



Territory of GUAM

MASTER PLAN

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



Territorial Planning Commission

PART ONE
SUMMARY OF GOALS
AND
RECOMMENDATIONS

THE MASTER PLAN
OF
THE TERRITORY OF GUAM



A Physical Development Policy Statement



Prepared by the
Territorial Planning Commission



The preparation of this report was financed in part through an Urban Planning Grant from the Housing and Home Finance Agency under the provisions of section 701 of the Housing Act of 1954 as amended.

January, 1966

January, 1966

Honorable Manuel F. L. Guerrero
Governor of Guam
Agana, Guam 96910

Dear Governor Guerrero:

Submitted herewith for your consideration is the Master Plan for the territory of Guam. The plan serves as an official statement of the legislative body which establishes major policies relating to the future development of Guam.

The Master Plan is essentially an affirmation of community-wide goals indicating the direction in which Guam shall develop. It is a statement of intent to attain certain objectives judged to be reasonable and feasible.

Though long-range in scope, it is not a rigid program for the future. While desired ends are specified, the means to achieve these ends in terms of cost, priorities, and schedules, requires refinements that are of necessity short-range practical considerations. The overall plan is mainly inspirational in nature, but is within the realm of possibility and practical achievement.

Because of the incremental nature of community development and because of the continuing evolution of man and society, the Master Plan must, of necessity, be as dynamic as life itself. It is, therefore, flexible and sensitive to changing urban requirements.

It is our desire to express sincere appreciation to all persons and to all governmental agencies who have assisted and cooperated in the study and preparation of this document.

Respectfully submitted,

Signed

Joaquin C. Arriola, Chairman
Territorial Planning Commission

Signed

Paul B. Souder, Executive Secretary
Territorial Planning Commission

RESOLUTION OF THE TERRITORIAL PLANNING COMMISSION
OF THE TERRITORY OF GUAM ADOPTING A MASTER PLAN
FOR SAID TERRITORY.

BE IT RESOLVED, by the Territorial Planning Commission of the territory of Guam, as follows:

WHEREAS, the Planning Division of the Department of Land Management and the Territorial Planning Commission have prepared a Master Plan for the territory of Guam, including Land Use Elements, Circulation Elements, Standards of Population Density, Community Design Elements, Urban Renewal Elements, School Elements, Recreation Elements, Transportation Elements, Public Service and Public Facility Elements, elements relating to beautification and aesthetic values, all as set forth in that certain document consisting of text maps and charts, entitled "Master Plan of the Territory of Guam, January 1966;" and

WHEREAS, the Territorial Planning Commission has heretofore held one public hearing on consideration of said Master Plan, notices of which were given in the manner and the times required by law: Now, therefore,

BE IT RESOLVED AS FOLLOWS:

1. That certain document entitled, "Master Plan of the Territory of Guam, January 1966," a copy of which is attached hereto and made a part hereto be, and the same is, hereby adopted by this Commission as the Master Plan for the Territory of Guam.
2. That the Chairman of the Territorial Planning Commission and its Executive Secretary be hereby directed to cause their signatures to be affixed and recorded on said Master Plan of the Territory of Guam.
3. That a copy of said Master Plan of the Territory of Guam, be certified to the Governor of Guam for his submission to the Eighth Guam Legislature.

Passed and adopted by the unanimous vote of the Territorial Planning Commission of the Territory of Guam, at the Regular Meeting of said Commission held on _____, by the following called votes:

AYES: Commissioners - Arriola, Needham, Untalan,
Christopher, San Nicolas.
NOES: Commissioners - None
ABSENT: Commissioners - None

ATTEST:

Joaquin C. Arriola, Chairman
Territorial Planning Commission

Paul B. Souder, Executive Secretary
Territorial Planning Commission

GOVERNOR OF GUAM

Manuel F. L. Guerrero

TERRITORIAL PLANNING COMMISSION

Joaquin C. Arriola, Chairman
Reverend Grosvenor Needham
Jose L. G. Untalan
Charles J. Christopher
Lucas San Nicolas
Paul B. Souder, Executive Secretary

GUAM HOUSING AND URBAN RENEWAL AUTHORITY

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SUMMARY OF GOALS AND RECOMMENDATIONS

The purpose of the Master Plan is to serve as a guide for arriving at decisions, both public and private, which may result in a constantly improving urban environment. In order to achieve this objective for the territory of Guam, this Master Plan has been developed. It presents studies of the elements as indicated below, and establishes goals with attendant recommendations for their achievement.

POPULATION, POPULATION DENSITY, AND BUILDING INTENSITY

TO ANTICIPATE THE ISLAND-WIDE IMPACT OF CHANGES IN POPULATION, POPULATION DENSITY AND BUILDING INTENSITY.

1. By continuing evaluation of population and economic trends.
2. By annual revision and extension of the projection in view of continuing trends.
3. By consideration of the effects on population generation and growth resulting from land use and zoning decisions.

LAND USE

TO ALLOCATE THE USES OF LAND IN A MANNER THAT WILL PROVIDE THE BEST POSSIBLE PHYSICAL ENVIRONMENT IN WHICH TO LIVE AND WORK.

Residential Areas. To designate residential areas and their densities in order to encourage the best possible environment for living, and to relate these residential areas to existing and proposed public facilities necessary for the well-being of the people.

1. By encouraging residential development to locate within the limits of planned neighborhoods and unified communities in order to assure a balanced and full complement of services and facilities.
2. By encouraging and maintaining a wide range of housing types, guided by socio-economic wants of the people through:
 - (a) Encouragement of innovations in design and construction.

(b) Modulation of densities through the use of planned community.

(c) Rehabilitation of existing housing.

Hotel Areas. To designate resort hotel areas in order to encourage the best possible development of desirable and attractive hotel accommodations and visitor facilities in appropriate locations.

1. By locating resort hotel developments where served by a major street or highway.
2. By preserving, improving, and maintaining features of historic or scenic significance on resort hotel sites for use by the visitors.

Commercial Areas. To designate the logical allocation of land for varied commercial uses in order to insure maximum efficiency and to better relate these uses to the needs of the people in the area.

1. By requesting that the developer or property owner provide a comprehensive market analysis for any proposed commercial facilities.
2. By establishing the commercial center concept as the best means for obtaining integration of good physical design and economic efficiency in business and retailing.

Industrial Areas. To designate the logical allocation of sufficient land for varied industrial uses with optimum accessibility and to better relate these uses to the needs of the people in the area.

1. By studying inappropriately zoned industrial land with a view to designate it for more appropriate uses.
2. By lessening industrial concentration and subsequent traffic congestion in order to offer the individual more freedom in choice of living and working areas.
3. By adopting development standards based on modern industrial technology, rather than on strict segregation of uses by type and permissiveness; and by coordinating these standards with zoning and subdivision regulations.

Agricultural Areas. To develop an agricultural industry in order to contribute to the economy of Guam, and to employ a substantial number of persons.

1. By preserving prime agricultural lands, and reserving and protecting suitable land from infringement by non-agricultural uses.
2. By minimizing the possibility of land speculation because of inflated or artificial land values.

Conservation Areas. To curb urban sprawl; to encourage more economical and desirable urban development; and to help provide necessary recreational, conservation and scenic areas.

1. By preserving open-space land essential to proper development and welfare of the urban areas.

CIRCULATION AND TRANSPORTATION

TO PROVIDE A CIRCULATION PLAN WHICH IS EFFECTIVE, EFFICIENT, AND SAFE; WHICH IS GUIDED BY THE GOALS DIRECTING LAND USE PATTERNS, AND WHICH PROVIDES TOTAL INTEGRATION OF ALL ISLAND-WIDE AND COMMUNITY CIRCULATION SYSTEMS.

1. By continually evaluating the designs, standards, and phasing programs of proposed, new and improved highway routes up to the period of construction in order to remain contemporary with the growing areas.
2. By fully integrating the design, alignment and right-of-way of all proposed, new and improved highways with the topography, and adjacent natural and urban environment through which they pass in order to capture every aesthetic advantage presently existing and to create new aesthetic values through imaginative landscape techniques and structural design.
3. By initiating a comprehensive island-wide land use and circulation study, and by including as an integral part of this study a parallel program for the regular updating, review and analysis of pertinent data.

PARKS AND RECREATION

TO DEVELOP A PARK AND RECREATION SYSTEM THAT WILL MEET THE LEISURE TIME DEMANDS AND NEEDS OF ALL AGE GROUPS ON THE ISLAND OF GUAM, AND TO PRESERVE OPEN SPACE FOR THE SATISFACTION AND ENJOYMENT OF FUTURE GENERATIONS.

1. By providing a comprehensive range of recreation activities--active and passive, organized and unorganized, programmed and unprogrammed--which will satisfy the needs and desires of all age groups (pre-school children, school age, teenage, adult, and senior citizens).
2. By relating park and recreation space requirements and facilities to the socio-economic patterns and conditions present in each municipality and neighborhood on Guam.
3. By relating the location of park and recreation areas and the character of the facilities and uses designed therein to existing and proposed land uses in the municipalities in a manner calculated to protect and enhance surrounding property values while achieving the utmost in access and service to the community.
4. By the Legislature adopting a program favoring multiple uses for recreational purposes of such public facilities as utility easement, flood control channels, creeks, rivers, water conservation reservoirs, the college campus, and other school facilities.
5. By encouraging the development of commercial recreational facilities to help meet existing and future demands and by determining the role, type and location of such activities in the urban scene.

PUBLIC SERVICES AND FACILITIES

TO MAINTAIN A COORDINATED PLAN FOR PUBLIC SERVICES, FACILITIES AND BUILDINGS PROVIDING OPTIMUM SERVICES TO THE HEALTH, SAFETY, CULTURAL, AND EDUCATIONAL NEEDS OF THE PEOPLE IN AN EXPANDING URBAN AREA.

Water.

1. By unifying governmental agencies involved in water supply and distribution into a single body (island-wide) with financial resources to meet the water problems.
2. By improving watershed areas for the preservation of water supply, affording recognition to the importance of such areas for recreation, conservation and flood control.

Refuse Disposal.

1. By periodic review and evaluation of methods in refuse collection and disposal in order to attain maximum benefits at minimum cost to the individual citizen utilizing this service.

2. By the inclusion of completed fill-and-cover disposal areas in the Government of Guam Park System as an added public benefit in the multi-utilization of public lands.

Electrical.

1. By recognizing power transmission and its system of distribution as an integral part of urban form.
2. By developing distribution systems in a manner compatible with the forms of the island-wide communities and their neighborhoods.
3. By consolidating high power transmission facilities to minimize disruption of urban form.

Sanitation.

1. By unifying sanitary sewer extension expenditures with other governmental expenditures in a coordinated expansion program.
2. By intensifying coordinated efforts to solve island-wide sewage disposal problems, especially as they relate to water pollution.

Storm Drainage.

1. By preventing urban encroachment into flood plain areas and stream banks where topographic features such as slope of land, shape of basin, ground cover, rainfall and soil conditions cause floods.
2. By limiting the velocity of the water flow to a safe standard.
3. By establishing stream rights-of-way for all major drainage ways in accordance with appropriate design criteria.
4. By establishing tentative stream alignments and improvements where possible.

PUBLIC BUILDINGS

TO PROVIDE AND MAINTAIN AN ADEQUATE INVENTORY OF PUBLIC BUILDINGS FOR THE CONDUCT OF GOVERNMENT AND ESSENTIAL PUBLIC SERVICES, LOCATED WITH OPTIMUM SPATIAL INTERRELATIONSHIP AND DESIGNED TO ESTABLISH AN EXAMPLE OF STRUCTURAL EXCELLENCE FOR AESTHETIC URBAN DESIGN.

Schools.

1. By intensifying recreational use of school playgrounds and playfields as part of a coordinated island-wide recreation program.
2. By increasing community-wide use of classroom and specialized facilities.
3. By increasing awareness of total community demands as related to the design of school facilities.

Administrative Center.

1. By coordinating all levels of government in the planning of open space and circulation within the Administrative Center.
2. By encouraging private development near the Administrative Center which would enhance the function of public areas through compatibility of land use and traffic patterns.

Public Works Center.

1. By periodic review of maintenance demands in order to determine areas where development is causing an over-extension of facilities.

Libraries.

1. By strengthening the central library through coordination with the school system.
2. By developing a mobile branch or bookmobile to circulate throughout areas of scattered development where branch facilities are not justified.
3. By integrating library collections with collections of the public museum in order to provide reference and research material in such fields as graphic arts, sculpture, architecture and archaeology.

Fire Stations.

1. By evaluating fire protection and reviewing fire station service areas with regard to new development.
2. By locating new fire stations in such a way that conflict with traffic patterns of major generators may be minimized as much as possible.

3. By coordinating the development of fire stations and major streets in order to insure maximum utilization of the station.

Police Stations.

1. By locating future police stations in conjunction with fire stations in order to correlate service when necessary, serve the community more effectively, and be available for assistance in adjoining areas.

Commissioners' Offices.

1. By constructing new Commissioners' Offices where temporary structures now exist.
2. By centrally locating these offices so they may be accessible to the community--preferably next to fire and police stations.

Health Centers.

1. By making investigations to determine essential locations. One health center should be located in the northern half of the island and one located in the southern portion.
2. By designing and maintaining the centers to adequately provide for the needs of the people they serve.

COMMUNITY DESIGN

TO MAINTAIN THE HIGHEST POSSIBLE URBAN STANDARDS IN PHYSICAL DEVELOPMENT, ENCOURAGING THE COOPERATION OF ALL GROUPS AND AGENCIES (PUBLIC AND PRIVATE) WHICH HAVE RESPONSIBILITY IN THE URBAN BUILDING PROCESS.

1. By periodic review and updating of subdivision, zoning, housing, building and other governmental codes. These codes express the government's commitment to the health, safety, and welfare of its citizens through the establishment of the minimum standards for sanitary facilities, refuse disposal, structural soundness, utilities service, street access, building intensity, housing density, vacant lot maintenance, and fire prevention.
2. By promoting island-wide neighborhood design plans. These studies are developed to encourage improvement of pedestrian and vehicular circulation, coordination of public facilities with neighborhood living

patterns, and compatibility of development with the natural identity of the site. Developers should continually be urged to work toward these, and other improvements in design quality, which tend to strengthen neighborhood identity and amenities.

3. By encouraging individual and project design by trained professionals or design teams.
4. By attracting more natural attention to good urban design on Guam through competition or participation in award programs.
5. By developing a dynamic program of revitalization, renewal and redevelopment in urban design.
6. By providing programs that contribute to visual urban order. A community street tree program would strengthen the character of Guam by assuring tree-lined streets throughout the island. The cooperation of private owners, of developers and of public service groups should be encouraged in the implementation of a tree program.

In addition to the street tree program and the provisions for functional efficiency of the street system, public interest in the government's streets through the integration of signs and street furniture controls with street development standards should be promoted.

7. By sponsoring active community participation in urban design clinics, seminars, and courses.

URBAN RENEWAL

TO MAINTAIN A CONTINUING PROGRAM OF COMMUNITY RENEWAL DIRECTED TO THE ELIMINATION OF URBAN BLIGHT AND DETERIORATION IN ALL ITS FORMS WITHIN THE TOTAL URBAN PATTERNS.

1. By instituting a community renewal program within the island-wide planning process to coordinate government renewal efforts with the Master Plan.
2. By increasing interest of all citizens dedicated to improving their urban environment to participate in the renewal program and assist in the formulation of island-wide renewal principles and objectives.
3. By encouraging private enterprise to undertake renovation and modernization of privately owned properties.

PART TWO

BACKGROUND FOR THE MASTER PLAN

HISTORICAL BACKGROUND

"Guamanian" (chosen by an island-wide referendum following World War II) defines a people and a way of life which proudly reflects the culture and heritage of the residents.

Although Guam may have been settled as early as 1500 B. C., the origin of the primitive inhabitants of Guam is vague, principally due to lack of written records. Long before the arrival of the European, the Chamorro, remote ancestor of the present day Guamanian, had established a community on Guam. Little is known of their place of origin or route of migration to the Marianas, but it is believed that they were a Malayan people originally from southeast Asia. A distinct and harshly imposed caste system flourished in communal-type living in over 180 villages (ranging from six to 150 huts) when the early Spaniards arrived.

Ferdinand Magellan's landing on Guam, March 6, 1521, marked the discovery of Guam by the Western World. Guam was claimed by Spain in 1665, and occupied in 1668 by Spanish missionaries (led by Padre Luis de Sanvitores), who introduced the inhabitants to Christianity. The customs and traditions of Guam today reflect the influence of 230 years of Spanish rule which gradually gave way to a mixed Spanish-Chamorro way of life.

The combined effects of Spanish cruelty, natural catastrophes (earthquakes and typhoons) and disease reduced the population from an estimated 40,000 in the early 16th Century to an official census of 9,676 in 1901.

Misrule seemed prevalent until the early 19th Century when several governors of recognized ability contributed to slow island progress.

Guam became a United States Possession in 1898 (Treaty of Paris), and the responsibility for the government was assigned to the Department of the Navy by President McKinley. During the nearly four decades of Naval administration, living conditions improved and progress made in developing a viable economy and political structure.

The island was surrendered to the Japanese in 1941, and the people, subject to the pressures of Japanese occupation until the July 21, 1944 liberation, developed a new economic, social and political structure. The heavy fighting prior to liberation left a war-weary people with a tremendous task of reconstruction and rehabilitation.

Naval administration was re-established and maintained until 1950 when the local government was established by the Organic Act,

passed by Congress and signed by President Truman. The terms of the Organic Act shaped Guam into an unincorporated territory, extended American citizenship, and transferred administration of civil affairs to the Department of the Interior with the executive, legislative and judicial branches in local civilian hands.

The island is presently recovering from the devastation of Typhoon Karen (the worst in recorded history), and with the growing realization of the island's economic potential and strategic value, Guam is destined for a greater role in the Pacific Area and modern history.

NATURAL RESOURCES

LOCATION

Guam is the largest island in the Western Pacific between Hawaii and the Philippines. It is 30 miles long and from 4 to 8 1/2 miles wide, with a land area of 212 square miles. The island is 3,300 nautical miles west of Honolulu; 1,500 miles east of Manila; and 1,300 miles south of Tokyo. It is the most populous and southernmost of the Marianas Islands (the remainder of these islands lie within the jurisdiction of the Trust Territory of the Pacific Islands).

CLIMATE

The climate on Guam is tropical, warm and humid. Although Guam is only 13 degrees north of the Equator, the climate is tempered throughout much of the year by brisk trade winds. Temperatures range between 70 degrees Fahrenheit and 95 degrees Fahrenheit with an annual mean of 81 degrees.

The humidity is relatively high with an annual average of 73%. In wet summer months, however, it may rise to 90% or above.

Guam's rainy season extends from June through November. Two-thirds of the annual yearly precipitation of 90 inches falls during these months.

The easterly winds are prevalent from November to June. During the period from July through October, when typhoons most often occur, wind directions are extremely variable and calms are frequent. Guam lies within the typhoon belt of the Pacific and has, at intervals, experienced widespread devastation from these cyclonic storms over the centuries.

OCEAN

The ocean dominates the Island of Guam and is largely responsible for its climate. The ocean at this latitude maintains an air temperature of about 81 degrees the year around. Tides on Guam occur twice daily with a range of 0.6 feet at low tide, and 2.3 feet at high tide.

The northern equatorial current, associated with the north-east trades, generally sets in a westerly direction near the Island of Guam with a velocity of 1/2 to one knot. Wind waves are dominantly from the northeast to southeast, driven by the trade winds. Normal trade wind waves are low (less than two feet) to medium (less than nine feet) in height and are usually less than five feet. Occasional calms are common from April to September,

but calm periods of more than two or three days are rare. Wind waves higher than six feet are generally associated with storms, and waves are generated periodically by storm centers as much as 1,000 miles from Guam. Most commonly, destructive waves are caused by typhoons moving westward after they have passed north or south of Guam. (One storm generating severe waves was a typhoon 350 miles north of Guam.)

REEFS

Guam is completely encircled by fringing reefs except along parts of the limestone cliffs. Small lagoons are enclosed by barrier reefs. Fringing reefs range from narrow cut benches around limestone headlands, thinly veneered by encrusting algae below sea level, to broad reef flats more than 3,000 feet wide containing a variety of corals and algae. Although the reefs vary greatly in character from place to place, the development of certain features seems to depend to some extent on their locations.

Small bays are numerous where well-established rivers and streams have prevented the development of the reef; however, Apra is the only area that can be considered an appropriate harbor. A combination of natural features such as Orote Peninsula, Cabras Island, Luminao Reef, and flat interior areas have created one of the most outstanding harbors in the Pacific Islands. Dredging, creation of an inner harbor, and construction of a breakwater have further developed Apra Harbor.

TOPOGRAPHY

Generally, the whole island is viewed as having two distinct topographic features: Northern and Southern. The northern portion of the island is a broad, relatively undissected limestone plateau undulating southwestward from a height of 600 feet to approximately 300 feet and bordered by steep cliffs and coastal plains. The southern portion has broad, volcanic uplands with major faults of relatively impervious volcanic rocks and contains heights of 1,000 to 1,334 feet. The central mountains, topographically a section of this part of Guam, are diverse in their configurations. The southern island, unlike the northern, accommodates limited level land around its mountain bases which include scattered coastal lowlands, valley floors, and many streams.

A further division of topography can be made into seven physiographic units: The rough summit land entirely in the southwest of Guam; the mountainous land located in the western half of south Guam; the dissected sloping and rolling land entirely on the eastern part of south Guam; a belt along the southeast coast and a section of western part of the island;

the interior basin and broken land which occurs entirely in the central part of south Guam; the northern plateau; and, the coastal lowland and valley floor which occurs discontinuously along the coast except for the long stretch around the northeast side of the island.

GEOLOGY

A series of bow-like submarine ridges paralleled by deep trenches is a prominent feature of the Western Pacific Ocean. This feature forms a boundary between the Pacific Basin and the Philippine Sea, the latter primarily bounded by island arcs. Guam is a member of the southern Marianas Arc which is characterized by volcanic origins displaying limestone caps.

Faulting has been prominent within all major sections of Guam with the northern plateau experiencing uplift and tilting; the ridges and knobs in the central mountains caused by differences in rock quality; and the western cuesta with a gentle eastern slope in southern Guam a result of tilting. Minor folding of both volcanic and limestone formations has also occurred.

Historical Geology indicates that Guam, as well as the other Marianas Islands, was formed during the most recent Geological Era, the Cenozoic. The youngest volcanic rocks are of the Miocene Epoch, with volcanoes still active in the northern Marianas. Guam is composed of limestone and volcanic rocks of the Eocene Epoch: shales of the Oligocene Epoch; Miocene volcanic rocks; and Miocene and Pliocene-Pleistocene limestones.

SOILS

Soil groups, of which there are fifteen on Guam, are generally based on parent material and topography. Three basic categories that can thus be delineated are: Limestone uplands, volcanic uplands, and coastal and valley flats. Usability of soils is more complex involving such factors as slope, depth, water availability and drainage, size, exposure, and ground cover as well as parent material. Different categories may be determined on the basis of proposed uses such as agriculture, conservation, or watershed.

The limestone uplands, comprising 59% of the island, have three soil groups classified as clayey silt. These groups have soil depths of less than two feet and usually no more than six inches. From a vegetation viewpoint, forest development and grazing are best suited to this grouping although where soil depths are adequate, general agriculture, citrus, and other crops are feasible. Natural drainage is generally adequate with surface drainage slow but internal drainage free to rapid. The remaining soil groups in this category are classified as fat to silty clay.

Soil depths are greater, ranging between 15 feet and 35 feet, although a small convex surface may have less than three feet. Surface drainage is rapid to medium and agricultural use includes cropping of all kinds; however, shallow soil would limit this use to grazing.

The volcanic uplands are generally hilly or mountainous areas covered by silty clay in the upper parts and sandy silt in the lower. This unit comprises 35% of Guam. Soil depths range from 10 feet to 100 feet with an average of 25 feet to 50 feet. Most ridges and slopes are covered with savanna although mixed forests are found in some ravines. Surface and internal drainage is generally slow.

The remaining 6% of Guam's soil is located on the coastal and valley flats. Soil groups include silty clay, highly organic silts (muck), and poorly graded sand. Parent material of these soil groups includes limes and limestone, volcanic rock, sediments, and alluvial deposits. Drainage is medium to slow and in some areas, none. The deeper silty clay areas are generally suitable for cropping of all kinds. Other areas, when drained, can be used for vegetable crops, and where water supply is adequate, rice and taro may be grown (Chart No. 1).

SLOPE

The distinction between elevation and slopes assists in the determination of land capability. Elevation ranges from sea level to 1,329 feet while slopes are characterized by relatively horizontal land to rolling and hilly and to steep and precipitous. Although specific projects require a narrow range of slope, the general purposes of this report are satisfied with three basic categories: 0-15%, 15-30%, and above 30%.

