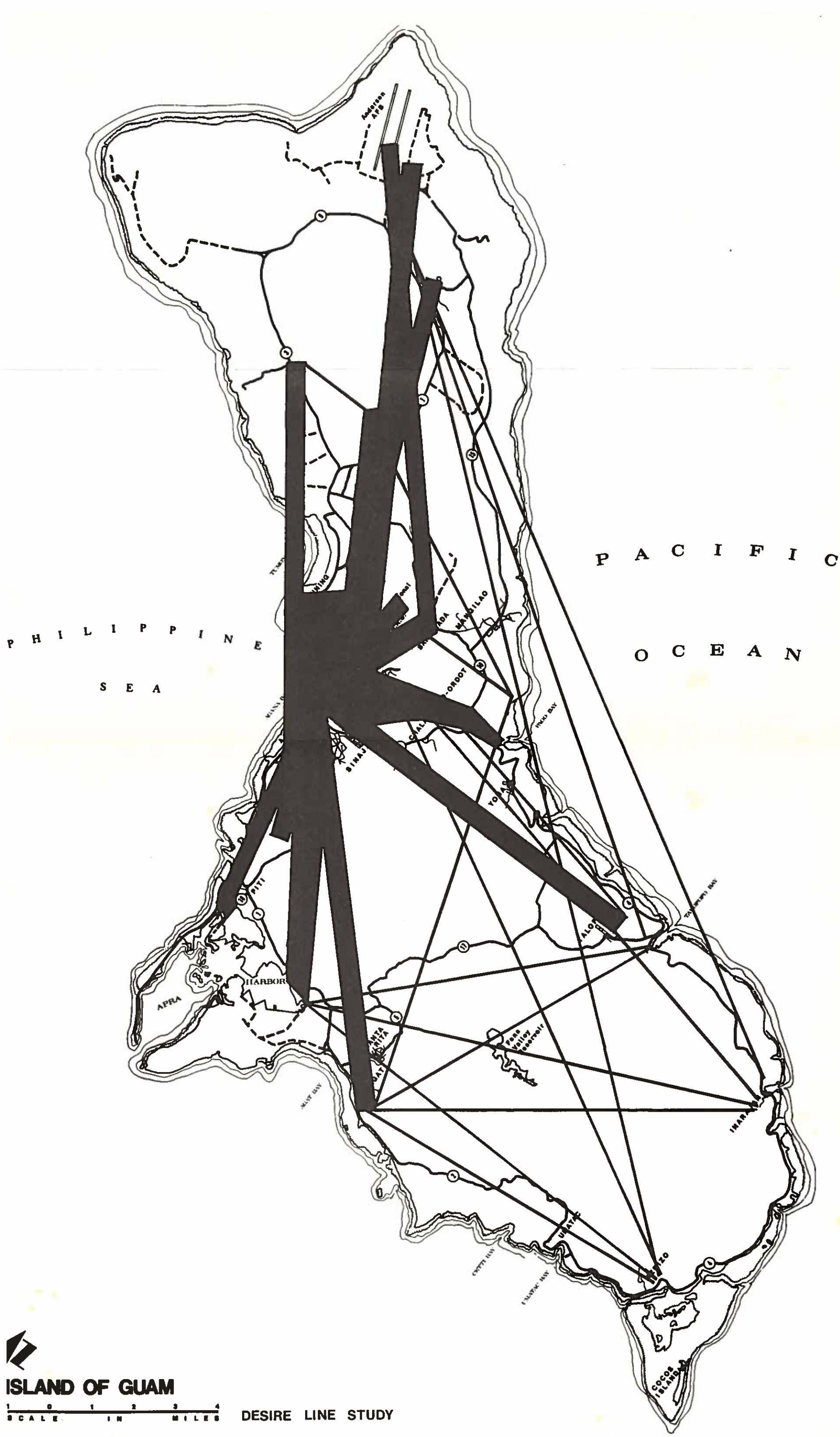
Series	Year	Civilians	Est. Military	Total Pop.	Persons per Vehicle	Total Vehicles
A	1975	76,089	22,000	98,089	2.5	39,236
	1980	89,938	23,000	112,938	2.3	49,103
	1985	105,706	24,000	129,706	2.0	64,863
	1990	123,157	25,000	148,157	2.0	74,079
B	1975	84,317	22,000	106,317	2.5	42,526
	1980	104,956	23,000	127,956	2.3	55,633
	1985	128,982	24,000	152,982	2.0	76,491
	1990	157,352	25,000	182,352	2.0	91,176
C	1975	87,562	22,000	109,562	2.5	43,825
	1980	112,597	23,000	135,597	2.3	58,955
	1985	144,597	24,000	168,597	2.0	84,299
	1990	180,089	25,000	205,089	2.0	102,545



ISLAND OF GUAM

SCALE 0 1 2 3 4 IN MILES

1969 TRAFFIC COUNT STATIONS



ISLAND OF GUAM

SCALE IN MILES 1 0 1 2 3 4

DESIRE LINE STUDY

C I R C U L A T I O N

3. Traffic Volumes

Included in the 1970 Highway Master Plan prepared by the Planning Division of the Bureau of Land Mangement, was a detailed traffic count for 1969.

Forty-seven strategic locations were selected to analyze traffic volumes throughout the road network. These station locations are shown on Plate A.

Counts were mechanically taken at these stations for 24-hour periods in October and November, 1969. Traffic was counted Mondays through Thursdays; Friday through Sunday traffic was not utilized because of the non-representative nature of weekend traffic volumes and concentration of shopping trips on Friday evenings.

Traffic volumes were computed in terms of 24-Hour Average Daily Traffic (ADT); Hourly Average Traffic; Peak Hour Traffic and Average Hourly Traffic for the Five Peak Hours at each station. This data is shown in Table C.

The highest traffic volumes occurred on Marine Drive between Dededo and the Naval Station at Apra Harbor. Beginning from Dededo, the traffic counts show a peak hour volume of 1,119 in the vicinity of Tumon 2,115 between Tamuning and Agana, 2,160 at Agana, and 2,014 in the vicinity of Apra Harbor. Traffic on Route 8 had an indicated peak hour volume of 1,484 vehicles. Approximately 992 vehicles traveled on Route 2-A. The peak hour traffic counts for the majority of the roadways were less than 650 vehicles. Only Marine Drive had a peak hour traffic volume exceeding 1,500 vehicles.

Traveling south and around the Island, traffic volumes decreased rapidly from 743 vehicles at Agat to 345 vehicles at Yona. The lightest peak hour traffic volumes were on Route 4 between Umatac and Inarajan, with only 85 vehicles passing through in the vicinity of Umatac and 57 vehicles in the vicinity of Inarajan. Except for Marine Drive, the traffic volume figures do not present a clear indication of the critical traffic congestion which occurs daily on the highways, especially on Route 16 which is used as a bypass for Marine Drive and on Route 4 which is the principal highway to the Univ sity of Guam and the various schools located in the municipalities of Chalon Pago and Mangilao.

4. Desire Lines

The 1970 Highway Master Plan delineated concentrated population areas, business districts, employment centers, recreation attractions and shopping areas as the major Island traffic generators. These are depicted on Plate B. This information was coupled with present and future traffic volumes to establish desire lines shown on Plate C.

These studies emphasize the importance of the Agana-Tamuning district in present and future travel patterns. This district contains the largest employers on the Island plus the highest concentration of shopping, business and entertainment facilities.

Although the Island's military installations are self-contained in varying degrees, residents of these installations do frequent non-military facilities in addition to other military facilities on different bases. This off-base military traffic is also largely oriented toward or through the Agana-Tamuning district.

5. Parking

To measure parking demand, a survey was conducted to determine normal utilization of existing parking spaces. The survey found that demand for facilities presently exceeds the supply; most parking facilities are operating at or above their capacities. (Parking facilities provided by various business establishments or at government buildings are shown in Table D.)

The survey data also was used to determine the types of available facilities and their capacities. General analysis of the current parking supply and its utilization show that present facilities are inadequate for existing requirements and that additional facilities must be constructed.

The degree of shortage varies by location, but appears most critical in the Central Agana Business-Government District, in business districts along Marine Drive in Tamuning and Agana and, to a lesser extent, in Anigua. The parking problem in the Central Agana Business-Government District is particularly serious because more cars must be accommodated there on precious land which is often used for other than parking facilities.

6. Demand/Supply Issues

a. Construction

The relatively large annual outlays for construction on Guam in 1963 and 1964 resulted primarily from the replacement and repair of structures destroyed or damaged by Typhoon Karen. During this period, the Federal Government accounted for $3 of every $4 spent on construction. Until 1970, the fiscal year 1964 construction outlays of $41.6 million represented the peak of construction spending.

Declining federal construction outlays in the years 1965 through 1968 were offset by increases in private and local government construction outlays which rose $7.7 million in 1965 to $22.3 million in 1970. Also, in fiscal 1970, private plus Government of Guam construction outlays exceeded Federal Government construction spending by $2.3 million. This is a good indicator of the vigor of recent expansion in the civilian sector of the economy.

Prior to 1969, residential construction (in dollars) was usually 3 to 5 times commercial construction. In 1969 this ratio was $1.70 to $1.00 and in 1970 was $1.60 to $1.00. Thus, although both are increasing, the value of commercial construction is rising more rapidly than is residential construction.

Construction activity on Guam reached a new high in 1970. Total outlays were $42.3 million or 10.4 percent from 1969.

The total number of building permits issued for new construction during 1970 was 1,055 as contrasted to 690 in 1969. Almost 80 percent were permits for residential construction.

Government of Guam awarded $5.5 million in construction contracts, up $2.7 million (96.4 percent) over 1969. Government of Guam construction outlays constitute 13 percent of the 1970 total as compared to 7 percent of the 1969 total. By almost doubling construction activity in 1970, the Government of Guam indicates its continuing efforts to provide needed services to a growing economy.

Federal Government construction spending (primarily military) declined $1.1 million (5.2 percent) to $20 million in 1970. However, the outlook for future years does not indicate declining Federal construction activity on Guam. Military withdrawals from Southeast Asia, a recent $100 million appropriation for the construction of an ammunition facility on Guam, and a proposed $36 million ship repair facility in Apra Harbor indicate continued expenditures on this strategically located island.

Residential construction increased $1.1 million (12 percent) to a total of $10.3 million in 1970. However, residential construction maintained the same proportion, 24 percent, of total construction spending.

Commercial construction increased $1.3 million (25 percent) to a new peak of $6.5 million in 1970. Commercial construction was 15 percent of the 1970 total and 14 percent of the 1969 total.

Based on building permits issued, the estimated cost for all residential, commercial, apartment, and miscellaneous planned projects during 1970 was $32.6 million, an increase of 147 percent over the close of fiscal year 1969.

The number of commercial building permits increased from 18 ($701,000 value) to 37 ($1,618,000), an increase in value of $917,000 or 130.8 percent. The average value per commercial permit rose from $38,944 in 1969 to $43,730 in 1970.

The number of apartment building permits rose from 26 ($5 million) in 1969 to 53 ($6.5 million) in 1970, an increase in value of $1.5 million or 30 percent. However, the average value per apartment permit declined from $194,038 in 1969 to $122,321 in 1970.

The miscellaneous building permits category saw a spectacular rise from 15 permits ($638,000 value) to 125 ($14,153,000), an increase in value of about $13.5 million or 2,118 percent. Included in this is the estimated initial cost of construction of the Guam Oil Refinery of $5.2 million, the foundation for the Dai-Ichi Hotel at $2.7 million, and the Hilton at $4.2 million. Other construction projects with substantial estimated construction costs are warehouses, pumphouse, fuel tanks, dental clinic, hotel additions, power generator, office building, San Miguel Brewery, and condominium-golf course complex.

Over in the public sector of the economy, the U. S. Navy Officer in charge of construction, Marianas, had 133 active contracts totaling $41.7 million as of the close of fiscal year 1970. The largest of these contracts is for the first increment of the $7 million Tanguisson Power Plant. Another contract for $6.7 million was awarded for the construction of 271 units of family housing.

The sum of all these projects indicates that fiscal 1971 will be another very active year in the construction industry.

The number of commercial building permits issued during the first quarter of FY 71 was 26, down from 32 last quarter. During first quarter fiscal year 1970 only one commercial building permit was issued with an estimated construction cost of 15 thousand dollars. During the first quarter of fiscal year 1971, 26 permits for new commercial projects were issued with an estimated construction cost of 3.3 million dollars, which accounts for the 21,771,0 percent increase this quarter when comparing it to the same period a year ago. The number of building permits issued this quarter reached a new high of 789. Last quarter only 242 building permits were issued. The number of residential construction permits issued this quarter rose to 260 from 154 last quarter. The majority of the new residential starts were in the Mongmong-Toto Barrigada-Maite areas with 95 and 21 building permits issued, respectively. Two building permits were issued for construction of an apartment in the Tumon-Harmon area with total estimated construction cost of 437 thousand dollars. One apartment construction permit was issued in the Agana Heights-Maina area, two in Mongmong-Toto, and one in Tamuning for a total of 152 thousand dollars of estimated construction cost for these projects.

The new table on the type of occupation requested for importation and for those requesting extension of stay included in this issue reflects the need of construction companies for skilled and semiskilled workers. The majority of the request for skilled and semiskilled alien workers were received from construction companies on Guam.

ESTIMATED COST OF NEW CONSTRUCTION
($ Thousand)*

Fiscal Year	Residential	Commercial	Apartment	Miscellaneous 1/	Total
1961	1,770	540	0	0	2,274
1962	1,453	449	0	0	1,902
1963	4,373	2,989	0	0	7,362.
1964	7,826	2,154	0	0	9,980
1965	5,780	1,643	0	0	7,423
1966	5,898	1,513	0	0	7,411
1967	7,718	1,351	637	834	10,540
1968	7,147	853	2,039	664	10,703
1969	6,779	5,045	701	638	13,163
1970 (Jul-Dec)	4,979	789	1,271	6,862	13,901

1/ Motels, offices and warehouses.

CONSTRUCTION COMPLETED 1/*

Fiscal Year	Residential	Commercial	Apartment	Other	Total
1965 2/	197	23	0	0	220
1966	294	32	0	0	326
1967	257	25	1	0	283
1968	389	19	10	0	418
1969	390	23	11	0	424
1970 (Jul-Dec)	175	3	15	5	195

1/ Figures for prior years not available.

2/ Figures represent last half of the year.

*Source: Statistical Abstract Guam 1970.
Prepared by: Economic Research Center, Dept. of Commerce.

CONSTRUCTION COMPLETED BY TYPE
FISCAL YEARS 1969 AND 1970

Type	1969	1970	Percentage Change +(-)
Residential	390	250	(35.9)
Apartment	23	16	(30.4)
Commercial	11	26	136.4
Miscellaneous	0	13	0
Total	424	305	(28.1)

Source: Annual Review of Business Conditions In Guam, Fiscal Year 1970. Prepared by: Economic Research Center, Department of Commerce, Government of Guam.

CONSTRUCTION COMPLETED
FIRST QUARTER FY 1971

Month	Residential	Apartment	Commercial	Miscellaneous	Total
July	11	2	2	0	15
August	13	0	0	0	13
September	20	5	2	0	27
Total	44	7	4	0	55

Source: Quarterly Review of Business Conditions, Guam, U.S.A., First Quarter, Fiscal Year 1971 Volume 8, No. 1.
Prepared by: Department of Commerce, Economic Research Center, Government of Guam.

CONSTRUCTION
($ Million)

Fiscal Year	Private				Government				Total Value of Construction
	Residential		Commercial		Guam		Federal		
	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	
1963	4.4	24	3.0	17	*	*	10.6	59	18.0
1964	7.8	19	2.2	5	*	*	31.6	76	41.6
1965	5.8	16	1.6	4	*	*	29.5	80	36.9
1966	5.9	17	1.5	5	*	*	26.8	78	34.2
1967	7.7	33	1.3	6	.4	2	14.0	61	23.4
1968	7.1	34	.9	4	2.1	10	11.1	52	21.2
1969	6.7	19	5.0	14	2.8	8	21.1	59	35.6
1970	10.3	24	6.5	16	5.5	13	20.0	47	42.3

Source: Private and Government of Guam, Building Permit Section, Department of Public Works.
Federal Government - Officer In Charge of Construction, U.S. Naval Forces, Marianas.

*Less than $100,000 and/or 1 percent.

BUILDING PERMITS ISSUED AND ESTIMATED VALUE FOR NEW CONSTRUCTION*

Fiscal Year	Number	Value ($ Thousand)
1961	813	2,274
1962	704	1,902
1963	1,641	7,362
1964	1,598	9,982
1965	1,125	7,423
1966	784	7,411
1967	969	10,540
1968	963	10,703
1969	690	14,163
1970 (Jul-Dec)	534	13,901

NUMBER OF BUILDING PERMITS ISSUED FOR NEW CONSTRUCTION*

Fiscal Year	Residential	Commercial	Apartment	Miscellaneous	Total
1961	733	80	0	0	813
1962	661	44	0	0	705
1963	1,500	141	0	0	1,641
1964	1,483	115	0	0	1,598
1965	1,061	64	0	0	1,125
1966	715	51	0	18	784
1967	898	48	15	8	969
1968	890	29	30	14	963
1969	631	26	18	15	690
1970 (Jul-Dec)	460	9	30	35	534

*Source: Statistical Abstract Guam 1970.
Prepared by: Economic Research Center, Dept. of Commerce.

SUMMARY OF BUILDING PERMITS

Calendar Year	No. of Res. or Permits	Average Unit Cost (Computed)	Total Cost (Estimated)
1960	527	$ 2,580	$ 1,357,126 -
1961	710	2,700	1,912,367 -
1962	730	1,610	1,177,865 -
1963	1,746	4,450	7,752,946 -
1964	1,549	4,910	7,603,806 -
1965	698	7,360	5,148,789 -
1966	761	8,900	6,765,076 -
1967	947	7,480	7,072,883 -
1968	741	10,000	7,412,700 -
1969	788	10,500	8,207,953 -
1970	940	14,000	13,163,564 -
1971 (Jan-May)	766	14,700	11,223,092 -

TOTAL - 10,903

Total - 4,182 (1967 - 1971)

Source: Department of Public Works
Building Permit Section
Agana, Guam

BUILDING PERMITS ISSUED FOR NEW CONSTRUCTION
FISCAL YEARS 1969 AND 1970

TYPE	1969 NO. OF PERMITS	1969 VALUE ($ THOUSAND)	1970 NO. OF PERMITS	1970 VALUE ($ THOUSAND)	PERCENTAGE CHANGE +(-)
Residential	631	6,779	840	10,336	52.5
Apartment	26	5,045	53	6,483	28.5
Commercial	18	701	37	1,618	130.8
Miscellaneous	15	638	125	14,153 1/	2,118.3
Total	690	13,163	1,055	32,590	147.6

1/ Estimated cost for the construction of the Oil Refinery, Hotel, Service Station, Pumphouse, Fuel Tanks, Warehouse and Dental Clinic accounts for the great rise in this area.

Source: Annual Review of Business Conditions In Guam, Fiscal Year 1970. Prepared by: Economic Research Center, Department of Commerce, Government of Guam.

BUILDING PERMITS ISSUED FOR NEW CONSTRUCTION
FIRST QUARTER FY 1970 AND FY 1971

Type of Construction	1970		1971		Percentage Change In Value (-)+	
	No. of Permits	Value (In Dollars)	No. of Permits	Value (In Dollars)	Year Ago	Last Quarter
Residential	258	2,834,033	260	3,932,548	38.8	70.4
Apartment	12	642,220	6	589,008	(8.3)	328.9
Commercial	1	15,000	26	3,280,635	21,771.0	(36.4)
Miscellaneous	18	6,106,465	436	1,635,984	(73.2)	(63.5)
Total	289	9,597,718	728	9,438,175	(1.7)	(21.9)

Source: Quarterly Review of Business Conditions, Guam, U.S.A., First Quarter, Fiscal Year 1971 Volume 8, No. 1.
Perpared by: Department of Commerce, Economic Research Center, Government of Guam.

b. Finance

In the money market total deposit (Demand and Time Deposit) at the close of fiscal year 1970 was 60.9 million dollars. Total deposits in 1970 were up 32.5 percent from 1969 total deposits. The rise in total deposits was due to the 14.4 million dollars increase in time deposits, demand deposits maintaining its 1969 level.

Total loans increased 16.3 percent in 1970 over 1969. Installment and mortgate loans reporting advances of 60.5 percent and 83.8 percent, respectively, in 1970 over the 1969 figures.

DEPOSITS AND LOANS, ALL FINANCIAL INSTITUTIONS
AS OF JUNE 30, 1969 AND 1970
($ Thousand)

Type	1969	1970
Deposits:		
Demand	22,046	22,580
Time	23,898	38,282
Total	45,944	60,862
Loans:		
Installment	27,975	44,908
Mortgage	9,502	17,463
Other	17,159	1,183
Total	54,636	63,554

Source: Annual Review of Business Conditions
Fiscal Year 1970, Guam, U.S.A.
Prepared by: Economic Research Center,
Department of Commerce, Government of Guam

LOANS, ALL FINANCIAL INSTITUTIONS ON GUAM
FIRST QUARTER FISCAL YEAR 1971
(In Dollars)

Month Ending	Installment	Mortgage	Other	Total
July	45,436,310	18,761,587	24,268,914	88,466,411
August	48,380,610	18,958,094	23,543,017	90,881,721
September	47,499,184	19,308,147	25,169,336	91,976,667

Source: Quarterly Review of Business Conditions, First Quarter, Fiscal Year 1971 Volume 8, No. 1, Guam, U.S.A.
Prepared by: Department of Commerce, Economic Research Center, Government of Guam.

Typical bank convention mortgage financing terms for residential take-out loans are as follows: 10-15 year term; 50 percent loan to value ration; 9½ percent interest rate; and 1½ point fee.

A limited number of 66 percent of value loans are also available to preferred buyers. Most loans, however, are FHA-insured and only a few uninsured loans are given out on Guam. Naturally the loan to value ratio severely limits the buyers who would even apply for a home mortgage where the owner has to make a down payment of $10,000-$15,000.