The 0-15% slope, from nearly level, gently sloping or undulating to sloping or rolling, is evident in the northern part of the island and coastal lowland areas and valley floors. Some of the upland plateaus, swales, and cliff ramparts, such as those bordering the northern plateau, make up the 15-30% slope. This slope ranges from moderately steep or hilly to steep. It has a tendency of being easily converted into precipitous slope whenever loose soil and rocks present in the area yield to erosion and weathering. The slope above 30% is very steep or precipitous. Composing it entirely are ravines, sinkholes, and largely denuded and weathered cliff sides found mostly in the southeastern section of Guam.

DRAINAGE

The drainage on the entire island depends greatly on elevation, slope, and underlying rocks and soils. These surface characteristics of Guam's land define and regulate the intricate pattern of the

drainage system. The northern part, with elevations ranging from sea level flats to a 600 feet high plateau, is dominated by coastal lowlands, valley floors, and limestone plateaus. Drainage of this area is downward into the porous underlying limestone although some coastal lowlands are not well drained allowing the accumulation of wide bodies of standing water to depths of several inches in very rainy weather. Most drainage in the central section of the island is downward into the rock mass but also drains through rivers and tributaries flowing upon relatively impervious volcanic rock underlying the clayey limestones in the area. Torrential rains flood the valley bottoms of the central area and cause active erosion. The southern part of the island is generally mountainous with rolling land on the eastern half, and basin land at the interior. A network of tributaries and large streams, including those at the shoreline where they empty into the ocean, drain the southern area. In general, they constitute a parallel drainage system.

WATER

A supply of good water in adequate quantity is most essential to the subsistence as well as to the growth and development of any community.

There are two basic sources of water on Guam. The first of these is ground water which occurs in a fresh water lens which forms at sea level under the coralline plateau that makes up the northern half of the island. Ground water also occurs in perched water tables where a permeable layer (usually coralline limestone) is underlain by an impervious layer (usually basalt).

The second source of water is surface run-off which is found in the mountainous southern half of the island. This source is collected in reservoirs, treated and pumped out. At present, most of the water used on the island comes from this source.

VEGETATION

The total plant cover of the island or parts of the island together with its general characteristic, can only be presented in a reasonably detailed manner by directing due considerations to density and to correlations between vegetative cover and soils, ground water and physiographic features. For the purposes of generalization, common names and language are used. The Land Use Map illustrates the mosaic pattern of vegetative distribution on Guam. Generalizations are based on Military Geology of Guam, aerial photographs, and field checks. It is important to note that no single unit should be taken to represent accurate detailed mapping of any one plant association or community, or even of a

simple major formation. Much of the vegetation is in a state of relative change or vegetational succession and a map of such accuracy for the island, as a whole, would not have enough permanent value to justify a detailed study.

Vegetation types are classified into five major units based largely on their evident predominance. They are as follows:

1. Open ground, pasture or grassland.
2. Coconut plantation or predominantly coconut.
3. Swamp and marsh land.
4. Mixed wooded forest.
5. Cultivated land.

HUMAN RESOURCES

The interest, initiative and innate abilities of its people constitute one of Guam's greatest assets. More than fixed assets of climate, topography, or other natural resources, these human resources shape the destiny of Guam.

Human interest and abilities are capable of a constant extension and a great variety of expression. The experience of urban living can generate increased interest; the encouragement of a dynamic area can stimulate personal initiative; education can expand native abilities. The response of citizens, whatever the motives, to form numerous citizen groups to further their particular concepts of bettering community development is a desirable manifestation. An increasing variety in employment types gives an individual a greater chance for expression and growth in his work. A full program of civic and special interest organizations gives him creative outlets in his non-working hours.

Guam has the challenge of providing encouragement, education, and job opportunities for an increasing number of people. The median level of education on Guam in 1960 was below the national standards, due primarily to World War II; however, it is now on the increase. This rising education level, along with the development of abilities and interest of the people, can be expected to increase demands of public facilities. There will be demands for non-academic educational experiences and more need for a variety of outdoor and indoor public spaces for activities of creative expression.

As the leisure time of the citizens expands, the challenge to Guam will grow--the challenge for the development and expression of its human resources.

CREATED RESOURCES

Man's creativity uses the resources of nature to yield products which allow him to satisfy needs and more fully enjoy the benefits of life. These created resources and their development and use, define the environment and to some extent, the possibilities of urban life.

Basic created resources fall into three categories: Structures, service facilities, and defined open space. It is within these categories that cooperation among individuals is most critical and government responsibility greatest. The development of these created resources--shelter for living, job places for working, streets and highways for mobility, public services for living standards, parks for recreation, etc.--is a joint private and public endeavor.

Although these created resources require tremendous investments, the measure of their achievement, even more than the amount of effort and capital spent, is the manner in which these resources satisfy the demands of their users. Because of the growth pressures being exerted upon every element within the urban structures of Guam, the importance of multiple use of these created resources is imperative. Such multi-use creates alternatives for utilization.

THE ECONOMY

Economic trends within a community indicate growth potential for the future. The community must know the extent of its assets, existing and potential, in order to more clearly direct its ambitions and expenditures. Trends established by economic factors at work within the community can assist in determining direction of community growth.

POPULATION

The total population on Guam is currently estimated at more than 77,000 as compared to 22,300 in 1940. The larger part of this remarkable expansion came with the establishment of greatly expanded military facilities after World War II. Population increase, however, has continued at a relatively rapid rate since 1950, with the rate of growth of civilians well above that of the United States.

This increase in population has manifested itself in new homes and subdivisions; an upsurging of new industries, such as contractors and builders; and the conversion of agricultural land into military bases, industrial sites, commercial sites, highways, schools and other public facilities. The present rate of growth is expected to continue at or near the same rate of growth for several years to come.

EMPLOYMENT AND THE LABOR FORCE

A relatively high level of employment has existed on Guam during most of the postwar period and there has been relatively little unemployment. Federal and local government and construction activities have been the major job sources.

Census reports list total civilian employment at 18,671 in 1949 and at 17,208 in 1960. During this period there were declines in employment in agriculture and extractive activities, transportation, communications and utilities, and construction, which were partly offset by gains in manufacturing, trade, finance, service, and public administration.

A special manpower resource survey in June, 1964, estimated total civilian employment at 18,750. The increase in employment is listed in four categories: Agriculture and extractives; manufacturing; wholesale and retail trade; insurance and real estate. The increases in these categories from 1960 to 1964 are attributed to expansion of private business.

The role of Federal and local government employment in Guam's economy is vital. In view of Guam's significance as a military base,

civilian employment at the military bases will remain the majority of the total labor force for some time to come. However, private employment has expanded at a faster rate than government employment since 1960. Government employment in 1964, both Federal and local, was 10,454 or 54% of total employment. Civilian employment at the military bases accounted for the majority of this total with 5,675 while Government of Guam employed 4,779 persons (Table 1).

INCOME AND THE WORK WEEK

The growth of population and employment has brought about a rapid increase in personal income. The 1960 census reported a total money income of \$59 million for the Calendar Year 1959, and on the basis of estimated population in that year, a per capita money income of \$920.

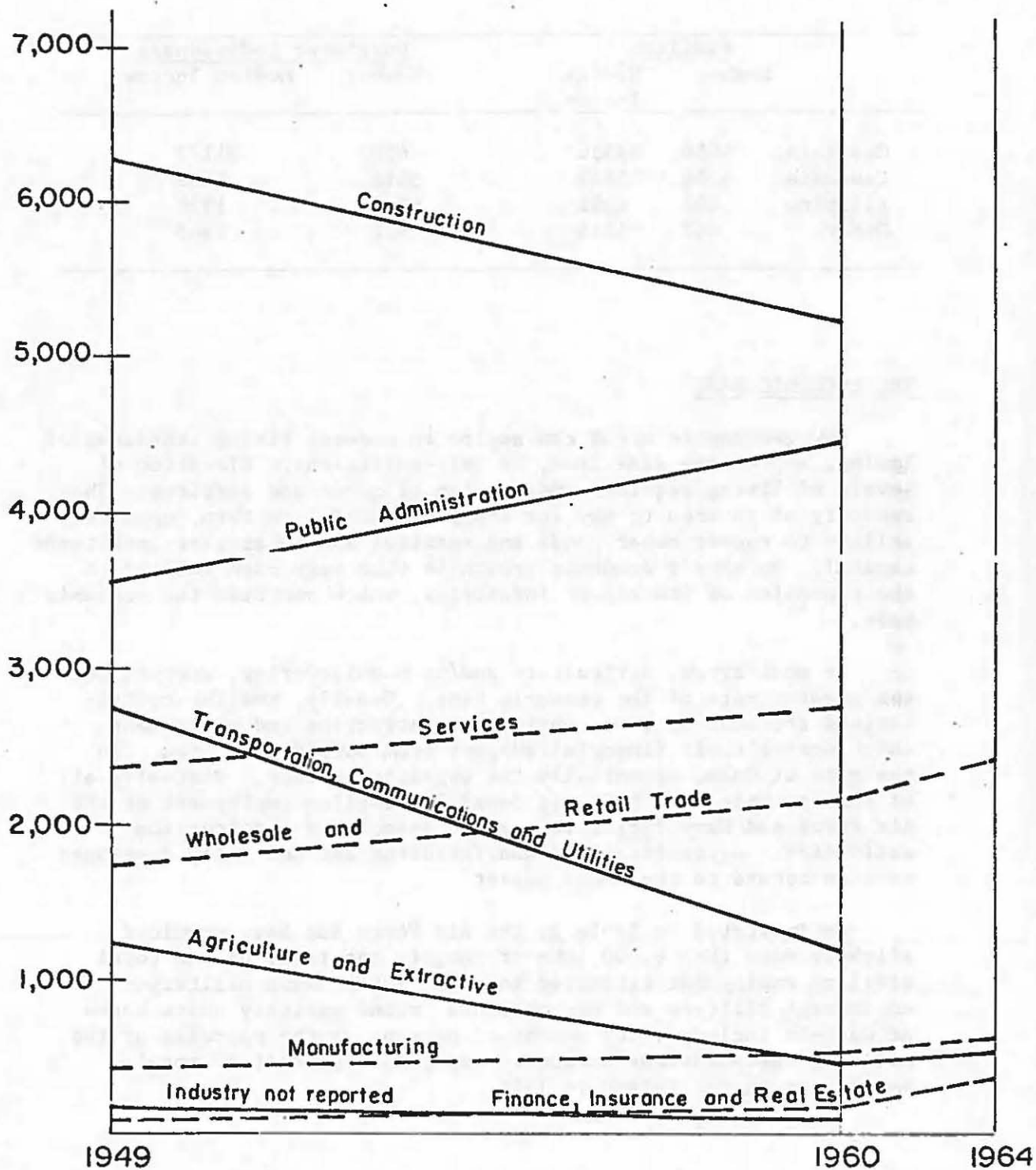
Family income for 1959 showed a median figure of \$4,550 compared with the United States average of \$5,657. The 1959 data, however, showed considerable differences in median incomes of families.

The young age distribution of the Guamanian population was at least in part responsible for the low median income in 1959. Younger workers tend to have lower paying jobs due to inexperience and lack of training, and their employment is often of a part-time nature. Changes in the age distribution of the Guamanian population should bring improvement in the income picture. Also, income differentials as reported in 1959 reflected to some extent the fact that skilled workers, specialists, and professional persons accounted for a large part of the employment recruited from off the island. As more Guamanians are trained and educated to meet these demands, further progress will be made in the elimination of income differentials.

The Department of Commerce, Government of Guam, has recently estimated that income payments for 1962 were between \$74 million to \$77 million. It is estimated that income per capita rose from \$920 to approximately \$1,050 in 1962, a gain of nearly 15%. These figures tend to understate personal income on Guam in comparison to national averages, since the data for Guam relates only to money income and does not include estimates for such components of real income as owner-occupied housing and family production of food. An important contribution to improvement of real income levels on Guam will come from new housing and other facilities made possible by the Guam Rehabilitation Act.

TABLE 1

CIVILIAN EMPLOYMENT ON GUAM



Source: U.S. Bureau of the Census
Odessa Dubinsky, Survey of Manpower Resources, 1964

TABLE 2

MEDIAN INCOME OF FAMILIES AND UNRELATED INDIVIDUALS ON GUAM

1959

	<u>Families</u>		<u>Unrelated Individuals</u>	
	<u>Number</u>	<u>Median Income</u>	<u>Number</u>	<u>Median Income</u>
Guamanian	4956	\$3516	698	\$1171
Caucasian	4266	5857	5418	1759
Filipino	601	4291	6048	1720
Other	442	5355	822	1945

THE ECONOMIC BASE

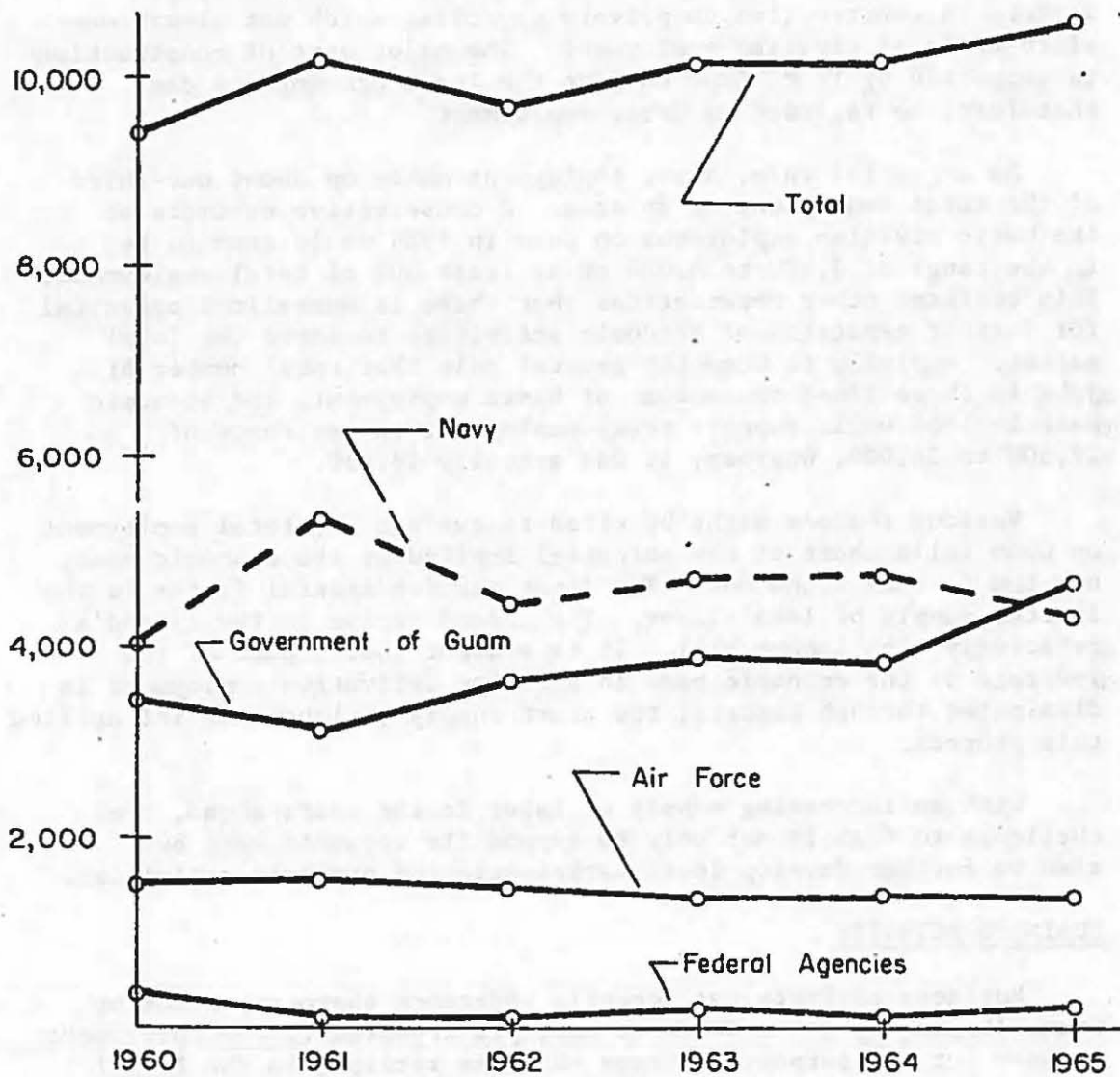
Few geographic areas can aspire to modern, rising standards of living, and at the same time, be self-sufficient. Elevation of levels of living requires importation of goods and services. The capacity of an area to pay for imports depends, in turn, upon its ability to export other goods and services and to attract investment capital. An area's economic growth is thus very much related to the expansion of its export industries, which comprise the economic base.

In most areas, agriculture and/or manufacturing, account for the greater part of the economic base. Usually, smaller contributions are made by those parts of construction and government which derive their financial support from outside the area. In the case of Guam, essentially the opposite is true. Virtually all of the economic base today is found in civilian employment at the Air Force and Navy facilities and in associated construction activities. Agriculture and manufacturing are not fully developed even in regard to the local market.

As indicated in Table 3, the Air Force and Navy provided slightly more than 6,000 jobs or roughly one-third of the total civilian employment estimated in June, 1964. When military--employment, officers and men assigned to the military units based at Guam--is included, the number of persons on the payrolls of the military installations accounted for more than half of total employment on the island in 1964.

GOVERNMENT EMPLOYMENT ON GUAM

TABLE 3



Source: Guam Employment Service, Department of Labor and Personnel, Government of Guam.

On the other hand, only a part of the income paid to these military and civilian personnel has an impact upon the local private economy. The customary accoutrements of military installations, such as on-base housing, commissaries, post exchanges, and service clubs, account for an important part of the expenditures of those on military payrolls. Nevertheless, it is clear that military and related construction activities now provide almost all of Guam's economic base.

The importance of construction activity has already been noted. The 1964 survey of manpower resources reported 3,000 workers in construction on private payrolls, which was almost one-sixth of total civilian employment. The major part of construction is supported by funds from outside the local economy and can, therefore, be regarded as basic employment.

As a general rule, basic employment makes up about one-third of the total employment of an area. A conservative estimate of the basic civilian employment on Guam in 1964 would seem to be in the range of 7,500 to 8,000 or at least 40% of total employment. This confirms other observations that there is unrealized potential for further expansion of economic activities to serve the local market. Applying to Guam the general rule that total number of jobs is three times the amount of basic employment, the economic base in 1964 would support total employment in the range of 22,500 to 24,000, whereas, it was actually 18,750.

Various reasons might be cited to explain why total employment on Guam falls short of the potential implied by its economic base, but two factors stand out. The first and fundamental factor is the limited supply of local labor. The second factor is the island's relatively high import bill. It is evident that a part of the leverage of the economic base in creating derivative employment is dissipated through imports; the short supply of labor has intensified this process.

With an increasing supply of labor in the years ahead, the challenge to Guam is not only to expand its economic base but also to further develop local market-oriented economic activities.

BUSINESS ACTIVITY

Business activity has recently undergone sharp expansion on Guam, judging by gross business receipts reported to the Government of Guam for tax purposes. Gross business receipts in the Fiscal Year ending June, 1964, totaled \$124.7 million, compared with \$83 million in the 1962-1963 Fiscal Year, and \$70.1 million in the previous fiscal year. A very large part of this increase was directly due to increased construction activity, as indicated by a rise in contractors' receipts from \$10.9 million in the 1961-1962 Fiscal Year to \$44.1 million in the 1963-1964 Fiscal Year.

Between mid-1958 and mid-1962, Guam experienced what appears to have been a full cycle of expansion and contraction of business activity. Since late 1962, business activity has been rising sharply, with the monthly volume of business receipts in June 1964, reaching twice the volume of June 1962.

The structure of the recent expansion is indicated to some extent in Table 4 showing the distribution of business receipts among major categories of activity. The importance of construction activity as a determinant of the level of business activity is readily apparent. Between the 1957-1958 and 1959-1960 Fiscal Years, the rise in contracting receipts was approximately 60% of the gain in total receipts. The same was true between 1961-1962 and 1963-1964.

The rapid build-up of construction activity during the last two years shown in Table 4 was the direct result of typhoon "Karen" which struck the island in November 1962, and to a lesser extent, typhoon "Olive" which hit in April 1963. "Karen's" winds reached velocities as high as 235 miles per hour, breaking all previous records on the island. Damage was all the more extensive because many structures were inadequate by even normal standards. Since "Karen," building activity has not only been directed at repairing typhoon damage but also at providing improved and "typhoon-proof" structures. There has also been some expansion of military facilities and new construction by the Government of Guam.

The dominant role of construction in patterns of business activity on Guam is a recognized matter of concern. Recent completion of major phases of Air Force and Navy construction programs points to some decline in contracting receipts below the high level attained in Fiscal 1963-1964. However, substantial work remains to be done on certain Navy facilities, only a beginning has been made on the \$45 million of projects authorized for Government of Guam by the Rehabilitation Act of 1963, and further expansion of private construction is anticipated. Construction activity may decline somewhat, but it promises to continue as a significant source of employment and income over the next few years.

Due to the fact that construction activity has made heavy use of imported labor as well as imported materials, local adjustments to future declines in construction outlays will not be as serious as anticipated. Also, the increasing number of Guamanians reaching working age may facilitate some substitution of local workers for alien contract workers, tending to increase local consumption and housing expenditures.

TABLE 4

GROSS BUSINESS RECEIPTS, GUAM, FISCAL YEARS 1958-1964
(millions of dollars)

	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64
Retail trade	28.8	31.1	34.9	34.3	32.8	35.3	43.3
General merchandise	19.6	20.3	22.4	22.2	22.7	22.6	25.5
Motor vehicles	3.4	4.0	4.3	3.3	2.4	3.8	6.5
Other retail trade	5.8	6.8	8.2	8.8	7.7	8.9	11.3
Wholesale trade	6.7	6.5	7.5	*11.1	12.1	14.0	16.2
General merchandise	4.4	5.3	5.8	6.2	6.4	7.4	9.7
Other wholesale trade	2.3	1.2	1.7	*4.9	5.7	6.6	6.5
Manufacturing	3.1	3.2	3.5	2.9	2.8	3.2	3.6
Amusement	1.0	0.9	1.1	1.0	0.9	0.9	1.3
Services	10.9	12.5	16.3	11.6	10.7	11.2	16.3
House rentals	1.5	1.6	2.2	2.0	2.0	2.0	2.8
Insurance premiums	1.4	1.6	1.9	1.8	1.9	2.1	3.3
Other services	8.0	9.3	12.2	*7.8	6.8	7.1	9.9
Contracting	<u>7.8</u>	<u>15.2</u>	<u>26.6</u>	<u>22.1</u>	<u>10.9</u>	<u>18.5</u>	<u>44.1</u>
Totals	58.3	69.4	90.0	83.1	70.1	83.0	124.7

*Discontinuity in series reflecting change of classification shifting certain receipts from miscellaneous services to wholesale trade.

Sources: Departments of Finance and Commerce, Government of Guam.

Basic support for business activity comes, of course, from the military and civilian payrolls and purchases by the Air Force and Navy. Barring dramatic changes in national defense requirements, large changes in expenditures for military operations seem unlikely. The rate of long-term growth in business activity in future years may, therefore, depend in large measure upon development of Guam's unrealized potential in agriculture, manufacturing and tourism.

Retail trade has been a consistently active segment of business on Guam throughout the period shown on Table 4. This was true even during the construction downswing of Fiscal Years 1960 to 1962. Retail trade, accounting for about one-fourth of the private employment on Guam, can be said to be the core of the island's private economy today.

IMPORTS AND EXPORTS

During the postwar period, Guam has relied heavily upon imports to meet local consumption demands. Imports totaled \$42.2 million in the Fiscal Year ended June 30, 1964, while exports were valued at \$8.8 million. Table 5 shows the trend of exports and imports for the Fiscal Years 1958 through 1964. The elevated level of imports during the Fiscal Year 1963-1964 reflects, of course, the same sharp advance in business activity as evidenced in gross business receipts.

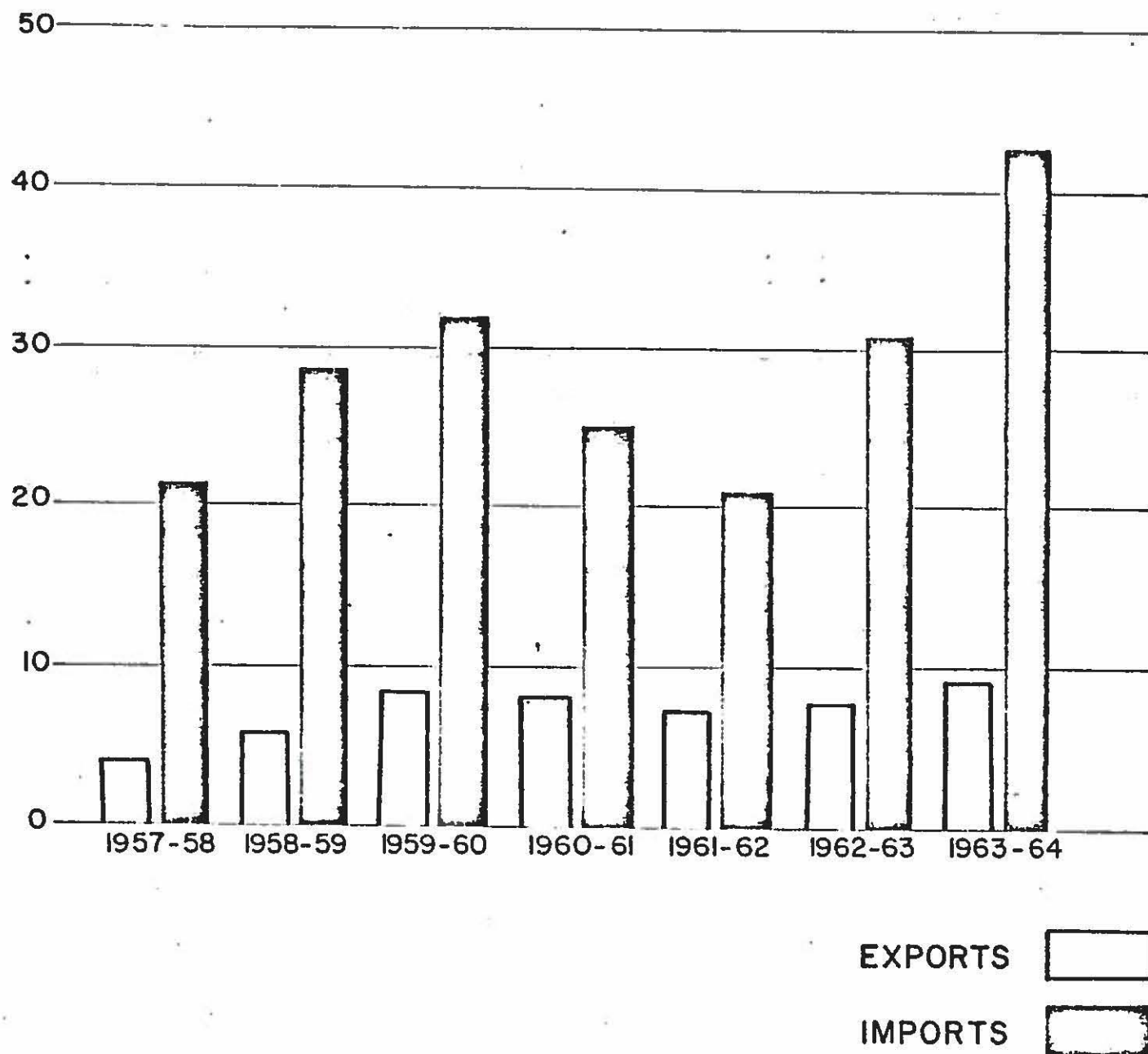
Although there are conceptual difficulties in comparing imports and gross business receipts, some notion of the relative importance of imports may be obtained by such comparison. In the period since July 1957, the value of imports has varied between about 30% and 40% of gross business receipts. As gross business receipts rose by \$54.6 million between fiscal 1962 and fiscal 1964, imports increased by \$21.5 million, that is, by an amount equal to about 40% of the gain in gross business receipts. The apparent relationship is that the value of imports moves toward 40% of gross business receipts during periods of expanding activity and declines toward 30% of gross business receipts in periods of business contraction.

The main source of Guam's imports is the United States, which accounted for \$22.9 million, or about 76% of the \$30.4 million total in Fiscal Year 1963. Japan was second with \$2.7 million, and Australia third with \$2.1 million. Major items of import include rice, flour, sugar, frozen meats and fish, fresh vegetables, beverages, various other foodstuffs; feeds, lumber, cement, petroleum products, and durable consumer goods.

IMPORTS AND EXPORTS

TABLE 5

MILLIONS OF
DOLLARS



Sources: Commercial Port of Guam and Department of Commerce, Government of Guam

As indicated in Table 5, Guam's exports have been relatively small and stable compared to imports. Shipments to the United States account for the largest portion of exports, being equal to about 49% of the total in Fiscal Year 1963. Exports to the Trust Territory of the Pacific Islands accounted for approximately 29% in that year. Rice and some other foodstuffs, cement, petroleum products, scrap metal, and government surplus items have been important in quantity terms, and it is apparent that much of this commerce has been re-export in nature. The Guam Port is also a point of transshipment, mainly for goods moving from the United States to the Pacific Trust Territory Islands.

It has been repeatedly pointed out that the large imports of foodstuffs and certain other consumer items might be somewhat reduced by increasing local production of the same or comparable goods. An important barrier to such development, however, has been the shortage of local labor relative to total demand. Also, in some cases, the minimum economic scale of operation may be greater than the size of the local market, and cost comparisons may be unfavorable to local production. Of course, there is a need for technical knowledge and organization, not to mention capital, but as the labor supply expands in the future, greater production of items for import substitution is a likely development.

FUTURE ECONOMIC DEVELOPMENT

Guam, would indeed, be in unusual place if its future economic development could be projected as certain and easy. Difficulty and uncertainty are the usual, rather than the exceptional, signposts along the road of economic progress.

MILITARY ACTIVITIES AND CONSTRUCTION

As already noted, the recent high rate of construction activity seems certain to undergo a moderate decline in the near future, but construction should continue to be a significant source of employment for at least several years. The most important element that could alter this outlook would be a change in the scale of military activities on the island, and in this regard, expansion would seem a more likely development than contraction.

Guam holds a strategic position as the westernmost base on American soil. Enlargement of the military complement on Guam could come with a general increase in the military commitment of the United States in the Far East or a withdrawal of present forces. Stability, if not expansion, appears a reasonable expectation for military operations.

AGRICULTURE AND MANUFACTURING

In 1964, less than six percent of total employment on Guam was in agriculture and manufacturing. Guam has limited resources for agricultural and industrial development, but the present state of development still falls somewhat short of the potential. The high import bill suggests that there are opportunities for local agriculture and manufacturing to expand by providing import substitutes.

Agricultural production today in Guam is significantly below its pre-World War II level, when Guam was almost entirely an agrarian economy. Production of eggs is on a commercial basis, and there is some local sale of fresh produce and poultry, but agricultural production is largely for family consumption.

The Guam Department of Agriculture is making a positive effort to stimulate interest in farming, to find better answers to the technical problems of agricultural production, and to enhance farming as a source of income. New and expanded facilities being provided during the current reconstruction program will strengthen the Department's program. Expansion of agricultural production must be viewed as one of the major goals in the further economic development of Guam.

The problem of expanding agricultural production on Guam has its unique aspects. Loss of agricultural land to military and non-agricultural uses, and the relatively strong demand for labor in other activities pose special problems, as do plant diseases and pests, thin soil, heavy rainfall, and the ferocity of tropical storms. Perhaps most significant of all, the decline of agriculture in the postwar period has marked a lapse in the development of an organizational structure appropriate to commercial production. Such a structure, which includes formulation of schedules for production of appropriate commercial quantities, marketing mechanisms, and methods of finance, appears to be the most pressing need for a resurgence of agricultural activity.

Guam's location suggests some potential for development of a commercial fishing industry. In its annual report for the Fiscal Year 1963, the Guam Department of Agriculture estimated that the year's commercial production of fish was 200,000 pounds, whereas potential demand on Guam was estimated in excess of two million pounds. The department has proposed a program to stimulate production of fish for local use.

Manufacturing activity on Guam is largely in the production of non-durable goods for local consumption, namely, bakery products, milk processing, soft drink production, and printing. There is

GEOGRAPHICAL SIGNIFICANCE

Guam's strategic location as the closest United States territory to the expanding markets and rich raw materials of Asia should assume increasing importance in the years to come. As world trade registers yearly increases and as the United States continues to seek overseas markets, Guam can be an important stepping stone to Asiatic markets. In short, the island has great potential as our "window to the Far East." Efforts are now being made to demonstrate to mainland firms the advantages of locating Far Eastern headquarters, sales offices, and mail order outlets on Guam.

Facilities have been developed and are being improved to enhance Guam's strategic position as a potential commercial center. It is an important link in trans-Pacific communications. Regular jet flights put Guam within easy reach of the major cities of the Far East, as well as Honolulu and the West Coast. A new, modern air terminal will soon be constructed; a commercial port was developed in Apra Harbor in 1950; and Naval security clearance was eliminated in 1961. Under the rehabilitation plan, the commercial port will be relocated to provide room for expansion and to avoid possible future conflict with military security requirements. As a duty-free port since 1951, and with a preferred position under United States tariff laws, Guam would seem to be in a position to assume a significant role in the future commerce of the Pacific basin.

Guam offers an opportunity for enterprises to do business in close proximity to Far Eastern markets and sources of materials, while at the same time, being based in an American community. Significant in this regard is the protection of the American legal system and due process of law. Also important are the banking and financial institutions, insurance companies, and other organizations which provide, in Guam, the same type of services available in the commercial centers of the mainland United States.

As the westernmost military base on American soil, Guam is already the nation's strategic window to the Far East. Future progress and development hold the promise of making it the nation's economic window to the Far East.

PART THREE

PLANNING CONSIDERATIONS
UNDERLYING THE MASTER PLAN

some potential for further development of manufacturing to meet local needs. The strong hope, however, is for development of manufactures for export, especially to the mainland United States. The potential of Guam in this regard does not lie in its natural resources, which are quite limited as a base for industrial development. It lies, rather, in Guam's proximity to Far Eastern sources of supply, its recently adopted tax incentive program, and its status as a free port. Guamanian manufactured goods, of which foreign materials comprise less than 50% of total value, may be sent to the mainland duty free. With this in mind, study is being given to various possibilities for development of manufacturing. The prospect that some possibilities will be realized is enhanced by the expectation that a greater supply of local labor will become available in the years ahead.

TOURISM

Guam's significant natural resources are its climate, scenic beauty, sea and reef areas, and proximity to the Far East. It has the basic ingredients to attract a substantial tourist trade. A major drawback has been its distance from the United States, but modern air travel has already reduced this obstacle. In addition, future tourist trade can be expected to come from Japan and Australia.

The tourist resources of Guam today are undeveloped. Construction of a new air terminal is part of the rehabilitation program, and proposals for building a hotel have been made by private interests. These are essential parts of the development of a tourist trade, but they are only a beginning. Full exploitation of Guam's tourism resources would require relatively substantial amounts of public funds and private capital. Improvement of beaches, development of recreation areas and facilities, preservation and reconstruction of historic sites, and revival of essential aspects of a traditional Pacific Island setting are some of the things that would contribute to establishing a total environment attractive to tourists. The tourism possibilities of Guam are exciting and deserve the fullest study.

COMMERCE WITH THE TRUST TERRITORY

Lying to the north, southeast, and south of Guam is a vast ocean area of some three million square miles, containing approximately 2,100 islands and atolls. Ninety-six are inhabited and have a total population of approximately 85,000. This area is the Trust Territory of the Pacific Islands, administered by the United States under the United Nations' Trusteeship System. The major island groups are the Marianas, the Marshalls, the Carolines, and the Palau Islands. Familiar names include Saipan, Tinian, Rota,

Koror, Yap, Ulithi, Truk, Ponape, Kwajalein, and Eniwetok. Although some of the distances are great, there is an established pattern of commerce between Guam and the major centers in the Trust Territory. As the Trust Territory makes further progress in its own development, expansion of economic relationships with Guam appears likely.

CULTURE AND EDUCATION

The original Chamorro name for Guam was "Gauhan," meaning "We Have." Guamanians take the greatest pride in what they "have" for it means that from their abundance they can share with their friends and guests. This is exemplified in their fiestas, where food and hospitality are extended to all through customs similar to those practiced centuries ago.

This tradition of friendliness and hospitality, coupled with the beautiful natural scenery of the island, should do much toward stimulating a tourist trade. Guam seeks to attract more than tourists, however, it also seeks outside investment to stimulate manufacturing and other aspects of the island's economy. The role of education, particularly higher education, can be an important factor in this effort.

The College of Guam, located on scenic ground overlooking Pago Bay, is planning an expanded program to meet the higher educational needs of Guam. This college is accredited by the Western Association of Schools and Colleges, and is destined to become an important center of education in the Pacific. It is already planning to establish a school of marine biology and is working, in conjunction with the University of Hawaii, for recognition as a Pacific language center.

DEFINITION AND PURPOSE OF THE MASTER PLAN

A Master Plan is a document which provides a policy framework within which decisions, private and public, can be made relating to the physical development of a community and its environs. It designates the geographical areas in which these decisions are to apply. It also differentiates major land uses and establishes the criteria necessary in formulating policies for their development. These criteria are fundamental in defining and analyzing the principal, social, and economic factors within the urban environments and also for measuring the existing situation relative to the ideal socio-physical image to which the Island of Guam aspires.

Since physical development policies must be subject to re-evaluation as land use decisions are effectuated and as socio-economic changes occur, the Master Plan is flexible in nature and long-range in scope.

LEGAL AUTHORIZATION

The extent to which the Master Plan can favorably influence orderly growth within a community or an area is fully recognized by the territory of Guam. The Legislature of the territory of Guam has adopted legislation which establishes the basis for a Master Plan. The Government Code of the Territory of Guam--Title 14, Chapter 3, Section 13205, sets forth:

"It shall be the function and duty of the commission to prepare and adopt a comprehensive, long term general plan for the physical and economic land development of Guam. Such a plan shall be known as the "Master Plan" and shall be prepared with a view towards its utilization as a basis for the development of Guam. The Master Plan with the accompanying maps, diagrams, charts, descriptive matters and reports shall include such of the following subject matters or portions thereof as are appropriate to Guam, and as may be made the basis for the physical and economic development thereof: Land Use Plan, Public Building, Community Design, Housing, and other additional plans and reports."

AREA OF STUDY

Because of the economic, social and physical interdependence between the different municipalities, the Government of Guam has cooperated and will continue to cooperate in the planning of these municipalities. In this way, solutions to problems of mutual concern relating to flood control, sanitation, water supply, education, recreation, circulation, and other public facilities may be resolved most advantageously. Therefore, the Government of Guam is vitally concerned with the development of the municipalities of Agana, Agana Heights, Agat, Asan, Barrigada, Chalan Pago-Ordot, Dededo, Inarajan, Magilao, Merizo, Mongmong-Toto-Maite, Piti, Santa Rita, Sinajana, Talofofo, Tamuning, Yona, Yigo, and Umatac.

THE MUNICIPALITIES OF GUAM

The city of Agana is the central city of the Island of Guam. In the metropolitan area concept, the central city represents the nucleus about which the urban activity and growth of the area is organized. The activities of Agana are recognized as inter-related with the activities of the other communities, and the rural areas.

The Island of Guam has been broken down into nineteen municipalities and for planning purposes, these municipalities will be referred to in this Master Plan as the municipality areas. Because of the extent and the diversity in social, economic, and geographical characteristics, the term municipalities (which land area covers 212 square miles) has been used for the sake of convenience and efficiency. The broad, long-range land use goals of this Master Plan are being implemented in the more precise area plans developed for each of the municipalities.

Each specific municipality has been further divided into neighborhoods from which more refined planning (related closely to property lines) can be accomplished.

The following criteria were used in designating the boundaries of each municipality area (Chart 2):

- Natural and/or artificial boundaries.
- Functional significance.
- Existing and/or potential urban patterns. .
- Extent and location of areas.
- Statistical convenience.
- Economic distribution and specialization.
- Historical significance.

Each of these nineteen areas varies from the others in complexity and intensity of land use. They are not, however, independent, but should be considered an integral part of the entire structure of the Island of Guam. Some of these municipalities are considerably developed; some have yet to experience urban development of any type. It is necessary, for convenience, to describe each of these municipality areas in order to assist in expediting the continual revision of this Master Plan as the general land use plans of each specific area are developed or revised. (For the delineation of the boundaries of each municipality, refer to the Government Code of Guam, Title 16, Chapter 1, Section 15001.)

The extent of urban development and the existing land uses in each municipality area are briefly indicated in the following pages.

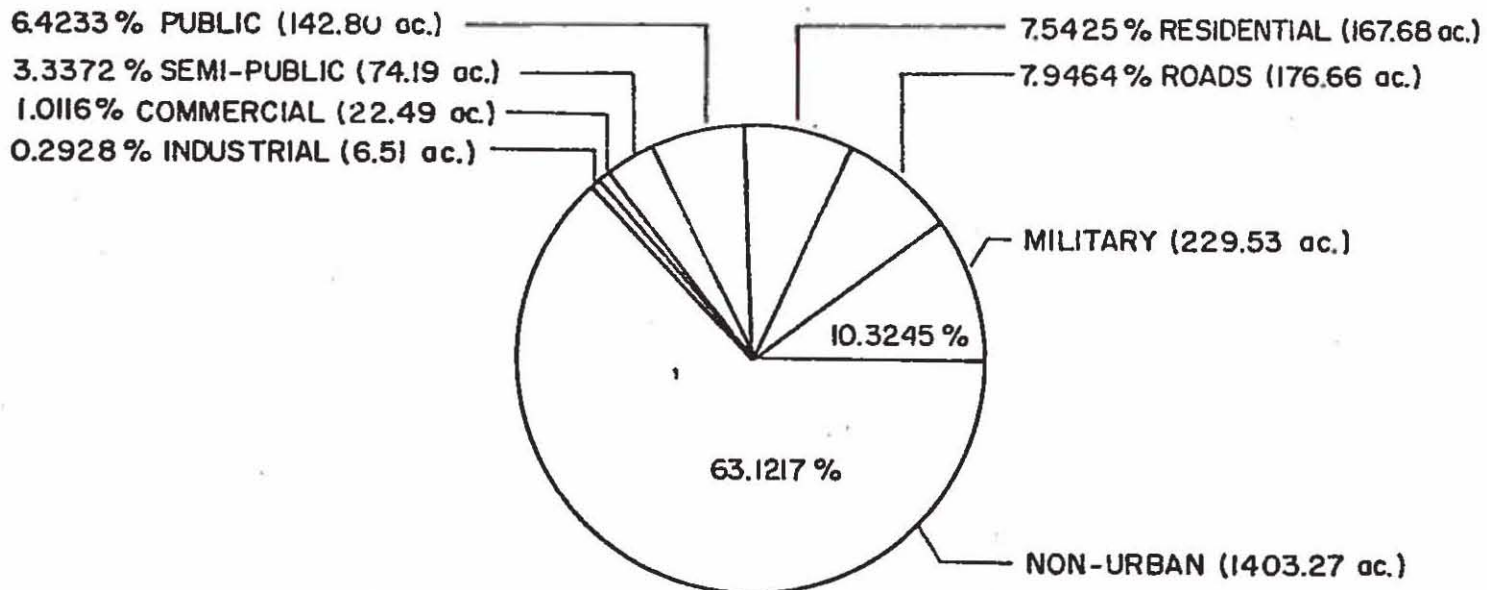


AGANA - 1.157 Square Miles

The community of Agana is the capital seat of the Government of Guam. This area has traditionally been the center of commerce for the Island of Guam. Formerly a city of 12,000 inhabitants, it was completely destroyed during the American liberation of the island during World War II. One of the most complex problems in Agana today is the fractional lot problem. After the War, the Naval Administration laid out a new city for Agana with new streets and utilities. Unfortunately, after the work was completed, it was found that the new streets chopped up the property lines in such a way that a vast amount of land became unusable due to the small size or plural ownership. There is a strong Guamanian feeling against the sale or lease of property which has been in the family for decades, and so the property could not be consolidated for sale or lease. The Territorial Planning Commission, at the present time, is resolving this problem with a grant from the Federal Government by buying these fractional lots and consolidating them into usable sizes.

When this land problem is settled, Agana will continue to grow as the business and financial center of Guam.

TABLE 6



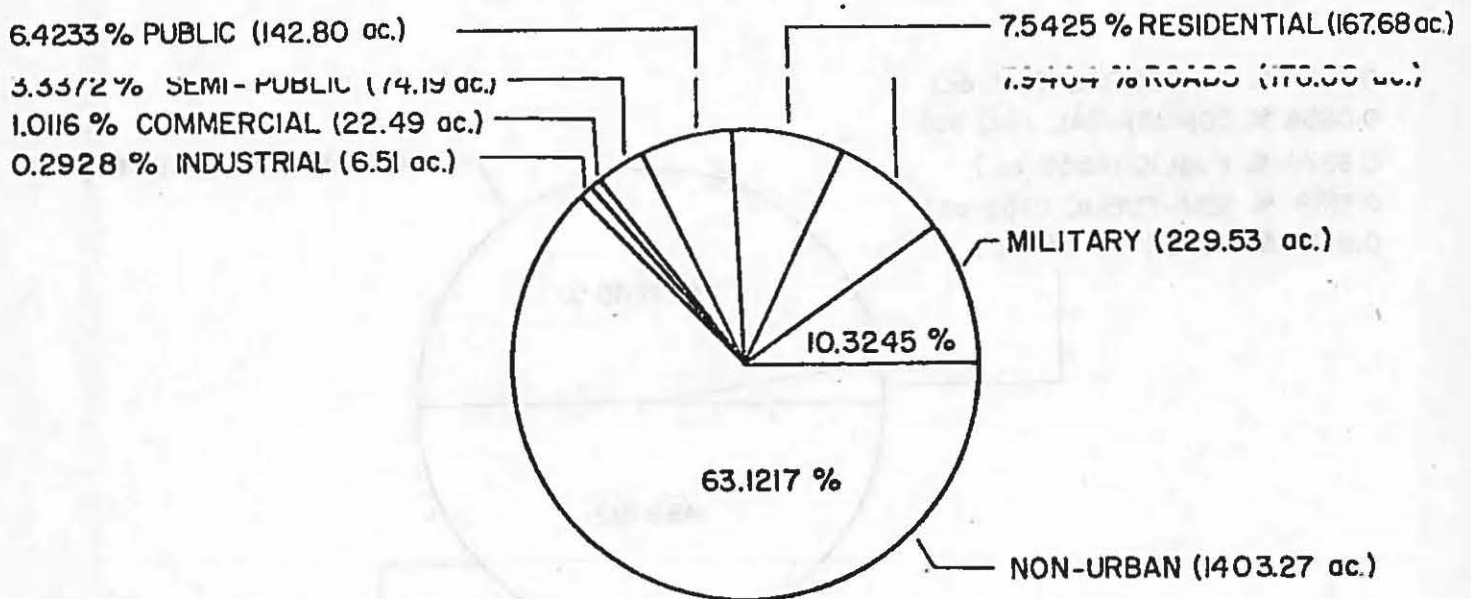
MUNICIPALITY OF AGANA, AGANA HEIGHTS, & SINAJANA
Total Area = 2223.15 ac.

AGANA HEIGHTS - 1.1578 Square Miles

The community of Agana Heights is located in the hills above Agana overlooking Agana Bay. This area for years has been exclusively residential, single-family homes having a very scenic location. Also located within this area is the United States Naval Hospital.

Agana Heights has the potential of being an exclusive residential area by enforcing zoning and building regulations and by upgrading substandard lots and homes.

TABLE 7

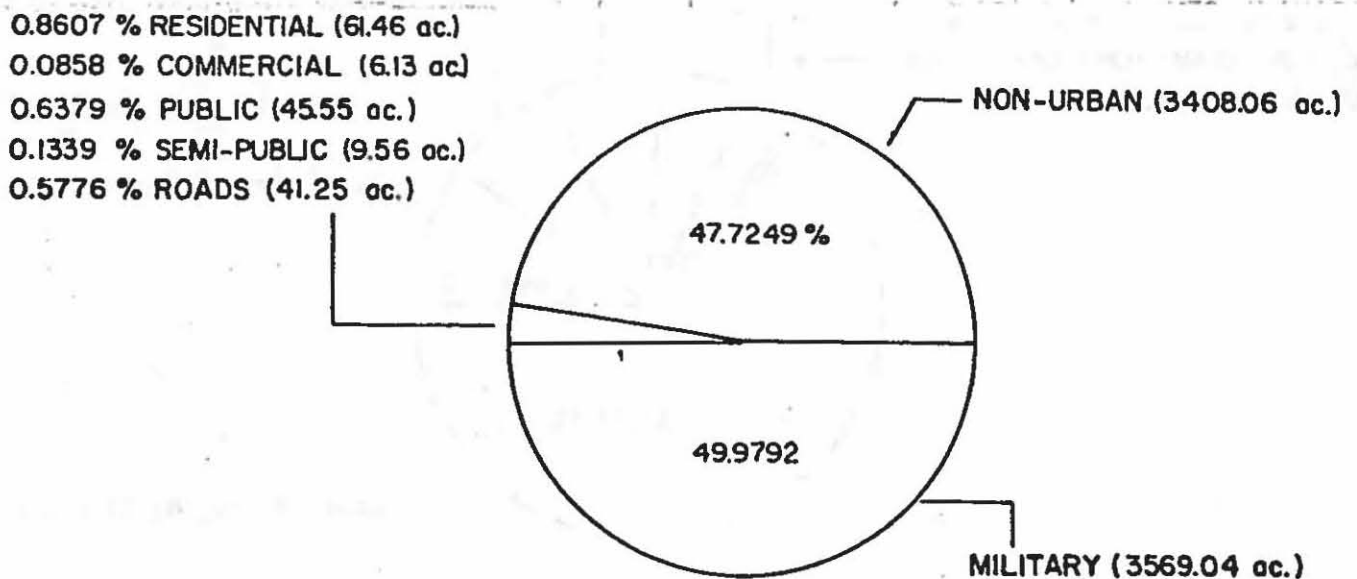


MUNICIPALITY OF AGANA HEIGHTS, AGANA, AND SINAJANA
Total Area = 2223.15 ac.