Other than conventional bank financing, another private source of funds which might be considered by a developer is a public underwriting. This might be a viable alternative to a developer who did not wish to be constrained by the many specifications and regulations under which FHA loans or insurance is given. This type of private financing would give the developer a flexibility in his development design and program which might not be available if dealing with the Federal Housing Administration.

One source of local mortgage funds is the Guam Housing Corporation, a quasi-public body organized several years ago to assist in home purchases. As of March 1969, GHC had provided a total of 430 loans at an average of $8,234 each. Applications for an additional 66 loans were awaiting approval. In addition to being a source of mortgage funds, GHC under its charter has acted as sponsor, developer, owner and operator of low-cost housing projects on Guam.

Related to GHC is the Guam Rental Corporation formed in 1967 to act as sponsor for a Sec. 221(d)(3) BMIR project of 115 units at Dededo. The land here was provided by the State at nominal cost and rentals range from $82/month for a 2-bedroom unit to $111/month for a 4-bedroom. Private sponsors have proposed smaller apartment developments of 50-60 units to be built under Sec. 207 which would require rents of $200-$300/month for air conditioned 1-3 bedroom units.

The Administrator of GEDA, the Guam Economic Development Authority, has indicated the government plans to provide new mortgage funds of $45 million through an underwriting of a revenue bond.

Several FHA-insured mortgage programs are available to home buyers who do not qualify for low-income and moderate-income FHA subsidy programs. These Federal mortgage insurance programs typically have a $49,500 value insurable limit for a single family residence with a loan to value ratio of: 97% of $22,500 of appraised value; 90% of value over $22,500 but not over $37,500; and 80% above $37,500.

This attractive mortgage would assure the buyer of an aggregate down payment of 10 percent at worst if he qualifies for this insurance. These loans are given under programs including FHA, Section 203(b), 220(d)(3)(A), 234(c) and for multifamily buildings Sec. 207 and 213 and Sec. 220(d)(3)(B).

Federal assistance in financing the cost of new housing for low or moderate income families may be provided by many different programs.

Since many local financial institutions have insufficient resources to provide many home mortgages, the bulk of the mortgage funds in Guam have been provided by FNMA Special Assistance Funds (Program 2) for FHA-insured home loans. It is estimated, locally, that houses financed with FHA-insured loans constitute 80 to 85 percent of the total of "subdivision type" new home construction in Guam. In addition, a fairly large number of owner-built houses which (typically) do not meet modern standards have been added to the inventory in recent years. In the 1966-1968 period, there was a substantial increase in FHA activity in Guam, from 133 loans insured in 1966 to 260 in 1968. All but 15 to 20 of these loans each year were for new construction. One added source of funds for home financing is the Guam Housing Corporation, a public body organized several years ago to assist in home purchases. As of March 31, 1969, GHC had provided a total of 430 loans, at an average of $8,234 each. Applications for an added 66 loans were awaiting approval.

A very substantial proportion of the FHA-financed single-family homes produced in the past two years have been in the Kaiser development at Dededo. Using land made available by the Government of Guam at a nominal price and a tilt-slab of reinforced concrete, the Kaiser organization has provided houses at $17,000 to $20,000. It is reported that the available lot in this development will be used up this year.

BUREAU OF PLANNING
GOVERNMENT OF GUAM
P.O. BOX 2950
AGANA, GUAM 96910

The Guam rental market is tight and prices are rising. The individual renter is at a particular disadvantage because the available supply tends to be preempted by large organizations, e.g., the airlines and the Government of Guam for their employees. It was reported that the Government of Guam now leases about 700 units at rents of $225 for two-bedroom apartments and $275 for three-bedroom units. These are made available to stateside employees, who are in Guam on contract, at substantially lower prices. It is indicative of the market that property owners who made these units available to the government on ten-year leases are now eager to be released from the agreements since they believe higher rents can be obtained on the open market.

As part of its overall program, the Guam Housing and Urban Renewal Authority is implementing the Low-Rent Public Housing Project and the Urban Renewal Projects in Sinajana and Yona.

Early this year, 12 family dwelling units were completed in Mongmong, part of 250 units authorized and financed by the U.S. Department of Housing and Urban Development through an agreement signed with GHURA in 1966. The units range in size from one to six bedrooms at an estimated cost of $5.1 million in Federal funds. These units are currently being built at six different sites in Sinajana, Agana Heights, Mongmong and Toto.

In addition to these 250 units, GHURA has requested a program reservation for 100 units of low-rent public housing with HUD. These will be built in Yona to provide rehousing facilities for families to be displaced by urban renewal in that village. Tentative cost estimate for this project is in the neighborhood of $2 million.

The development of a $300,000 Non-Title I Subdivision, authorized by Public Law 9-192 enacted by the Ninth Guam Legislature, was well in progress during the year. The project calls for 18 acres of raw land to be developed into 54 residential lots, averaging 6,500 square feet in size. It is located on the southwest fringe of Sinajana village adjacent to the Urban Renewal Program site. These house lots will be made available for sale on a priority basis to families who will be displaced by Urban Renewal action in Sinajana.

Work continues to progress on the urban renewal programs for Sinajana and Yona. The Sinajana program has been underway for well over a year and is estimated to cost $12,292,040. It is funded on a 75/25-percent matching basis by the federal and local governments.

The Yona project has met all Federal requirements and is now on the "pipeline" for funding. The federal government has reserved $3,821,115 and the local share amounts to $1,230,345 for a gross total cost of $5,051,460.

Under the Sinajana Urban Renewal Project, 258 private structures will remain and 426 will be acquired by GHURA for removal. In Yona, only 81 structures will be allowed to remain and 156 to be acquired.

The Guam Housing Corporation processed 100 applications for loans totalling $1,456,800 and approved 38 valued at $564,400. As of the end of June 1970, 62 applications totalling $892,400 were awaiting availability of funds.

Undisbursed proceeds of loans approved during the year was $189,876.57. The corporation operates on a revolving fund of $3,095,000 appropriated by the Legislature, and it derives its revenues mainly from interest on loans.

The Guam Rental Corporation's sponsored low-rent housing project, known as Lada Gardens in Dededo, was completed in November 1969. Except for one two-bedroom units that is presently being used as an office by GRC, all 114 units had been leased out. These units are presently being occupied by 620 family members. The project was built by Kaiser-Hawaii Kai at a total cost of $1,869,800 that included on-site developments.

Based upon the foregoing data and analysis we conclude that there are few, if any, available vacant units in Guam. Unoccupied housing in Guam may be assumed, therefore, to be essentially uninhabitable, although in a tropical climate the definition of an uninhabitable unit is somewhat elastic.

C. Statement of Obstacles to Solution of Housing-Related Problems

1. Sewer: To date only three of 19 villages have sewer systems and two additional villages will have under the renewal program. Some main trunk lines are being installed a treatment plant is under construction, with others planned. Unfortunately, these plans are only of a short range nature, attempting to bridge the existing gap. Lack of proper sewage affects development in many areas and adds to health problems that include lagoon pollution.

2. Storm Drainage: Only a piecemeal approach to drainage has occurred, consequently, severe flood problems exist in the majority of the built-up areas. Some corrective work has been performed and more is planned; however, much remains to be done.

3. Electrical: The Island has a severe power shortage with constant outages. A new power plant is nearing completion, but this will barely meet current demands and definitely will not be adequate for future development.

4. Schools: Overcrowding exists in essentially all schools, even though the Department of Education has an impressive schedule of capital improvements. Existing schools are relatively new, with 14 of the present 27 having been constructed during the past five years. There is a problem of future sites within urban areas, either for new schools or additions to existing schools as population density increases. Due to poor locations of many schools, students are seldom within walking distance, creating an inability on the part of officials to provide maximum safety from traffic movement. Site planning of schools and other community facilities has been lacking.

5. Telephone: Very inadequate; an overhaul of the entire system is needed.

6. Roads and Highways: Latest figures indicate that over 36,000 vehicles are licensed on Guam. Of the 150 miles of highway system, the major portion consists of 2-lane, 22-ft. pavement, although there are a few miles of 3 and 4 lanes. While local government has made efforts to widen the most heavily traveled strips, a complete multimillion dollar improvement program is needed to adequately handle the projected traffic. Safety design features are essentially nonexistent, such as channelization and median strips, and many highways are subject to flooding during heavy rains. The territorial government is attempting to qualify for Federal Highway Aid, but a vast amount of additional planning is required.

7. Public Transportation: October 1970 saw the first attempt of a public bus route, connecting the southern end of the island with the core area. This has proved to be quite inadequate. An extensive study should be undertaken so that the transportation system may be tailored to meet the needs of the people. An effective public bus system would help to greatly reduce the traffic congestion problems of the island, particularly in and around Agana.

8. Low-Income Housing: At present, 250 units of public housing are under construction. It is estimated that an additional 1000 units are now needed, without considering future projections. The high cost of construction, plus a shortage of skilled labor, makes low cost housing virtually impossible to realize. Generally, a 9% interest rate is being charged for convention financing, with funds not being committed to a home owner-builder until the land is free and clear and a roof is on the roughed-in structure. Funds can then be borrowed to complete the project. FHA and VA are available. The average new 3-bedroom/1 bath home is being sold for approximately $22,500. No truly low-cost housing is currently being constructed.

   GHURA has renewal programs which offer low-interest loans for new construction, 3% loans for remodeling, and is responsible for the development of public housing. A land subsidy program, based on completed housing as a package, is open to low-income families on a priority basis. Should the low-income families be unable to qualify for mortgage money, then the package may be offered to others. FHURA records show that of over 400 families interviewed, 60 had incomes of less than $6,000 per year.

   Another agency of the government, Guam Housing Corporation, also assists low-income families in securing financing for new homes after refusal by regular lending establishments. Capital has been appropriated by the Guam Legislature for a revolving fund, but it is insufficient to achieve a marked degree of success.

9. A Land Utilization Study needs to be performed to give guidance to proper village development in terms of housing capacity. Lack of such a tool has helped produce the problems of the village of Dededo, where over 2,000 units are being developed with services, including schools. However, such development is segmented and no answer is given to the question of core, village identity and character. A broader scope of study needs to be initiated to determine effects of consolidating development in certain areas, while neglecting others.

10. Lack of public land utilization policy has caused an obstacle to acquisition of additional land for future needs and properly directed growth. Potential use, value of land, and priority of development should be included in a study to provide information in determining land policy. Particular emphasis would be made on use of portions of the public land for additional low to moderate income sales and rental housing.

11. An obstacle to development is the lack of skilled labor which, currently, must be imported. Local training programs must be coordinated with labor importation activity.

12. Still another obstacle is the lack of rental housing of all sizes and types. We need considerably more units, not only to correct overcrowding and to handle the expected growth, but also to force out the badly deteriorated and functionally obsolete older structures for which rentals are also high.

13. Lack of funds has been discussed previously, but has been an obstacle both to public development and the individual.

14. Codes and Zoning: Currently, there is an adequate basis for land and building development, although difficulties are evident in the enforcement. The adopted codes include building, fire protection, housing, sanitation, water and air pollution and subdivision.

    The major problem is one of a need to establish a coordinated enforcement system to include inspector training. Certain portions of the codes require additional adaptation to local conditions at present. New laws must be adopted to rid the island of vacant and dilapidated structures. Most are so termite-infested or typhoon-damaged that they constitute a hazard to health and safety of the people.

15. A large amount of restudy is needed as the rapid growth over the past few years has created huge problems of mixed, noncompatible uses. Residential areas are being infringed upon by industrial-commercial uses and the law permits residential infringement upon industrial-commercial development. Spot zoning has occurred, especially in conjunction with nonconforming uses. A capability analysis and design standards are urgently needed to analyze our land needs with relationship to our land availability.

16. There is uncertainty about the accuracy of census data - were all the people and structures actually counted?

17. No complete house-by-house survey of structural condition has been made.

D. Statement of Goals and Objectives Related to Housing

1. Legislation

a. Housing program utilizing public lands.

b. Review and updating of various codes.

c. Land registration and survey amendments.

d. Abandoned vehicles legislation.

2. Planning

a. Village studies of existing housing by condition, size and use.

b. Master Housing Plan to guide village development, including capacity, zoning, mixed uses, capital improvements and infrastructures.

c. Five-year public housing and island-wide renewal plan.

d. Study of rentals, sales, public land utilization, subsidization.

e. Study of replacement and demolition requirements.

f. Financing potentials study.

g. Public and 236 Housing Study to answer needs of elderly and low to moderate income families and individuals.

h. Manpower study to determine potential replacement of imported construction labor by local residents presently underemployed.

i. Establish a program to coordinate planning and development activity to insure logical extension of services with a priority system designed to place planning and development in their appropriate relationship.

j. Highway System and Infrastructure to be coordinated with new communities and greatly expanded older communities necessary to provide for the growth of Guam and to replace the large numbers of substandard structures. Study to provide service to these areas is based on optimum development, not just for catching-up or short-range projections.

CIRCULATION ELEMENT

Summary of Problems and Opportunities

1. To understand the precise magnitude of Guam's circulation problems a study in detail greater than possible in a comprehensive plan is required. Specific sites and problem areas should be examined, isolating their problems, causes, and implications. Network traffic counts are only a single issue in a breadth of interrelatec complex forces affecting any circulation system. Each of these issues must be understood before priorities and relevant improvement programs can be formulated.

2. Arterials are not differentiated as to their use, thus resulting in an inefficient mix of traffic and user types. Civilian and military, and local and regional users traverse common routes; their conflicting intent often results in congested and hazardous circulation conditions.

3. Most land use concentrations, including commercial, industrial, and institutional, have been developed linearly along major arteries. Movement from the diverse uses into the system has aggravated user conflicts and congestion. A hierarchial system of collectors has not been established to function as a transition between these uses and the major arteries; rather, they feed directly onto these highways.

4. Comprehension of the circulation network is difficult. Its ambiguous pattern results from the interconnection of early major activity centroids. As no ordered pattern has been developed, it is a particular problem to those unfamiliar with the destination points.

5. Failing to take advantage of one of its unique capabilities, the circulation network has not been used to shape, form, and control urban growth. Its configuration, as a result of existing developments, has only reinforced these activity nodes.

6. Access to many major traffic-generating uses is inadequate. A substantial number of activity and residential nodes can be reached only by lengthy and complex indirect patterns of movement. Only Agana exhibits direct linkage to most of the Island's high-intensity use areas.

7. Access to many potential recreational sites is severely restricted by an absence of roads, particularly to undeveloped beaches and certain inner Island preserve areas.

8. Direct access to some housing tracts and subdivisions is almost impossible. Access roads may exist only "on paper", running through another owner's property or house.

9. In certain Island areas, housing has been developed in such a haphazard and chaotic pattern that it would be impossible to structure a local road network where none exists.

10. Many roads are too narrow to facilitate and provide freedom of traffic flow. Most of the roads on Guam are two-lane highways; a few miles of three-lane highway remain. The only existing four-lane highways include Marine Drive from upper Tamuning to the Naval Station at Apra Harbor, and a portion of Route 6.

11. Vehicle ownership and use are increasing at a rapid pace and every indication points to a much greater growth rate in the immediate future, causing present and ever-greater overloading of the existing network.

12. Island topography restricts the construction of new and alternate routes. Effectively, this is as substantial a problem as funding. Routes parallel to the major north-south and east-west arteries would be difficult and costly to construct due to the land's slope and changes of elevation.

13. Substantial sections of the existing road network, much of which was developed by the military subsequent to World War II, are now owned by the Territory of Guam. However, road maintenance is their responsibility.

14. Since rights-of-way were not acquired in fee simply by the Federal Government, no new highway construction can occur; only maintenance in accordance with the rights of prescription.

15. Few roads are maintained to any appreciable level, their surface conditions ranging from fair to very poor. The present type of road surface has proven unsuitable against bad weather conditions and dust. They lack the lasting quality of a good pavement. Lack of a substantial capital improvement budget for road maintenance has aggravated this situation.

16. Roads are constructed with coral-base asphalts, which become extremely slippery and dangerous in rainy weather. Accidents frequently result.

17. Most local roads, particularly those within the villages, are not paved. These include such heavily traveled tourist routes as the roads to Two Lovers Point and the Spanish Fort at Umatac. Following heavy rains they are impassable.

18. Unrealistic posted speed limits and different speed limits for each direction of the same stretch of roadway have caused inefficiency in traffic movement throughout the road pattern. Many limits fail to recognize the impact of adjacent land uses or potential natural hazards on traffic flows.

19. Electronic traffic control equipment (signalization) is limited to four or five locations. Such dispersion severely limits their controlling capability. One rationale for their absence states the lack of major intersecting roads as potential control locations. To some extent this is true. However, certain important intersections, such as at Marine Drive and Airport Road, fail to have signals. In those cases where lengthy sections of highway do not have intersecting highways, left turns into residential and commercial areas and U-turns still occur. It is evident that some degree of control is necessary even in those cases where no intersecting streets exist.

20. Three-land highways, where the center lane is used for overtaking and passing by traffic in either direction, have high accident rates.

21. Curvatures and gradients are substandard along many short sections of existing highways. This is particularly true in the southern half of the Island where highways pass through rugged terrain of hills and cliffsides. Such abrupt curvatures and long, steep grades reduce the safe speeds for vehicles and the number of areas sufficiently wide or straight to permit safe passing.

22. Restrictive side clearances on bridges and narrow road shoulders substantially reduce the capacity of many roads. Many of the bridges, particularly in the southern half of the Island, are in need of some degree of reconstruction.

23. Along most Island routes lane striping is barely visible, due to lack of maintenance. This has resulted in confused motorists and frequent accidents.

24. Street lighting is inadequate, resulting in very low illumination and visibility. Light fixture types are individually insufficient and their spacing too great.

25. Throughout the Island, informational and traffic control signing is inadequate. In most cases signs are too small, spaced too infrequently, deteriorated, and are located at points beyond which decisions for a change of movement become hazardous. Locational orientation is extremely difficult as signs indicating village direction and routes are almost non-existent.

26. Few Island roads, including major arterial and regional routes, have curbs and gutters. Generally, they are found only in the new residential tract developments, such as the current Kaiser construction in Dededo, and urban renewal areas, such as Sinajana. When constructed they often are characterized by inferior workmanship and materials, thus accelerating potential deterioration.

27. Comprehensibility of the Island-wide road network and identification of place is extremely difficult due to a lack of dedicated street names. Major highways are identified by route numbers and certain roads by common names (Marine Drive, Hospital Road, Airport Road, and O'Brien Drive). However, most roads remain unnamed. In such cases, it is difficult to orient persons to an unfamiliar location.

28. Lack of street addresses compounds the problem of location, identification, and orientation.

29. Free-flow of traffic is hindered by the regulation requiring all traffic to stop on both sides of a highway when a school bus stops for loading and unloading of children. Installation of traffic control instruments could negate this necessity.

30. Movement patterns at some intersections are confusing and awkward. In one particular case, left turns from Hospital Road onto Marine Drive require movement into a vaguely-marked transition lane which merges into a parallel continuous-flow northbound lane. Often motorists completing the left turn will proceed directly into the northbound lane, or northbound drivers will move into the transition lane, resulting in frequent close-to-collision situations. In addition, the transition lane is not of sufficient length to accommodate the traffic volumes engaged in this movement.

31. Guam's circulation network will be incapable of handling the additional pressures resulting from projected population growth and intensification of land uses in the Agana-Tamuning-Dededo areas. Unless alternate routes are developed, these areas, linearly connected along a single route, will add greater volumes to the already congested conditions. In addition, access to the east side of the Island from these areas will be limited by an absence of cross-Island linkages.

32. No direct link exists between Tamuning and the central and eastern side of the Island, including the villages of Barrigada, Mangilao, and Pago Bay. Access is possible only by traveling through Agana's commercial strip, thus compounding its existing congestion.

33. Access to the University of Guam is inadequate and time-consuming from most of the Island's residential and institutional sectors.

34. Access to centrally located International Airport is possible only from one direction, as the surrounding military property is closed to the public. All traffic passes along a single road to Marine Drive. As airport loads increase, congestion at the airport and the Marine Drive intersection will substantially increase.

35. Severe congestion exists along Marine Drive as a result of a breadth of sub-problems. These include:

    a. Concentration of the most active and intense land uses along this route. Apra Harbor, including both naval and commercial port activities, the governmental and commercial nucleus of central Agana, the strip commercial activities of the Agana-Tamuning area, International Airport, and the residential population concentrations of Dededo and Tamuning, are located along and free into Marine Drive. As presently configured, access to most of these uses must occur along this route.

    b. No alternate routes have been developed to relieve congestion, due to topographic conditions, lack of funding, and ownership problems.

c. Left turns are permitted from the center lanes of the four-lane highway into commercial developments at any point along its length, thus severely restricting the free-flow of through-traffic. During the late afternoon, at the close of the working day, the congestion becomes particularly aggravated as through-traffic reaches its peak and many home-bound motorists stop for purchases at the commercial establishments. Left-turn pockets have not been provided to prevent the cessation of flow in the center lane when left turns are being executed.

d. Few traffic control measures have been taken to regulate flows along the route. Due to the lack of intersecting streets, only a small number of electronically-controlled signals have been installed. These are located only at the end of major stretches of highway, including the Agana Loop and Hospital Road intersections. During hours of congestion, a number of traffic-control officers are deployed along the route. However, their number is such that effectively they exert little control.

e. Lane striping is barely visible, contributing to confused and erratic circulation and frequent accidents.

f. During rainy periods the surface of the roadway, constructed of coral-base materials, is extremely slippery. This has been one of the primary causes of the Island's disproportionately large number of accidents.

g. Destination and use signing is very poor and inadequate. Where signs exist, they usually are too small for clear legibility, are located so that decisions requiring changes in a motorist's movement pattern must be accomplished in a dangerously short distance, and are severely deteriorated.

h. Insufficient parking provisions exist at office buildings and commercial establishments of all kinds. Because these buildings are located so close to Marine Drive, there is little that can be done to change this situation.

36. Any widening of Marine Drive would substantially affect the strip commercial development. Taking from the property physically constrained by the bluffs would aggravate an already serious parking and access problem. Alternatively, this could accelerate the strip's deterioration, require the construction of parking structures, or generate the regrouping of enterprises into common commercial clusters along the strip or in other locations.

37. There exists a serious lack of parking facilities in the central Agana and Marine Drive shopping districts. Bluffs along Marine Drive constrain developable land to a narrow strip. As commercial enterprises have been developed along its length, parking has been restricted to the thin strip of remaining land. In the government and commercial office sectors of central Agana few parking lots have been provided. For all practical purposes parking has been limited to curbsides. Very high land costs make such lots impractical for the Government and undesirable for the private sector within the district itself.

38. Certain portions of Marine Drive are located so close to the ocean's interface that adequate area for beach development is not possible. This is particularly true in the Agana-Tamuning boundary area, Nimitz Beach and South Agat, and Merizo.

39. Continued land use, population, and automotive growth will abrogate the Agana-Paseo Loop's usefulness. Eventually, it will contribute to, rather than relieve, congestion.

40. Pedestrain circulation routes are practically non-existent. Other than certain central Agana locations, sidewalks and crosswalks do not exist. This is a particular problem in the Marine Drive commercial strip where pedestrians dash in front of motorists to pass from one side of the street to the other. On either side, there is no continuous pedestrian strip to link the commercial facilities. Within the villages pedestrian channels have not been developed and are needed to link school, residential, institutional, recreational, and community nodes. No recreation pedestrian paths have been developed to take advantage of the Island's natural features, including its topography, foliage, and seashore.

41. Except for the school bus, Guam does not have a public transportation system. Projected economic and population growth will tax the existing transportation mode, the automobile, and its infrastructural network to a critical point. Systems to relieve the pressure will be necessary. A three-month trial transit program utilizing buses failed. However, the measure of success was determined by the system's financial self-sustenance. Whether or not <u>any</u> mode of mass transit can be sustained without some form of subsidy is a highly questionable premise. In addition, three months is not a sufficient period to ascertain the greatest-demand locations for routes or for public acceptance and use of the system.

42. Current population concentrations do not justify a rail-mode system of rapid transit. However, increases in densities and urban activities and the utilization of such a system to shape the form of future growth would likely be a just rationale for development. Such a system could free land normally used for automobile parking for higher-value commercial, industrial, and residential development. Commercial growth could be stimulated as easy access would be facilitated by the system.

43. Present school bus utilization is highly inefficient and costly. It is likely that the program of free busing for all students is not required, as the number and distribution of schools has been substantially improved. Travel distances between residential districts and schools have been reduced to the point that many who now ride buses could walk. Many inefficient overlapping patterns exist in the distribution of bus routes. Cost inefficiencies exist in the paying of drivers for a twelve-hour day, when they frequently work fewer than eight hours.

ALTERNATIVES (PROGRAMS AND POLICIES)

Base Statements

1. Pursue detailed micro-scale analyses of individual problem areas. Included would be investigations into particular network-wide areas of concern, such as road surface construction, highway geometry, and control signing, and into specific locational problems, such as the Central Agana Government and Business District and the Marine Drive commercial strip. Investigation breadth would range from detailed traffic counts, through testing of systems and materials, to development of capital improvement and funding programs and concepts.

2. Pursue the upgrading and development of a functional and efficient Island-wide circulation system to accommodate present and future demands.

General Island-Wide Measures

3. Locate and classify roadways according to their function. Functional classifications should be related to the location and type of land use served, the origin and destination of the traffic served, and the speed, type, and volume of the traffic to be accommodated.

4. Differentiate the road system so that the movement channels are easy to understand, and define specified land use areas.

5. Establish a clear hierarchy of road size, volume, access, and parking throughout the Island. Standards should be related to an ordered system of primary, secondary, collector, and local roads.

6. Develop the circulation system to reflect and promote the desired distribution and intensity of land uses, e.g. high-speed and mass-use arterials should be used in existing areas of and as a means to promote high density land uses.

7. Configure the circulation network so that all major land uses are not located along the same network link.

8. Create a network of circulation routes which provides direct access between all major land use concentrations.

9. Provide vehicular and pedestrian access to proposed recreational areas.

10. Pursue an active program of right-of-way acquisition to accommodate both existing and future transportation needs. Acquire fee ownership rights for those areas where roads exist and where future routes are to be established.

11. Survey the accessibility of all existing development. Provide vehicular access in those cases where it does not exist. This may require the purchase or condemnation of property through which the access will be provided.

12. Develop urban renewal programs for those areas where a chaotic development pattern prohibits establishment of an infrastructural circulation network.

13. For existing and proposed highways, require the exploration of methods of integrating highways into the natural environment so that they are more harmonious and less disruptive of existing ecological and topographic conditions. Techniques should include route selection on the basis of minimal environmental disruption, highway depression or elevation, tunneling, construction of earth buffers, and intensive programs of landscaping and beautification.

14. In the development of new highway routes and expansion of existing, require social impact analyses, in addition to traditional economic. These should survey potential disruption and harm to social groups, impact on neighborhood cohesiveness and identity and on the family unit, and programs of relocation.

15. Improve access to major activity centers on the Island by providing continuous major and secondary street patterns which do not conflict with residential land uses. Residential-generated traffic should be accommodated by collector and local roads.

16. Clearly identify movement patterns at intersections through the installation of electronically-controlled signals, improved signing, left-turn pockets and transition lanes, and new lane striping. Locations of these problem-intersections should be determined through a detailed survey of the circulation network.

17. Convert existing three-lane highways to four-lanes, and no further three-lane development should be permitted.

18. Pursue a program to widen highways in accordance to a set of standards related to traffic flow capacities and land use impacts. Base improvements on the 1970 Highway Master Plan prepared by the Department of Land Management as modified by recommendations of the proposed General Plan, reflecting updated land use densities and distribution.

19. Conduct surveys to determine locations of inadequate highway curvature and severe gradients. Subsequent improvement programs should be pursued.

20. Improve all bridges deficient in width and construction. Again, the existing Highway Master Plan serves as a useful reference for their specific locations and problems.

21. Prohibit utilization of coral-asphaltic paving materials and replace with other non-skid substances.

22. Develop a systematic program of roadway reconstruction to replace existing coral-asphaltic surfaces. Effort should be concentrated in the early stages to the areas of greatest use, particularly the Marine Drive link between Apra Harbor and Dededo, Airport Road, and the Tumon Bay Loop.

23. Groove existing pavements to improve surface tire adhesion and reduce dangerous skids.

24. Develop programs to pave all local roads. Particular attention should be paid to those routes heavily used by tourists, such as the roads to Two Lovers' Point and the Spanish Fort at Umatac.

25. Develop and implement extensive road maintenance programs.

26. Annually allocate a portion of the budget, substantially greater than current expediture levels, for capital improvement and maintenance programs, specifically for the circulation system.

27. Take immediate action to identify traffic lanes through striping. A specific program of annual maintenance and upgrading should be developed.

28. Prepare a detailed analysis of existing illumination levels for the entire Island. Particular emphasis should be placed on visibility at intersections and on heavily traveled stretches of highway.

29. Develop a phased program to replace existing street lighting hardware with newer equipment of greater efficiency, such as mercury vapor lamps, and space at closer intervals.

30. Pursue programs to upgrade and replace information and traffic control signs. Initiate a system-wide study to isolate locational deficiencies, size and information effectiveness, and physical condition. Use large control signs to clearly indicate required movements, destination directions, and potential hazards, and locate at distances enabling motorists to accomplish the required action in sufficient safety. Locate directional and informational signs so that a driver's position within the system can be comprehended.

31. Develop a program to name streets and assign addresses to the individual parcels along their length.

32. Implement a network of electronic traffic control equipment to regulate flows throughout the highway infrastructure. Locate hardware at major intersections and critical points along developed strips, uninterrupted by intersections, to control left and U-turns.

33. Pursue an extensive program to provide curbs and gutters along every road, including primaries, secondaries, collectors, and locals. Construction priority should be based on immediate need. Initiate an investigation intended to isolate those areas throughout the Island where highway flooding is most critical. These areas, along with those routes which carry the greatest traffic volumes, should be assigned initial priority.

34. Create and adopt policies for guiding the upgrading, appearance, and utilization of major and secondary street frontages. This would include elimination of on-street parking, development of frontage roads, increased setbacks, additional right-of-way purchase, and one-way street construction in selected areas.

35. Create a plan for pedestrian circulation in village and urban areas linking residential with public facilities (schools, cultural centers, etc.) and major recreational activities.

36. Where feasible, separate pedestrian and auto movement. Where major streets serve high pedestrian generating land uses, traffic control and/or pedestrian bridges or underpasses should be implemented to insure the safety of both the pedestrian and automobile driver.

37. Revise posted speed limits as necessary to reflect highway conditions (curvatures, gradients, surface, deterioration, etc.) and adjacent land uses (e.g. speed limits should differentiate between residential and open land). Refer to the suggestion of the 1970 Highway Master Plan and update in accordance with the proposed General Plan.

38. Provide attractive parkways, street trees, and other appropriate landscaping on all public property adjacent to and within public thoroughfares.

39. Pursue detailed analyses examining alternative methods of mass transportation for Guam. Explore user demand, alternative modes, density concentrations, system potential as a form-generator of the urban environment, and methods of financing and subsidy.

40. Develop a busing program of mass transportation, on a subsidy rather than self-sustenance basis. Limit initial routes to areas of the greatest traffic flow and congestion, including, but not limited to, Marine Drive between Apra Harbor and Dededo.

41. Adopt a policy to utilize mass transportation systems to control and shape urban growth and change. Performance standards should be developed to control relationships of land uses to the system and insure proper development phasing.

42. Investigate the feasibility of developing a Personal Rapid Transit (PRT) System in use intensive corridors. Emerging technologies have substantially reduced the costs of such systems, making them economically feasible for communities of 30,000 and 40,000 population. Several such systems have been developed recently, including efforts by Ford, Dashaveyor-Bendix, and Rohr Corporation, and are currently being implemented. A detailed investigation of their applicability and feasibility for Guam should be undertaken.

43. Pursue policies to render greater effectiveness to the school bus program. Examine school locations and their geographic drawing area. Appropriate walking distances should be enforced and busing eliminated for those within this area. Overlapping bus patterns should be eliminated. Public use of the buses during the hours they are not required for school purposes should be considered.

44. Develop specific school bus stops, at which crosswalks and signals or underpasses and overpasses would be developed. As this is accomplished, regulations requiring that all traffic must stop as the bus does should be eliminated.

45. Design the street system to separate residential areas and other generators of pedestrian traffic from industrial, commercial, and other through vehicular traffic, while providing these areas with convenient access to major highways.

46. Require sidewalks or other pedestrian paths to be provided when any street is widened.

47. Perform a comprehensive study of the parking problem for the formulation of an integrated parking plan combining parking areas and the development of public transportation facilities.

Specific Sites

48. Pursue every effort to develop a parallel, alternate route for Marine Drive. Such a route should be linked to all major land uses which contribute to the present traffic load. This includes Apra Harbor, the Central Agana Business and Government District, the commercial strip, International Airport and the Naval Air Station, the resort areas of Tumon Bay, and Dededo.

49. Explore the possibility of federal financing of a route parallel to Marine Drive as a "defense highway". Interconnection of Apra Harbor, the Naval Air Station, and Andersen Air Force Base would substantiate this designation.

50. If the route parallel to Marine Drive were to traverse military property, a probability, it should be depressed or berms constructed as physical and visual buffers.

51. Actively pursue the upgrading of Marine Drive. As one alternate, its utilization as a conveyor of regional traffic would be discouraged, relying on the development of alternative routes for this purpose. Rather its role would emphasize the accommodation of local traffic to and from commercial enterprises and the office-government sectors of Agana. To facilitate circulation, the following measures should be explored:

    a. Improvement to four-lane, divided highway status.

    b. Left and U-turns permitted only from transition lanes and pockets at particular control points along its length.

    c. Electronic signalization installed at all control points.

    d. Access to and from commercial establishments along Marine Drive permitted only at individual points, rather than at any position along its length.

    e. Informational and directional signing installed as needed.

    f. The present coral-asphaltic highway surface replaced with other non-skid materials.

    g. Grooving of the highway to increase tire traction.

    h. Lanes striped at regular intervals.

    i. Reflectors and hazard bumps improved and located within the stripes.

j. Street lighting hardware and its spacing improved along its length.

k. Extensive landscaping programs implemented for areas fronting on Marine Drive and in median strips as they are developed.

l. Curbs and gutters constructed in conjunction with street widening and improvement programs.

m. A continuous pedestrian route developed to interconnect all commercial development.

n. Encourage commercial developers through a program of incentives to cluster parking into common compounds. Tax benefits, increased heights, and greater site coverage are examples of possible incentives.

52. As a second alternative, a program emphasizing use of Marine Drive as a conveyor of regional traffic, de-emphasizing local and commercial-oriented trips, would require the following additions to or modifications of the above:

a. Widening to six-lane, divided highway status

b. Elimination of most strip parking along the route

c. Minimal and controlled access to adjacent commercial facilities

d. Eventual relocation of most of the Agana-Tamuning strip commercial.

53. Locate a route connecting Tamuning with Barrigada, Mangilao, and other east Island areas, permitting traffic to bypass Marine Drive and central Agana. It is likely that such a route would cross Navy property in the vicinity of International Airport. Negotiations should be initiated with the Navy for this purpose.

54. Create a more direct route from the population concentrations of Agana and Tamuning to the University of Guam.

55. Establish access from International Airport to Routes 8 and 18.

56. Redefine and clearly identify left-turn pockets and transition lanes at the Hospital Road - Marine Drive intersection. In addition, examine and restructure the permitted traffic flow pattern. Northbound movements on Marine Drive should be prohibited as left turns proceed from Hospital Road.

57. Provide electronically-controlled traffic signalization at the intersection of Airport Road and Marine Drive.

58. Develop parking clusters and compounds in the Central Agana Business and Government District. This should include both publicly-financed and privately-owned structures. Tax, site coverage, and height incentives could be established to encourage privately-owned structures. Tax, site coverage, and height incentives could be established to encourage private development of parking compounds.

59. Investigate alternatives to the Agana-Paseo Loop to accommodate movements from Marine Drive onto Highway 4. These could include the provision of left-turn pockets, new signalization flow-patterns, and/or under- or overpasses.

60. Realign the confluence of O'Brien Drive, Route 8, and the Mongmong-Toto Road so that continuity, hence system clarity, is provided.

61. Realign further inland those sections of Marine Drive that pass so close to the ocean's edge that beach development is impossible. Specific consideration should be directed toward the portion near the Agana-Tamuning boundary, Nimitz beach and areas south of Agat, and Merizo.

Statistics, Background Information, Comments

1. The Circulation Network

Presently, Guam is served by a main highway system comprised of approximately 132.4 miles of numbered roads or highways, of which 10.7 miles are within security areas controlled by the military and are not open for public use.

2. Vehicle Registration

Tables A and B compare past trends for both motor vehicle registration and population growth on Guam. In 1970, there were 31,471 motor vehicles of all types on the roads compared to 16,903 in 1963 -- an increase of 14,568 vehicles in seven years. This represents a percentage increase of 86.2 percent -- or an average gain of 12.3 percent a year.

Private passenger cars accounted for 25,086 or 79.7 percent of the total 31,471 vehicles registered in 1970. However, non-taxable, vehicles, such as government-owned cars, are not included in the figures. (In 1970, the Government of Guam maintained a fleet of 579 vehicles, of which 485 were passenger cars, 94 were heavy equipment and utility vehicles, and 155 were school buses.)

The figures in Table B show that over the same seven-year period, the Island's population increased by 7,471 persons -- from 79,458 to 86,929 -- or by only 9.4 percent. Hence, the number of motor vehicles is climbing at a faster rate than the population. This means that the number of persons per vehicle has steadily decreased each year, from 4.7 persons per vehicle in 1963, to 2.8 persons per vehicle in 1970.

Present trends and the Island's expanding economy indicate that this population-per-vehicle ratio will descend to 2.0 persons per vehicle, which is the average for many U.S. cities. Assuming this to occur, the following alternatives may result:

TABLE A

MOTOR VEHICLE REGISTRATION

Fiscal Year	Private	Taxi Cab	Cargo	Trailer	Motorcycle	Dealer	Bus	Special Equip.	Military	Total Vehicle
1963	13,131	104	1,557	321	928	66	0	33	763	16,903
1964	13,713	144	1,824	323	834	85	0	72	708	17,703
1965	14,350	135	1,810	253	760	91	4	30	438	17,871
1966	16,875	141	2,050	275	1,505	75	9	41	748	21,719
1967	17,953	146	2,165	266	1,242	88	18	11	624	22,513
1968	20,371	152	2,409	263	1,324	82	22	23	1,021	25,667
1969	22,304	136	2,834	403	1,051	79	25	27	852	27,711
1970	25,086	127	3,645	431	1,301	96	25	35	725	31,471

Source: Guam Department of Commerce

TABLE B

MOTOR VEHICLE REGISTRATION & POPULATION

Fiscal Year	Total Vehicle	Total Population	Persons per Vehicle
1963	16,903	79,458	4.7
1964	17,703	84,659	4.8
1965	17,871	88,254	4.9
1966	21,719	95,425	4.4
1967	22,513	98,090	4.3
1968	25,667	97,844	3.8
1969	27,711	87,572	3.2
1970	31,471	86,929	2.8

Source: Guam Department of Commerce

Table C

1969 TRAFFIC COUNTS

	24 Hour A.D.T.	Average Hourly Traffic	Peak Hour Traffic	Average of 5 Peak Hours
Station 1	1,434	60	150	122 per hour
Station 2	882	37	85	70 per hour
Station 3	633	26	57	53 per hour
Station 4	1,572	66	156	127 per hour
Station 5	1,171	49	166	116 per hour
Station 6	958	40	122	103 per hour
Station 7	939	39	100	87 per hour
Station 8	1,876	78	194	158 per hour
Station 9	3,322	138	345	286 per hour
Station 10	8,385	349	824	710 per hour
Station 11	6,715	280	974	593 per hour
Station 12	8,789	366	787	739 per hour
Station 13	10,521	438	957	854 per hour
Station 14	5,355	223	531	473 per hour
Station 15	2,189	91	270	192 per hour
Station 16	878	37	130	86 per hour
Station 17	2,863	119	417	262 per hour
Station 18	7,388	308	656	594 per hour
Station 19	1,331	56	117	108 per hour
Station 20	4,157	173	463	355 per hour
Station 21	12,763	532	1,119	951 per hour
Station 22	2,355	98	202	187 per hour
Station 23	4,340	181	364	326 per hour
Station 24	11,144	464	885	817 per hour
Station 25	29,694	1,237	2,115	2,005 per hour
Station 26	16,771	699	1,484	1,249 per hour
Station 27	30,450	1,269	2,160	2,067 per hour
Station 28	4,881	203	443	386 per hour
Station 29	16,192	675	1,948	1,335 per hour
Station 30	1,864	78	239	160 per hour
Station 31	1,673	70	184	156 per hour
Station 32	17,135	714	2,014	1,429 per hour

Table C (Cont)

1969 TRAFFIC COUNTS

	24 Hour A.D.T.	Average Hourly Traffic	Peak Hour Traffic	Average of 5 Peak Hours
Station 33	10,176	424	992	830 per hour
Station 34	13,537	564	1,663	1,189 per hour
Station 35	9,048	377	879	734 per hour
Station 36	7,168	299	743	604 per hour
Station 37	7,303	304	725	629 per hour
Station 38	24,853	1,036	2,029	1,720 per hour
Station 39	10,801	450	951	835 per hour
Station 40	6,275	262	639	509 per hour
Station 41	2,655	111	222	199 per hour
Station 42	5,395	225	628	472 per hour
Station 43	3,144	131	315	262 per hour
Station 44	2,893	121	281	243 per hour
Station 45	2,001	83	354	183 per hour
Station 46	2,299	96	251	181 per hour
Station 47	11,114	463	933	771 per hour

TABLE D

PARKING INVENTORY
(Date of Survey - May 1971)

SHOPPING CENTERS

Name and/or Location	No. of Spaces
Town House	200
Mark's Apparel	20
Mark's Walgreen	20
Ben Franklin Store	30
Ada's Mart - Agana	60
Corn Bldg. - Anigua	60
Ace Hardware	20
Omega Center	10

RECREATION CENTERS

Name and/or Location	No. of Spaces
Guam Recreation	60
Dairy Queen	10
Snow White - Anigua	12
Tiny's Place	5
Playland Bowl	53
A & W Drive-in	18

GOVERNMENT OFFICES

Name and/or Location	No. of Spaces
Legislature	30
Island Court	50
Post Office	50
Dept. of Administration	100
Public Safety & Police Court	82
Library	-
Gabriel Bldg. (GPA)	30

FINANCE CENTERS - OFFICE BLDGS.

Name and/or Location	No. of Spaces
Bank of Hawaii-Agana	40
Bank of America-Agana	70
Guam Savings & Loan	15
Ada Arcade & Plaza	68
Family Finance	8
Gabriel Bldg. - Agana	30

E C O N O M I C S

ECONOMIC FACTORS

Summary of Problems and Opportunities

I. Military Influences on the Economy (see also the Military Element)

A. The military presence on Guam is a major source of employment on the Island. Indications are that this activity will continue to be an important economic fact of life despite the fact that American participation in the Vietnamese War is drawing to an end. Diminishing American presence in Okinawa and a somewhat uncertain future for the Republic of Taiwan confirm the impression that Guam will become a major focus of American military and foreign policy in the Southwest Pacific. Should these assumptions prove unfounded in the future, severely diminished military activity could have a catastrophic impact on the employment situation unless rapid economic growth in the private sector were to fill the gap.