AGAT - 11.15 Square Miles

The community of Agat, located toward the southern half of the island, is the largest community within this area. Agat is primarily residential at this time but has great potential for agricultural development. (Located within this area also is Nimitz Beach, one of the largest recreation areas on Guam.)

TABLE 8

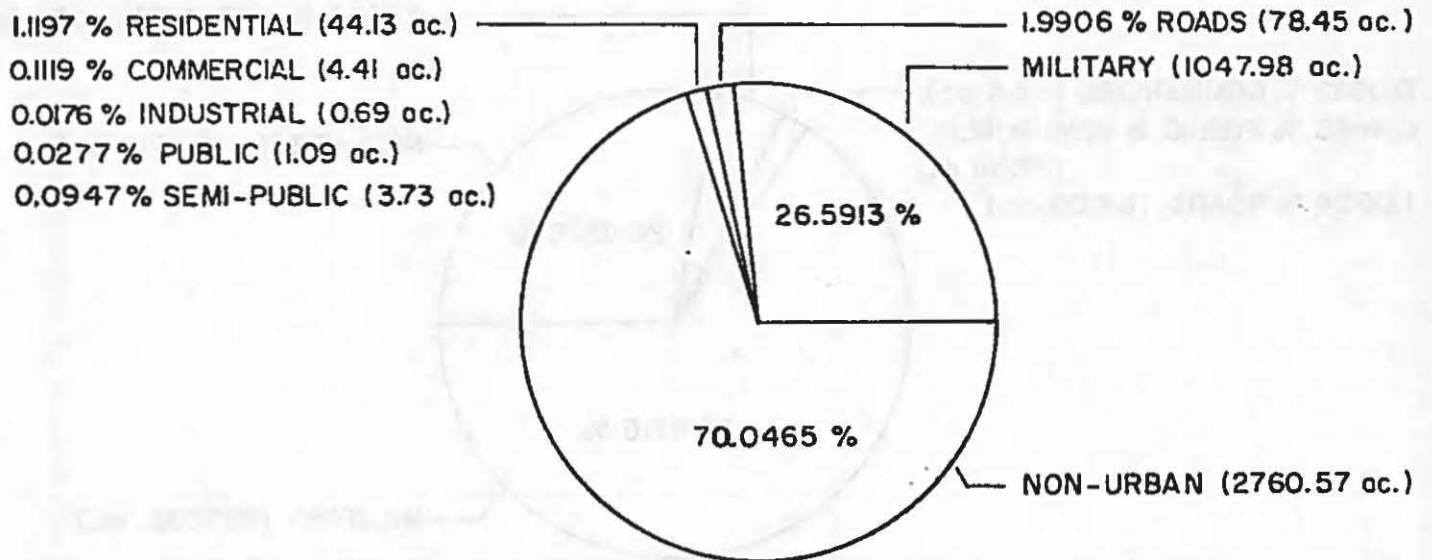


MUNICIPALITY OF AGAT
Total Area = 7141.05 ac.

ASAN - 6.15 Square Miles

The community of Asan is located two and one-half miles south of Agaña fronting on the ocean along Marine Drive. Asan is composed of residential and commercial establishments scattered along Marine Drive. It is limited in expansion because of the topography and the ocean. The potential of this area could be greatly increased by upgrading the lots and structures that exist.

TABLE 9



MUNICIPALITY OF ASAN

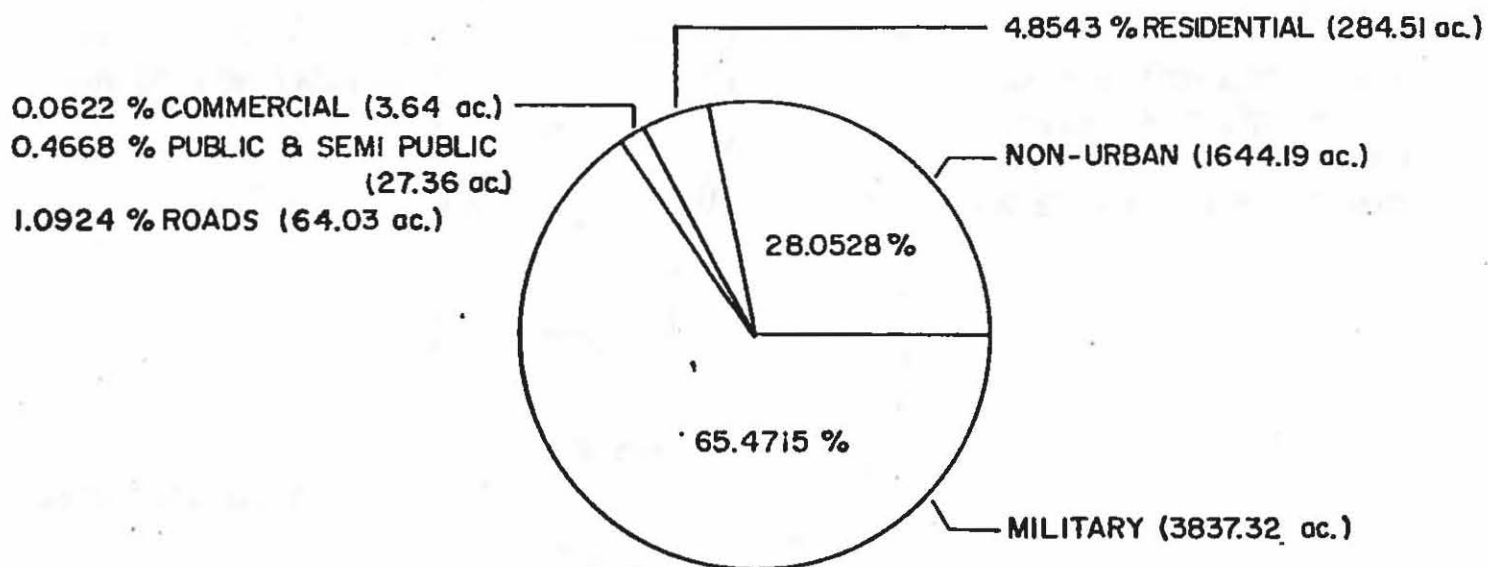
Total Area = 3491.05 ac.

BARRIGADA - 9.15 Square Miles

The community of Barrigada is one of the most populated areas on Guam. It is concerned chiefly with agriculture and composed of single-family residential areas. Located within this area is the United States Naval Air Station.

Barrigada, with its relatively flat topography, has the potential of being an important agricultural area.

TABLE 10



MUNICIPALITY OF BARRIGADA

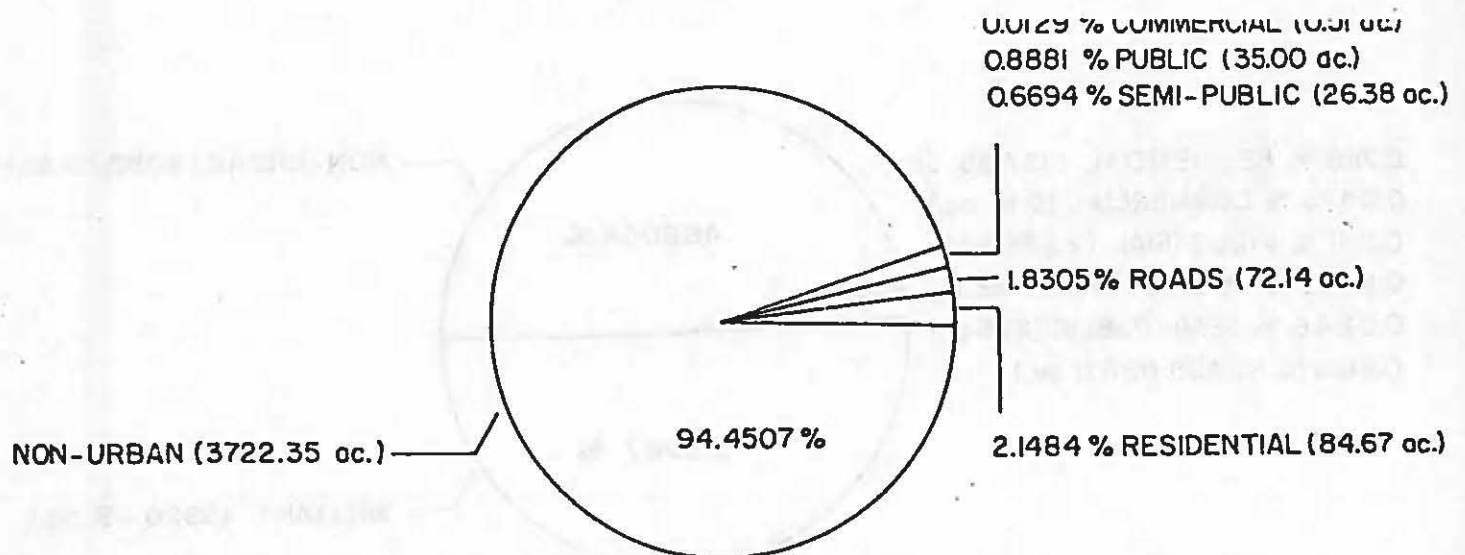
Total Area = 5861.05 ac.

CHALAN PAGO-ORDOT - 6.1573 Square Miles

The community of Chalan Pago-Ordot is sparsely populated due to topographical conditions. It is chiefly residential with small agricultural areas.

Chalan Pago-Ordot has potential of becoming basically residential due to the topographical conditions which are undesirable for large-scale agricultural development.

TABLE 11



MUNICIPALITY OF CHALAN PAGO - ORDOT

Total Area = 3941.05 ac.

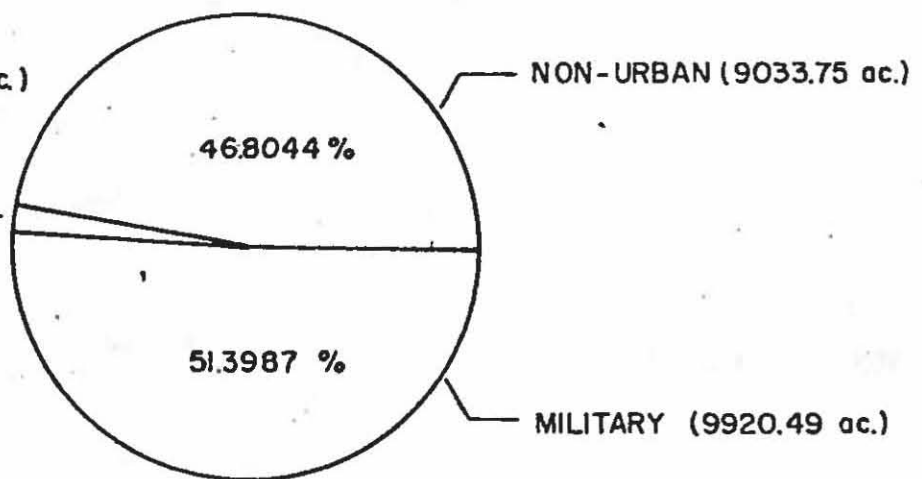
DEDEDO - 30.1578 Square Miles

The community of Dededo is located in the northern half of the island. It is one of the fastest developing residential communities on Guam, and encompasses one of the largest land areas. A major portion of Dededo is owned and maintained by the military.

The potential in Dededo is both in residential and agricultural development.

TABLE 12

0.7116 % RESIDENTIAL (137.85 ac.)
0.0475 % COMMERCIAL (9.16 ac.)
0.1211 % INDUSTRIAL (23.36 ac.)
0.2305 % PUBLIC (44.27 ac.)
0.0246 % SEMI-PUBLIC (4.76 ac.)
0.6616 % ROADS (127.71 ac.)



MUNICIPALITY OF DEDEDO

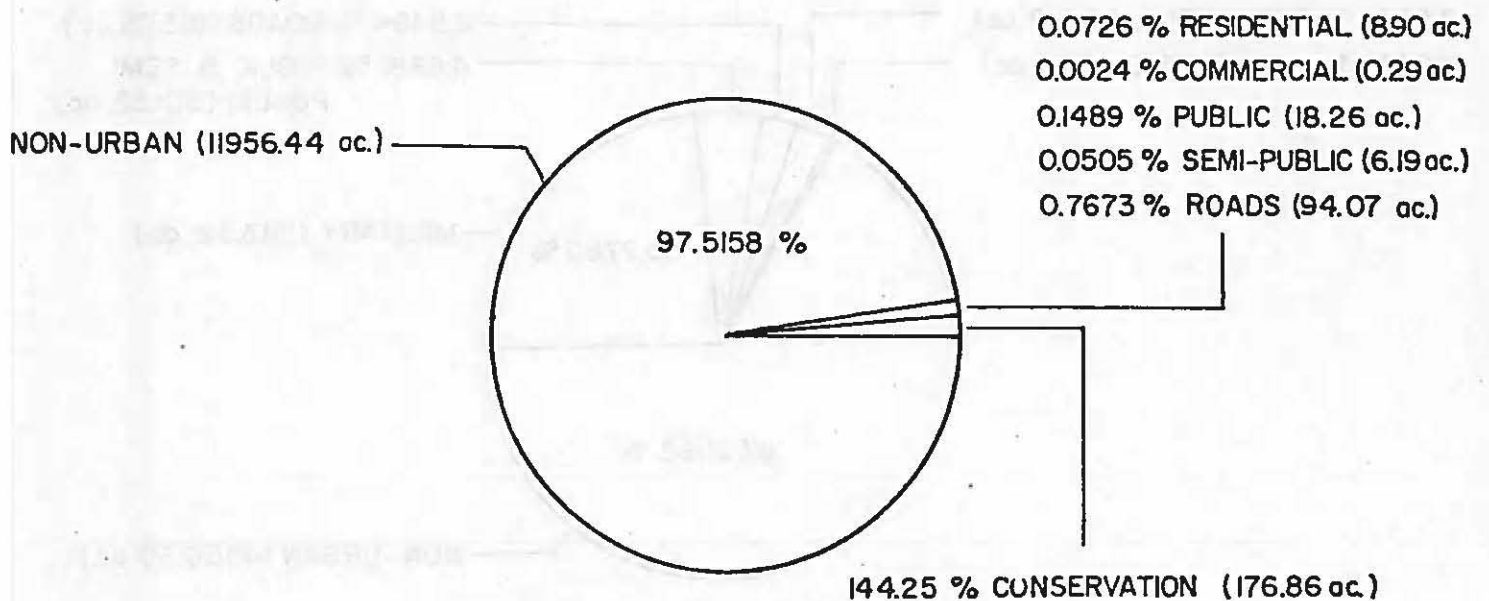
Total Area = 19301.05 ac.

INARAJAN - 19.1578 Square Miles

The community of Inarajan located in the southern half of the island is considered one of the most picturesque communities on Guam. It is primarily a residential area with old and beautiful Spanish-type architecture. Being unprotected on the low southern coast, however, Inarajan is subject to destruction by typhoons.

Inarajan has the potential of being an agricultural area as well as having recreation and scenic value.

TABLE 13



MUNICIPALITY OF INARAJAN

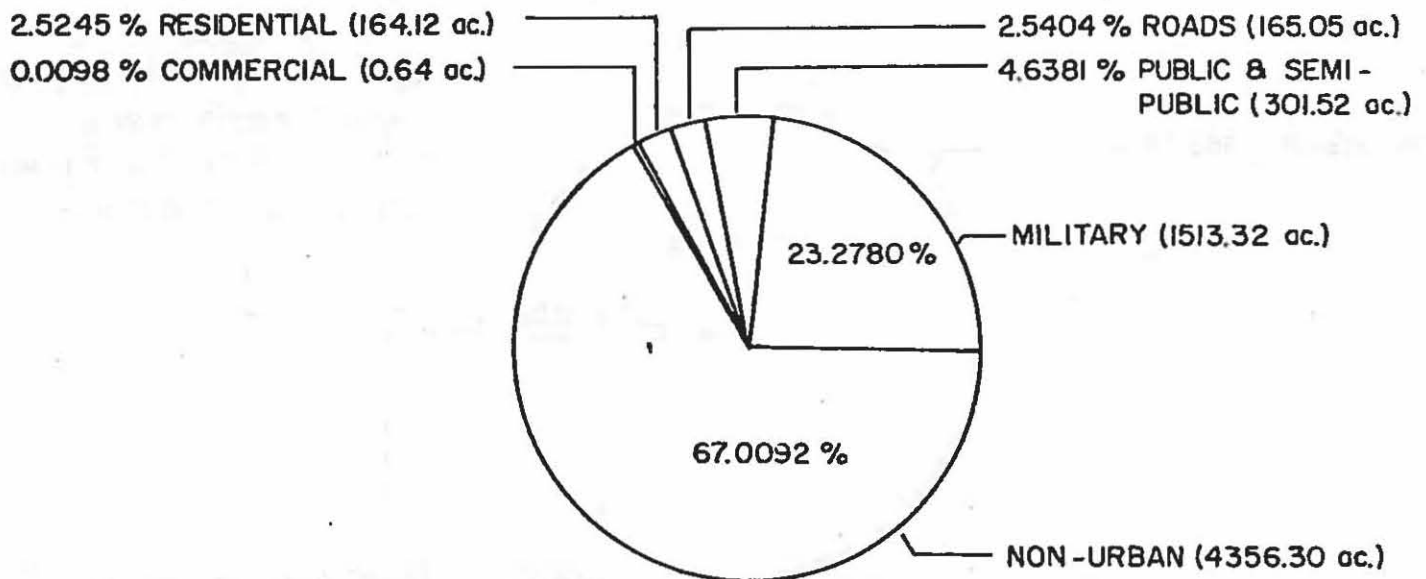
Total Area = 12261.05 ac.

MANGILAO - 10.1578 Square Miles

The community of Mangilao is located on the eastern side of the island. It is composed of scattered residences with small agricultural areas. Its focal point is the College of Guam which is becoming the education center for Micronesia.

The area surrounding the College has the potential of becoming an exclusive residential area, and because of the relatively flat topography, Mangilao could play a major role in agriculture.

TABLE 14



MUNICIPALITY OF MANGILAO .

Total Area = 6501.05 ac.

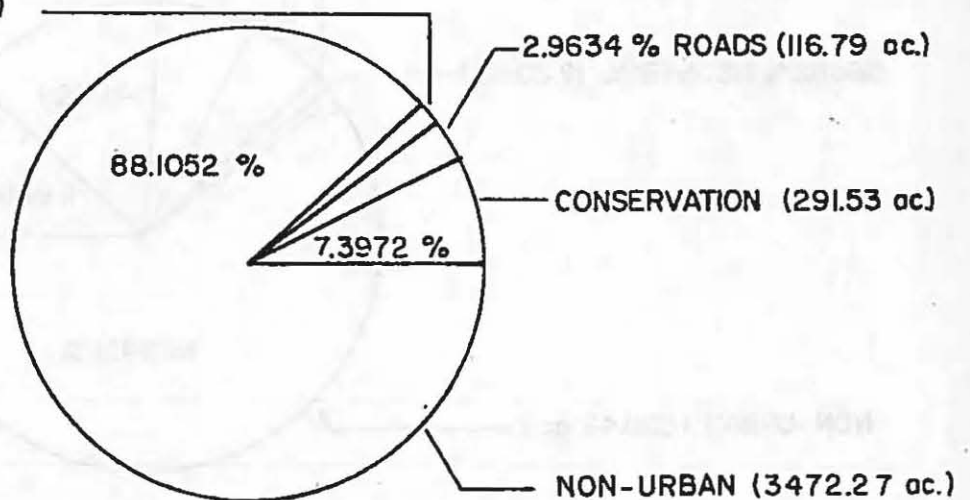
MERIZO - 6.1578 Square Miles

The community of Merizo is located on the southern tip of the island. This is one of the most picturesque communities and unique because the people have clung to the old customs and traditions more earnestly. Their principle occupation is fishing and farming.

Merizo has the potential of becoming a recreational and scenic area as well as a small agricultural community.

TABLE 15

0.7587 % RESIDENTIAL (29.90 ac.)
0.0282 % COMMERCIAL (1.11 ac.)
0.1279 % PUBLIC (5.04 ac.)
0.1152 % SEMI-PUBLIC (4.54 ac.)
0.5042 % MILITARY (19.87 ac.)



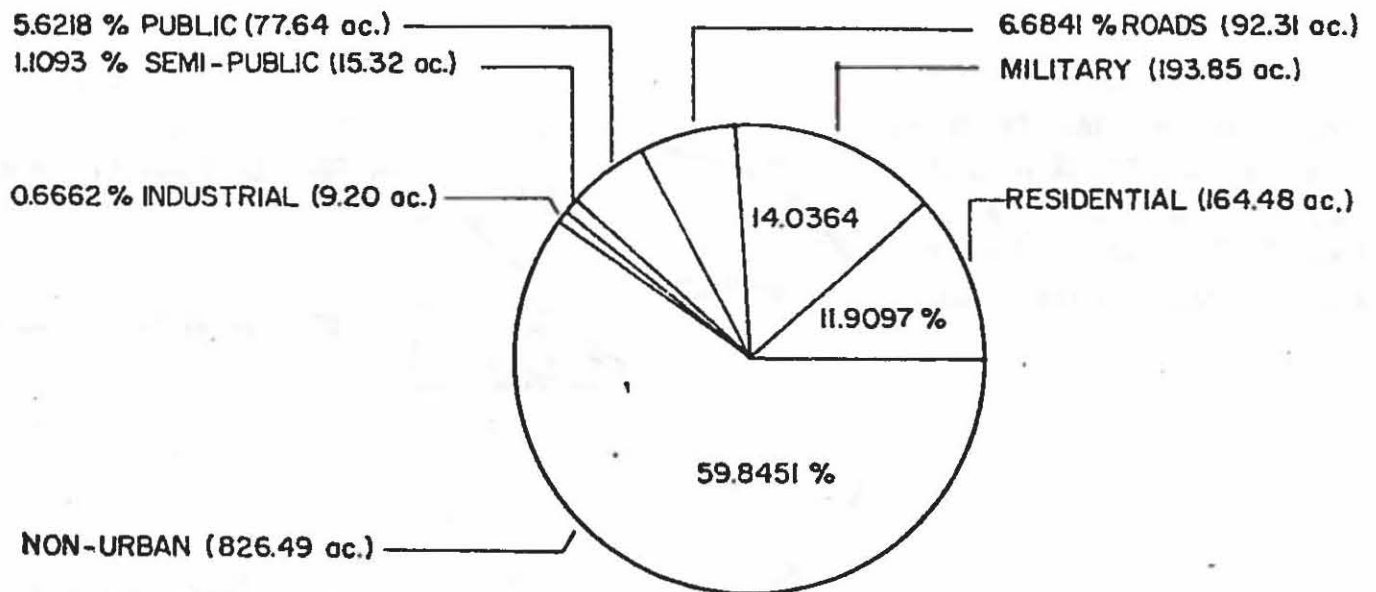
MUNICIPALITY OF MERIZO

Total Area = 3941.05ac.

MONGMONG-TOTO-MAITE - 2.1578 Square Miles

The community of Mongmong-Toto-Maite at the present time is principally an agricultural area with scattered residential. Because of its proximity to Agana, it has the potential of being a residential area as the demand increases due to the expansion of commercial areas in Agana.

TABLE 16



MUNICIPALITY OF MONGMONG-TOTO-MAITE

Total Area = 1381.05 ac.