B. The military role in the economy of Guam has positive and negative aspects. Some of the positive aspects are:

1. It provides jobs for Island residents and imported labor;

2. It contributes to increases in the purchase of goods and services by both employed laborers and servicemen and their families stationed on Guam, thereby increasing employment in these sectors;

3. It provides job training in certain areas;

4. It assists the Guam Government in handling certain types of emergencies;

5. It has provided and continues to provide certain kinds of capital improvements for the Island;

6. It provides a large tax base for the Government.

Some of the negative aspects are:

1. The military establishment controls one third of the Island's land; land which could be used for housing, industry, agriculture, or other economically viable enterprises. However, only a small portion of the land controlled is intensively utilized.

2. The military doesn't provide a great diversity of civilian-oriented trades which can be readily adapted to private sector requirements.

3. The level of activity in the military is based on the vagaries of foreign policy. These conceivably could undergo rapid changes in the next decade.

4. The military competes with private enterprise for labor and in some retail sales areas. More is said about these items in the section on Employment and Trade.

II. Employment

A. As stated above, the Military is a major employer on Guam. Because Federal Civil Service provides higher rates of pay, more job security, more fringe benefits, and certain base privileges in regard to purchase of goods and services, the hierarchy of job preference on Guam is:

1. Federal Civil Service, first

2. Government of Guam, second

3. Private enterprise, last

This can only be altered if private enterprise moves more vigorously to provide higher pay, better working conditions, more job security, and increased employee benefits. Further, it appears that allowing civilian employees to have certain base privileges in terms of purchase of goods and services at reduced rates works to the unfair disadvantage of private enterprise on the Island, and is a hardship on individuals not able to take advantage of these benefits.

B. There is a labor shortage, both in unskilled and skilled workers, on the Island. Presently, this labor shortage is filled by the importation of contract workers from continental United States and alien workers from the Orient. The contract workers are primarily skilled tradesmen and professional people, and the alien workers are principally unskilled workers in the construction industry. This solution to the labor shortage appears to be unfair in certain respects to the native Guamanian population. The contract workers have their airfare paid to and from Guam, receive a contract for assured work over a definite period of time, and are able to obtain housing at reduced rents, subsidized by the Government. The alien workers, on the other hand, often receive rates of pay based upon standards prevailing at their point of origin. In many cases this is below the rate ordinarily received by a native Guamanian. As long as the labor shortage prevails in Guam, neither of these problems appear critical at this time. However, continued rapid population growth could conceivably outrun employment opportunities in the future and unemployment could become a problem if present labor importation practices were continued.

C. Currently there is very little unemployment in Guam for the reasons stated above in (B). Some residents are siphoned off each year by other world markets, principally continental United States, where opportunities for advancement in employment are greater. Unfortunately, some of the people with most promise in terms of talent and ability are lost in this way. They could, no doubt, find employment locally if they were willing to accept the opportunities which were open. However, there does not at present appear to be a wide enough occupational choice on the Island to hold these people.

D. The labor market is not truly an open market, owing to the importation of aliens and contract workers. Additionally, the dominating effect of civil service benefits has tended to decrease the natives' desire to enter private enterprise, thereby limiting the quality of workers available to this sector.

E. In the professional and highly skilled sectors, there is a tendency to make advancements from within. It is, therefore, necessary in many instances for capable people to enter at employment grades lower than their skills would indicate. This practive, while assisting in the creation of good morale, can tend to have a stultifying affect on ambition and certainly limits the incentive for people to enter the field initially.

F. Job training for skilled trades appears to be a key issue in opening job opportunities for Island Residents. At present there is little being done in this field. If an aggressive program of job training is not pursued, unemployment problems could exist in the future as more and more Guamanians become available in the labor market (owing to the high birth rate), but are unable to qualify for the jobs available. Additionally, a successful program of job training seems to be the key issue in determining future levels of contract and alien worker importations. As pointed out above, these importations have a vital effect on wages, opportunities, advancements, and other aspects of employment. Therefore, it would appear that as job training effectiveness increases, importation needs should decrease. With a continuing labor shortage, it will be very difficult to develop any labor-intensive industries on the Island (except certain aspects of tourism), if these are indeed desirable.

G. Following are some statistics from the Bureau of the Census concerning employment.[1]

1. Of the 15,396 in the civilian labor force, 15,245 are employed and only 151 unemployed. This group includes all males 16 years old and over. Of the 7,100 women, 16 years old and over, in the labor force, 6,867 are employed and only 233 unemployed.[2] The rate of unemployment on Guam is very low indeed.

2. The rates of employment for males between 20 and 64 years of age are consistently high:

20/21 --	92.8%
22/24 --	94.4%
25/34 --	96.8%
35/44 --	97.1%
45/64 --	87.9%[3]

[1] Burau of Census, 1970, PC (1)-B54

[2] Census, op. cit., Table 12

[3] Ibid.

3. The top ten occupations in terms of number of workers are:[4]

Clerical workers	2,586[5]
Construction craftsmen	1,877[6]
Other craftsmen	1,369
Professional workers	1,204[7]
Food service workers	1,160
Salaried managers, other industries	1,145[8]
Secretaries, stenos, typists	1,118
Teachers, elem. & secondary	1,109
Carpenters	1,075
Operatives, non-manufacturing industries	944

The importance of administration, construction, and the professions is clear.

4. The type of industry employing workers is also indicative of the relative importance of particular segments of the economy. The top ten employers are:[9]

Public administration	4,622
Construction	3,661

[4]Census, op. cit. Table 13

[5]Excluding bookeepers, secretaries, stenos, typists

[6]Excluding carpenters

[7]Excluding engineers, physicians, dentists, technicians, and teachers

[8]Excluding manufacturing and retail trade

[9]Census, op. cit. Table 14

Public & Private Schools	2,203
Manufacturing	1,374
Business Services	1,142
Other Transportation	964[10]
General Merchandise retail	933
Other retail trade	884[11]
Motor vehicle/transp. equip.	733
Eating and drinking places	726

There is high cross-correlation between this grouping and that shown in (3) above.

III. Industry/Manufacturing/Trade

A. In order for the residents of Guam to attain a safe, healthful and personally rewarding standard of living commensurate with the environment in which they live, it will be necessary for them to earn an increasing supply of dollars from off-island sources unless great strides are made in the development of local industry and trade.

B. Currently, the Government of Guam offers several incentives to attract new industries to the Island. These are:

1. Generous property tax exemptions

2. Manufactured products are duty free if 50% or more of their value is added in Guam

These incentives have had a positive affect in encouraging some new industries to locate on the Island. It appears, however, that monetary incentives alone are not adequate to attract new industry. An analysis should be made of the complex reasons why industries relocate or open new branches; reasons such as adequate labor supply, accessibility to raw materials or to suppliers, favorable transportation rates, proximity to markets, and others. A

[10]Excludes trucking services and warehousing

[11]Excludes food, restaurants, general merchandise, motor vehicle sales and service stations

superficial view of the situation would seem to indicate that Guam cannot compete successfully in the attraction of industry based solely upon the factors listed above. This view is not entirely warranted, however. For example, while it is true that high transporation and great distance to the continental United States market are negative factors in the development of local industries, it is equally true that markets on the Eastern Pacific basin, particularly in Southeast Asia, are probably close enough to provide Guam-located industries with some export opportunities. Previous economic reports prepared for Guam indicated that the fabrication on Guam of certain products might be exportable to and competitive in the domestic U.S. market. These products involved the use of inexpensive raw materials obtained from the nations of Southeast Asia.

C. There is currently a very great dependence on imports, and this dependency is continuing to rise. Most local production is in non-durables, and is consumed locally. This means that virtually all durable commodities are imported, and because of the great distance from the suppliers, difficulties arise in inventories which must be maintained at larger than normal volumes in order to provide a good service and to avoid long waiting periods. This is an economic hardship or private enterprise. The relatively high cost of transportation from the supplier to Guam is a negative trade factor which needs to be overcome. Because of a lack of locally produced export items, there is a directional imbalance in ocean-going cargos. If this imbalance were corrected, it would have a salutary effect on transportation rates.

D. If new industries are brought to the Island, they would broaden the economic base and offset the importance of income from military activities, which at present tend to dominate the Island's economy. Creation of new industries, however, will increase the need for a positive vocational training program to alleviate the labor shortage and to decrease the negative aspects of imported labor.

E. Currently, it appears that industrial and trade development occurs in a somewhat haphazard manner. Serious problems could arise if new industries were promised any site they choose simply as an incentive to get them located on Guam, since this could have a very detrimental affect on the Island's environmental condition and on future urban, agricultural and recreational expansion.

F. At present no large scale shopping complex has been developed owing primarily to the lack of sufficient population to support one. No survey of retail potential exists.

IV. Agricultural/Fishing

A. Intensive agricultural activity to make Guam self-sufficient and to produce exportable commodities would be complicated by several factors:

1. Large-scale, intensive agriculture requires large initial investments of capital and experienced farm managers who know how to operate profitably;

2. A ready farm labor supply, which does not presently exist on the Island;

3. The Island has a thin mantle of topsoil which may or may not sustain the kinds of crops which might be considered viable for export;

4. The occassional violent tropical storms pose a definite hazard to large-scale, industrialized farming;

5. The complex land-ownership patterns on the Island make consolidations of large, tillable parcels very difficult, and land rents or costs would have to be equated with the value of output in order to ascertain whether the venture could be financially successful.

6. Without importation of alien workers, viable crops would have to be of high unit value owing to high transportation costs. It is understood that both Japanese and Taiwanese interests have sought to expand their activities to Guam, owing to shortages of land in Japan and possible political complications in Taiwan. These interests apparently desire to bring their own labor supply to the Island and to export virtually all of the product back to their homelands. If this is the case, it would appear that little of economic value would accrue to Guam's economy, except in somewhat higher taxes on the land utilized for agriculture. It would appear that in terms of agricultural production the most beneficial approach would be the intensive farming of relatively small tracts of land for the production of field crops and fruits almost solely for local consumption. This would bring the Island close to independence in terms of its food supply, which in turn would help to alleviate the imbalance in trade.

B. The 1970 Census [12] lists only 160 workers employed in agriculture, forestry, and fisheries. This is less than 1% of the work force.

C. Poultry, egg and livestock production appear more viable than extensive farming. These have relatively high unit value and are in great local demand. Pultry raising and production of eggs do not require the consumption of large areas of land.

D. Commercial fishing appears to be a natural sector for growth. However, this opportunity has several negative aspects.

1. The Guamanians appear not to be sea-going people by nature, and if this could not be overcome, crews would most likely have to consist of alien fishermen.

2. The products of a fishing industry could be processed on Guam for both local consumption and perhaps for export, but the competition in the region is not known and should be investigated thoroughly. For example, both Japan and the Soviet Union maintain very large and highly competitive fishing fleets which put great pressure on nations trying to compete in this sector.

V. Other Economic Growth Sectors

A. Scientific Research - the future of this sector appears limited to ocean sciences. Guam is, of course, in an excellent geographic position to be a center of marine sciences. However, its great distance from other scientific centers would put it at a disadvantage when compared to the level of oceangraphic research done today by Wood's Hole and Scripps Institution of Oceanography. In any case, it would have a limited economic impact on the Island, owing to a relatively small employment base composed of very highly skilled and trained people. Additionally, an ocean sciences research center would require a very high level of professtional expertise, would require grants and gifts of funds in order to operate and to purchase the esoteric equipment required to undertake the research.

[12] Census, op. cit. Table 14

B. The idea that Guam can derive great economic benefits by functioning as the focal point for the entire Trust Territory has many good possibilities for the future. Owing to the rela- low level of economic growth of other Islands in the Trust Territory, however, it appears that Guam will be able to derive little in terms of tourist dollars, trans-shipment of goods, or other economic benefits from other islands in the Trust Territory.

C. The concept of Guam as "the U.S. Gateway to Southeast Asia and the People's Republic of China" is probably very rational and undoubtedly will provide many opportunities for the future economic growth of Guam. This is particularly true in light of certain foreign policy decisions recently taken by the U.S. Government; namely a pull-out from Okinawa, a virtual disavow of permanent ties with Taiwan, and an opening of relations with the People's Republic of China. At the present, however, it is very difficult to postulate what the impact of these events will be on Guam. For the moment, however, it is probably safe to assume that most of the impact would be in the sector of tourism, and the remarks regarding that economic sector can be found below.

VI. Tourism

A. There has been a tremendous increase in visitors and tourists to the Island since 1967. In fact, this increase has been so spectacular that one is tempted to ask why people visit Guam in such large numbers. Some of the more obvious reasons are that Guam is a colorful, tropical Island, offering a relief from the stresses of highly urbanized societies. It is quiet on Guam, with a slow pace of living; the terrain is interesting; the villages are colorful and provide much of interest for the tourist to see.

A less obvious but perhaps even more important factor is that airfares from Japan to Guam were lowered dramatically severl years ago, making it possible for many people of modest means to escape from the Island for a vacation or even a honeymoon.

B. An increasing number of visitors implies the following:

1. More accommodations will have to be constructed to house the tourists and visitors;

2. More trained labor will be required to provide service for the visitors, particularly in the fields of hotel and restaurant work;

3. More service business will be required to support the increasing amount of labor employed in the tourist industry;

4. An effort must be made to preserve the things which the vistors come to the Island to enjoy. This effort would have two parts: first, an analysis should be made of just why people come to Guam and what they do when they get there; and secondly, an action program should be generated which will direct government actions towards enhancing the tourist trade and making the tourist's stay on Guam more enjoyable. Part of this action program would undoubtedly include requirements for environmental and structural improvements in all parts of the Island;

5. Since tourism is a basic industry on Guam, an increase in tourism would mean greater dollar in-flow, and therefore a better balance of trade;

6. A greater emphasis on job training is required to provide Guamanians with the opportunity to work in the industries dependent on tourism for their life;

7. There is an opportunity on Guam for the development of more amusement type of activities to give the visitors and tourists something to do. These activities would include beaches and parks, nature trails, view points, historical monuments, and more traditional items such as restaurants, handicraft shops, etc.

VII. Construction

A. There is today on Guam a very large market for adequate, safe housing for residents of the Island. The reasons for this shortage have been documented in many places before; Briefly they include the havoc caused by typhoons Karen and Olive, the devastation of World War II, and in part the tropical life-style itself.

B. In addition to the shortage of housing for residents of the Island, there is a developing shortage of hotel accommodations for tourists and visitors.

C. Owing to the shortages in housing and visitor accommodations, a need exists for certain capital improvement programs, particularly in road building.

D. Despite the construction needs outlined above, there are certain problems associated with planning and executing a large-scale development program. These are:

1. There is a great shortage of skilled and unskilled labor and building professionals. Many of these people must be imported to the Island from the Continental U.S. or from East Asia. The problems associated with this type of labor importation have been discussed in the Employment section of this report.

2. The complex land ownership and title problems, make large-scale construction difficult. Additionally, outmoded subdivision patterns in some areas make even single-lot development difficult, owing to lack of proper access, irregular shape or size parcel, terrain problems and so forth.

3. The local money supply is apparently not adequate to meet the housing and other construction needs.

VIII. Income

A. Families

The 1970 Census[13] indicates the following distribution of family income:

Less than $250	387
$250 to $499	97
$500 to $699	67
$700 to $999	87
$1,000 to $1,499	159
$1,500 to $1,999	150

[13] Census, op. cit. Table 16

$2,000 to $2,999	412	
$3,000 to $3,999	804	
$4,000 to $4,999	1,099	
$5,000 to $5,999	1,442	
$6,000 to $7,999	2,602	
$8,000 to $9,999	1,904	About 75% of all families
$10,000 to $14,999	2,930	
$15,000 to $24,999	1,751	
$25,000 or more	368	

The median[14] family income is $7,886

B. Unrelated Individuals

The distribution of income among unrelated individuals is as follows:

Less than $250	1,099	
$250 to $499	323	
$500 to $699	251	
$700 to $999	306	
$1,000 to $1,499	842	
$1,500 to $1,999	1,376	
$2,000 to $2,999	2,346	About 60% of all unrelated individuals
$3,000 to $3,999	2,252	
$4,000 to $4,999	1,170	
$5,000 to $5,999	588	
$6,000 to $7,999	618	
$8,000 to $9,999	278	
$10,000 to $14,999	239	
$15,000 to $24,999	114	
$25,000 or more	34	

The median income is $2,734 for unrelated individuals.

[14]The median is not affected by extreme values and is therefore a better measure than the mean when the population base is small.

C. Median Incomes - Selected Occupations

The median earnings of males in the experienced labor force are indicative of the general wage scales prevalent on Guam. They are:

Professional, mangerial, and kindred	$8,467
Craftsmen, foremen and kindred workers	$4,443
Operatives, including transport	$4,270
Laborers, excluding farm	$3,619
Farmers and farm managers	$1,500
Farm Laborers	$2,929

Earnings for females in similar occupations are somewhat lower.

D. Total Earnings

Total earnings for families equals the number of families x the mean income, or 14,315 x $9,245 = $132,342,175.00.

Total earnings for unrelated individuals equals the number of individuals x the mean income, or 11,836 x $3,233 = $38,265,788.00.

Total earnings = $170,607,963.00.

POSSIBLE ALTERNATIVES AND ACTIONS

I. Military Influences on the Economy

A. The Government of Guam should attempt to ascertain from the Federal Government estimates regarding possible future employment levels related to military operations and probable future land use needs by the military establishment.

B. Regarding the military presence on the Island, the Government of Guam could: 1) assume that the present level of land utilization will remain approximately as it is today and attempt to do nothing about it; 2) attempt to bring pressure on the military to reduce its land utilization so that the Government of Guam may make use of the lands thus freed for other purposes.

C. The Government of Guam (GG) could investigate with the Navy Department the possibility of eliminating certain base privileges for civilian employees in order to aid the private sector, both from the retail and labor standpoints.

D. The GG could investigate the possibility of using the northwest section of Andersen Air Force Base as a site for the relocation of International Airport toward the view of releasing valuable land near for Agana for urban development purposes.

II. Employment

A. A vigorous program of job training appears to be the best alternative to the solution of both the labor shortage problem and to the problems inherent in importing labor from outside the Island. The alternative of no increases in job training does not appear to be viable since following this course of action would only heighten many of the current employment problems.

B. As long as labor shortages exist in all categories of employment, importations of labor will probably have to continue, as will the program of incentives which were created to entice skilled and professional people to the Island. The GG may wish to consider, however, the possible scaling down or modification of some of these incentives in order to eliminate as much as possible the disproportionate amount of advantages gained by imported workers over those attainable by residents of the Island.

C. Regarding the importation of alien unskilled workers, the GG may wish to investigate the problem of their receiving pay rates lower than residents of the Island. The problems inherent in this situation are analogous to those created by the importation in times past of Mexican farm workers into California, Arizona, New Mexico and Texas on a seasonal basis. These people were paid a rate far less than those which would been received by residents of those states, resulting eventually in unemployment. It is recognized that this is not an easy problem to solve since some people are willing to do certain types of work which other people are not willing to do at any price. However, taking the long view, it would appear that some alternative to the importation of unskilled workers must be found.

D. An incentive system should be developed which will help to encourage those who leave Guam for educational or other reasons to return to the Island. One alternative might be to make these incentives similar to those received by the contract workers, except that no return airfare to the Continental United States would be provided, and domestic benefits in terms of subsidized housing and so forth would be scaled down over a period of several years until the worker was well established in his job and community. Another alternative to this problem, and one which would also help solve the job training problem, is that the GG may wish to investigate the possibility of financing education for certain natives in universities throughout the Pacific Basin with the understanding that after graduation these people would return to the Island for a minimum period of time, practicing their skills or professions.

E. Related to the problem of problem of professional and highly skilled persons beginning service at the lowest rate of pay, there are several alternative solutions. One would be to stop the practice entirely and hire people at the rate and grade to which they are entitled based on their past experience and qualifications. Concurrently with this policy change, one could retain the right to give currently employed persons the first opportunity for advancement into the open grade. The second alternative would be to continue to accept new people only at the lower grades but for a very limited probationary period, during which time their performance could be tested. If they performed successfully during this period, advancement could then be made to a grade commensurate with their skills.

III. Industry/Manufacturing/Trade

A. It was pointed out in the section on Problems and Opportunities that monetary incentives alone are not adequate to attract new industry to the Island. Relocation of industry is a complex issue involving many factors, such as adequate labor supply, accessibility to raw materials, accessibility to suppliers, favorable transportation rates, proximity to markets. Additionally, there are less hard-headed business reasons such as the proximity of good homes for the executives, a full range of nearby recreational facilities, good climate, and so forth. An action program, which the GG may wish to follow is to institute a study of industries which seem to have a potential for location in the Southwest Pacific region. This study should examine in detail all of the factors which impact on industry's location in a particular area. A matrix could be constructed comparing industrial requirements with those factors which Guam can supply. In this way it would be possible to pinpoint certain industries which the Government could then concentrate its attentions on. A previously prepared economic report indicated that the fabrication on Guam of certain products might be exportable to and competitive in the domestic U.S. market. These products involve the use of inexpensive raw materials obtained from the nations of Southeast Asia. This type of study should be expanded in order to develop new Island-based industries. Since it is obviously important to the economy of the Island to develop new industries, no alternative other than a vigorous pursual of this goal appears viable at this time.

B. Insofar as a dependence on imports is concerned, there are several alternative courses of action open. One alternative would be the development of local industry to produce durable goods consumable on the Island. Since ideally this would include such items as automobiles, refrigerators, ranges, water heaters, and other domestic hardware of this type, it would appear that this alternative has some definite limitations. Since the relatively small population of the Island is obviously not sufficient to support manufacturing these goods on Guam itself, a more viable alternative might be to attempt to drive down the transportation rates of these goods. One method of achieving this could be the correction of the imbalance of ocean-going cargoes, but this can only be done if Guam produces exportable items to achieve this balance. Another method might be the creation of a free-port concept in Guam where American goods could be purchased at lower rates by nations in the Southeast Asia area, in return for their selling of an equivalent value of goods to the Guamanians at a lower rate.

C. The location on the Island of new industries should be a matter of very special concern. Site alternatives are discussed in detail in the Land Use section of the Master Plan, and since these locations were selected on the basis of environmental concerns, transportation, accessibility, utility service, and compatibility with the general urban fabric, they should be closely adhered to by governmental agencies responsible for site approvals. Alternatives to this course of action could only lead eventually to a chaotic land use situation and perhaps irreparable environmental damage.

D. As it appears that the present demand for commerce on the Island is unknown, it would be well to institute a study of the total disposable income of the population for the purpose of determining precisely how much trade potential in each sector there is today and will be in the future. Two important pieces of information would be derived from this type of analysis. First, one is able to ascertain the amount of floor area per store type needed to consume the disposable income and, secondly, it is possible to determine the level of taxable income the government would derive from these sources. Additionally, the information would enable planners and private enterprise to determine the nature, size, and best location for future shopping centers, whether small or large. This will be particularly important in the future when Guam's population reaches numbers large enough to sustain a major shopping center of the type found in Continental U.S. and on Oahu. An alternative to this course of action would be to permit commerce to locate in convenient areas in the population centers without any particular locational plan. This could result in poor land use relationships and would almost surely result in less than ideal marketing conditions for each individual business.

The following model illustrates an approach which could be used when further knowledge of local buying patterns is gained. The merchandise categories listed under the "Type of Goods" column was taken from a standard text [15] and should be modified to reflect the actual local demand for store types. The percentage of gross income expended on each category of merchandise (colun 1) was also taken from Nelson, and represents a continental U.S. average for families having a median income corresponding to that prevailing on Guam. It would probably be modified considerably after a local study of buying habits.

[15] Nelson: Selection of Retail Locations

Column 2 converts the percentages shown in Column 1 into dollars, based on the total gross earnings shown later in this Element. Column 3 represents the gross sales per square foot per year necessary to sustain a particular type of retailer. These are U.S. averages and must be adjusted for local conditions. Column 4 indicates the total square feet of retail area required for each category, and is obtained by dividing Column 3 into Column 2.

If one assumes, for the sake of discussion, that these percentages and the resultant square feet are valid for Guam (which they probably are not), the figure of 888, 800 square feet of gross leasable area would convert to about 20.5 acres of floor space. Multiplying by five (for access roads, parking, storage, etc.) would result in about 102.5 acres used for commercial purposes, not including filling stations and auto dealers. Assuming there are 30 of the former, occupying 2/3 acre each, and six of the latter each occupying four acres, these two categories add another 44 acres, making the total 146.5.

Type of Goods	(1) % of Gross Income Expended	(2) $ Spent on Goods (millions)	(3) Sales/ sq. ft. in $	(4) Total sq. ft. Required
Drugs	2.32	$ 3.96	150	26,400
Grocery	24.24	41.36	200	206,800
Other Food	4.15	7.08	175	40,500
Liquor	1.10	1.88	150	12,500
Hardware	0.97	1.65	45	36,700
Filling Station	4.65	7.93	---	---
Other Stores	2.75	4.69	60	78,200
Department Stores	7.55	12.88	100	128,800
Family Apparel	1.07	1.83	65	28,200
Men's Clothing	1.13	1.93	60	32,200
Shoes, fam. and men	0.48	0.82	70	11,700
Shoes, women	0.62	1.06	75	14,100
Women's apparel	3.33	5.68	75	75,700
Variety	1.35	2.30	50	46,000
Jewelry	0.33	0.56	75	7,500
Furniture/furnishings	1.85	3.16	50	63,000
Appliances & TV	1.55	2.64	150	17,600
Eating/Drinking	1.95	3.33	80	41,600
Auto Dealers	7.00	11.94	---	---
Auto Supply	0.75	1.28	60	21,300
TOTAL		$117.96		888,800

A 1966 survey indicated that 331 acres were occupied, well above the total shown above. By 1972, this had probably risen close to 500 acres.

The great disparity between these numbers (146.5 vs. 500) should not be taken as an indication that the model described herein is invalid as a method, but rather indicates the necessity for making a thorough, local survey, and the need to circumscribe "retail" uses as opposed to other enterprises which may be permitted in the commercial zone, such as hotels, offices, and professions. Once these have been accomplished, the model can be used to project future retail demands based on changes in population, income, buying habits, and merchandising practices.

Also of vital importance would be an accurate measure of how much disposable income is drained off by base stores.

IV. Agriculture/Fishing

A. Several alternatives are open regarding the development of agriculture on the Island. These are:

1. Limit agricultural production to small individual gardens where produce is grown for family use only. This alternative is very compatible culturally with the residents of Guam and would probably fit the present patterns of land use better than any other alternative. It would, however, probably not contribute significantly to the supply of agricultural products for the Island as a whole, nor would it create any export capability.

2. Encourage a large-scale, industrialized type of farming, owned and operated by residents of Guam. This alternative would probably run counter to the cultural mores of the people. It would most certainly have to face the problem of lack of willing, trained farm laborers on the Island.

3. Another alternative would be to permit alien farm operators to institute operations on the Island on a large scale. The problems inherent in this alternative are noted in the Problems and Opportunities section.

4. Another alternative would be to gradually phase out all farming operations on the Island except for what individuals may want to do in their own yards. This alternative could probably be justified on the basis of lack of adequate land and labor supply to carry on significant farming operations.

B. Since there appears to be an opportunity to develop a commercial fishing industry centered at Guam, several alternative courses of action are open to implement this type of economic move. These are:

1. Encourage the establishment of a large-scale commercial fishing industry on the Island, owned and operated by either Guamanians or state-siders. Hopefully, as part of this package it would be possible to establish at the same time a fish processing plant and perhaps even a can fabricating factory.

2. Foreign interests could be encouraged to establish a fishing industry on the Island if it were not possible to get domestic interest to do this. Obviously, this would raise a range of problems not inherent in the first alternative.

3. Another alternative would be disregard fishing as a significant source of income and do little or nothing to encourage its development.

Before any of these alternatives are implemented, a thorough analysis of the market potential of fishing should be made with particular attention being paid to the competitive nature of the formidable competition from the Japanese and Soviet fishing fleets.

V. Other Economic Growth Sectors

A. When addressing the problem of delineating alternative courses of action to bring to fruition specialized types of activities which may or may not have an economic impact on Guam, it is difficult to express them in definitive terms since the subjects themselves are rather nebulus. It was pointed out in the section on Problems and Opportunities that little of immediate economic importance could be ascribed to the concepts of Guam as the gateway to Southeast Asia or as the focal point for the Trust Territory, or as a center for marine research. Since these opportunities appear to be long-range in nature, a

viable alternative would appear to be the preparation of a program for promoting throughout the Pacific Basin, these positive attributes. It would seem natural to combine this type of campaign with a promotional campaign stressing the attraction of Guam as a tourist center.

VI. Tourism

Since it has been established that tourism is not only a basic industry on Guam, but also offers the best hope for reviving and expanding the local economy, alternative courses of action should all be directed toward achieving positive results in this regard. First, a comprehensive survey should be made of visitors and tourists. This survey should attempt to delineate quite specifically why the people come to Guam and what they do when they get there. It could be conducted on a random sampling basis if this appeared desirable. One interesting form might be to give selected tourists on their arrival a type of diary in which they would be asked to record their daily activities, and, if they were willing, to record how much money they spent and where. This diary could be turned in upon their departing from the airport or harbor. Such a survey should cover one full year in order that all seasons could be analyzed.

Secondly, it would be useful to have a comprehensive urban design analysis made of the Island from the view of the tourist. This would, of course, have to be performed by trained professionals, but preferrably by those who are not familiar with the Island so that the full impact of what the first-time tourist sees would also impact on the urban designer. From this should be derived an action program delineating what actions the Government should take to improve the physical environment and make the Island more attractive to the tourist.

Third, a positive program should be developed related to the comfort needs of the tourist, namely hotel rooms, restaurants, and places of amusement. Entrepreneurs interested in accommodating tourists will follow the market if it can be shown that a market does indeed exist. Since the rate of tourism is growing at such an amazing rate, it will not be difficult to present this in the form of an opportunity to shc entrepreneurs. However, it would be well for the Island's future to control the development of hotels. For example, in a realistically planned program in order to prevent a proliferation of facilities all out of proportion to the demand, with the attendent problems resulting therefrom. Notable examples of such overbuilding have occurred on the Costa Brava of Span and to some extent on Waikiki in Oahu.

Finally, it would be well to pursue the recommendations of the Johnsrud/Warnecke report on the development of recreation on the Island, particularly as these recommendations pertain to the tourist industry.

VII. Construction

Viewing the great demand for safe and adequate housing on the Island, and the interest that developers have shown and will continue to show in satisfying this demand, it appears that a gap will develop between what is actually needed and what will be in fact constructed. It is therefore, necessary to develop a housing program for the Island which will specifically delineate the types of units which are needed in terms of construction method, size and quantity, as well as the price ranges. Such a housing policy may well have to be backed to some extent by governmental controls and funding. Several programs are available through the National Housing Act which may be applicable to Guam. The alternative of permitting growth to continue in a relatively uncontrolled manner (uncontrolled that is in terms of satisfying the spectrum of the market), could result in developers concentrating on satisfying a relatively small share of the market, and that share would obviously be the portion which would provide the highest rate of profit to the developer. This is perfectly natural and in the tradition of American free enterprise, but would do little in the long-run to satisfy the total housing problem on Guam.

At the same time, a massive effort should be made to clear once and for all, all title problems on the Island so that some rational pattern of development in the future can take place. Without such a program, developments of all types will continue to be spotty and uncoordinated, and any attempt at a truly rational land use pattern will be futile.

It appears that for the present Guam will be able to derive little in terms of tourist dollars, trans-shipment of goods, or other economic benefits associated with other Islands in the Trust Territory.

ECONOMIC BACKGROUND

Until 1961, strict security regulations by the Military precluded immigration to Guam and limited the investment possibilities for the private sector of the economy. The economy grew slowly and was heavily dependent upon the infusion of monies from the military. In 1961 security regulations were lifted, and private funds and immigrants began to flow more freely into Guam. However, before Guam could take advantage of this new potential, it had to hurdle two major disasters which swept the island---Typhoon Karen in 1962 and Typhoon Olive in 1963. Together these typhoons did damage estimated at more than $100,000,000 and Guam had to undergo a period of rebuilding.

Elevation of levels of living to modern western standards usually requires importation of goods and services which in turn are paid for by exports of other goods and services. Basic industries are those which receive income from outside the economy and in the case of Guam are the key to development of the Island.

Agriculture, military activities, tourism, manufacturing of export products and research and development are considered basic industries. Secondary industries are those enterprises which service basic industries and/or the resident population. Retail and wholesale trade, bakeries, utilities, financial institutions, and government are examples of industries in this category.

In the case of Guam, however, such a clear delineation cannot be made because of its past history and resources. Virtually all of the economic base in the past has been founded on employment by the Federal and Guamanian governments and on construction. Recently, tourism has swiftly developed into a major basic industry for Guam and will become an ever-increasing source of revenue for the Island.

Military

The military on Guam will continue to be an important sector of the Guamanian economy. In its role, the military has done much for Guam in the employment of local residents, purchase of goods and services, job training, assistance in emergencies, and in the initial setting up of expensive basic facilities such as airports, power, water, telephone, medical services, etc. The importance of the military sector in the Guamanian economy is illustrated by the following expenditures for wages and salaries, construction, and the purchase of local supplies:

Total Federal Disbursements on Guam

Fiscal Years 1967-1970 (Millions of $)

	1967	1968	1969	1970
Wages & Salaries	$73.0	$81.0	$87.0	$94.0
Construction	14.0	11.0	21.0	20.0
Locally Purchased Supplies	5.0	6.0	7.0	6.0
Total	$92.0	$98.0	$115.0	$120.0

Moreover, income taxes collected by the military and returned to the Guamanian government in 1970 represented $11,100,000 of a total income tax collection of $34,700,000, or 32% of the total.

For the military, Guam provides a friendly base of operations with U.S. citizens and U.S. mainland customs. Guam is not only in a strategic location in the western Pacific but the only one of U.S. soil. It is presently the communications center for all Pacific operations and provides a stepping stone for rapid deployment of men and equipment. All indications are that Guam will continue to be the central focus of military strength in the western Pacific and military investment on Guam could very well increase with pressures to remove military forces from foreign soil back to U.S. territory. Recent endeavors such as increased naval housing projects, a proposed major ammunition depot project, and an oil refinery primarily built to service the military, all indicate that Guam can continue to rely upon the military presence as an important sector of its economy.

Construction

Normally, construction is classified as a secondary industry, but for Guam, construction and employment of construction workers are of greater importance to the economy. Moreover, since the major part of construction funds is derived from sources outside of Guam, it should be classified as a basic industry. Contracting has been a major force in Guam's gross dollar economy for the past 10 years.

Its importance as a percentage of gross receipts was heightened during fiscal years 1964-1966 due to rebuilding in the aftermath of Typhoons Karen and Olive. In those years, contracting represented over 30% of gross receipts. With Guam's expanding economy, contracting has maintained a high dollar volume, although it is decreasing as a percentage of total gross receipts. In fiscal year 1970, contracting volume was $53.1 million or 19.5% of total gross receipts. The $53.1 million represents a higher dollar amount than that generated during rebuilding after the two typhoons. During the first quarter of fiscal year 1971, contracting provided 4,363 jobs out of a total employment of 25,340, or over 17% of employed persons. Of the 4,363, 82.3% were classified as alien workers[1] and 17.7% as local or contract workers. The great predominance of alien workers in the contracting sector can be attributed to a shortage of labor, as well as a shortage of local skills necessary to this sector of the economy.

As the Guamanian economy continues to expand at a rapid rate and as housing projects are undertaken, contracting will continue to be a major source of employment and funds for the economy.

Agriculture

Agricultural production on Guam today has fallen significantly from its pre-World War II level, when Guam was almost entirely an agrarian economy. However, the Guamanian government has made positive efforts to stimulate interest in farming, provide better answers to technical problems and to enhance farming as a source of income. This effort has met with some success in certain areas, such as growing of local fruits and vegetables which in 1970 produced 2.4 million pounds valued at $430,000 (vs. total production value of $405,000 in 1969). Livestock and hog production have remained relatively stable. Vast improvement has been made in egg production, which rose from 1,300,000 dozens in 1969 to 2,150,000 dozens in 1970. Fishing produced only 151,000 pounds in 1970, against a catch of 326,000 pounds in 1969. However, fishing and tuna packing could become an important element of the agricultural sector if a packing plant were to be built on Guam.

Aside from the possibilities of increased poultry egg production and fishing, no great growth is seen for agriculture in Guam. Modern agriculture is a demanding industry which requires substantial amounts of capital but provides employment for relatively few persons. The heavy capital requirement, thin soil, tropical storms and demand for labor by other sectors of the economy will tend to restrain expansion of agricultural production.

[1] Does not agree precisely with Census data - See Population Element.

Manufacturing

In past years manufacturing activity has centered largely around the production of non-durable goods for local consumption, such as bakery products, milk processing, soft drinks and printing. This sector has experienced strong and continued growth over the past 10 years. Manufacturing output increased from $5 million in fiscal year 1969 to $6.3 million in fiscal 1970.

However, Guam has been handicapped in the manufacturing area due to its great distance from the United States and centers of activity in the Far East. Subsequent high transportation costs have favored production of goods having a low ratio of value to weight; goods produced for export should have a high value to bulk ratio.

Incentive for manufacturers has been provided by the Island's duty-free status, which permits most goods to be imported to Guam duty-free and finished products to be exported to the United States if 50% of their value has been added in Guam. This incentive has led to the establishment of a number of watch and watchband manufacturing companies in Guam.

A second incentive for manufacturers or new industries interested in locating in Guam is the Qualifying Certificate allowance, which grants property tax payment exemptions. This allowance has led to the establishment of a number of new hotels, a San Miguel brewery, and the Guam Oil and Refining Company---all endeavors which will augment Guam's exports, provide substitutes for some imported goods, and bring new sources of funds into Guam.

The manufacturing sector should enjoy continued strong growth and will remain an important element in Guam's economy and as a source of employment.

Research and Development

The Guam Economic Development Authority has served as a mjaor catalyst in encouraging private enterprise to establish new businesses and industries in Guam. Through the use of qualifying certificates, development of commercial and industrial parks, provision of a combination of services to assist new investors, GEDA has pushed forth the economic development of Guam. GEDA will continue to play an important role in the Growth of economic and employment opportunities in Guam.

In scientific research, the major emphasis to date has been in the areas of agricultural and marine research. While there is potential for expansion in this area, particularly in marine research, it is difficult to assess the possible magnitude of employment expansion since the basic funding source lies with the government. It would be logical to assume however, that only modest increases in employment will be generated by scientific research projects.

Tourism

The tourist industry holds the greatest potential to stimulate economic growth and employment opportunity in Guam. Affected will be hotels as well as various secondary businesses which are needed to service the tourist industry.

The number of tourist arrivals has multiplied following the typhoon rebuilding years as new airline routes and facilities to accommodate visitors have been added.

Tourist and Visitor Arrivals by Calendar Year 1964-1966 Actual with 1970-1975 Projected with Estimated Visitor Expenditures

Calendar Year	Tourists	Visitors	Estimated Expenditure
1964	300	1,975	400,000
1965	500	2,950	600,000
1966	1,500	3,500	700,000
1967	4,284	4,500	900,000
1968	15,082	18,000	3,600,000
1969	30,810	58,265	10,000,000
1970	47,585	74,621	15,000,000
1971	75,000	100,000	30,000,000
1972	105,000	130,000	50,000,000
1973	150,000	175,000	90,000,000
1974	200,000	225,000	130,000,000
1975	250,000	275,000	180,000,000

Source: Dept. of Commerce, Economic Research Center, as revised December 9, 1970.

Note: Tourists are classified as travelers coming to Guam strictly for pleasure. Visitors include tourists, business visitors, business-pleasure visitors, government travelers, etc.

The increasing number of hotel rooms has barely kept pace with the increase in tourist arrivals. The existing hotel inventory in mid-1971 is as follows:

Hotel-Motel Inventory

Hilton	256
Dai-Ichi	207
Continental Travel Lodge	203
Cliff	182
Fujita	135
Guam Tokyu	121
Hotel Micronesia	100
Guamerica	54
Sunset Motel	27
Sakura	24
Casa de Flores	23
Airtel	22
Hotel Polynesia	20
Earl's Hut	18
Tony's Travel Lodge	14
Hotel Hong Kong	9
	9
Total Existing	1,424

Proposed or Under Construction

Okura	200
Kukuei	100
Village of Tropic Winds	40
	240

Source: Department of Commerce, Guam

From the preceding inventory, it can be seen that 1204 of the present 1,424 hotel rooms are located in major hotels containing 100 rooms or more. Some 220 rooms are located in small hotels or motels, which average 20 rooms each.

Hotels have enjoyed a high annual occupancy rate over the past few years. A survey of major hotel operators showed these hotels experience an average annual occupancy rate of over 85%, with a double occupany rate of approximately 1.75 persons per room. The high double occupany rate is attributable to the resort nature of Guam's hotel business as well as the Island's popularity as a honeymoon or group tour destination for Japanese citizens. In 1970, more than 82% of the tourists came from Japan.

Hotel-motel inventory projections were calculated to ascertain what room inventory must be provided from 1971 to 1975 to accommodate the anticipated number of visitors to Guam. The following assumptions were used.

1. Hotel users were classified as tourists, business visitors, and business and pleasure visitors.

2. Average annual hotel occupancy would remain at 80%.

3. Average length of stay would be 6 days.

4. Double occupancy would remain at 1.75 persons per room.

	Room Inventory Projection	Tourist and "Other" Visitors
1972	1,452	123,700
1973	1,981 (a)	168,700
1974	2,568	218,700
1975	3,155	268,700

(a) Assuming the Okura, Kukuei and Village of Tropic Winds hotels are completed in 1973, the total inventory would be 1,764.

It can be seen from the above that to accommodate the anticipated visitor arrivals, more than 500 additional rooms will be required annually beginning in 1973. Without the additional inventory, new visitors could be discouraged from staying in and returning to Guam, particularly those who arrive during peak seaons.

Should Guam enjoy continued growth in tourism after 1975, the following room inventory will be required. Projections are broken down into potential 10% and 20% rates of growth per year.

	Rooms Required @ 10% Average Annual Growth	Tourist & Other Visitors	Rooms Required @ 20% Average Annual Growth	Tourist & Other Visitors
1980	5,276	449,500	7,035	599,300
1985	7,035	599,300	10,553	899,000
1990	7,937	676,100	14,070	1,198,500

The visitor industry is a highly labor-intensive economic activity. It is estimated that approximately .7 hotel employees will be required for each new room constructed and another .3 employees will be required for support facilities for tourists, such as retail stores, guided tour agencies, night clubs and other types of tourist-oriented businesses.

In areas where employment is already high or where the necessary skills are unavailable, higher visitor demand will require that more people be brought into the local labor force. These new workers will need a variety of public services, such as schools for their children, police and fire protection, etc. These added costs, virtually certain to follow a growth in tourism, must be included in budget planning. The visitor to Guam will contribute to the support of Guam's public sector by the purchases of goods and services as well as by the tax revenue generated therefrom.

Full exploitation of Guam's tourism resources will require a relatively substantial amount of public funds and private capital. Improvement of beaches, development of recreation areas and facilities, and preservation and reconstruction of historic sites are all necessary to establish a total environment attractive to tourists. These improvements will make the tourist's stay more pleasurable and encourage favorable reports about Guam, which could attract new businesses to the island.

With the tourist industry becoming a major factor in the Guamanian economy, it becomes imperative for the Guamanian to become involved in this rapidly growing area. Training for both lower-level employees and administrators at the University of Guam and vocational and trade schools should be accelerated so that local citizens can take advantage of employment opportunities in the hotel industry. It would be unfortunate if the hotel industry were staffed by imported labor because Guamanians then would not be deriving greatest benefit from one of the most dynamic forces in their economy.