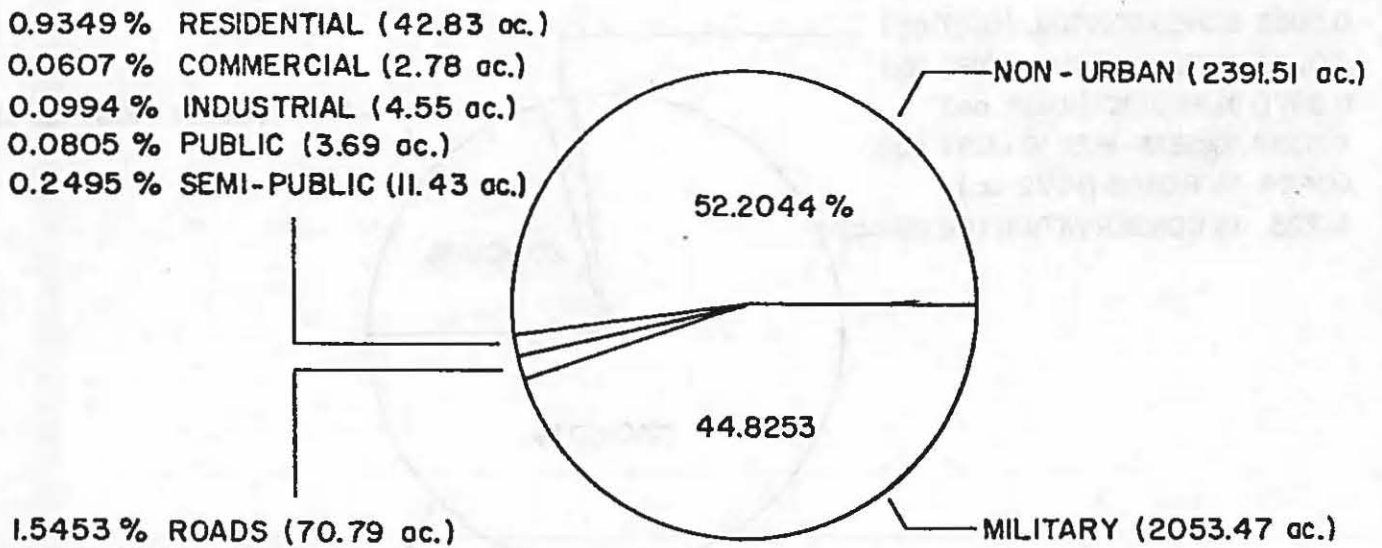
PITI - 16.1578 Square Miles

The community of Piti, located south of Agana on Route 1, is chiefly commercial with single-family dwellings scattered along the main highway. This area is limited in growth because of the ocean and steep mountains bordering either side.

Located within this area is Cabras Island and a large portion of Apra Harbor, which at the present time, is under military ownership.

Piti has the potential of being one of the main industrial areas on Guam. The proposed commercial port will be located on Cabras Island when this property is released to the Government of Guam by the military.

TABLE 17



MUNICIPALITY OF PITI

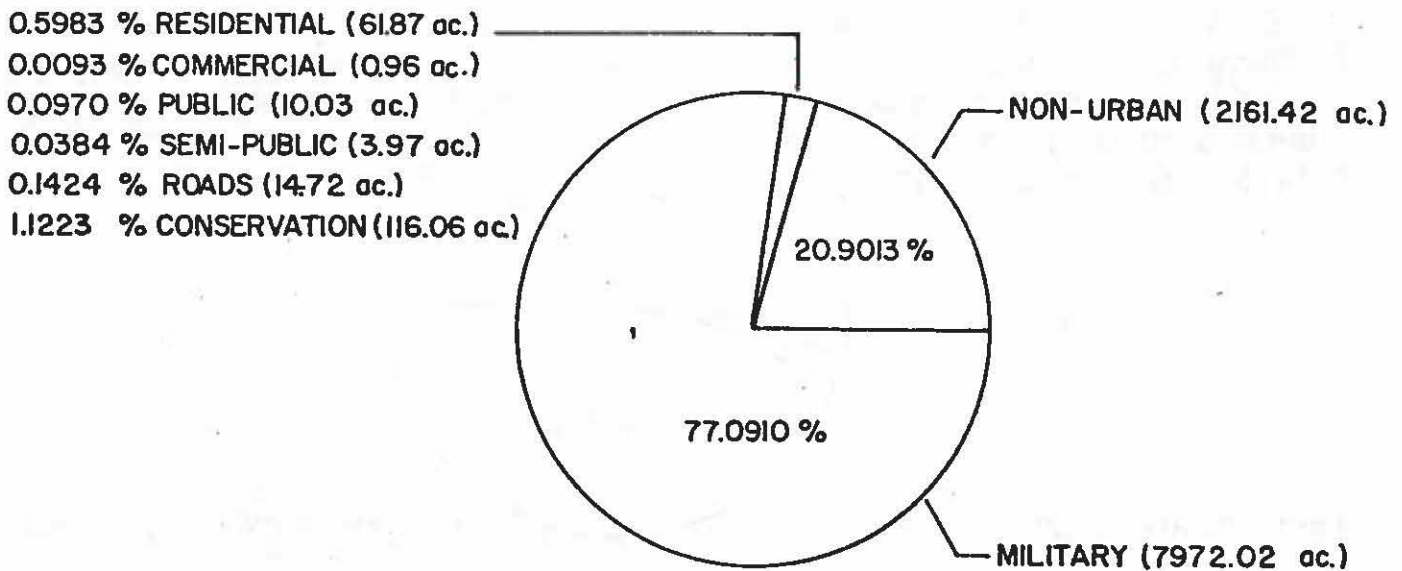
Total Area = 4581.05 ac.

SANTA RITA - 16.1578 Square Miles

The community of Santa Rita is located toward the southern half of the island. This is a residential area with scattered areas of agriculture.

Santa Rita, with its proximity to military areas and the proposed commercial port, has the potential of developing both large residential as well as agricultural areas.

TABLE 18



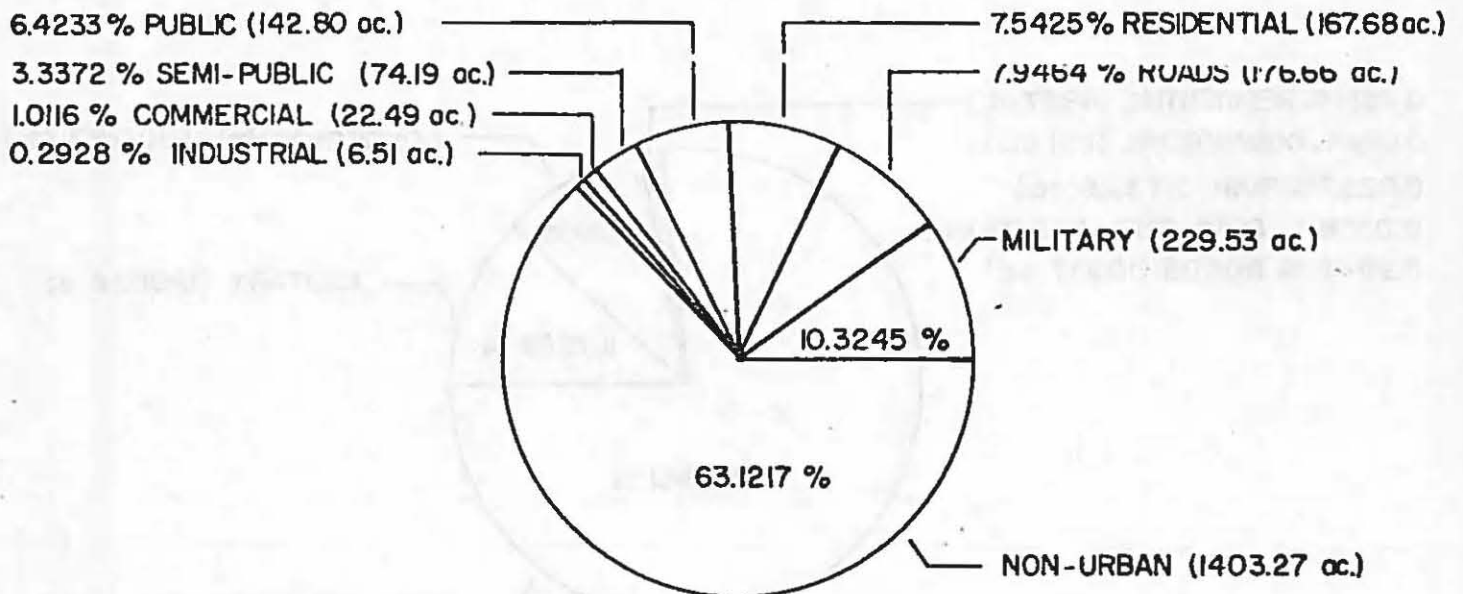
MUNICIPALITY OF SANTA RITA

Total Area = 10341.05 ac.

SINAJANA - 1.1578 Square Miles

The community of Sinajana, located in close proximity to Agana, is one of the most heavily populated areas on Guam. At the present time, Sinajana is considered substandard because of overcrowded conditions, inadequate lots and homes. Basically, this condition is a result of typhoon "Karen." Sinajana was declared a disaster area, and qualified for Federal Aid under the Urban Renewal Laws. Implementation of the Urban Renewal Program will fulfill Sinajana's potential as an outstanding residential area.

TABLE 19



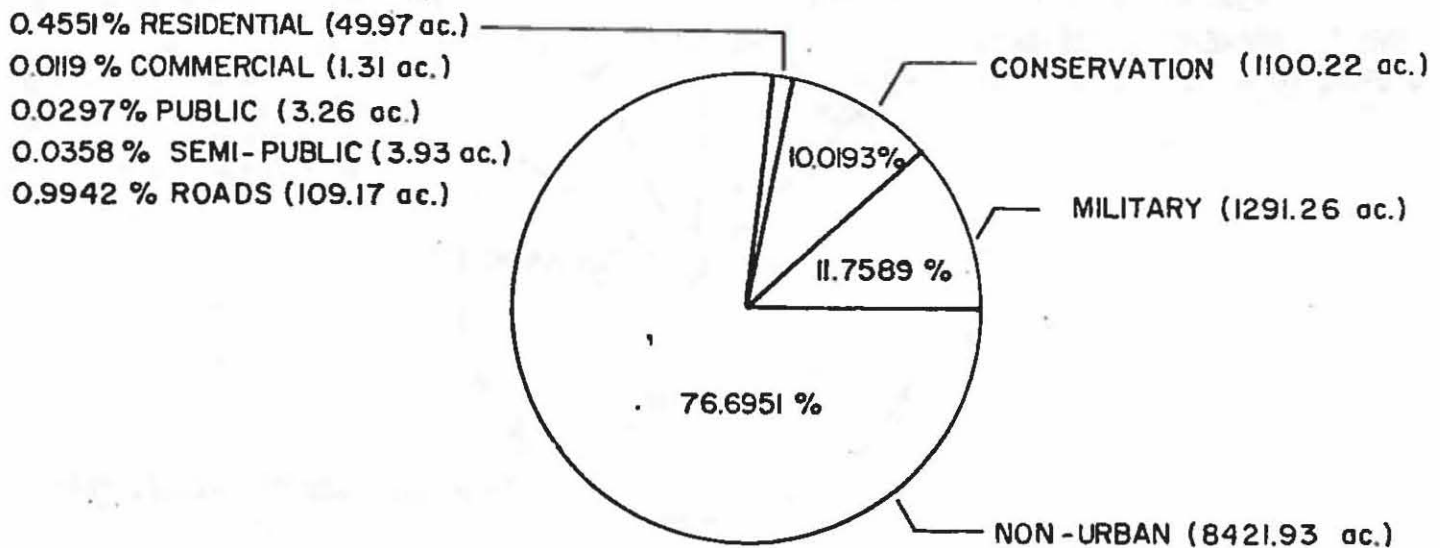
MUNICIPALITY OF SINAJANA, AGANA HEIGHTS, AND AGANA
Total Area = 2223.15 ac.

TALOFOFO - 17.1578 Square Miles

The community of Talofofo, located in the southern half of the island, is chiefly agricultural and residential.

Located east of Talofofo (on the east side of the island) is Talofofo Bay which is one of the most scenic areas on Guam. This area has the potential of being a large agricultural area as well as of scenic and recreational interest.

TABLE 20



MUNICIPALITY OF TALOFOFO

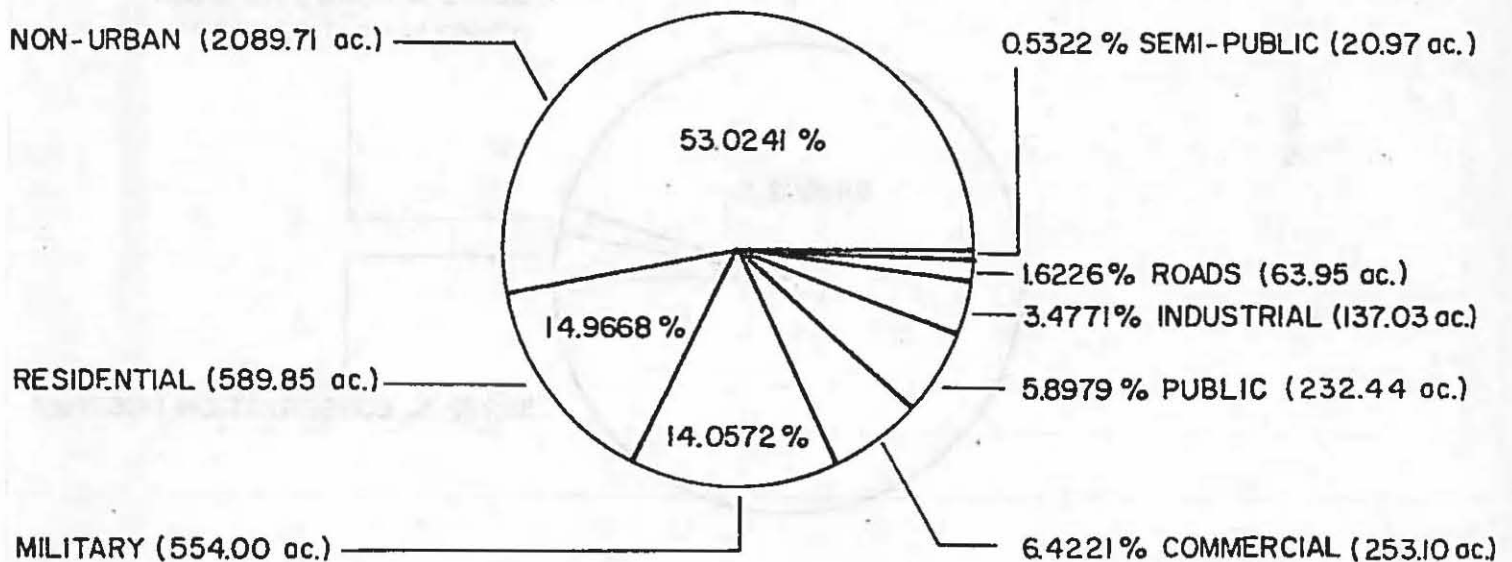
Total Area = 10981.05 ac.

TAMUNING - 6.1578 Square Miles

The community of Tamuning, located north of Agana on Route 1, is the most populated area on Guam. Because of the fractional lot problem in Agana, Tamuning has been forced to develop into a large commercial and industrial area as evidenced by the commercial and industrial structures abutting Route 1, creating traffic problems.

Tamuning has the potential of developing into a favorable residential, commercial and industrial area, but planning principles must be emphasized and restrictions imposed on the commercial-industrial areas in order to prevent encroachment into the residential areas and to prevent strip commercial uses along Marine Drive, Route 1.

TABLE 21



MUNICIPALITY OF TAMUNING

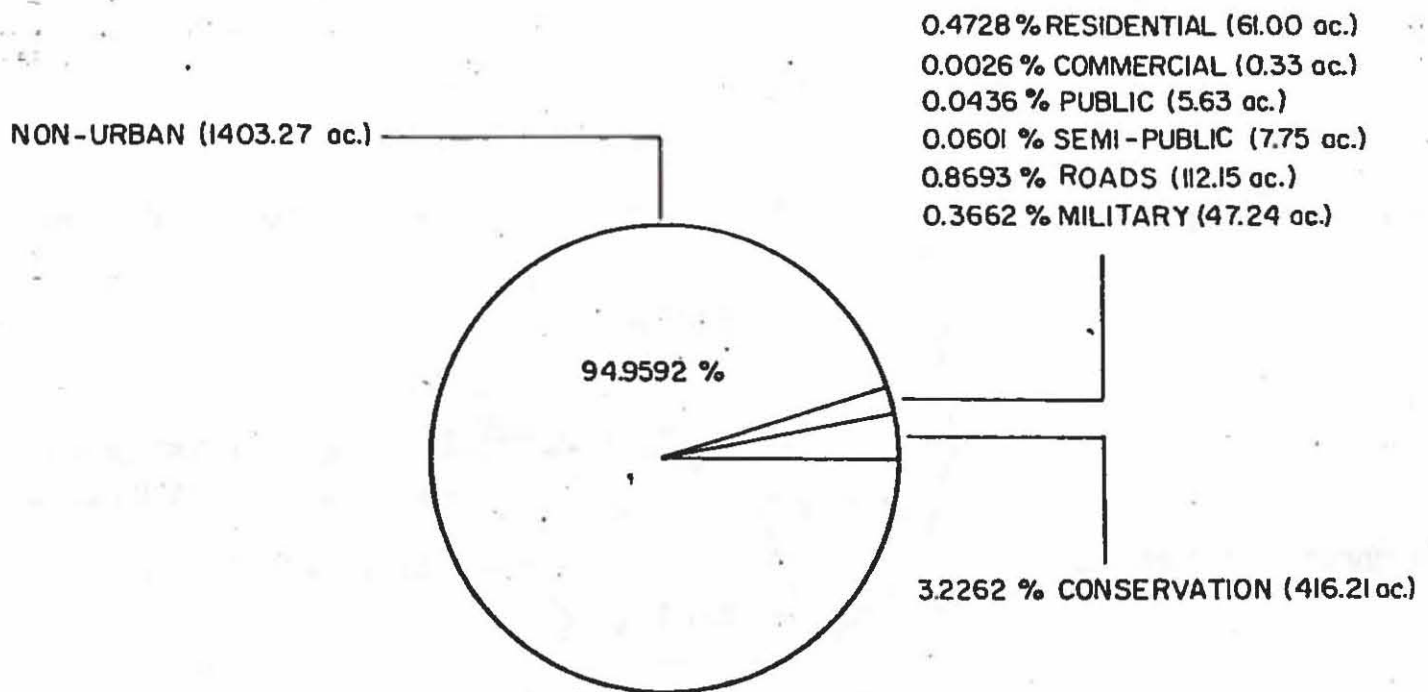
Total Area = 3941.05 ac.

YONA - 20.1578 Square Miles

The community of Yona is located on the east side of the island. This area was also devastated by typhoon "Karen" and regarded as a disaster area qualifying for an Urban Renewal Grant from the Federal Government. At present, Yona is mainly an agricultural area with problems resulting from substandard living conditions.

Yona has the potential of being a large agricultural area as well as an outstanding residential community when the Urban Renewal Project has been effected.

TABLE 22



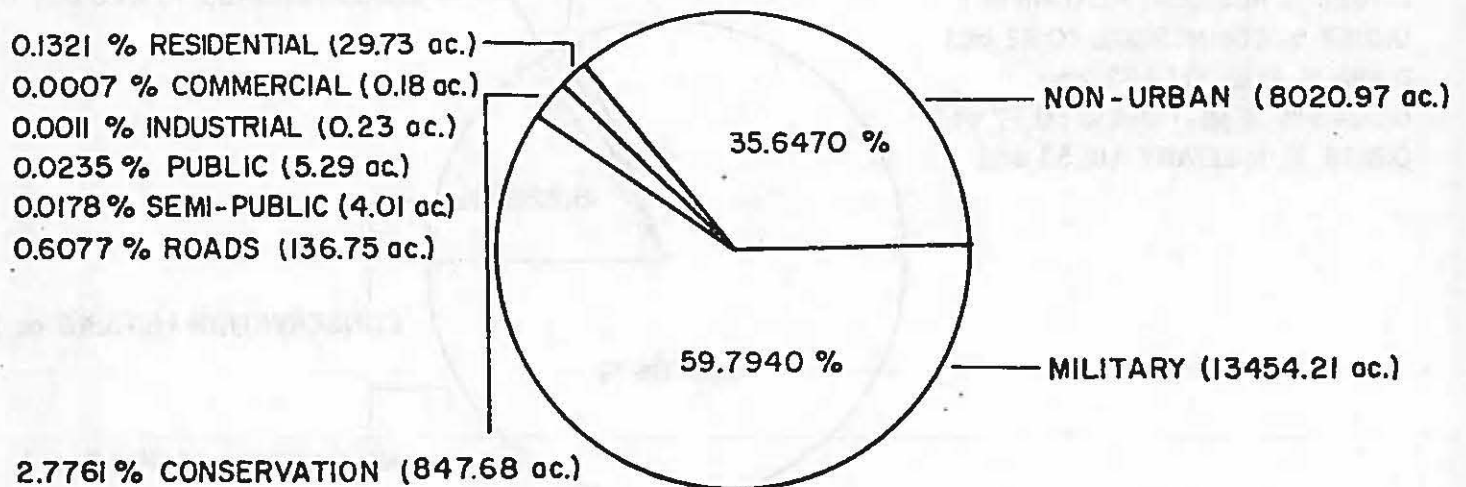
MUNICIPALITY OF YONA
Total Area = 12901.05 ac.

YIGO - 35.1578 Square Miles

Yigo, located in the northern half of the island, is the largest community in land area on Guam. Over 60% of Yigo is under military ownership within the confines of Andersen Air Force Base. Yigo is composed of scattered residential and agricultural areas.

Yigo has the potential of becoming a major agricultural area because of its large land area and relatively flat topography.

TABLE 23



MUNICIPALITY OF YIGO

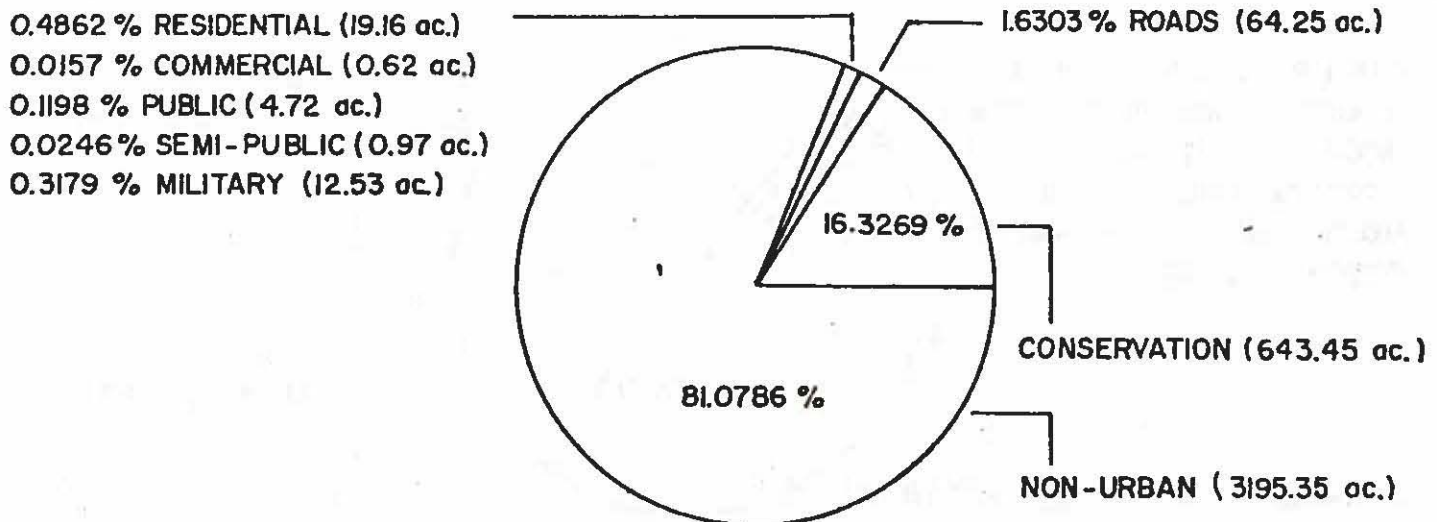
Total Area = 22501.05 ac.

UMATAC - 6.1578 Square Miles

The community of Umatac is located at the southern tip of the island and is probably the most beautiful area on the island. Locked in by mountains on both sides, the view of little village from the hills is very picturesque. It was here that Magellan landed, and remains of an old Spanish Fort can still be found on the two hills guarding the entrance to Umatac Bay.

Umatac has the potential of being one of the major tourist attractions on Guam both for historic and scenic value. The Federal Government has considered developing this area into a National Park.

TABLE 24



MUNICIPALITY OF UMATAC

Total Area = 3941.05 ac.

THE NEIGHBORHOODS

Precise plans for developing the neighborhood concept have been developed for this Master Plan. The amenities which are basically essential to all residential areas are the result of careful planning. The elementary school, the neighborhood recreation facilities for small children, and the necessary shopping accommodations for nearby homes are all part of the pattern for which Guam's neighborhoods are designed. Careful planning design should be employed in order to prevent the intrusion of incompatible uses and to discourage unnecessary traffic through the neighborhood areas. Reference to Guam's neighborhood planning will occur frequently in the sections of this Master Plan which relate to school sites, park and recreation facilities, and local shopping areas.

The following criteria have been used to establish neighborhood areas for the territory of Guam:

Physical Features

1. Size - The size of a neighborhood is determined by the area necessary for all its land use components; by the population and the residential development required to house them; by necessary community facilities and services; by the accessibility of these services; and by the existence of suitable physical boundaries.
2. Shape - The shape of a neighborhood is basically governed by accessibility to school and community facilities. This accessibility is partially based upon the desirable walking distance from the home to community facilities. The selected physical boundaries establish the final shape.
3. Topography - Natural boundaries such as rivers, creeks, and topographic barriers have been frequently used to delineate neighborhoods. The boundaries do not separate parts of a neighborhood.
4. Logical Boundaries - Physical barriers which isolate areas by their presence are logical boundaries. The following barriers which should not separate parts of a neighborhood and prevent its proper functioning are: Industrial and commercial areas, highways, and special features and districts such as an airport.