Cargo Facilities

The Guam airport and harbor facilities were expanded to service the requirements of the increased activity in the business and visitor sector of the economy. Both facilities are of great importance to Guam since they represent the support facilities for Guam's expanding economy. Surface revenue tons have increased since 1962 at an annual average of approximately 10% with appreciable increases since 1968. Revenue air cargo has shown a marked increase from 5,011 tons in 1967 to over 10,900 tons in 1970. Both faciaities should witness increased activity in keeping with increases in business and visitor activities.

Summary

The economy of Guam has made remarkable advances over the past decade. Guam is now in a period of continued rapid growth, but growth does not take place without creating related costs. Already there is evidence of several problems which accompany rapid growth, such as rising cost of land, continued housing shortages, labor shortages and continued importation of aliens and employees from outside of Guam.

The potential to benefit from the growth of the economy, particularly from opportunities generated by the rapidly expanding visitor industry lies in orderly growth through proper planning and controlled development.

PARKS & RECRE.

PARKS AND RECREATION ELEMENT

Introduction

The consultant has reviewed the Johnsrud/Warnecke "Plan for Outdoor Recreation on Guam," prepared in 1967, and the 1971 Revision to the Plan prepared by the Departments of Commerce and Land Management. These studies are of a very high professional quality and are at the same time visionary and practical. As they are analytically very complete (with several minor exceptions, explained below), it is not necessary to cover the same ground again. In this document the important problems and opportunities will be summarized, and some general comments will be made regarding alternative courses of action.

Problems and Opportunities

1. The major problems can be summarized as follows:

    a. Rapid population growth and increases in numbers of tourists and visitors is putting a progressively heavy strain on park and recreation facilities.

    b. There is, at present, limited public ownership of open space sites, and because of high land costs and limited availability of funds, this problem could increase.

    c. Existing park, recreation, open space, historical, and view spots are for the most part in a poor state of maintenance, lack adequate facilities, and are difficult to reach conveniently. Additionally, many are in private ownership.

    d. There is no requirement that developers provide for dedication of park land or payment of fees in lieu thereof when creating housing tracts or apartment complexes.

    e. Much land which has high recreation potential is controlled by the military.

    f. Military personnel are encouraged to use community parks and recreational facilities, whereas civilians not employed by the military cannot use the highly developed base facilities.

g. As urbanization increases, open space now used by residents, without particular regard to the formalities of ownership, will be in shorter supply. The present lack of formal parks and recreation facilities on the village level will be strongly felt as a result.

2. Opportunities in the park and recreation sector can be summarized briefly as follows: In virtually all aspects of the field, opportunities exist to create a more pleasant and attractive environment and lifestyle for both residents and visitors by adopting and implementing the program set forth in the documents cited in the Introduction. Major groups of facilities which present these opportunities are listed below, not necessarily in order of priority.

   a. Urban parks (tot lots, small playgrounds, landscaped remnant parcels, etc.).

   b. Neighborhood (or village) parks.

   c. Neighborhood facilities, such as swimming pools, recreation buildings, playground equipment, etc. (Some of b and c elements could be integrated with local school plants.)

   d. Regional parks.

   e. Beaches and shoreline parks, including the Guam National Seashore.

   f. Day use campgrounds with cooking and sanitary facilities.

   g. Stream greenbelts.

   h. Forest trails for hiking and horseback riding.

   i. Bicycle trails, particularly in urbanizing areas.

   j. Marine reserves.

   k. Small boat marinas.

   l. War monuments and other historical sites (including War in the Pacific Park).

   m. Golf course(s).

Additionally, there may be an opportunity to develop spectator facilities such as zoological and botanical gardens, although these should be studied to determine their viability and probable patronage.

Finally, there appears to be the opportunity for Guam to host the 1975 South Pacific Games. There are very specific requirements for such events, both in terms of athletic facilities and housing. A survey should be undertaken soon to determine exactly what the needs are, what can be supplied from Guam's existing facilities to satisfy those needs, what additional facilities must be provided, how much it will cost and how it should be funded, where it should be located, and what to use the facilities for after the Games.

Rather than concentrating on any single type of recreational facility, say regional park or local park, provision of a wide variety should be encouraged. A population of diverse characteristics requires variety in their recreational pursuits. This should be reflected in the breadth of facilities provided.

Use and Standards

Use:

1. The Johnsrud/Warnecke report delineated three basic types of park and recreation users:

   a. The native population, who were categorized as "resource-oriented";

   b. The nonindigenous residents, who were called "equipment- and group games-oriented";

   c. The military population, which is interested in both equipment-oriented activities and group games, and in outdoor recreation in general.

   To this group of users should be added, we believe, tourists and visitors, for their needs, while coinciding with those of the other groups in some instances, are probably quite divergent in other instances. Since it is generally acknowledged that tourism is one of the brightest prospects in Guam's economic future, it seems essential to ascertain as precisely as possible why people visit Guam and what they do during their stay. In the Economics section of this report it was suggested

that consideration be given to surveying visitors on these subjects. The suggested survey would cover the range of activities participated in by the visitor; it would be appropriate, therefore, to devote one section of the survey to leisure-time activities. Especially valuable would be an inquiry into what facilities the visitor would like to see created on the Island.

The absence of this information makes the otherwise thorough projections of park and recreation demands (by Johnsrud/Warnecke) incomplete.

Standards:

1. The consultant has researched a myriad of "standards" for park and recreational facilities from many local and national agencies and concludes that there is almost universal disagreement on this issue. A citation of these various opinions here would serve no useful purpose. The important issues upon which to base decisions regarding standards of development are these: *

   a. Can they satisfy positive human needs, both physical and psychological, for recreation amenities?

   b. Can they enhance and protect the resource base - the air, water, soil, plants, and animals?

   c. Can they positively affect economic development decisions such as tourism, development patterns, employment, real estate values, etc.?

   Implicit in these questions is the conclusion that development standards should vary according to local conditions and demands. This is in fact the case in most jurisdictions. Records show that 94 major cities in California - a very recreation-oriented State - had actual park acreages which varied from 0.2 acres to 28.0 acres per 1000 population. The vast majority (80) had less than 5.0 acres per 1000 people; this is one-half the amount recommended by the National Recreation Association and about 60% of the minimum recommended by California's own Committee on Recreation and Park Planning.

   These variations are attributable almost entirely to local conditions and demands; this should also be the case on Guam. The Johnsrud/Warnecke study developed demand criteria by applying use factors generated after an examination of local needs and cultural traits. This method appears wholly adequate, and only needs periodic updating as the age characteristics of the population change over time.

* Paraphrased from Principals and Practice of Urban Planning: International City Managers Association. 1968.

Based on these standards, a list of primary facilities required to provide full opportunity for outdoor recreation on Guam and to meet the potential recreation demand was generated. This list follows:

Summary of Recreation Facility Needs:

Facility	1966 Need	Additional 1971 Need	Additional 1985 Need	Total 1966-1985 Need
Beaches	1,500 lineal ft. of beach	770 lineal ft. of beach or	5,280 lineal ft. of beach, 39 acs. of land or	6,650 lineal ft. of beach 45 acres of land or
Swimming Pools	1 competition pool 4 pool units	equivalent pool units	equivalent pool units	equivalent pool units
Picnic Units	254 units 23 acres	117 units 21 acres	508 units 71 acres	879 units 115 acres
Campsites	587 sites 118 acres	75 sites 15 acres	260 sites 52 acres	922 sites 185 acres
Hiking Trails	0 to 55 miles	12 to 13 miles	43 miles	79 to 111 miles
Riding Trails	0 to 90 miles	0 to 12 miles	13 to 44 miles	13 to 144 miles
Hunting Areas	o	o	o	No anticipated deficiency
Shoreline	o	o	0 to 14 miles	0 to 14 miles
Boating Facilities	50 slips 4 ramps 2 acres of land	42 slips 3 ramps 6 acres of land	280 slips 14 ramps 24 acres of land	376 slips 21 ramps 32 acres of land
Surfing Beach	o	o	1,780 lineal ft. 12 acres of land	1,780 lineal ft. 12 acres of land
Protected Water	o	o	650 acres of water for water skiing	650 acres of water assuming Outer Apra Harbor available for private boating

(Contd. on next page)

Summary of Recreation Facility Needs: (Contd.)

Facility	1966 Need	Additional 1971 Need	Additional 1985 Need	Total 1966-1985 Need
Competitive Sports:	o	o	74 acres of land	74 acres of land
Basketball	o	o	26 courts	26 courts
Volleyball	o	6 courts	24 courts	28 courts
Baseball	3 fields	5 fields	22 fields	30 fields
Softball	o	o	11 fields	11 fields
Football	o	o	5 fields	5 fields
Tennis	o	o	23 courts	23 courts
Handball	o	o	o	No deficiency
Golf	o	o	9 holes	9 holes

In addition, the report analyzed potential sites for recreational facilities and prepared a recommended acquisition and development program for their implementation. The 1971 revision explored the status of the funding programs for certain of these sites. It is recommended here that the proposals of the report be implemented as structured, as nothing has occurred since its preparation to negate its content.

Alternatives

1. Program.

   a. Lack of aggressive actions to implement a comprehensive park and recreation program could result in a leveling-off or decline in tourism, a usurpation of potential open space by urban uses, irreversible negative effects on the environment, and a general degradation of Island lifestyle.

   b. Prompt, positive actions would alleviate or negate these problems.

2. Land Use Policy.

   a. Future growth could be directed to relatively confined areas at a medium to high density, leaving most of the Island open for recreational development and natural preserves.

   b. Future growth could be allowed to occur over most of the terrain at a relatively low density, much like the suburban sprawl of Southern California.

3. Development Style.

   a. Park and recreation facilities can be created, improved, and maintained to high standards commensurate with anticipated increases in use demand by residents and tourists.

   b. These facilities can be created and improved in an informal, rustic style with a relatively low level of maintenance to complement the historic view of the Island's environment.

Cultural and Environmental Background

Guam is a relatively nonurbanized Island with great economic and environmental potential. It enjoys a temperate climate year-round and a rich supply of natural resources. The Island has a diverse history that dates back to its original use as a supply port for Spanish galleons en route to the Philippine Islands. During World War II, after recapture of the Island from the Japanese, Guam served as strategic headquarters for the U.S. Armed Forces' Pacific operations.

As the westernmost U.S. territory, Guam is within convenient traveling distance from the Orient and Australia, making it a potential vacation spot for these neighbors. Additionally, Guam should continue to function as the center of activity for the Micronesian region.

However, fulfillment of Guam's potential depends upon its ability to use its resources prudently, and that will mean wise administrative planning and the efficient development of multipurpose recreational facilities before natural sites are destroyed.

Some of this report is based on a study of outdoor recreation on Guam conducted for the Territorial Planning Commission by Lawrence G. Johnsrud and Associates of Agana and the planning section of

John Carl Warnecke and Associates of San Francisco. Because little raw data were available to measure recreation demands of both residents and tourists, that study made its own survey of demand, then drew up recommendations for an immediate as well as a long-range program. Statistical data developed by Johnsrud-Warnecke are not repeated in this report.

Generally, Guam has a young population that can be segmented into three groups, each with different recreational needs:

1. The native Chamorro population has a lower standard of living than the U.S. average and, according to Johnsrud-Warnecke, tends toward the extended family unit with resource-oriented recreation demands, such as going to the beach, shoreline fishing, and picnicking, as opposed to equipment-oriented recreation like boating, golf, or skin diving.

2. The military population is young, male and exceptionally interested in outdoor recreation -- particularly in group games and outings.

3. The nonindigenous population which tends toward equipment-related activities and is also similar to Group 2.

The tourist population which is and will continue to be a strong economic factor, tends to prefer group tours of historic sites, other sightseeing, individual swimming and skin diving.

In general, the present population exhibits an especially high interest in recreation because of its youth, relative absence of competing leisure time activities, and a favorable outdoor environment.

Tourism has been identified as Guam's best opportunity for immediate economic growth. A thriving tourist trade requires first-class recreational facilities -- facilities which should accommodate demands for boating, deep-sea fishing, picnicking, golf and other "sophisticated" leisure activities. The tourist trade will benefit from development of accessible and attractive beaches, interesting historic sites and a convenient system of sightseeing as well.

Prudent planning of recreational facilities will afford protection of natural resources and help to ensure Guam of a balanced ecology.

While recreation planning should attempt to keep pace with demands, pressures on potential recreational sites will increase with growth. For example, some of the best recreation sites, if not preserved now, will be used for housing, highways or commerce.

Increases in education and income will create more leisure time and a more sophisticated demand for richer, more varied kinds of recreation. A thriving tourist trade can be expected to introduce additional problems.

Jumbo jetliners, the addition of authorized carriers, and reduced travel fares have opened Guam to many more people -- and will continue to do so. An expanding tourist population has been assumed as an important criteria for the development of this plan.

A comparison of projected visitor and resident populations suggests that visitors will account for about two and a half times the number of residents by 1976 (over a one-year period - at no one time would visitors exceed residents). Although the overall program must be designed for the resident population, it should have adequate quality and diversity to satisfy needs of the tourist population.

Guam's recreation potential remains virtually unexploited. The military services maintain well-developed facilities but these are not ordinarily available to indigenous or tourist populations. (These facilities are used by military personnel, government employees and their dependents.)

According to the Johnsrud-Warnecke report, the relatively limited facilities sponsored by government, private and church groups are devoted primarily to sports and games. The best beaches, waterfalls and scenic areas are frequently inaccessible or hard to find and, in many cases, are privately owned. Many government-operated recreation facilities, the study says, remain in disrepair, detracting from the aesthetic quality of their locales.

The Catholic Church maintains a few sports facilities in the villages. In addition, the Windward Hills Golf Club (a private facility) has an 18-hole golf course, swimming pool, clubhouse and private landing strip, all available on a fee basis.

According to Johnsrud-Warnecke, almost all privately-owned areas having recreation potential are undeveloped.

The government maintains one good beach at Ypao, Tumon Bay. Other beaches are at Agat (Nimitz), Schroeder Junction (Tepungan), and Talofofo. It maintains picnic units -- many unsatisfactory -- at Ypao Beach and Nimitz Beach. Hiking and riding trails over government lands are informal. The government's only boating facility is located at Agana, but it offers poorly-maintained slips and ramp provisions. Water skiing and skin diving are possible at certain areas around the Island, but there are no facilities.

Surfing is possible only at Talofofo, but there are no shore facilities, such as rest rooms.

A good number of competitive sports facilities, such as basketball and tennis courts and ball fields, are maintained at public schools around the Island. Although their number should suffice for the present, some localities lack specific facilities, a many of these are incomplete or poorly kept up.

Many of Guam's best historic sites are in private ownerships. They remain unimproved and, though some are used on an informal basis, many are inaccessible except by rough trail over considerable distances.

Many historic sites from the pre-historic Chamorro civilization, the colonial Spanish period and World War II lie unprotected in wilderness areas located on the northern coast, in the southwestern mountains and down the northeastern coastline. These include petroglyph sites, significant Chamorro and Spanish artifacts, Latte Stone sites, World War II invasion beaches at Asan and Agat, and a number of Spanish ruins.

There is an acute shortage of picnic units and boating facilities. Foot trails and bridle paths are informal and apparently sufficient for the present demand, although some development will be required eventually, preferably to include planned parking adjuncts and a good riding stable, the report advised.

In addition, the number of recreational facilities comprises only part of the total picture -- their quality also is an important element of any recreational evaluation. Guam is equipped with beautiful, sunny resources that imply a high potential quality of living. But the recreational program will have to provide for pollution control, preservation of nature, an initial clean-up campaign and beautification of man-made developments in order to create a truly meaningful recreational experience for the resident population, military personnel and visitors.

Johnsrud-Warnecke pointed out that during their 1966 study, researchers had to devise a direct questionnaire by which to measure user preference and evaluate the psychological restraints of money and limited leisure time. This approach was used because Guam does not have a full range of facilities or reliable records of use from which one could examine patterns of and restraints on use.

As facilities are developed, it is valuable to keep accurate and frequent user counts to be used in evaluation of a facility's rate of use. Rates of use can provide valuable guidelines for improvement or expansion plans. To ensure a supply of useful records, these counts should be taken uniformly, accurately and frequently.

DEPARTMENT OF PARKS AND RECREATION RESPONSIBILITIES

The Department of Parks and Recreation should have jurisdiction over all facilities required to meet the active and passive parks and recreation programs for Guam. The diverse types of government park responsibilities are enumerated in the following classifications:

Recreation Parks - This is the basic community recreation park. These parks should provide for activities such as football, baseball, basketball, volleyball. It should have general playground equipment and a sheltered structure for supervised activities.

Since the playground will serve children of elementary school age, the recreation park should be located close to the elementary school and within walking distance from the homes.

Beach Parks and Beaches and Shoreline Rights-of-Way - Sandy beaches provide sites for a significant portion of the recreational activities for the population. It permits swimmers, skin divers, and fishermen to gain access to the water. Beach parks permit the users to picnic, play, and have group activities in an environment conducive to good fellowship and openness. Rights-of-Way to beaches should be protected to assure permanent access.

Regional Parks - These are parks of broad open spaces encompassing areas of natural, historical, cultural or scientific features that are important to the Island. They may contain botanical or zoological gardens, or animal and bird sanctuaries. The proposed Agana Swamp Regional Park, the Dededo Regional Park and the Merizo Regional Park and Marina are examples of this classification.

Zoological Parks - The Government should investigate the need for a zoological park to be developed and maintained for the enjoyment and the education of the residents and visitors.

Botanical Gardens - This plan also proposes that investigations be made to determine the need for development of botanical gardens. It could occupy portions of other government parks and deal with specific kinds of fauna and landscape native to the Southwest Pacific region.

Stream Greenbelts - Greenbelts created around streams could flow through urban or developed recreational areas. These greenbelts may require protection of the natural stream bed and stream banks. Where flood control requirements necessitate special facilities, design consideration should be given to the appearance of these structures and adjoining areas to preserve the natural setting.

Golf Courses - Courses may be planned, if studies indicate a definite need, within regional parks or may be distributed around the Island to meet needs.

Urban Parks and Parcels - The improvement of government-owned small land parcels, median strips, traffic islands and other remnant areas could enhance the total environment setting in the urbanized areas.

Bicycle Trail System - Bicycling could be provided for with the development of bicycle trails around the shoreline and in the urbanized areas to provide another form of recreation and to help alleviate traffic problems. The Island's physical size could encourage bicycling as a popular form of recreation.

Marine Reserves - These are highly controlled offshore underwater reserves with protected biological ecosystems which are available for public viewing by means of underwater trails, or from the surface. The proposed marine reserve at Pago Bay is an example of this type of reserve.

Forest Trails - A mountain trail system suitable for hiking or horseback riding would provide access to and interconnection between scenic points and recreation and historic areas.

Marinas and Small Boat Harbors - More marinas and small boat harbors should be made available in Guam, as this activity shows promise of becoming more popular.

SUGGESTED FEDERAL GOVERNMENT RESPONSIBILITIES

Federal War Monuments: This includes areas of historic significance which are important to Federal government because of scientific, historical or cultural value. The proposed War in the Pacific Park is an example.

Guam National Seashore: The Federal government should be encouraged in their proposed development of this project, as it will provide much needed shoreline protection and could save the Guam Government a considerable amount of money were it to attempt to perform this function.

STANDARDS

The establishment of standards for development of a parks and recreation system for Guam will require a mature definition of goals sought by the people of Guam relative to the development of their communities and Island. The potential impact of tourism to the economy, quality of life and parks and recreation requirements must also be considered. In addition, the economic, social and political structures of Guam will have a great influence on the final standards. Standards set forth by Johnsrud/Warnecke appear logical for conditions on Guam, and only need updating based upon new population estimates.

FINANCING CONSIDERATIONS

1. Early consideration and approval of the goals established by the people and the Government will allow positive action toward implementation of a total program.

2. The Federal government should participate in the program, particularly in land acquisition and development costs.

3. A study should be made of all Federal financial and technical assistance programs, including interest-free advances for planning and land acquisition costs.

4. Action should be taken to introduce legislation which would issue concessions contracts up to 30 years with provision to require concessioners to construct facilities and purchase lands for dedication to the parks program.

5. Methods should be devised for purchasing long term land options, providing annual payments combined with tax relief, or installment buying with tax deferments.

6. Subdivision developers should be required by law to dedicate lands (or in-lieu cash payments) for recreation purposes to the government on the basis of standards deemed appropriate by the Administration and in compliance to criteria to be outlined by the Department of Parks and Recreation. Developers should be required to consult with the Department of Parks and Recreation as well as the Planning Department before they submit their development plans for approval.

7. An aggressive systematic land acquisition program should be launched as soon as possible with legislative approval of bond issues. This appears to be necessary to any effective acquiring of lands.

CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program includes the regular six-year CIP and schedules for a 20-year program.

Projects included in the six-year program will be accompanied by their operating costs to provide budgeters with overall costs for the projects within a six-year span. In this way, both CIP and operating budgets can be balanced to meet their respective needs.

Costs to staff and operate as required will be added to the program after the long-range plan has been approved. This will require systematic methods for development of staffing and operating needs, including cost data. The costs must be coordinated within the total planning, programming and budget systems adopted by the Administration.

Findings:

1. Current CIP methods of programming and establishing priorities are inadequate mainly because of lack of sufficient advanced planning.

2. Generally, long-range planning -- with approved goals and objectives -- has not been applied to development of a parks and recreation program. This has handicapped work with the CIP.

3. Advanced project planning also has been lacking. Project planning should be started three years before actual construction, and not less than two, in order to provide time for adequate plan preparation and review.

4. Cost estimating should be done by an experienced professional and based on project history data. To strengthen CIP cost proposals, cost estimating should consider project history records when formulating planning, programming and budget systems.

5. It is imperative that a Department of Parks and Recreation and Planning Department be created as soon as possible.

Objectives:

1. To assure maximum benefits for the public at minimum cost, the system of programming will have to provide management and the Administration with a complete overall picture of the proposed parks and recreation program.

2. The long-range plan should be speedily approved and a definite program of advanced project planning formulated in order to contribute to a stable CIP program. Changes and revisions are costly.

3. Important to a comprehensive parks and recreation program will be a system of project history data, which would afford more accurate project estimating and furnish management with up-to-date project status information.

4. Management should encourage the development and use of new methods and techniques in the planning-programming-budget system to reduce overall costs.

5. Key people should participate in special training courses conducted by large firms to learn new methods and techniques.

OPERATING AND MAINTENANCE PROGRAM

The quality of services offered the public and quality of facilities maintenance are as important to recreation as provision of the facilities themselves. The operating and maintenance program cannot be overlooked.

Findings:

1. There is a strong, regrettable tendency to short-change the operating and maintenance program in favor of the CIP in government, industry and business. This is particularly true in government, where impressive projects are initiated without adequate financing for necessary services and upkeep.

2. Like the CIP, costs of operations and maintenance increase at the same rate as those within the construction industry. Unless accurate cost factors are developed and presented with adequate justification, there is a strong tendency to allow existing service and maintenance operations to carry themselves without automatic increases to obtain financing needed to maintain the quality standards.

3. Because there is no Department of Parks and Recreation, this area's costs are commingled with costs of other jurisdictions. It becomes very difficult to obtain a true picture of costs for park operation and maintenance.

Objectives:

1. Develop project history data applicable to operating and maintenance activities for parks and recreation and provide an adequate program that will assure automatic increases to maintain quality standards.

2. Develop necessary programming costs and data that will assure full consideration of operating and maintenance requirements for all new CIP projects. Provide sound, complete schedules for staffing and acquisition of new required equipment that are reasonable and sufficient.

3. A systematic method of appraising operating and maintenance activities and programs should be developed to determine their effectiveness in maintaining minimum costs but quality standards.

4. Initiate a training program so that key personnel can participate in proven programs offered by agencies and private industry.

SOCIAL FACTORS

BUREAU OF PLANNING
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SOCIAL FACTORS ELEMENT

Introduction

This report summarizes the major concepts, conclusions, and alternatives presented in "A Study of the Socio-Cultural Factors of Guam: A Portion of the First Phase of the General Master Plan for the Territory of Guam," prepared by Paul D. Richardson. That report, accepted by the Territory of Guam's Master Plan Review Committee, is included as a part of this submission by reference and addendum.

Historical Background

Guam was probably settled originally by peoples originating from the South China Coast. Later, natives of the Philippine Islands migrated to Guam, and are the ancestors of the "Chamorros." The society was matrilinear and highly stratified.

Use of Guam as a way-station for the Manila Galleons was responsible for the introduction of Christianity to the natives. This gave rise to large-scale conflict, owing in part to the tribal structure of the society.

Eventually, Spain sold Guam to Germany, which in turn ceded it to the U.S. after the Spanish-American War. Control of the Island was given over to the U.S. Navy, which retained this responsibility (except for Japanese occupation in WWII) until 1950. In that year, a territorial government was established. In 1962, Typhoon Karen devastated the Island. Military security regulations were also relaxed in 1962. These served to stimulate Guam's economy.

Influences on Life Style

During the warfare between Spaniards and Chamorros, the population was practically annihilated. Guam and Rota alone remained inhabited. The village settlement pattern became typically Spanish. Intermarriages altered the physical characteristics of the natives, and no "pure" Chamorros remain today. The Catholic church became the major institution. The present village commissioner concept is a remnant of the Spanish period. The large villages were dispersed in the present pattern of small, scattered villages. The educational system established by the Spaniard became the foundation of present-day Chamorro culture.

During the period of U.S. Naval administration, an appreciation for democratic principles was cultivated but not practiced. Some advances were made in business opportunities, literary, and public health.

With self-government in 1950 came the full impact of western culture and practices. The economy changed from subsistence to wage earning. Economic growth has been spectacular, mostly owing to outside events such as Typhoon Karen and the Vietnam War.

Geographic Description

Guam is a tropical wet-dry Island, located in the typhoon belt of the western Pacific. Aside from these storms, the weather is somewhat monotonous and enervating.

In contrast, the terrain is varied; the Island seems larger than it is because of the irregular arrangement of the land. This tends to make residents less conscious of the sea, and therefore feel less closed in.

Most of Guam is high relative to the ocean, and its terrain is characterized by four distinctive physiographic divisions: the northern limestone plateau, the dissected volcanic plateau of the souther, the interior south-central basin, and the coastal lowlands and associated reefs. Each division has vegetation characteristic of the geology and soil cover.

Geographic Influences

Guam's location relative to nations on the eastern rim of the Pacific Basin give it national and international importance. It is the westernmost possession of the United States, and is a military base of strategic importance. It is linked to the western and eastern hemispheres by frequent daily air flights, by shipping, and by communication networks. It has a deep water port just south of the capitol city.

Although deficient in raw materials, manufacturing is being attracted to Guam because of its strategic location and special economic incentives. Additionally, tourism is growing explosively.

There is a great natural potential for agricultural development, but several factors have interfered with realizing the potential. These include complex land ownership patterns, threats of typhoons, a thin layer of topsoil, and proximity to Japan's highly competitive agricultural industry.

Demographic Factors

Special demographic features characterize Guam's population. They are (1) a large segment is highly transient; (2) a distinct ethnical settlement pattern; (3) a very high sex ratio (more than two males for every female); (4) a higher than usual birth rate; (5) a high immigration rate.

Total population has increased tremendously since 1900, but the proportion of Chamorros has declined relative to the total. Density of population is very high. The northern half of the Island is the most densely populated.

Guam's population is multiethic, divided principally into natives, military personnel, aliens, and statesiders. Because of wide fluctuations in population, it is difficult to maintain a satisfactory level of public services. The cultural differences among these groups is distinct, resulting in "cultural islands."

Age	Male	Female
Under 1 year	1265	1255
1 year	1192	1075
2 years	1140	1085
3 years	1174	1053
4 years	1192	1205
5 years	1204	1140
6 years	1259	1146
7 years	1255	1182
8 years	1179	1150
9 years	1157	1090
10 years	1157	1075
11 years	1101	1060
12 years	1065	967
13 years	1045	909
14 years	994	931
15 years	899	848
16 years	824	783

(Contd. on next page)

Age	Male	Female
17 years	714	805
18 years	769	771
19 years	942	694
20/24 years	6642	3628
25/29 years	3569	2837
30/34 years	3538	2633
35/39 years	3267	2207
40/44 years	3038	1754
45/49 years	2192	1338
50/54 years	1334	971
55/59 years	1015	733
60/64 years	577	493
65/69 years	324	365
70/74 years	160	191
75/79 years	104	142
80/84 years	42	63
85 +	34	55

(1) Bureau of Census, PC(1)-B54, Table 5

(2) For a discussion of preponderance of males in these age groups, see Population Element.

There is not a clear distinction between rural and urban ways of life. Only five communities on Guam have populations exceeding 2, 500, despite the rather large number of people on the Island.

Social Structure

The bulwark of community organization is its institution framework. Early Chamorro culture was kinship-oriented. During the Spanish period, people lived in communities surrounded by relatives with the church at the center of the village. Recently, as the Island emerged from isolation, formal organizations are no longer confined to those based on political, education, and religious institutions.

A large percentage of formal organizations are now based on civic concerns, business or professional interests, social and recreational endeavors.

Secondary, or informal organizations also exist. These are less formal and usually involve small groups in an unstructured setting. As many of these informal organizations involve young people, they have contributed to the rise of a "generation gap" with resultant delinquency problems.

Mobility has diffused informal groups beyond the confines of the family. Consequently, Guam is moving from a family-centered orientation to an Island-wide social organization motivated by expedience and individual aspirations.

Community Values

Even today, the most important factors in the value system are familism and religion. These two institutions are closely interwoven. Both apply social controls, help to prepare individuals for positions in society, and transmit characteristics of hospitality and friendliness. Frequent celebrations and games intensify the open life style. Cooperation in community life is also nurtured by familism and religion, and undergirds these institutions. Competitive recreational activities, popular with the people, are an outgrowth of the cooperative spirit.

Community Institutions

Vestiges of ancient Chamorro cultural institutions have survived the shocks of successive alien cultures. These institutions are classified as family, education, political, economic, and religious.

Family

High birth rate, large number of people per household, and the fact that relatives other than immediate family members live in the household, all give evidence of the strength of the family as an institution. It is probable that the mothers have been responsible for the transmission and perpetuation of the culture. The father is an authoritarian figure who instills respect for authority. Family loyalty does not seem to have caused hostility toward outsiders.

The family-based institution of compadreship (godparent relationships) is of great importance in strengthening family ties.

The traditional family economic structure based on subsistence is being altered rapidly, owing to the impact of modern culture.

Crowded home conditions with attendant lack of privacy does not seem to be too serious a problem in Guam. One solution has been to move many activities outside the house. Close personal contact and pronounced security in family and home leads to a feeling of caution when children confront new situations such as at school. These and other new situations have had an impact on traditional behavioral patterns, for example, courtship activities. On the whole, however, compliance to the rules is still expected in parent-child relationships.

Education

Informal education has a tremendous effect on the pre-school child owing to close mother-child relationships and rigid child-rearing practices. One outcome is shyness and caution in new situations. Attempts by persons of authority outside the family group to increase performance by raising stress levels usually result in failure. In the school environment, this can result in nonparticipation or even antisocial behavior. The school culture is alien and more often than not provokes anxiety in the child. As the school has evermore impact on the culture, the border between the family and school becomes less distinct. Adolescents seem to be more and more aware of the advantages of strong government and opportunities offered in the outside world.

Political

Strong executive rule has been traditional on Guam since Spanish days. Not until January 1971, however, did the first democratically-selected governor take office. Representative government was first instituted in 1917, and consisted of influential people appointed by the Governor to advise the Navy Department. In 1931 the system was revised to provide a bicameral legislature composed of elected members. It could only recommend legislation to the Governor, however. In 1964 an elective position was created to represent the Island in Washington.

The institution of municipal commissioners has a long historic tradition through the Spanish and Naval eras. They have been elected since 1948. Their role is to represent the people to the Governor, and represent the Governor to the people.

The Judiciary on Guam consists of a District Court hearing federal cases, an appellate division of the Court, and an Island Court which is analogous to state courts on the mainland.

Since the Organic Act of 1950, partisan political activities and a broad, citizen interest in politics have been keen. Voter participation in elections far exceeds stateside averages, and ethnic and sex barriers seem much weaker than on the mainland.

Because of revolutionary and evolutionary changes in political systems, Guam is characterized by a high degree of political maturity.

Economic

The present economic situation on Guam is characterized by a demand for goods and services. Inherent in this situation are higher prices and the danger of inflation. The shift from an agrarian to a salary-based economy has had the strongest impact on the economic institution. This shift has been dramatic over the past several decades. It has been responsible for an important change in the system of societal stratification, which in agrarian economies is based on land ownership, but is more complex in the salary economy prevalent today. Each ethnic group has its own stratification system according to their contributions as measured by their native cultures. More emphasis, however, is now being placed on achievement, so that political position, wealth, occupation, and education are becoming important determinants.

In labor, statistics indicate that the shift is away from manpower and toward machine power, and the occupations are diversifying.

Religion

The various forms of religion on Guam are concerned with the total welfare of the people, reaching out into the community with educational programs, medical facilities and social and individual services.

The Catholic Church on Guam is of extreme importance to the life of the people. After suffering great deprivations during the Japanese occupation, it has been completely reconstructed, numbering 23 parishes and over 47,000 people. The Church operates 10 schools. The role of the Church in community activities is very important, with the parish priest as a significant neighborhood leader. The interweaving of church, family, and community through religious activities is an important facet of the religious fabric of Guam.

Most Protestent Church activity has developed since WWII. There are approximately 25 churches, with total membership numbering around 5,000. There are two Protestant parochial schools.

There is one Jewish Community on Guam, with a membership of about 30.

Potential Problem Areas

1. The effect of Guam's change from a subsistence to a cash economy.
    a. De-emphasis of agriculture.
        1. Availability of off-the-farm occupational opportunities.
        2. Loss of land to the military.
        3. Demand for housing space.
        4. Increasing land cost.
        5. Mechanization of farming.
    b. Effects on the community and the family.
        1. Common bonds created by family farming life are being weakened.
        2. Job centers have moved away from the home.
        3. Patterns of authority and division of labor have been altered.
        4. Parents compete with peer groups for their children's loyalties.
    c. Transportation: an emerging necessity.
        1. Change in economic structure has created the need for a transportation system.

2. Use of a private automobile means more personal freedom and less dependence on others.

3. Social/cultural institutions compete with one another for the more mobile public.

4. Support systems for the automobile must be developed.

5. A cash economy makes concentrations of people possible. More sophisticated support systems are required to serve greater densities.

d. "Rurban" characteristics of Guam.

1. Urban and rural life styles are merging in some areas, while the extremes still exist in other areas.

2. The cultural shock of this changing character has had a severe impact on the extended family system, giving rise to conflicts.

e. Mobility and Social Change.

1. The pace of social mobility has accelerated, which has aggravated the value conflict.

2. Residential mobility (within the Island and to and from the Island) has accelerated.

3. Personal mobility has increased (community; mainland visits; school busing, etc.).

4. Mass media availability helps one identify with other life styles and cultures, contributing to social change.

5. Vertical mobility has increased owing to more diversified occupational opportunities.

6. Vertical social changes demand adoption of new behavior patterns, sometimes in conflict with traditional patterns.

7. Strong agrarian economies help cushion cultural shock. With that cushion gone, numerous problems of adjustment have resulted.

2. Potential social problems in Guam's sudden emergence as a prominent part of world-wide mobility.

   a. Ethnic group relations.

      1. Traditional in-group loyalties sometimes result in out-group hostilities. This is perceived by some as a threat.

      2. The inability to integrate successfully the conflicting values of social institutions has created an identity crisis which sometimes causes negative aspects of identity to be attributed to other groups. This results in the emergence of scapegoats, or in the rise of attitudes of superiority.

      3. Ethnocentrism emphasizes the differences among groups and leads to problems in adjustment.

      4. Segregated residential patterns result from ethnocentrism, perpetuating cultural differences.

      5. The segregation of the military community (residential, social, educational, recreational) contributes to strained relations between this group and the nonmilitary population.

      6. Although Guamanians are subjectively and in fact "Americans," there are strained relations with statesiders who exhibit attitudes of superiority and impatience.

      7. Government-provided (segregated) housing for contract statesiders intensifies this conflict.

      8. In the environment of employment, there is mutual lack of understanding between phlegmatic Guamanians and demanding employers, giving rise to conflicts.

      9. There tends to be a social segregation in schools between statesiders and Guamanians, leading sometimes to hostilities. Additionally, the greater language facility of the statesiders give them an unfair advantage.

10. There is marked social, cultural and physical segregation between Filipinos and other ethnic groups. As the Filipino community grows, it may pose a threat to the Guamanians, leading to resentments.

11. Relations between the large community of Palauans and Guamanians are strained owing to differences in language, customs and employment preferences.

12. Mainland-patterned schools, designed on the assumption that students are prepared to participate and communicate fully, create abrasive situations among culturally different groups.

13. Mainland teachers are subjected to insubordination and disputes owing to a feeling among students that they are not a part of the community. Short teacher contracts create a lack of continuity in the educational system.

14. Student passivity in the face of authoritarianism is often a response to stress rather than indicative of cooperation.

15. Reliance of schools on some irrelevant practices and rigid, paternalistic standards also causes social conflicts.

16. The practice of retaining unsuccessful students results in compounding psychological learning blocks and confirming failure. These students usually drop out at 16 and enter the labor market untrained, confused, and often angry.

17. Parents are reluctant to assume leadership related to school problems.

18. There is a general unawareness on the part of students of occupational opportunities "on the outside."

19. There are no continuing education opportunities for drop-outs.

20. Young people have too small a role in designing and operating recreational facilities and programs. Additionally, programs and facilities are inadequate for the young population, and are not strongly enough village-oriented.

21. Athletic competitions between villages may be stressed too much, and cooperation and group participation ignored.

3. Summary of influences of social change on Guam's institutional structure.

   a. Influences on the family.

      1. Competition among males for female companionship creates several problems:

         a. Since a large proportion of the male population is highly mobile, the illegitimacy rate may increase.

         b. Cross-cultural, and therefore conflict-prone, marriages could result.

         c. A strain may be placed on husband-wife relationships.

   b. Influences on the educational system.

      1. There is a definite lack of participation in school-home programs.

      2. Children often receive their formal education from the perspective of one culture (that of the contract mainland teacher) and their informal education from a different cultural perspective (the family). This often causes gaps in total education which are difficult to bridge.

   c. Influences on the political institutions.

      1. Customary laws based on an agrarian economy cannot adjust rapidly enough to effect social controls when the culture is impacted by rapid changes. Enacted laws are essential. These laws must be supported by the cultural mores if they are to be enforced.

   d. Influences on the economic structure.

      1. Increasing tourism may cause social problems, as affluent visitors can pay higher prices for goods and services, thereby increasing the danger of inflation. The differences between upper and lower economic classes may become more profound, perhaps causing some who cannot keep up to use devious methods to arrive at the same level.

e. Influences on the religious structure.

1. Since social change challenges religion and moral codes, the religious structure has been placed under a heavy strain.

2. There are heavy demands being made upon the present religious organizations to meet the ever-increasing needs of a rapidly-growing constituency.

HEALTH

HEALTH SERVICES

Introduction

This report summarizes the major concepts, conclusions, and alternatives presented in "Guam Master Plan: Health Services." That report, accepted by the Territory of Guam's Master Plan Review Committee, is included as a part of this submission by reference and addendum.

Summary - Health Services

1. Accidents

   a. The rate of accidental deaths per 100,000 people is considerably less on Guam than on the mainland. Automobile accidents and drownings account for almost all accidental deaths. The mortality rate attributable to automobile accidents alone is higher on Guam than on the mainland U.S. When compared to vehicle miles, it is $2\frac{1}{2}$ times the rate in California, which has more cars and miles of roads than any State or Territory. It is the second highest rate in the nation.

   b. Nonmotor vehicle accident mortality rates are below the national average. Nearly all these are caused by drowning. Work and school related accident incidents are not alarmingly high.

   c. Severe injuries and death resulting from accidental causes occur mostly in the under-35 age group. Personal and family consequences, as well as economic and social costs, are thus very high.

   d. Prevention and control of accidents require investigation into the basic elements; the environment, human behavior, and the object of the accident. General and specific control problems can be helpful in preventing accidents.

   e. Treatment of accident cases is available at Guam Memorial and the Naval Hospital. There is a limited blood bank capability, but no poison information center on the Island. Ambulance service is maintained for the central population centers of the Island (Agana/Tamuning/Dededo) as well as at Agat and Inarajan. Military ambulances are made available in case of a mass emergency. Helicopter service can be requested from the military, but there is no landing pad at Guam Memorial.

f. Within the Government of Guam structure, there are five individuals with responsibilities akin to safety officers. The Red Cross also is concerned with accident prevention.

2. Communicable Diseases

- o Guam's location and highly transient population make it a potential host for a variety of diseases.
- o The overall sanitary conditions on Guam are generally substandard.
- o Water pollution is a serious problem.
- o The nutritional status of the population is thought to be inadequate for optimum maintenance of resistance to infection and disease.
- o Conditions which lead to a high prevalence of parasitic infestation are present in Guam.
- o Public knowledge of the foregoing problems is limited to a small segment of the population.

a. Specific Problems

1. Reporting of incidences of communicable diseases on Guam is sporadic, resulting in incomplete data on the subject. Immunity levels against diphtheria, tetanus, polio, measles and rubella among elementary school age children were approximately 80% in April 1970. It is suspected that immunization levels among the general population are below what they should be.

2. Gastrointestinal diseases, bacteria and fly-borne, are fairly common. Sanitary conditions in public eating places are below the national average.

3. As of 1970, there existed on formal program of insect control. There are several mosquito types on the Island suspected of carrying malaria, encephalitis, dengue, and filarrasis.

4. It was expected (as of November 1970) that Guam would soon be declared a rabies-free area. No other cases of diseases transmitted by animals were reported up to that time.

5. Guam has a very high rate of tuberculosis cases per 100,000 people. In 1968 it was about 4 times the rate in continental U.S.

   It is believed that the reservoir of venereal disease cases is probably much larger than the number of reported cases would indicate.

   Because of environmental conditions and quarantine facilities on Guam, it is conceivable that sporadic or epidemic occurrences of internationally quarantinable diseases could happen. Of particular concern is the island-wide distribution of the Norway rat, the preferred host of bubonic plague.

6. Parasitic infestation is widespread and common. Certain varieties of worms can have a particularly debilitating effect on children.

b. Resources

1. The Communicable Disease Section of the Department of Public Health and Social Services is responsible for the following programs:

   a. Immunization

   b. Tuberculosis

   c. Venereal disease

   d. Epidemiology

   e. Foreign quarantine

   Active programs directed toward control of these problems are being carried out.

2. The General Sanitation Section of the Department of Public Health and Social Services is responsible for:

   a. Inspection of eating and food handling establishments.

   b. Village sanitation.

   Both these responsibilities are being carried out diligently.

3. The Zoonosis Control Section of the Department is responsible for rabies control and animal surveillance, pickup, impoundment, reduction, licensing, vaccination, etc.

4. The Health Education Section is concerned with educational matters concerning communicable diseases.

5. There was, as of April 1970, no formal program for the improvement of nutrition.

3. Chronic Diseases

Guam has a much younger population than Continental U.S. As communicable and parasitic diseases come more under control, the problem of chronic diseases becomes relatively more important. Statistical data suggest that relatively more effort should be directed toward prevention and care of chronic diseases in young people.