Population Features

1. Age Groups - Many planning decisions depend on population totals and on data as to family composition. An effort has been made to select residential densities to fit the different sizes and types of families and to plan parks, schools and other community facilities, serving specific age groups, in relation to known and potential age distribution.
2. Density - The density of population within an area determines to a great extent the spatial arrangement of community facilities. This distribution of the population varies from area to area depending upon the extent to which the land is utilized. A neighborhood composed primarily of medium and high density residential development requires more facilities per acre of land than the neighborhood of similar size composed of low density, single-family development.
3. Ultimate Population - Population totals have been used in reaching many planning decisions. These totals comprise the anticipated potential population the area or areas will hold by 1985. The ultimate plan for school and community facilities depends upon the anticipated ultimate population utilizing these facilities. To greatly underestimate or overestimate this population can create an imbalance within the neighborhood or communities and cause excessive public expenditures. Therefore, care has been taken to base decisions on conservative estimates.

Services

Services such as schools, recreation facilities, and shopping facilities can be directly related to the neighborhood and have been included within the necessary neighborhood land use components. Police and fire protection, health services and sanitation, drainage and utilities are additional services which are distributed through the neighborhood, although planned on an island-wide basis. Since the allocation of services are part of environmental planning, the neighborhood is used as a guide.

ASSUMPTIONS OF THE MASTER PLAN

In developing the Master Plan for the territory of Guam, it has been necessary to make certain assumptions. Certain primary urban socio-physical and socio-economic factors are assumed to remain constant or consistent in their broad effect upon the general urban and non-urban structure. These assumptions are necessary in order that projections of specific urban and non-urban characteristics can be made within a generally stable form.

These assumptions are stated here in order to enable the people of Guam to understand why certain proposals and recommendations have been made and to assist them in evaluating the Plan.

Guam's strategic location as the closest United States territory to the expanding markets of Asia should assume increasing importance in the years to come. As world trade registers yearly increases, and as the United States continues to seek overseas markets, Guam can be an important stepping stone to Asiatic markets. More generally, any event such as declared armed conflict, large scale disaster, or a major change in the basic economy would have unforeseeable effects which could nullify this Plan. It is assumed that such changes will not occur. Specifically, the following assumptions are made:

1. That favorable climate, undeveloped land, and economic and educational opportunities will continue to induce in-migration into Guam.
2. That the present in-migration ratio will increase due to the new immigration bill recently signed by the President of the United States.
3. That Agana will remain the central city of Guam and remain the economic center for future commercial growth.
4. That Federal policies supporting and encouraging urban development through programs in urban renewal, residential construction, insurance and home ownership loans, will continue and the territory of Guam will benefit through participation.
5. That residential development in the outlying areas will be predominantly agriculture, low-density, single-family homes; and that high-density homes will increasingly become the mode in the central area of Guam.

PART FOUR

ELEMENTS OF THE MASTER PLAN

THE PRINCIPLE CONCEPTS OF THE
MASTER PLAN OF THE TERRITORY OF GUAM

Five principle concepts regarding the physical development of Guam are inherent in the goals and recommendations of the Master Plan. These concepts listed in order of importance concern:

1. Extent of the Communities - The extent of the communities is the prime determinant for general physical planning. The future Land Use Plans for each community shows the extent of the area they will cover. Topographical features are the main considerations in determining the size. Also, inherent in the concept of size is an assumption regarding migration of industry and people to Guam, in the foreseeable future. Basic policies of the Government of Guam should be as follows:
 - (a) Continued expansion of the communities until reaching maximum projected population or limiting topographical features.
 - (b) By extension of the necessary services of sewers storm drains, and roads.
 - (c) Planning and zoning reserves of land for industry, commerce, and residence in advance to insure choice in location and usage for development of living and working areas.
 - (d) Progressive programming of capital improvements in order to implement planning goals of providing high levels of public services at the lowest cost by active programs to permit construction at today's prices.

In view of these proposed policies, the Master Plan of the territory of Guam projects land use, circulation, and public facilities over the Island of Guam in a manner calculated to achieve the goals and recommendations of the Plan.

2. Forms of the Communities - Many factors combine to create the present forms of the communities and influence their future forms. These factors are generally related to the contemporary value system of the inhabitants and immigrants of Guam, and of the legislators the people elect to represent them. The present value system that relates to the desirability of each man owning his own home or his

own parcel of ground is the predominant thread that appears to run throughout all the policies (public and private) that tend to create the present density of housing on Guam.

The development of Guam's future working areas should follow a low-density, low-intensity pattern of industrial sites of large areas rigidly segregated from residential uses. A concentration of industry in the northern part of the island determines to a great extent the existing and the projected form of land use and circulation. Nuclei of industrial uses projected at Cabras Island's proposed commercial port will somewhat alter the existing pattern of concentration of living and working areas into a lineal pattern of working areas extending north and south on a central axis (Marine Drive, Route 1).

The circulation system serving the land use activities is the dominant element that ties the island together; a pattern of radial and circumferential major highways and streets.

3. Mobility - Reducing costs and effects of the friction of movement should be a major policy commitment of the Government of Guam in its efforts to create desirable and amenable living and working areas on Guam. Therefore, mobility is a major concept of the Master Plan and increasing the opportunity for movement should be a clearly recognized objective supported and implemented by an array of policies. The travails of commuting from one area of the island to another, to work, live or seek out culture, education and recreation is a problem that Government of Guam should realize and it must be approached on an island-wide basis.

Policy and future action is strongly oriented to the automobile as the chief mode of individual transportation and to the truck as the prime mover of goods and services. All efforts of planning and programming for future transportation movement is based on a highway system solution.

4. Agana - Urban Core - The Master Plan recommends the improvement and enhancement of Agana as the central core of Guam in order that it may better serve the Island of Guam. The renewal and redevelopment of the core area is a vital element in the sound economic well-being of the island. Solutions to the problems of congestion, blight, fractional lots, declining sales and vacant lots and buildings are being evolved.

5. Identity of the Communities - Identity of Guam is first geographic in context. Guam is the largest island of the Marianas chain.

More localized geographic identity is found in the locational aspects of living or working in such areas as the northern part, the central part and the southern part of the island. The various communities aid in identification of a given urban area.

Social and economic identification is encountered in many of the geographic considerations as well. From a socio-economic standpoint, Guam is viewed as the gateway to the East being the last position of the United States in the far Pacific. Many of the localized identifying attributes have similar social or economic significances--Umatac being an area of older Spanish architecture and traditions, while Dededo is composed of new and young families with many children.

The Master Plan contains many elements that will aid the individual or group in attaining identification with Guam. The neighborhood plans, the circulation system, the public facilities system, and particularly the recreation elements all aid and are designed to give identity to Guam.

POPULATION INTENSITY AND DENSITY ELEMENT

Goal - To anticipate the island-wide impact of changes in population, population density and building intensity.

The term "building intensity" means the extent to which structures use land and air space. Control of building intensity is necessary in order to insure sufficient light and air for living spaces and to fulfill community goals for a more pleasant environment. Because of the tropical climate and the consequent affinity of its citizens for outdoor living, Guam has had a preference for low-intensity development. Public purchases of permanent open space is one method of assuring low-intensity development. Guam, however, must rely most heavily on regulating development through setback and height provisions. On a single-family lot of 7,000 square feet, the buildable area should be limited to 3,300 square feet by yard requirements. An apartment building should be permitted to cover no more than half of a 7,000 square foot lot, even under the least-restrictive multiple-unit setbacks. Intensity of non-residential development is also of concern. Although setback requirements for industries are not required, all development types are under some kind of control--either height or setback building intensity controls or both. The industrial practice of low-intensity development and commercial needs for parking are depended upon to assist in lowering intensities in industrial and commercial areas.

Population density is measured in persons per unit area, but is more often expressed in dwelling unit per acre. Table 25 shows the dwelling unit density classifications used in this Master Plan. Both population density and building intensity are basic to the Plan, as density determines circulation and other personal service needs, and intensity determines fire and police protection and open space requirements.

Population potential is largely determined by land area, building intensity, and population density. Guam has gained population through migration and birth. The extent of vacant lands within the different municipalities makes it possible for low-intensity practices to continue through the foreseeable future. On Guam, there are approximately 80,000 acres of vacant or agricultural land.

TABLE 25

POPULATION DENSITY - PERSONS PER DWELLING UNIT				
DUS/AC	EQUIV. Lot Size	EST. People/DU	EST. PEOPLE/AC	
			Mean ¹	High ²
0-2	20,000 Sq.Ft. & Over	5.5	5.5	11.0
2-5	20,000 - 8,000	5.5	19.3	27.5
5-7	8,000 - 6,000	5.5	33.	38.5
7-8	6,000 - 5,000	5.5	38.5	44.
8-18	5,000 - 2,500	3.0	39.	54.
18-42	2,500 - 1,000	2.5	75.	105.

These are net acre densities, the appropriate requirements for streets and public utilities and facilities have been taken from gross acre totals.

¹Mean number DUS/AC multiplied by est. number persons/DU.

²High number DUS/AC multiplied by est. number persons/DU.

Along with its expansion of usable land area, Guam has experienced an increase in densities. These density increases are expected to continue as suggested in the Land Use Element. Density and intensity of development in the outlying rural areas are expected to continue to be low. Due to area and height controls, urban building intensity will be little affected by increases in density which occur, except for Agana which has reached less than 50% of its total density due to the fractional lot problems.

In addition to the physical factors of intensity, density, and area, growth in population is dependent upon those factors which will attract migrants to, and keep local people on Guam. The tropical climate, attractive housing, and extensive public services will make it a desirable home; and the economic opportunities will make it possible for people to live productive, profitable lives. If Guam's growth is to continue, the expansion of housing inventory, public services, and economic opportunity must also continue. These do not expand by themselves, but through individual decisions by developers, local government, and private industry. Decisions to make new investments are dependent, in part, upon projections of demand and opportunity. By providing current population, income, and other statistical information, the Government of Guam plays a role in coordinating short-term decisions of various groups. By providing a projection of population, the Government of Guam offers a basis on which public and private decisions may be made in order to meet the needs of this population.

The projection cannot take into account world wars, epidemics, famine, or violent economic relocations. What it can do is sift recent happenings and see which are part of established trends, which are beginnings of new trends, and which have only immediate effect. The likelihood of occurrences is more difficult to determine the farther away the projection date becomes, but a projection for only one or two years is not of much help making capital investment decisions. A generation is a sufficient time span, and yet it does not extend so far into the future that the projection becomes a mere guess. The Master Plan projection will be to 1985.

Many trends in population can be projected to give estimates of future population. The reliability of the estimate depends upon the proper assessment of historical trends and of changes in these trends, such as local birthrate, migration from outside and increased military personnel. In order to make a projection that is sound, a base of information must be established.

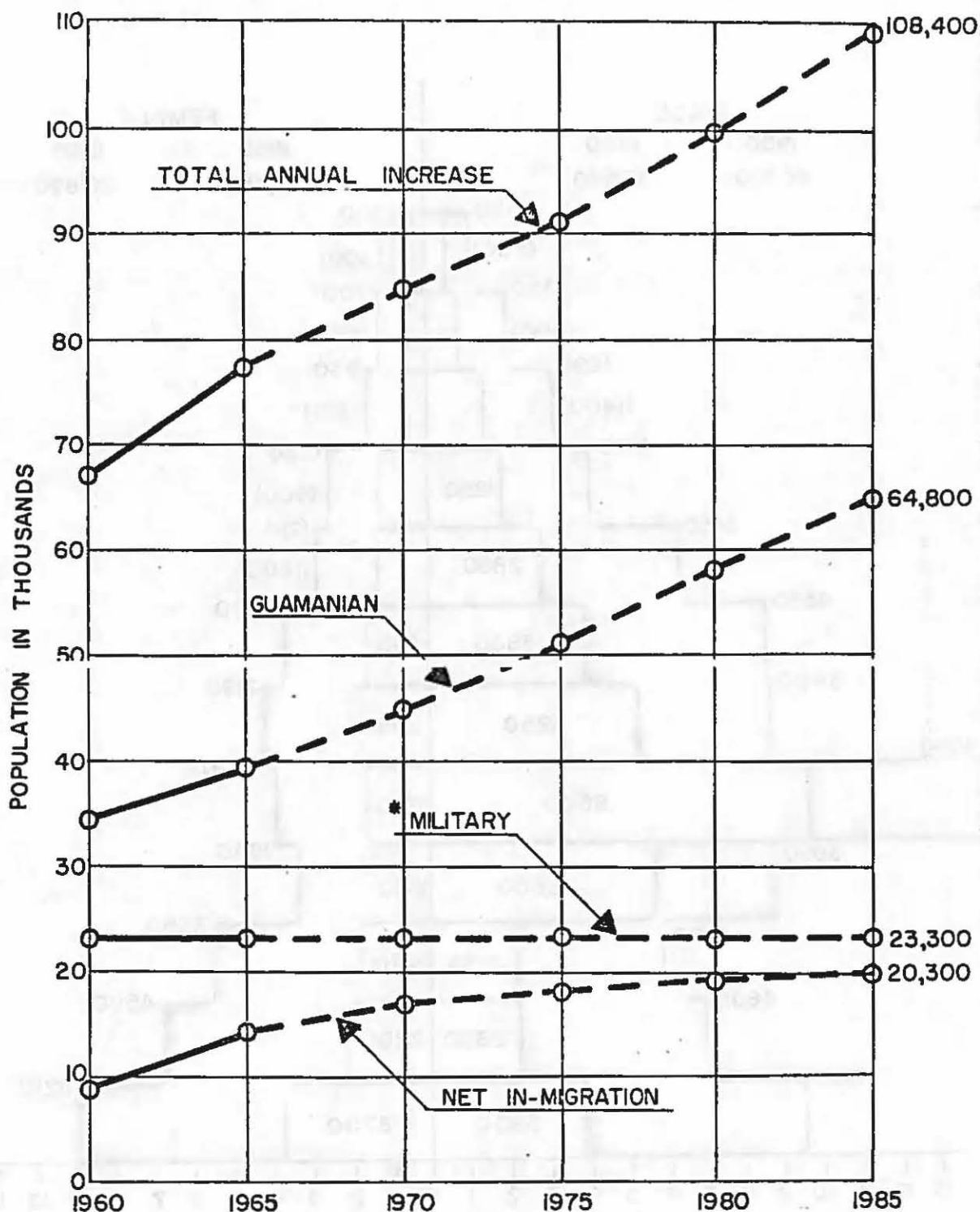
Special census reports in 1910, 1915, 1920, 1925, 1930, 1940 and 1945, taken by the United States Naval Governor, and again in 1950 and 1960, by the United States Department of Commerce, Bureau of the Census, give a picture of the rapid growth during the past decade. Since 1960, Guam has relied on estimates by the Division of Planning. The population growth of Guam accelerated through the 1950's, however, these increasing rates have not continued, although Guam has had a relatively steady increase in population since 1960. Present growth shows no sign of significant acceleration, but little sign of stopping. Economic opportunity on Guam shows a possibility of increasing and the climate, education, and other amenities which have attracted people to Guam are still important factors in population growth.

Because of the changing boundaries of the various municipalities on Guam, components of population, i. e., natural increase (the amount by which births exceed deaths), and net in-migration are recorded for the entire island. In-migration is the most important in current population gains, but fluctuates so much each year that short range projections are impracticable, and longer projections can show that the population will continue to increase.

Natural increase has been nearly steady. As the population of Guam was increased by numbers of young families after World War II, birth rates rose and the expanded population base itself produced further expansion of population. The force of in-migration and military is still great, and the population so largely young, it is not likely that the next generation will see a major decline in birth rates or in natural increase.

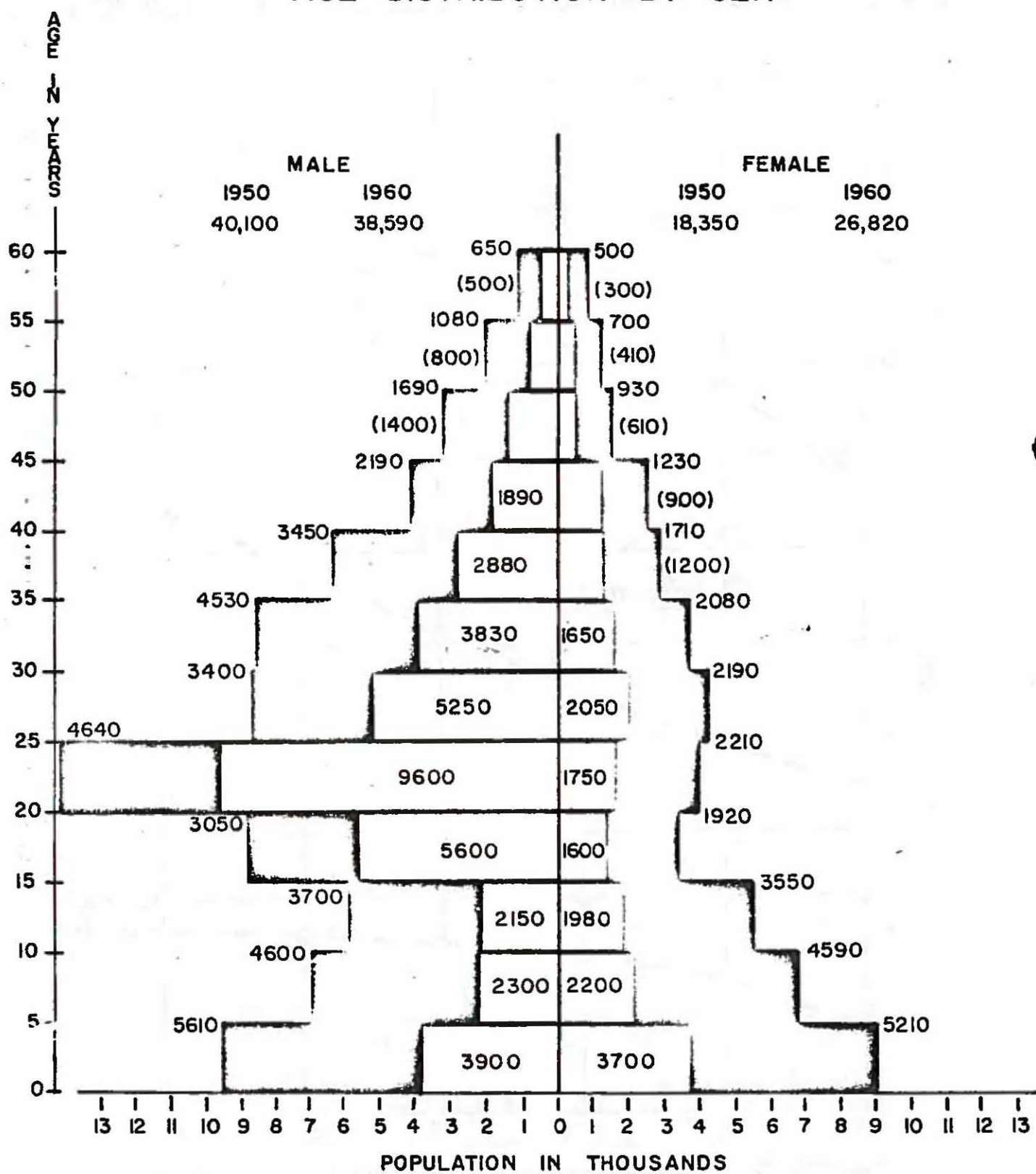
TABLE 26

COMPONENTS OF ANNUAL INCREASE IN POPULATION



* MILITARY - The military represents an indeterminate entity. No projection of this population is herein attempted and the 1960 population residing on military held lands will be considered constant at 23,300 persons.

AGE DISTRIBUTION BY SEX



□ 1950
■ 1960

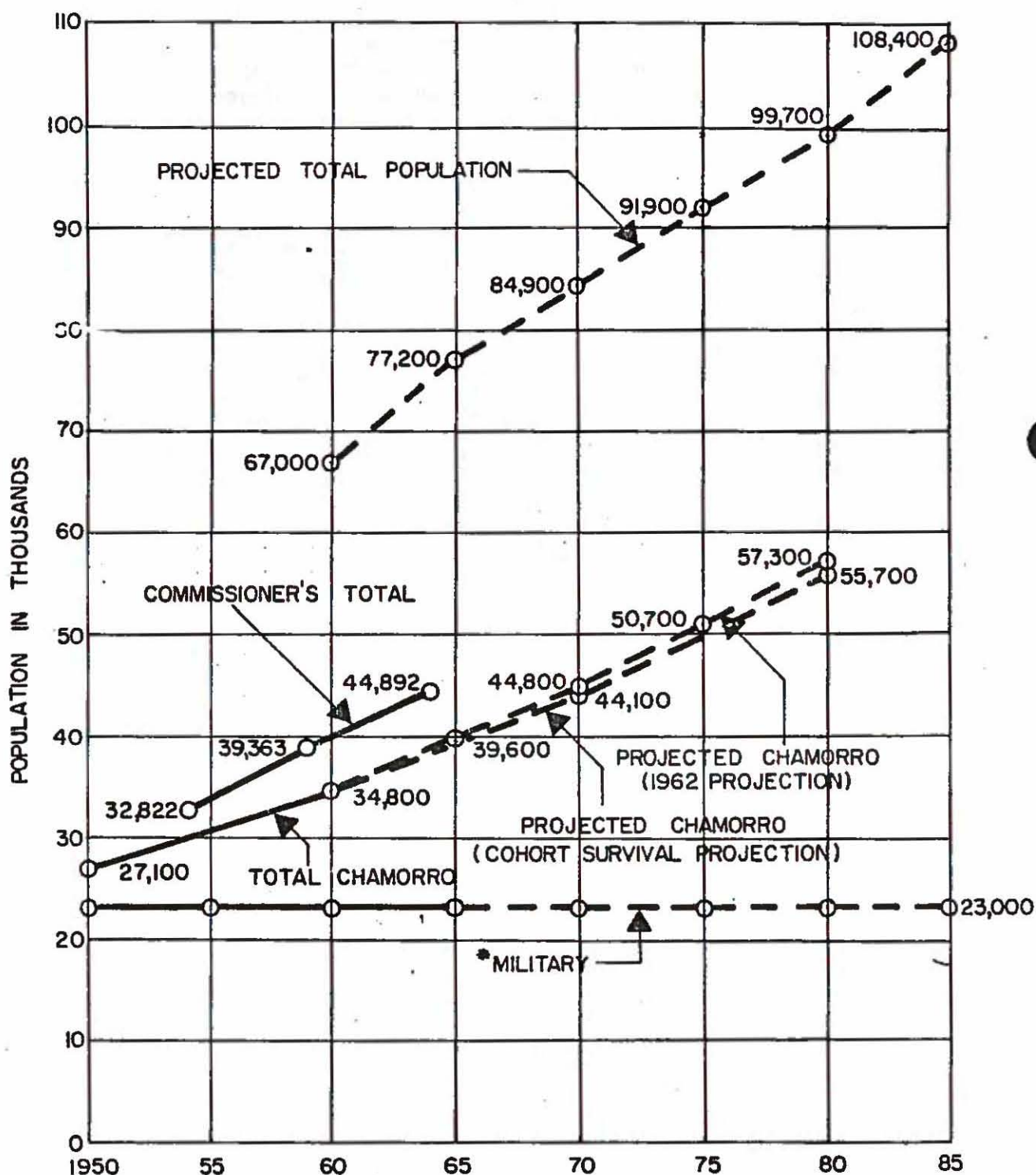
TABLE 27

Since the tremendous changes in economic base and growth patterns during the 1960's brought about by military activity and typhoon "Karen," there is not enough population data available to project population trends without considering other factors. Large in-migration demands rapid expansion of employment opportunities; and economic projections become of major importance. Government of Guam cannot project economic trends because of limited resources and economic dependence upon the military and Federal Government. The Master Plan projection is made on trends in the past and submitted as representing the growth likely to occur on Guam from now until 1985; the growth on which public and private groups should base planning efforts. In order that it may continue as a firm basis for planning capital investments, the following actions will be taken:

1. Continuing evaluation of population and economic trends.
2. Annual revision and extension of the projection in light of continuing trends.
3. Consideration of efforts on population generation and growth resulting from land use and zoning decisions.

POPULATION STUDY

TOTAL POPULATION 1960-1985



*MILITARY - The military represents an indeterminate entity. No projection of this population is herein attempted and the 1960 population residing on military held lands will be considered constant at 23,300 persons.

TABLE 28

LAND USE ELEMENT

Goal - To allocate the uses of land in a manner that will provide the best possible physical environment in which to live and work.