Comparison of the ten leading causes of death on Guam with those of Continental U.S. shows that on Guam, heart, blood vessel and stroke problems, and cancer are of lesser importance while infant mortality, pneumonia, and accidental death rates are of greater importance.

a. Specific Problems

   1. Heart disease affects relatively few people on Guam because of the youth of the population.

   2. Hypertensive heart disease rate for Guam is uncertain.

3. Rheumatic heart disease and rheumatic fever appear to be relatively prevalent on Guam.

4. The rate for congenital heart defects is slightly lower on Guam than in Continental U. S.

5. Stroke has not assumed the high relative rank as a cause of death in Guam that it has in the U. S.

6. Cancer ranks relatively lower than in the U. S.

7. Diabetes is a public health problem of significant magnitude in Guam.

8. The incidence of both major diseases of the central nervous system (ALS and PD) is much higher on Guam than in Continental U. S.

9. Kidney diseases have assumed increasing importance in the overall chronic disease picture.

b. Resources

1. As of June 1970, there was no functional program for the early detection of chronic diseases in Guam.

2. Treatment of chronic diseases is obtained from private physicians, the Island's hospitals and clinics, and the Crippled Children's Service. Many sophisticated treatments must be secured in Hawaii or on the mainland. Because of Guam's isolation, it is difficult for its physicians to keep abreast of current techniques.

c. Rehabilitation is carried out by the Home Health Service, the Division of Vocational Rehabilitation, and the Guam Memorial Hospital.

4. Mental Health and Social Adaptation

The incidence of mental illness on Guam is not known, but professional opinion indicates that it is very likely comparable, if not greater than, that experienced on the mainland. Mental disorders occur at about the same rate as on the mainland, whereas the rate of psychotic disorders is only about 35% of that in the U. S.

Owing to the social, economic, and moral stress factors discussed in other elements of this General Plan, it is believed that mental health is an important problem on Guam. Its implications for health and well-being are profound.

a. The following are symptoms of poor mental health:

1. Alcoholism

2. Drug Abuse

3. Suicide

4. Juvenile delinquency

5. School drop-outs

6. Divorce

The rates of incidence of these problems vary from those prevailing in mainland U.S., and no absolute conclusions regarding their significance on Guam should be drawn until after a thorough study is made of the mental health picture.

b. Resources

Guam Memorial Hospital has a new Comprehensive Community Mental Health Center which offers outpatient, consultative and educational services. There is no child guidance clinic, no marriage counseling agency, and no other resources that would ordinarily complement the services of a mental health clinic.

5. Dental Health

The shift from reliance on Island-produced fruits and vegetables, meats and fish, to imported, canned products containing more sugar constitutes a significant dietary change. This change has impacted on the dental health of the residents. Certain socioeconomic factors have put dental health low on the list of priorities of the residents.

a. Specific Problems

1. Available records indicate that lack of adequate dental care has produced a deplorable dental condition in the younger generation, with possibly as high as 98-99% of children having teeth which need restoration or extraction.

2. It is believed by the Division of Public Health dentists that about 60% of the school children have some form of gingival inflammation.

3. The extent of orthodontic problems has not been determined.

4. It has been shown that the only really effective treatment for the prevention of dental caries is flouridation of drinking water. The children of the future could best be protected against caries if the Government were to fluoridate the water supply.

b. Resources

1. The present ratio of population to dentists on Guam is over twice that in mainland U.S. Guam needs more dentists.

2. The Dental Section of the Department of Health and Social Services is responsible for providing dental services to approximately 30,000 patients, mostly children.

6. Physical and Mental Impairment

Impairment in this context refers to the end result of a disease, injury, or defect rather than a continuing disability associated with some chronic disorder. The problems of "impairment" are often much different from the problems associated with the prevention and/or treatment of the conditions which gave rise to it.

a. Specific Problems

1. The four major physical impairment problems on the Island of Guam are those involving eyesight, hearing, speech, orthopedic (amputations, birth deformities, bone problems). Additionally, there are other physical problems associated principally with epilepsy, paralysis, and cerebral palsy.

2. There is little definitive data on mental impairment on Guam. Children who are classified as being "mentally slow" may actually be victims of cross-cultural difficulties which tend to obscure real mental retardation.

b. Resources

The following services are available to residents having physical or other impairments:

1. The Guam Crippled Children's Service Program.

2. The Speech and Hearing Clinic of the Department of P. H. & S. S.

3. The Division of Vocational Rehabilitation.

4. Brodie Memorial School for mentally retarded children.

5. Schools for the visually handicapped and deaf on the campus of New Piti Elementary School.

6. There is a plastic surgeon practicing on the Island.

7. The Lions' Club of Guam donates glasses and hearing aids.

8. As of August 1970, there was no program for the care of the preschool mentally retarded or custodial care of the mentally retarded ineligible for acceptance at Brodie Memorial School.

8. Reproduction and Development

The tendency toward large families combined with low incomes and unsatisfactory diets have contributed to too frequent pregnancies and poor maternal and child health.

a. Specific Problems

1. The rate of premature births is much higher than the mainland rate.

2. Guamanian babies on the average weigh less at birth than white babies, but slightly more than nonwhite babies born on the mainland.

3. Neo-natal death rates are higher than on the mainland. They are highly associated with lack of pre-natal care.

4. Infant mortality, generally believed to be an index of general health conditions, is somewhat higher than in the U.S.

5. A recent study indicated that "There seems to be no great objection to contraception; in fact, it can be said that there is a general desire to know more about family planning." If this is true, it would appear to be beneficial to maternal and child health to achieve better spacing of pregnancies, and to limit family size.

6. At least one of every ten births on Guam is illegitimate. Unwed mothers are often reluctant to seek pre-natal care, thereby contributing to an elevated infant mortality rate.

7. Maternal morbidity and mortality rates are probably higher on Guam than on the mainland.

8. There are high incidences among pre-school children of iron deficiency anemia, dental caries and intestinal parasitism. Additionally, the prevalence of untreated middle ear infection has resulted in a rate of hearing loss in school children four times as great as on the mainland.

9. The very high incidence of certain diseases, particularly ALS, PD, and diabetes indicates that there is a strong possibility that genetic factors may be of concern on Guam. This concern arises from the constant intermarriage among a limited number of families over a long period of time.

b. Resources

1. Maternal and child health services are provided for

   o child spacing and infertility counseling

- o pre-natal and post-natal care
- o maternal counseling
- o maternal and infant care (high risk mothers)
- o well child conferences

2. The School Health Program appropriate educational curricula dealing with reproduction, sex counseling, and family life education, utilizing skilled teachers and consultants are at present being given at only two of Guam's schools.

3. There is no marriage counseling service on Guam.

4. Genetic counseling is in the hands of private physicians.

5. Women desiring legal abortions must go either to Japan or Hawaii. Voluntary male sterilization is available from private physicians and at the Seventh Day Adventist Clinic.

9. Nutrition

The shift in the conomy from an agricultural base to a salary base is discussed at length in the Social Element of the General Plan. One result of this shift has been a dietary change, wherein processed imported foods have been substituted for fresh, locally produced foods. High living costs contrasted with low average income has created the problem that many residents are not able to purchase those commodities which would contribute to good nutrition. Surveys have indicated definite dietary deficiencies among Guam's residents. This can lead to impaired physical and mental development, ill health, and untimely death. The problem is most severe in the area of maternal and child health.

Good nutrition is also important to the older population. Obesity or excessive leanness are possible results of poor nutrition in aged persons.

a. Specific Problems

The following problems may be the direct or indirect partial consequences of poor nutrition:

1. High incidence of iron deficiency anemia.

2. Very high incidence of dental disease among children.

3. High tuberculosis incidence rate.

4. Large numbers of obese females in early and middle ages.

5. Low average birth weights of Guamanian infants.

b. Resources

There is little indication among the components of the health system that the improvement of general nutritional status commands a priority equal to its implications for health.

PUB. EDUCATION

III. Educational Characteristics

The U.S. Bureau of the Census in its report entitled "General Population Characteristics - Guam", PC(1)-B54, issued April 1, 1972 (although dated February, 1972), lists the following educational characteristics of the population.

A. School Enrollment

Nursery School		351
Public	175	
Parochial	34	
Other Private	142	
Kindergarten		1,110
Public	665	
Parochial	135	
Other Private	310	
Elementary (1/8)		18,425
Public	15,483	
Parochial	2,384	
Other Private	558	
High School (9/12)		5,741
Public	5,025	
Parochial	507	
Other Private	209	

College		1,438
Public	1,346	
Private	92	
Students 35 years & older		242
Total		27,307

B. Enrollment by Age Group

3 and 4 years old	339
5 and 6 years old	2,955
7 to 13 years old	14,851
14 and 15 years old	3,485
16 and 17 years old	2,717
18 and 19 years old	1,416
20 and 21 years old	438
22 to 24 years old	325
25 to 34 years old	539
35 + years old	242
Total	27,307

C. Data Differences

There are several significant differences between data supplied by local sources and information provided by the Census.

1. Different data base. The Census records enrollments on the basis of elementary schools -- grades 1 through 8 -- and high schools -- grades 9 through 12. The school system on Guam is divided into elementary (1-6), junior high (7-9), senior high (10-12). Since the junior high grades overlap the census grades of 1-8 and 9-12, it is difficult to make a rational correlation between the two sets of figures.

2. Difference in numbers. According to the Census, there were 21,173 students enrolled in the public school system (excluding the University) in April 1970. The Statistical Abstract of Guam (Table 12) indicates an enrollment of 21,781 in the fall of 1969. This small difference may be due to one or more of the following factors:

   a. Natural reductions (drop-outs, relocations) in enrollments between the beginning and end of the school year.

   b. The Census does not include in "regular" schooling the specialized vocational, trade, or business schools. Since the system includes a vocational high school, it is possible these students were not counted in the Census.

   c. By definition (pg. App-6 of Census document cited above), data on school enrollment collected by local agencies may not be always compatible owing to "differences in definition, subject matter covered, time references, and enumeration methods."

   On the whole, there appears to be good correlation between Census and local sources.

There is a large discrepancy between the Census and locally supplied statistics regarding enrollment at the University. The Census lists 1,346 in attendance in April 1970, whereas the University Office of the Registrar reports a total enrollment, including extension students, of 2,206* in the fall of 1969 (presumed to be comparable in time to the taking of the Census). The Census does not count as "students" those who are enrolled in non-credit extension classes (consultant's interpretation of Census definitions). Eliminating the 322 extension students results in a total "regular" enrollment of 1,884, well above the Census figure of 1,346.

In view of this discrepancy, it is our opinion that the information supplied by the Registrar should be taken as more accurate than those derived from the Bureau of the Census.

* Guam Statistical Abstract, Table 20

IV. Required Educational Facilities: 1970-1990

Based on the age-sex classification totals of the three parametric population projections, (see "Population"), the required number of educational facilities are calculated for the 1970 to 1990 time span. These computations are listed on the following tables. Since the educational system serves both civilians and military populations, an estimated "military student population" has been defined. This is derived from an estimate of the number of military families and their dependent children of school age.

REQUIRED EDUCATIONAL FACILITIES 1970-1990

POPULATION	YEAR	SCHOOL LEVEL	CIVILIAN STUDENTS	MILITARY FAMILY UNITS	FAMILY STUDENTS PUPILS PER FAMILY	NUMBER	TOTAL STUDENTS	REQUIRED SCHOOLS K-6 (1/700)	7-9 (1/1200)	10-12 (1/2500)
Series A (Low)	1970	K-6	12,099	3,332*	1.2	3,998	16,092	22		
		7-9	4,665	3,332	0.33	1,100	5,765		5	
		10-12	3,631	3,332	0.23	766	4,397			2
	1975	K-6	12,164	3,450	1.2	4,140	16,304	23		
		7-9	5,377	3,450	0.33	1,139	6,516		5	
		10-12	4,600	3,450	0.23	794	5,394			2
	1980	K-6	17,533	3,500	1.2	4,201	21,734	31		
		7-9	5,132	3,500	0.33	1,155	6,287		6	
		10-12	5,302	3,500	0.23	805	6,107			3
	1985	K-6	22,378	3,600	1.2	4,320	26,698	38		
		7-9	8,440	3,600	0.33	1,188	9,628		8	
		10-12	5,061	3,600	0.23	828	5,889			3
	1990	K-6	25,774	3,750	1.2	4,500	30,274	43		
		7-9	10,020	3,750	0.33	1,238	11,258		9	
		10-12	8,322	3,750	0.23	863	9,185			4

*See "Population" for discussion of "military family units"

Source: Quinton-Budlong

POPULATION	YEAR	SCHOOL LEVEL	CIVILIAN STUDENTS	MILITARY FAMILY UNITS	FAMILY STUDENTS PUPILS PER FAMILY	FAMILY STUDENTS NUMBER	TOTAL STUDENTS	REQUIRED SCHOOLS K-6 (1/700)	REQUIRED SCHOOLS 7-9 (1/1200)	REQUIRED SCHOOLS 10-12 (1/2500
Series B (Medium)	1970	K-6	12,590	3,332*	1.2	3,998	16,588	23		
		7-9	4,898	3,332	0.33	1,100	5,998		5	
		10-12	4,466	3,332	0.23	766	5,232			2
	1975	K-6	12,820	3,450	1.2	4,140	16,960	25		
		7-9	5,662	3,450	0.33	1,139	6,801		6	
		10-12	5,732	3,450	0.23	794	6,526			3
	1980	K-6	20,849	3,500	1.2	4,201	25,050	36		
		7-9	5,561	3,500	0.33	1,155	6,716		7	
		10-12	6,688	3,500	0.23	805	7,493			3
	1985	K-6	27,509	3,600	1.2	4,340	31,849	46		
		7-9	10,422	3,600	0.33	1,188	11,610		10	
		10-12	6,593	3,600	0.23	828	7,421			4
	1990	K-6	32,835	3,750	1.2	4,500	37,335	53		
		7-9	12,515	3,750	0.33	1,238	13,753		12	
		10-12	12,241	3,750	0.23	863	13,104			5

POPULATION	YEAR	SCHOOL LEVEL	CIVILIAN STUDENTS	MILITARY FAMILY UNITS	FAMILY STUDENTS PUPILS PER FAMILY	NUMBER	TOTAL STUDENTS	REQUIRED SCHOOLS K-6 (1/700)	7-9 (1/1200)	10-12 (1/2500
Series C (High)	1970	K-6	12,590	3,332*	1.2	3,998	16,588	23		
		7-9	4,898	3,332	0.33	1,100	5,998		5	
		10-12	4,466	3,332	0.23	766	5,232			2
	1975	K-6	12,974	3,450	1.2	4,140	17,117	25		
		7-9	5,728	3,450	0.33	1,139	6,867		6	
		10-12	5,809	3,450	0.23	794	6,603			3
	1980	K-6	22,642	3,500	1.2	4,201	26,843	38		
		7-9	5,717	3,500	0.33	1,155	6,872		7	
		10-12	6,870	3,500	0.23	805	7,675			3
	1985	K-6	30,962	3,600	1.2	4,340	35,302	50		
		7-9	11,625	3,600	0.33	1,188	12,813		11	
		10-12	6,997	3,600	0.23	828	7,825			4
	1990	K-6	37,969	3,750	1.2	4,500	42,469	61		
		7-9	14,276	3,750	0.33	1,238	15,514		13	
		10-12	13,828	3,750	0.23	863	14,691			6

Introduction

This report summarizes the major concepts, conclusions, and alternatives presented in "A Study of the Public Education Factors of Guam: A Portion of the First Phase of the General Master Plan for the Territory of Guam" prepared by William L. Thuemmel. That report, accepted by the Territory of Guam's Master Plan review committee, is included as a part of this submission by reference and addendum. Supplemental material obtained from the 1970 U.S. Census regarding educational characteristics of the population is included (Section III), an additional new section (IV) explores the potential demand for educational facilities based on the Parametric Population Projection Series selected from the Cobort-Survival Model (see "Population").

PUBLIC EDUCATION

SUMMARY

I. The Public School System

Approximately 25,000 students are enrolled in the system. The school plant consists of twenty-three k/6 schools, five 7/9 junior highs, two 10/12 high schools, one vocational/technical school for grades 10/14, and two special schools. The buildings themselves are modern and substantial. Organization, curricula, subject matter, and achievement goals are similar to those of mainland schools. The school system took about 45% of the fiscal 1971 budget.

A. Administrative staff turnover.

1. The recent high turnover rate for administrators has resulted in a loss of continuity and direction.

B. Instructional Staff

1. The number of contract and other non-resident teachers far exceeds the number of resident teachers. The percentage of resident teachers has declined steadily during the last decade.

2. Contract teachers are costly to employ, have a high turnover rate, and are generally not fully oriented to the problems of local students.

3. Employing too many contract teachers causes economic problems and social conflicts, whereas employing too many local teachers could lead to "provincial inbreeding". A middle ground between these extremes should be sought.

4. Monetary advantages and incentives available to contract teachers and not available to local teachers have created a double standard of compensation. This is an are of conflict.

5. Teacher trainees at the University have received a substantial increase in their monthly stipend; at the same time the Government is attempting to reduce the incentives offered to contract teachers.

6. It is likely that the percentage of certified local teachers will increase less rapidly than the number of school enrollments.

7. Average salaries paid to teachers on Guam is approaching those paid on the mainland. Equity is essential to maintain the ability to recruit new instructors.

C. Academic Achievement

1. Actual academic achievement goals are officially ill-defined. Since the curriculum is similar to that which prevails on the mainland, it is assumed that similar achievement goals have also been set.

2. The diverse cultural, linquist, and socio-economic backgrounds of the students may indicate that stateside-patterned achievement goals should be modified.

3. Achievement is periodically tested and measured on the basis of national norms. Guam students regularly achieve at a level considerably below these norms; however, the gap appears to be closing.

4. It is believed that language difficulties are the most significant factor in low achievement scores. These actually hamper the taking of the tests. Most Guamanian children are fluent neither in their native Chamorro nor in English. Several programs have been instituted to help erase this problem.

D. Dropout Incidence

1. The dropout rate on Guam is approximately 25% of all students. This is roughly equivalent to the national average. The local rate, however, has been dropping recently despite increases in total enrollment.

2. The most serious dropout problem is at Vocational-Technical High School. Some probable causes are:

   a. Higher graduation requirements and/or unrealistic academic expectations.

   b. The school enrolls more students who are potential dropouts and/or of lesser ability.

   c. Lack of "extras" which are available at other high schools.

   d. Better counseling services at other high schools.

   e. Students at V-T can find work easier even though training is incomplete.

3. Guam has no really comprehensive high school program to offer the students.

E. Vocational and Technical Training

1. There is a lack of coordination among the various vocational training programs, and between vocational education and the job market. This situation wastes resources and poses a threat to the growth and development of Guam.

2. The people of Guam will not fully benefit from economic growth unless they acquire the middle-manpower skills which are essential for active participation in a modern economy.

3. Most local manpower is absorbed by the Federal and Territorial governments, where incentives are inadequate to encourage employees to increase efficiency and productivity. Underemployment and poor services result.

4. The private sector makes up manpower deficits by hiring alien workers at bargain prices.

5. Guam has a surplus of unskilled, untrained labor and a shortage of skilled workers.

6. Less than 10% of all high school graduates receive vocational training.

7. The demand for trained, skilled workers is expected to increase dramatically during the next five years.

8. Some steps have been taken recently to institute a manpower planning program for Guam.

II. The University of Guam

The University is the only four year, degree-granting institution in Micronesia. It plays a key role in educating those who will probably become the region's teachers, administrators, and leaders. The physical plant is composed of modern buildings which occupy a beautiful site. Faculty and student enrollment are increasing rapidly. The University supplies adult non-degree and non-credit courses to the community.

A. Trends and Projections

1. Student enrollment has increased over 20% each year for the past two years.

2. The number of full-time students is increasing at a much faster rate than the number of part-time students.

3. An increasing percentage of students are local residents. These increases are due entirely to immigrants who have established local residency. The ratio of "Guam born" to "non-Guam born" enrollees has decreased dramatically.

4. Total enrollment is expected to increase 2 1/2 times in the next five years.

5. The operational budget is expected to grow at a lesser rate.

6. No new construction is planned at the University despite overcrowding.

7. To help offset the lack of a capital improvements program, an educational improvement program has been instituted.

B. Vague Institutional Goals.

1. The University has not defined its institutional goals in terms sufficiently specific for planning its response to educational needs of the Western Pacific.

2. It was elevated to "university" status without any definition of what is role as a university should be.

3. Institutional goals need to be made more relevant to present day problems through continuous feed-back from the community and research studies. Some efforts are now being made to attack the goals problem.

4. Should the University serve Guam only, or all of Micronesia?

5. Should it fulfill the traditional academic functions; supply training for adults in the community; or both?

6. Present liaison with the Department of Education and the Manpower Planning Council is weak. Coordination with the T.T. Government is practically non-existent.

C. Overly-Centralized Administrative Control

1. Because of the political nature of administration in general on Guam, managers are often forced to behave in the dual, and often equivocal, role of semi-politician and professional administrator.

2. Administration vacillates between traditional paternalism and modern democracy.

3. Perhaps no other public-supported U.S. University is subjected to such rigid government control as the University of Guam. Many routine decisions must be made by the Governor.

PUBLIC FACILITIES ELEMENT

BU[illegible]AU OF PLANNING
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Problems and Opportunities

1. The question of centralization vs. decentralization of governmental offices has not been satisfactorily resolved.

2. The existing Administrative Center cannot be expanded at its present location to accommodate needed additions.

3. Arrests for criminal offenses have increased by approximately 50% in the last six years, a larger percentage than the population growth. Almost half those arrested were juveniles.

4. As the number of automobiles has increased, so have the moving violations, injury and non-injury accidents, and fatalities. The rate of increase of these incidents far exceeds the rate of growth of motor vehicles.

5. There is a need to:

   a. Determine what actions need to be taken to prevent crime, increase departmental efficiency, provide better training, provide better service.

   b. Decide the issue of centralization vs. decentralization of police services.

6. Fire losses have increased sharply over the past six years. However, during the period 1966-1970, fire calls were actually reduced by a significant percentage. Correlations between these factors should be made to provide insights into the nature of the fires, types of structures involved, availability of water at adequate pressures, etc., with the objective of planning for better service.

7. The steady replacement of old buildings with Class A, typhoon-resistant structures should decrease fire hazards.