The substance of planning for the future of Guam is the designation of the uses of land, public and private, that will achieve for all segments of the island the highest order of environment in which to work and live. This designation of activities must be based on realistic and workable community-wide goals, principles, and standards of land use and development. In governing community and neighborhood development, the legislators and planners must be cognizant of the many and varied social, economical and cultural values and mores of the society and age in which we exist. Planning for the future of Guam involves projecting these social, economic and cultural attributes to a later period and to forecasting population. Forces and trends affecting these attributes of society and, subsequently, the physical environment must be recognized and treated in the process of land use allocation.

The present pattern of land use and development on Guam is the physical representation of insufficient policies, and land use and subdivision controls. Because post-world war II reconstruction and post-typhoon "Karen" reconstruction were rapid and without proper planning and controls, Guam today is faced with many problems of substandard housing, substandard lots and inadequate service facilities. The pattern that has evolved is one of a spread out urban-suburban environment as indicated along Marine Drive (Route 1) from Dededo to the Junction of Route 2A. The inhabitants of Guam exhibit a high degree of dependence on the automobile for all facets of life, a concomitant of the apparent desire for detached single-family homes. Commercial facilities and public services necessarily reflect the same pattern of dispersed facilities dependent on a circulation system of highways, major and local streets.

Of major importance to planning the future of Guam are the answers to two questions--1) to what extent is the urban form that has evolved a legitimate expression of the will, needs and desires of the people of Guam; and 2) is the projection of a similar form, its faults further mitigated, upon an even greater area to be desired or is some alternative form preferable.

The Master Plan asserts that from all discernable evidence--social, economic and political--the evolved physical form, with its many admitted faults and failings is a conscious expression of

the contemporary goals and values of a greater part of the inhabitants of the territory of Guam, a deliberate physical representation of current consumer wants and preferences.

Imperfections and inequalities, however, are many and manifest as studies of Guam reveal. It is toward a solution directed toward goals and policies (public and private) that decisions will be guided affecting the distribution of people and activities upon the land.

The form that ultimately evolves may change as thought and conditions change; but in the light of what is currently known and predictable, the present dispersed pattern of living and working, geared to a high dependence on the automobile for transportation and a preference for single-family detached housing, will continue to prevail. The additions to the communities may be slightly higher densities, creating more efficient use of our non-ubiquitous land resources. Transportation needs may be altered and reduced by creating nuclei of multi-family, and small commercial centers at peripheral locations to the core area of Agana. (The objective is to encourage a variety of dwelling types and of small retail facilities which will supplement the core area of Agana.)

EXISTING LAND USE

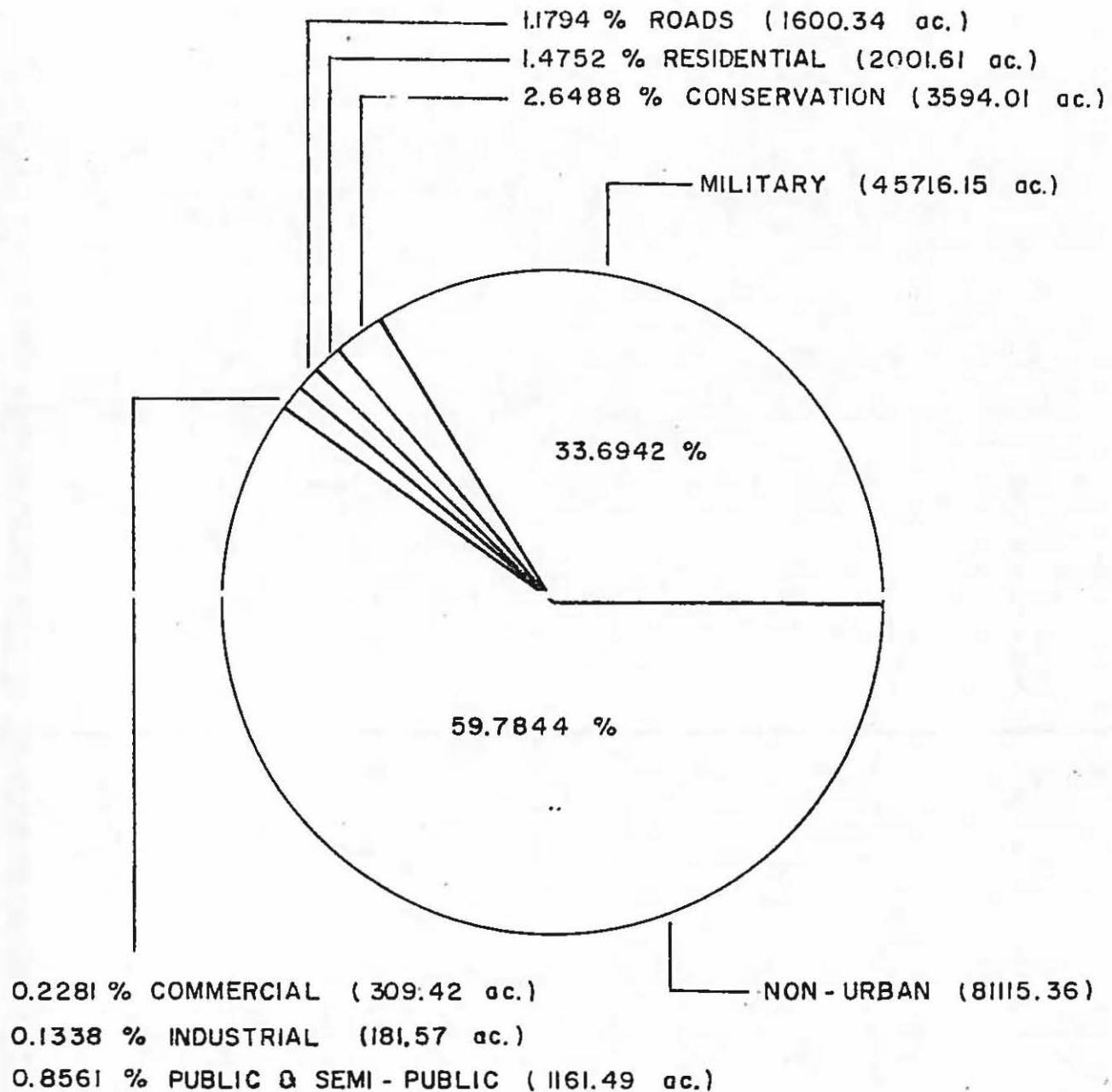
The growth of Guam, breaking up of large parcels of land, and construction of industrial and commercial areas has established a new pattern and environment on the land. An understanding of these activities and their relationship is the starting point for planning the future of Guam--its future functions and patterns of development.

Land use data bears specifically on the following items:

1. The activity or use on each parcel of land.
2. The location and grouping of activities and the relationship between various concentrations of use.
3. The intensity of urban development within the various communities.
4. The relationship of uses to the circulation system and to areas of potential conflict, friction and operational difficulty.
5. The distribution and sufficiency of public facilities and services.
6. The direction of growth, its rate and pattern.
7. The availability of land for future urban development.

TABLE 29

EXISTING LAND USE 1965



ISLAND OF GUAM

Total Area = 135679.95 ac.

FUTURE LAND USE

Since this Master Plan is a guide, it is general in nature rather than precise and specific as regards the use of each individual parcel of land. Precise development plans will be evolved to implement the recommendations of this Plan.

The Land Use Element of the Plan designates generally the areas for living (residential); those for working (commercial and industrial); and those for recreation (parks and recreation) which will comprise the land use area of Guam in approximately 1985. The Plan is based on holding capacity at given densities and intensities of the individual municipalities for a population of 108,000 persons.

Residential Areas: Goal - to designate residential areas and their densities; encourage the best possible environment for living; and relate these residential areas to existing and proposed public facilities necessary for the well being of the people.

The residential areas of the Future Land Use Plan are divided into various classes on the basis of density. Within the Plan, there are two levels of residential densities--low density and high density. Areas of these two densities are shown on the individual Future Land Use Maps of the various municipalities.

The type of density is defined as the number of dwelling units developed per net acre. By "net acre" is meant the area remaining from a gross acre of land after deducting the land required for streets, schools, parks and other facilities needed for neighborhood services. Studies by the Planning Division indicate that from each gross acre of residential property on Guam, approximately 40% should be devoted to streets and public facilities.

The minimum standard lot size used in this Plan for the Island of Guam is 7,000 square feet for all future development. In areas where the lot size has been established as substandard, an up-grading for adjacent property is indicated, and also consolidated where feasible.

In areas where a lower density of development is desired, larger lots should be provided ranging from 10,000 square feet to one acre. Where topographic features are such as to necessitate terracing or other major alteration of the terrain in order to subdivide the property, larger lot sizes--from one-half to one acre--are recommended.

In general, the Future Land Use Plan attempts to establish a balance between the future demands for single-family and multi-family developments based on foreseeable travel needs and desires.

The recommendations for proposed densities in terms of dwelling units, lend themselves to "Planned Community" type development, which may be either single-family or multiple-family. Their location will depend upon specific zoning.

To attain this objective, the following principles should be duly considered in residential development:

1. Physical aspects such as natural topographic conditions should be properly related to reasonable densities and economic capabilities.
2. Residential areas should provide living environment where the internal street minimizes through traffic, and should be easily accessible to employment centers.
3. Residential areas should be in close proximity to major highways for convenience.
4. Residential areas should be protected from incompatible uses by adequate buffer zones.
5. The concentration of residences should be commensurate with the capacity of community facilities. All necessary facilities should be available or proposed in appropriate quantity for the proposed density. A wide variety of densities and housing types should be encouraged.
6. Well planned community developments with varied housing choices in terms of type and price range with adequate commercial and community facilities should be encouraged.
7. Good design and high standards of site and building construction with ample open space and privacy should be promoted in the most economical manner.
8. An efficient traffic circulation pattern with adequate parking facilities should be provided.
9. Maintenance, improvement and enhancement of existing residential areas should be encouraged.

Hotel Areas: Goal - to designate resort hotel areas in order to encourage the best possible development of desirable and attractive hotel accommodations and visitor facilities in appropriate locations.

The resort hotel development shown on the Land Use Plan visualizes, although not designated, three densities of development. The low, medium and high density areas are located on sites that contain some unique natural assets. Although many suitable resort hotel sites are designated on the Plan, there are again as many sites not shown which have similar desirable characteristics. Until the demand justifies additional areas, however, these designations should be limited to what is reasonable, economical, and physically feasible. Emphasis should be placed upon planned open space, underground utilities, building height limitations, bulk and density controls; improved vehicular and pedestrian circulation, and widened and improved beaches.

The tourist industry is susceptible to the whims and fancies of the visitors and world economic conditions. Nevertheless, it should be considered as a future contributor to the economy of Guam if properly guided.

In order that Guam may compete favorably with other tourist destination areas, it is necessary that desirable and attractive hotel accommodations and visitor facilities be situated in appropriate locations. To provide such accommodations and facilities, the following requirements should govern resort developments:

1. Low density mountain and beach resort development in rural areas should average six hotel units per acre; ~~should average 60 units per acre~~ for medium density resort development in urban and suburban areas; and average 180 units per acre in high density areas.
2. Resort hotel developments should be served by a major street or highway.
3. Features of historic or scenic significance on resort hotel sites should be preserved, improved, and maintained for use by the visitors.
4. The minimum lot area should be ten acres for low density; 20,000 square feet for medium density; and (except in unusual circumstances) 10,000 square feet in the high density areas.

Commercial Areas: Goal - to designate the logical allocations of land for varied commercial uses in order to insure maximum efficiency and best relate these uses to the needs of the people in the area.

The Land Use Plan designates two levels or types of commercial areas--regional centers and neighborhood centers.

These differ in the type of facilities and merchandise available and in the number of persons required to support them.

A regional commercial center contains a wide variety of retail stores, professional offices, hotels, theaters, cultural facilities and financial institutions. The primary difference between these facilities and other levels of commercial districts is that it offers specialized activities and the opportunity for competitive shopping. There is only one center of this level on Guam with the potential of developing into a Central Business District, namely, Agana.

The neighborhood commercial center is the smallest of the retail shopping centers. Its function is to provide convenience goods and personal services to a population of from 2,000 to 10,000 persons. Commercial centers of this level are integrated into the neighborhood design and are usually located within walking distance of the residents served.

The neighborhood grocery store has played an important function in the development of our urban centers, but the automobile and new marketing techniques have changed shopper habits. The number of pioneer family corner stores in the neighborhoods is diminishing as a result of modern trends. They are losing their importance, have long since been amortized, and most of them are presently housed in substandard structures that are a blight on the neighborhood and lack adequate parking.

Sound land use planning should provide for the phasing out of these incompatible uses. A non-conforming status permits the operation to continue as it has in the past, permits alterations controlled by law and yet accomplishes a gradual elimination of these uses. The danger in the legal continuance of these uses through zoning is that they eventually cease because of economic reasons, and when an attractive offer is made for the land because of its commercial zoning, the operation is then sold and replaced by other business concerns (i.e., filling station, drive-in restaurant, etc.) that are more incompatible with the surrounding neighborhood.

Establishing a desirable pattern of land use for commercial purposes, fostering and creating a favorable economic climate for commerce are part of the broad objectives of the Master Plan. Some principles to accomplish these objectives are as follows:

1. Improve and maintain the Agana Central Business District as the financial and civic center of the island and as a major shopping district.
2. Provide adequate clusters of commercial land areas in appropriate locations with sufficient pedestrian and

vehicular circulation systems, adequate landscaped parking, and efficient accessibility.

3. Encourage attractive and harmonious shopping and business structures in commercial areas with plantings, pedestrian way and sign controls.
4. Prevent the intrusion of commercial land use into residential areas, and to discourage strip commercial development.
5. Serve the shopping and service needs of residents efficiently, conveniently, and pleasantly in shopping centers related to residential areas.
6. Determine, after careful study of the population and purchasing power of the area to be served, the number, size, type and location of shopping centers.
7. Achieve by site design and buffer zones, a harmonious relationship between commercial development and surrounding land use.

Industrial Areas: Goal - to designate the logical allocation of sufficient land for varied industrial uses with optimum accessibility, and to best relate these uses to the needs of the people.

Areas designated on the Land Use Map for industrial uses will not necessarily be completely absorbed by industry. It is to be noted that many of these areas are generally not suited for future residential uses and some over-zoning of industrial land will tend to keep industrial land values within more reasonable limits.

It is the intention of the Master Plan that future industrial development be located in areas close to the central business district, but in such areas to avoid the adverse effects of these uses upon densely populated areas. The Plan has attempted to properly locate sufficient industrial areas to insure enough industrial land for future needs. In some areas like Harmon Field, more 'industrial' is designated than justified by present trends. However, it is undesirable that it be designated for any other use as this is the logical land use pattern for the future.

Since availability of land for industrial uses near Apra Harbor is limited, areas so zoned should be utilized for such purposes and not for commercial or other uses.

Inasmuch as the sound growth and development of existing and new industries is one of the objectives of the Master Plan, the following requirements should be provided:

1. Industrial lands should be located near major highways or where there are suitable access roads to these highways.
2. There must be an adequate supply of water with water mains close enough for economical extension into the industrial district.
3. The area must have adequate power available with sufficient voltage for all industrial uses in the district.
4. There must be adequate facilities for waste disposal.
5. The industrial area must have the proper drainage. In addition, the substratum must adequately support foundations for various types of structures.
6. The area must be large enough to accommodate a group of industries with allowance for plan expansion.
7. The area should be within reasonable commuting distance from residential areas, and large enough to supply the necessary labor for industries locating in the district. With the increasing use of automobiles and with adequate parking facilities and other service amenities, employees are willing to travel greater distances to work.
8. The industrial developments should present a pleasant appearance and an attractive working environment.

In order that industrial developments will not adversely affect the populated areas and yet have excellent accessibility and relationship to markets and supplies, the following requirements should be met:

1. For new industrial tracts, the minimum lot area should be 7,500 square feet for light industrial uses; 10,000 square feet for heavy industrial uses; and 20 acres for industrial parks.
2. All obnoxious industrial uses should be located a sufficient distance from residential areas so that smoke, dust, odors, fumes, noise, etc., will not adversely affect living conditions.

3. All industrial areas should have good accessibility and preferably be served by at least one major thoroughfare with a minimum right-of-way of 76 feet and 60 foot pavement. In any event, when warranted, with at least a 56-foot roadway with a 40 foot pavement.
4. The minimum off-street parking for all new industrial development should equal one space for each employee on the maximum working shift.

Agriculture Areas: Goal - to develop an agriculture economy, reserving suitable lands for agricultural purposes, and preventing infringement by non-agricultural uses wherever possible.

The Island of Guam is the largest of the Marianas chain, containing 212 square miles of land area of which more than 50% has agricultural potential. Urban uses have been competing with potential agricultural uses. There can be no doubt that one of the serious planning problems that will arise on Guam will be the situation created by sprawling and scattered housing subdivisions as the population increases, depleting our best agricultural lands and requiring the extension of expensive community facilities.

The agricultural industry has the potential of being a large contributor to the economy of Guam, and could employ a substantial number of the labor force. Being an island community, it is desirable that Guam be self sustaining. Even though agricultural production shows signs of increasing, it has not been able to keep pace with our population growth necessitating larger import of foodstuffs.

The greatest detrimental effect is reflected on lands being utilized for diversified agriculture because new areas may be beyond the means of acquisition of the individual farmer and he will be forced to operate on leased land.

One of the principle objectives of the Master Plan is to create an agricultural economy. Not only is there a need to make Guam self-sustaining, but there is a need also to curb urban sprawl which encroaches upon agricultural lands.

To accomplish these purposes, our prime agricultural lands must be preserved wherever possible. The governing principle should be that suitable lands be reserved for agricultural purposes and be protected from infringement by non-agricultural uses wherever possible. At the same time, the possibility of land speculation because of inflated or artificial land values must be minimized.

The agricultural land use designation is shown on the land use plans. No differentiation is made for the various types of agricultural uses, but it is contemplated that the following minimum requirements shall be adhered to:

1. Area. A minimum of three (3) acres should be provided where livestock or other forms of animal husbandry may be kept. A minimum of one (1) acre should be provided for each dwelling unit.
2. Parking should be provided as follows:
 - (a) One (1) parking space per dwelling unit.
 - (b) One (1) parking space per two employees.
 - (c) A truck loading and unloading area.

Conservation Areas: Goal - to curb urban sprawl; to encourage more economical and desirable urban development; and to help provide necessary recreational, conservation, and scenic areas by preserving open-space land essential to proper development and welfare of the urban areas.

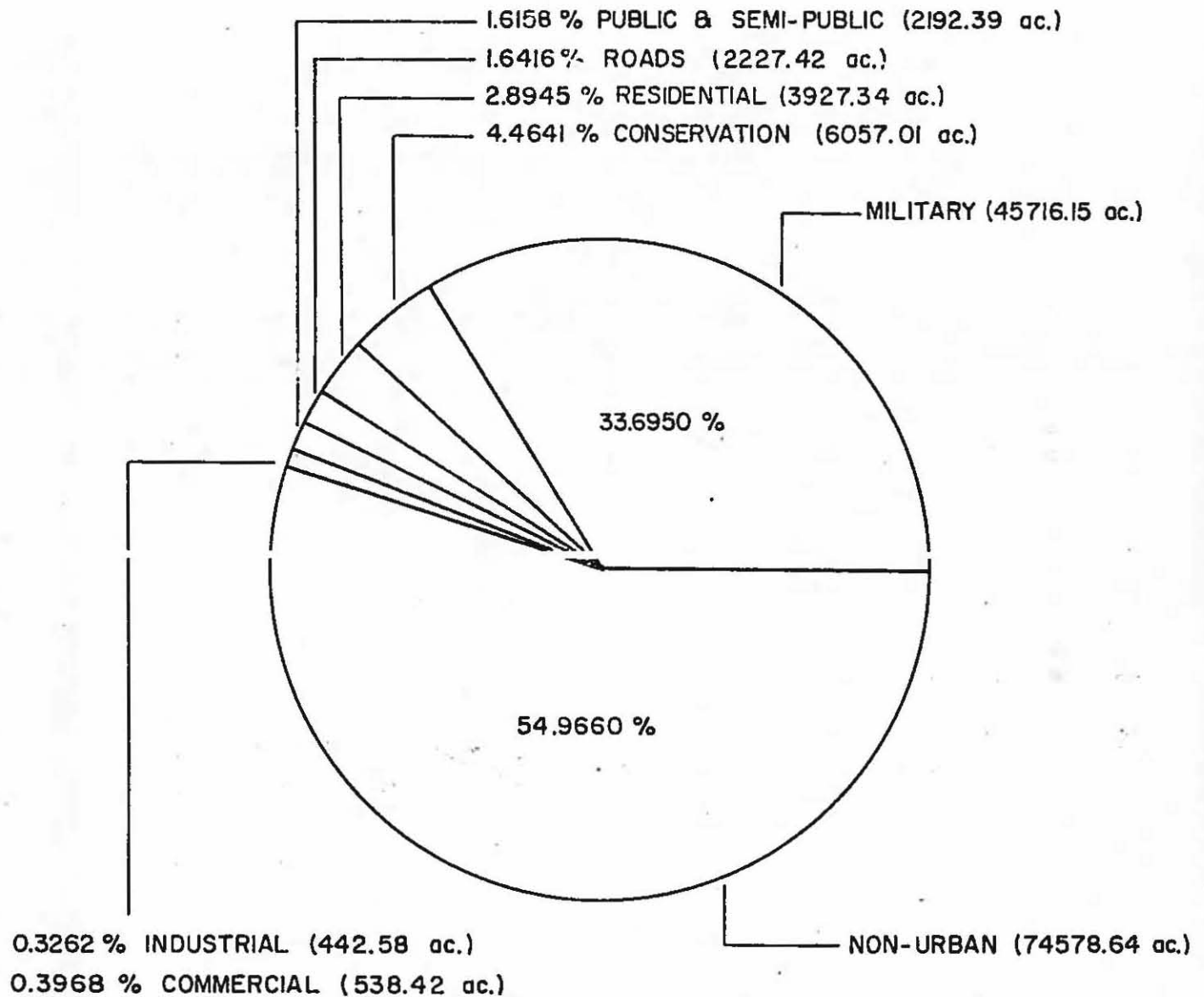
The conservation areas include areas normally considered too steep to economically accommodate building sites; the forest reserves and lands designated conservation by the United States Department of the Interior; open spaces that may be necessary for the preservation of wild life, indigenous forests, and plants; beach and mountain areas containing significant natural assets or historic sites; and areas subject to floods and earth slides which endanger life and property.

The term "open-space" means any undeveloped or predominantly undeveloped land in an urban area which has value for (a) park and recreational purposes, (b) historic or scenic purposes, or (c) preservation of life and property in areas subject to floods and earth slides.

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FUTURE LAND USE 1965 - 1985

TABLE 30



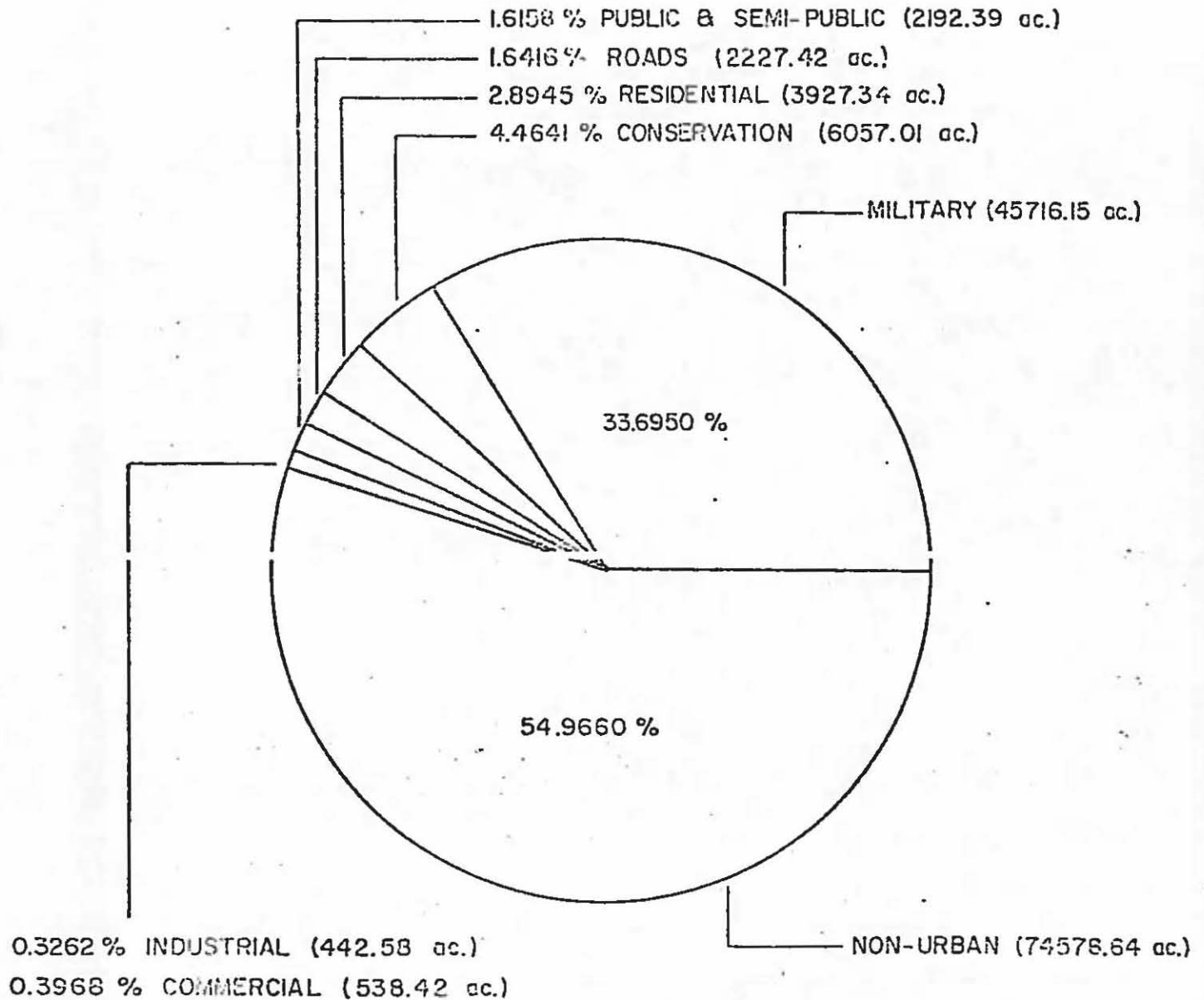
ISLAND OF GUAM

Total Area = 135679.95 ac.

FUTURE LAND USE

1965 - 1985

TABLE 30



ISLAND OF GUAM

Total Area = 135679.95 ac.

CIRCULATION AND TRANSPORTATION ELEMENT

Goal - To provide a circulation plan which is effective, efficient and safe, guided by the goals directing land use patterns and providing total integration of all inter-island and community circulation systems.

The original circulation system on Guam was completely destroyed during World War II, and rebuilt after the re-occupation of American forces.

Generally, the existing highway system is in fair condition, and serves its purpose, but confusion does exist on the ownership and maintenance responsibility. At present, there is a total 132.4 miles of numbered highways with 10.7 miles of highway within the security area controlled by the armed forces, and inaccessible to the general public. Therefore, these roads have been eliminated from the report. This report deals with the remaining 121.7 miles of highways which are open to unrestricted public travel.

The ownership of the highway rights-of-way is broken down into five categories, and 41.1 miles or 33.8% of the highway rights-of-way are either under leasehold or trespassing on private property (Table 31).

The responsibility for maintaining the highway system bears little relationship to the right-of-way ownership. The responsibility was set up under an agreement entitled "Agreement between Department of Navy and Department of Interior with Respect to the Transfer of Responsibility for the Administration of the Government of Guam" effective August 1, 1950. This Agreement has been amended twice and several addenda attached. The maintenance responsibility is placed into four classifications: Navy, Air Force, Government of Guam and Joint Use. The 'Joint Use' category is divided into 70% for Government of Guam and 30% for the United States Navy, on the basis of square feet of pavement and shoulder to be maintained. These areas have been computed and sections of the highways have been assigned to both agencies. All other highways not covered by this Agreement are the responsibility of the Government of Guam for maintenance and upkeep (Table 32).

The trend on the Island of Guam is for greater movement of people and goods by motor vehicles. No community can grow or survive without adequate streets and highways for the movement of these vehicles in an economical, safe and uncongested manner.

People and the activities in which they are daily engaged determine the volume of traffic and the routes to be traveled. The solution is to set forth a pattern of streets and highways which would be adequate for predicted future development, following the desired lines of travel as topographical considerations and economy of construction would allow.

TABLE 31 RIGHT-OF-WAY OWNERSHIP

Route No.	Federal Military Areas	Govt. Non-Military Area	Govt. of Guam	Leasehold	Private or Unknown	Total Miles
1	7.0	11.4	0.6	4.1	6.9	22.5
2	0.4	2.4				10.3
2A	1.8					1.8
3	5.5					5.5
4				9.1	19.1	28.2
4A			2.3		1.1	3.4
5	2.6	0.2				2.8
6	3.9	0.9				4.8
7	1.0	0.5				1.5
8	3.2	0.3		0.8		4.3
9	3.2					3.2
10		3.6				3.6
11	2.1					2.1
12		0.7	0.6			1.3
14		1.2				1.2
15	5.1	4.6	2.0			11.7
16	1.2	3.0				4.2
17	0.5	7.2				7.7
18	1.6					1.6
Total Miles	39.1	36.0	5.5	14.0	27.1	121.7

Total Per-Cent	32.1%	29.6%	4.5%	11.5%	22.3%	100%
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TABLE 32 MAINTENANCE RESPONSIBILITY FOR HIGHWAY SYSTEM

Route No.	Joint-Use Navy/Gov. Guam		Air Force	Gov. Guam	Not Assigned	Total Miles
1	4.0	16.3	2.2			22.5
2	3.4				6.9	10.3
2A	1.8					1.8
3		5.5				5.5
4		9.1			19.1	28.2
4A					3.4	3.4
5	2.8					2.8
6		0.9	3.9			4.8
7		1.5				1.5
8		4.3				4.3
9			3.2			3.2
10		3.6				3.6
11			2.1			2.1
12				1.3		1.3
14				0.7	0.5	1.2
15				11.7		11.7
16				4.2		4.2
17	7.7					7.7
18		1.6				1.6
Total Miles	19.7	41.2	7.6	17.9	29.9	121.7
Total Per Cent	16.2%	33.9%	6.2%	14.7%	24.6%	100%

The purpose of the circulation plan is to furnish a long-range general guide for the location of new roads and the improvement, widening and realignment of existing roads adequate to meet the needs of the future population anticipated for the territory of Guam. The plan will serve to:

1. Promote the social and economic growth of the area.
2. Provide a guide for the orderly development of an efficient, economical and safe road system.
3. Serve as a guide in the development of the lands of the area.
4. Provide the basis of a continuing road improvement program.
5. Provide a basis for budgeting funds to accomplish the plan by assigning priority on the basis of need.

There are four major determinants which substantially dictate the street and highway system for the territory of Guam.

1. The forecast of future population (108,500 by 1985, including military and dependents).
2. The prediction of the major future uses of land that would generate traffic.
3. The existing topography.
4. Existing street and highway systems.

It is necessary to establish where and in what numbers the population will move by automobile to work, recreation and trade, and the general traffic for services required to serve the population within the territory of Guam. This establishes the future location for industrial centers, shopping centers, schools, and recreational areas.

The northern half of Guam is a relatively flat plateau, raising to an elevation of 600 feet. The southern half of Guam is more rugged; the terrain is very irregular with many hills and cliff-sides, which control and influence the physical location of the road system. It may be difficult to find a practical route for a road to serve a particular desired line of travel, and at the same time, meet the design standards for grades, widths of roadbed, and minimum curvatures necessary for safe and convenient travel.

Streets and Highways

The primary objective of the streets and highways section of the Circulation Element is to provide a balanced relationship between the use of land and the attendant circulation which the land uses generate, coordinated with speed and type of transportation desired.

Efficiency in the movement of traffic is directly related to the capacity of the facilities which channel and control the traffic. The graduation of movement is exemplified by a recognized hierarchy of vehicular circulation facilities which begins with the residential street and works up to the major thoroughfare by way of the collector and commercial streets, feeder streets and rural highway. The vehicular circulation facilities are shown on Chart 19.

Residential Street - Facility providing direct access, light and air to abutting property, not designed for through traffic. A residential street may be a cul-de-sac or a dead-end street with a turn-around at the closed end.

Collector and Commercial Street - Facility providing access to adjacent lands. This is usually a low-volume street of little general island importance, although used as a commercial street, it has a high volume of traffic providing service to abutting property. These streets are classified into two categories, urban and rural.

Feeder Street and Rural Highway - Facility connecting neighborhood collectors to major thoroughfares. This is used in place of major thoroughfares where such thoroughfares are not justified and classified into two categories, urban and rural.

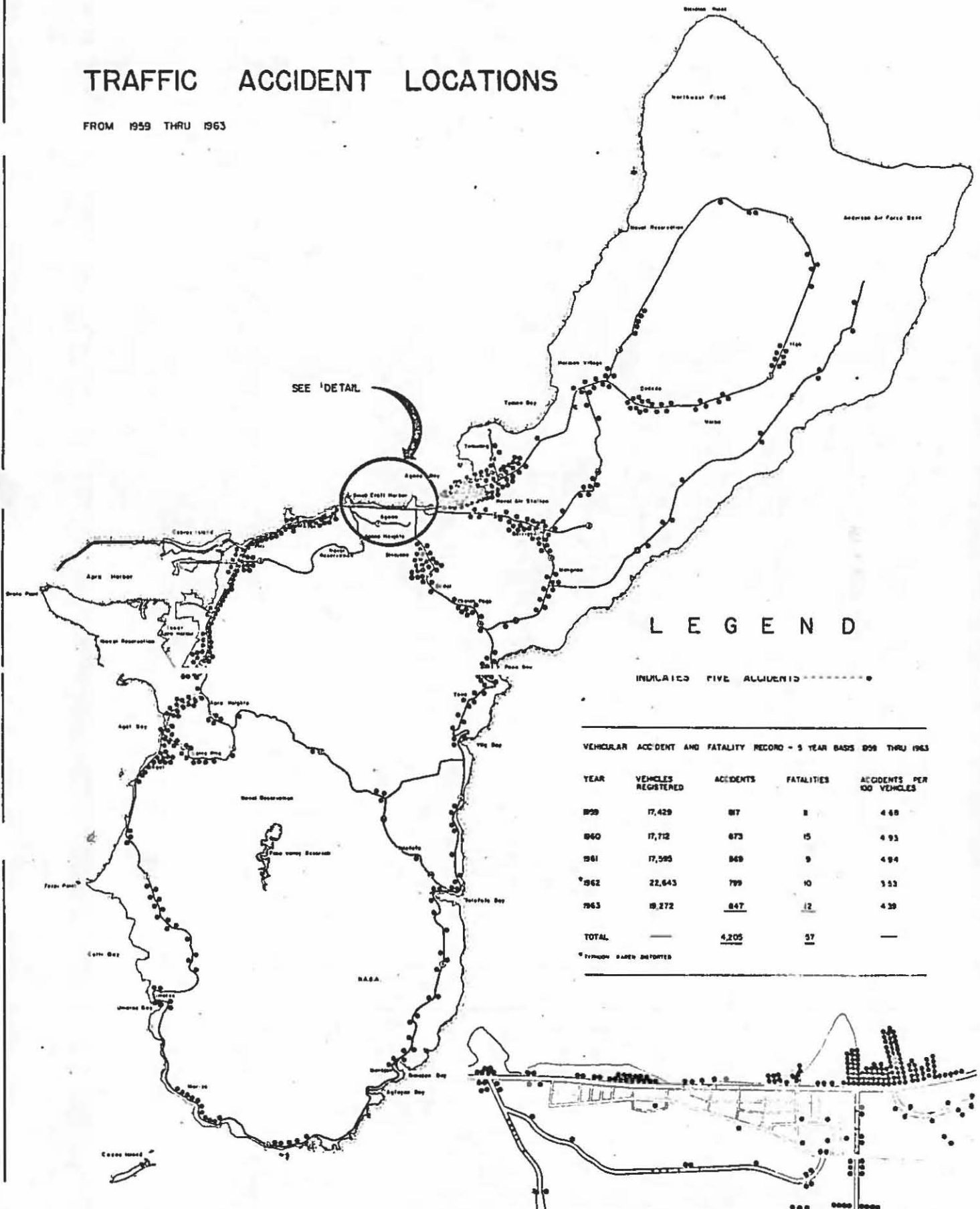
Major Thoroughfare - Principle arterial highway, Marine Drive, Route 1, from Wettengel Junction to Route 2A having intersection access at grade, and offering direct access to abutting property. Limited access reservations may be required in hazardous and heavily congested areas. This facility allows the movement of through traffic from one local area to another. Also classified into two categories, urban and rural.

Recommendations:

1. The maximum use should be made of the existing road network in order to avoid costly uneconomical duplication of needs or unnecessary utilization and cutting up of lands by roads which are not essential.
2. Marine Drive, Route 1 from Route 8 to Wettengel Junction should be widened to four lanes, with a median strip to provide for turning lanes, based on the standards of the major thoroughfare. This recommendation is based on the accident rate over a five-year period as illustrated on Chart 22, and the traffic flow, Chart No. 23.

TRAFFIC ACCIDENT LOCATIONS

FROM 1959 THRU 1963

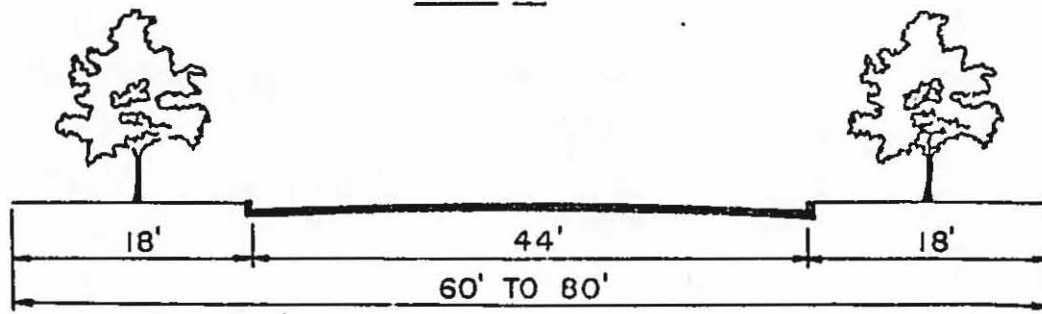


TERRITORIAL PLANNING COMMISSION • GUAM
 MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT

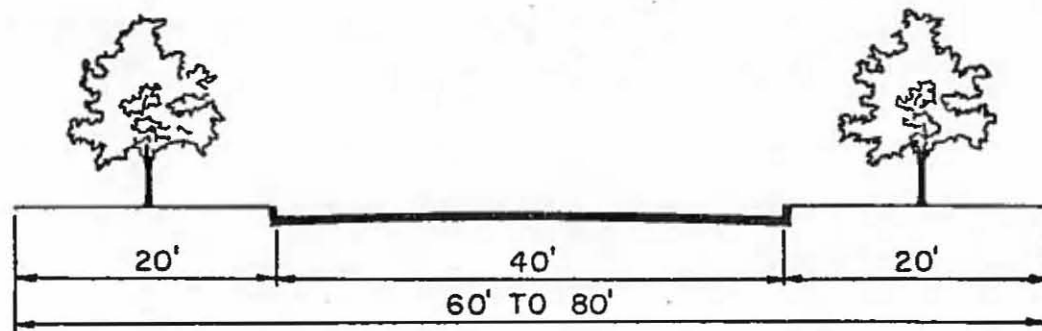
THE PREPARATION OF THIS MAP WAS FINANCED IN PART THROUGH AN URBAN PLANNING GRANT FROM THE HUDSON AND HERRING TRUST, UNDER THE PROVISIONS OF SECTION 201 OF THE PUBLIC ACT OF 1964, AS AMENDED.



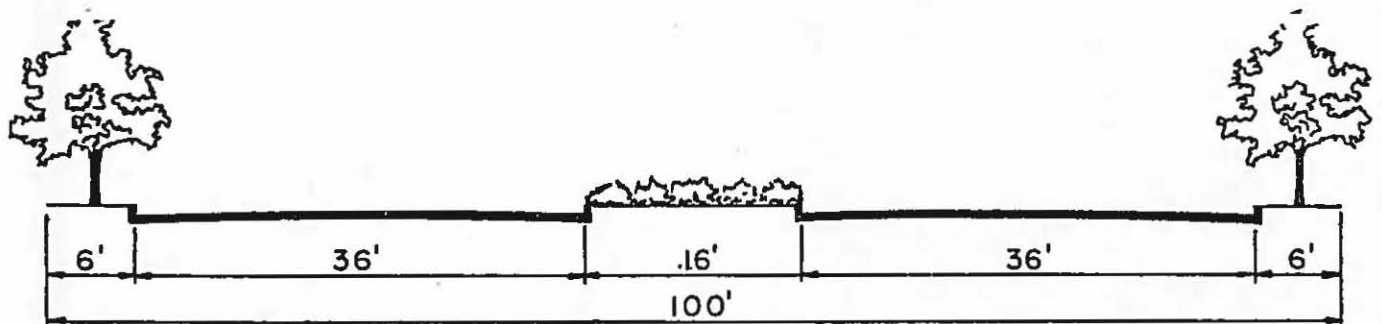
CHART 20



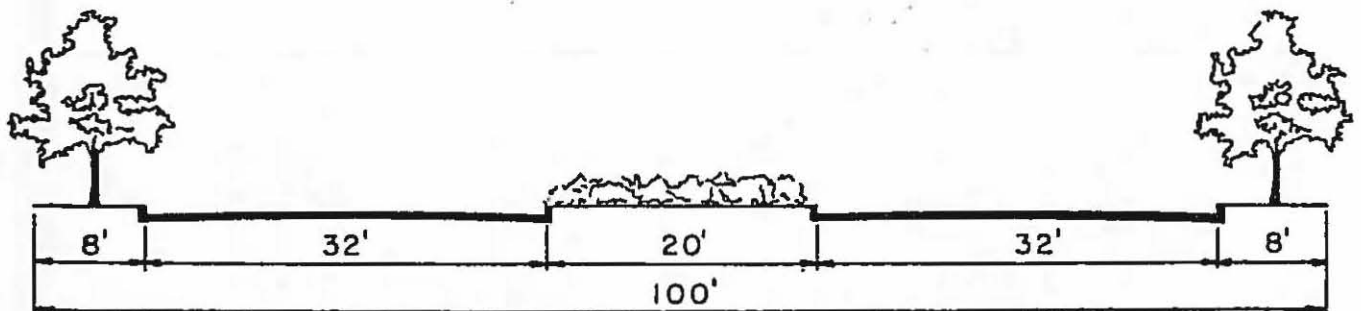
URBAN AREA



RURAL AREA



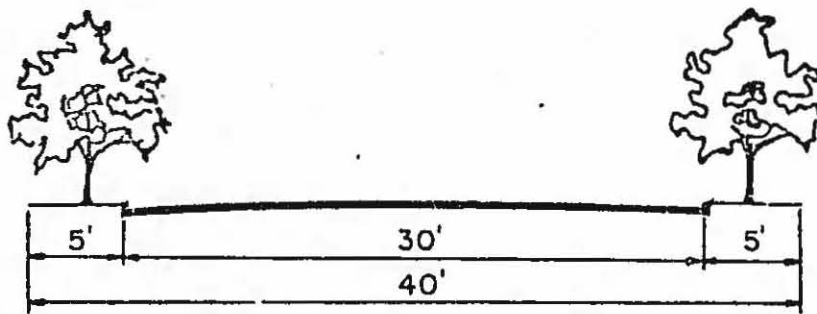
URBAN AREA



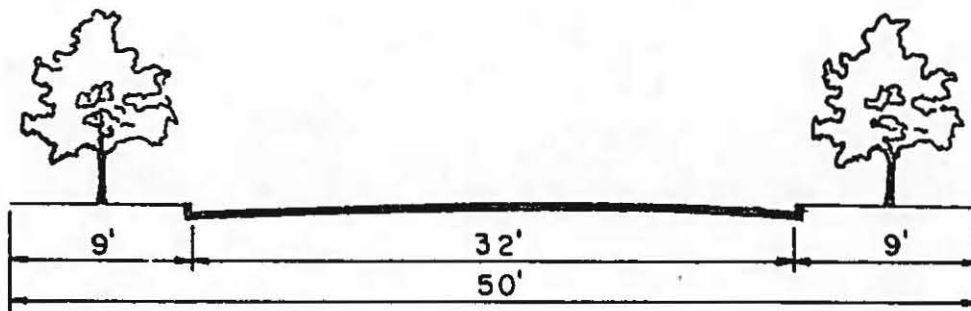
RURAL AREA

MAJOR STREET CROSS SECTIONS
SCALE 1' = 15' - 0"

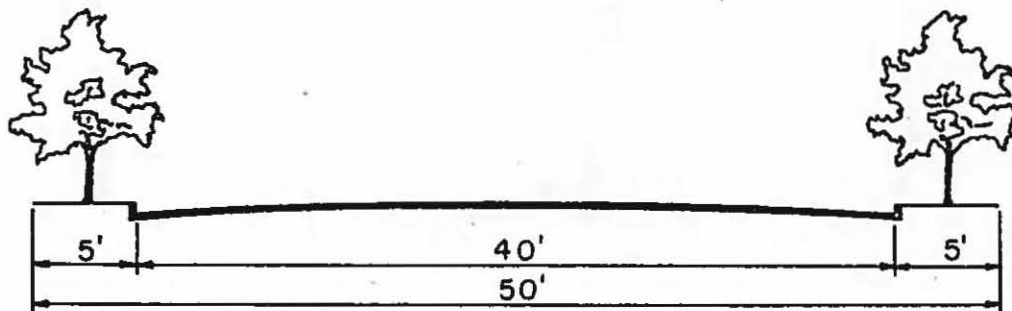
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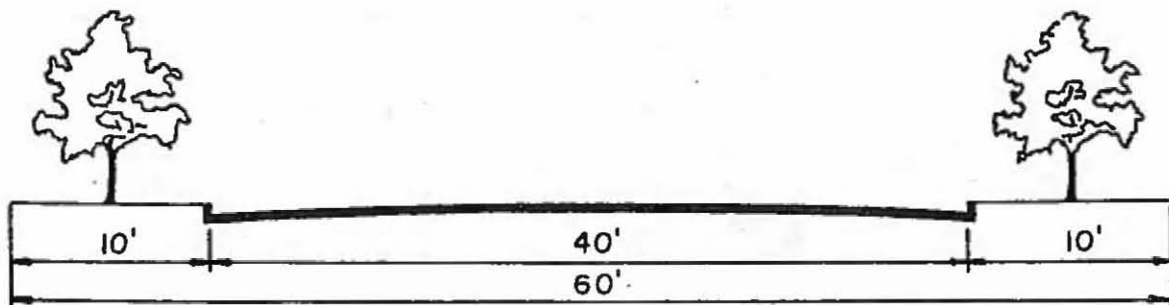
URBAN AREA



RURAL AREA



URBAN AREA



RURAL AREA

MINOR STREET CROSS SECTIONS

SCALE

1" = 10'-0"

18 HOUR VOLUMES - NOVEMBER, 1963



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

3. An extension to Route 7 should be constructed in order to divert the through traffic around Agana's Central Business District to help alleviate the traffic congestion on Marine Drive, Route 1 based on the traffic flow count.
4. Access should be limited along Marine Drive, Route 1 between Route 6 and Route 14 in order to provide free-flowing traffic due to the existence of high commercial and industrial density along this area.
5. Careful studies made along Marine Drive, Route 1, indicate that the intersection of Route 8 should be closed and diverted into the proposed extension of Route 7. This assumption is based on the traffic flow and accident rate data. It is also estimated that because of this poorly designed intersection, traffic flow and maximum capacity are reduced by more than 50% because of delays in starting and stopping.
6. The Harmon Field Cut-Off for Route 1, from the new Public Works Center to Dededo should be constructed to create a safer and more efficient route, and open Harmon Field for future development and expansion.
7. Three-lane Routes 4, 6, 8, and 10 should be reduced to two lanes because of the high accident rate caused by the center lane. The center lane should be converted into a median strip providing a protected turning island at designated locations.
8. The Government should adopt a stronger policy through capital improvements to improve existing roads and construct new ones.
9. Street lighting should be provided to safeguard against street accidents and street crimes. For example, the installation of a high-intensity business district lighting system in a stateside city, decreased the night street crime by 41%. Because major thoroughfares carry higher through-speed traffic and because a substantial proportion of the users may be unfamiliar with the streets, adequate lighting of city thoroughfares is especially important.
10. The Government of Guam should landscape their roads to enhance the beauty of the island and create new aesthetic values through adoption of a Street Tree Program.

Effectuating the Plan

Road construction on Guam has been slow in keeping pace with the demand because of lack of funds. Although some improvement work

has been done, traffic has continued to outgrow the roads, and inflation has cut the buying power of the highway dollar. Yet, Guam needs more well-designed streets and highways to keep pace with the growing volumes of traffic without the necessity of removing costly public and private improvements which may be in conflict.

In order to provide for future street and highway needs, "Future Plan Lines" should be immediately established under the terms of a zoning ordinance. Under such a law, improvements would necessarily be located outside of the planned future rights-of-way. In addition, as undeveloped lands are subdivided, the Government can require the reasonable deduction of such rights-of-way as would be necessary to meet the future requirements for street improvements or widening, as well as an orderly extension. Where future rights-of-way cannot be acquired by deduction, the Government should establish a program of continuing land acquisition. It should be recommended that the Government adopt a condemnation policy (Eminent Domain) for the acquisition of such lands as are needed in the future for roads that cannot reasonably be acquired by other means.

Commercial Port Facilities

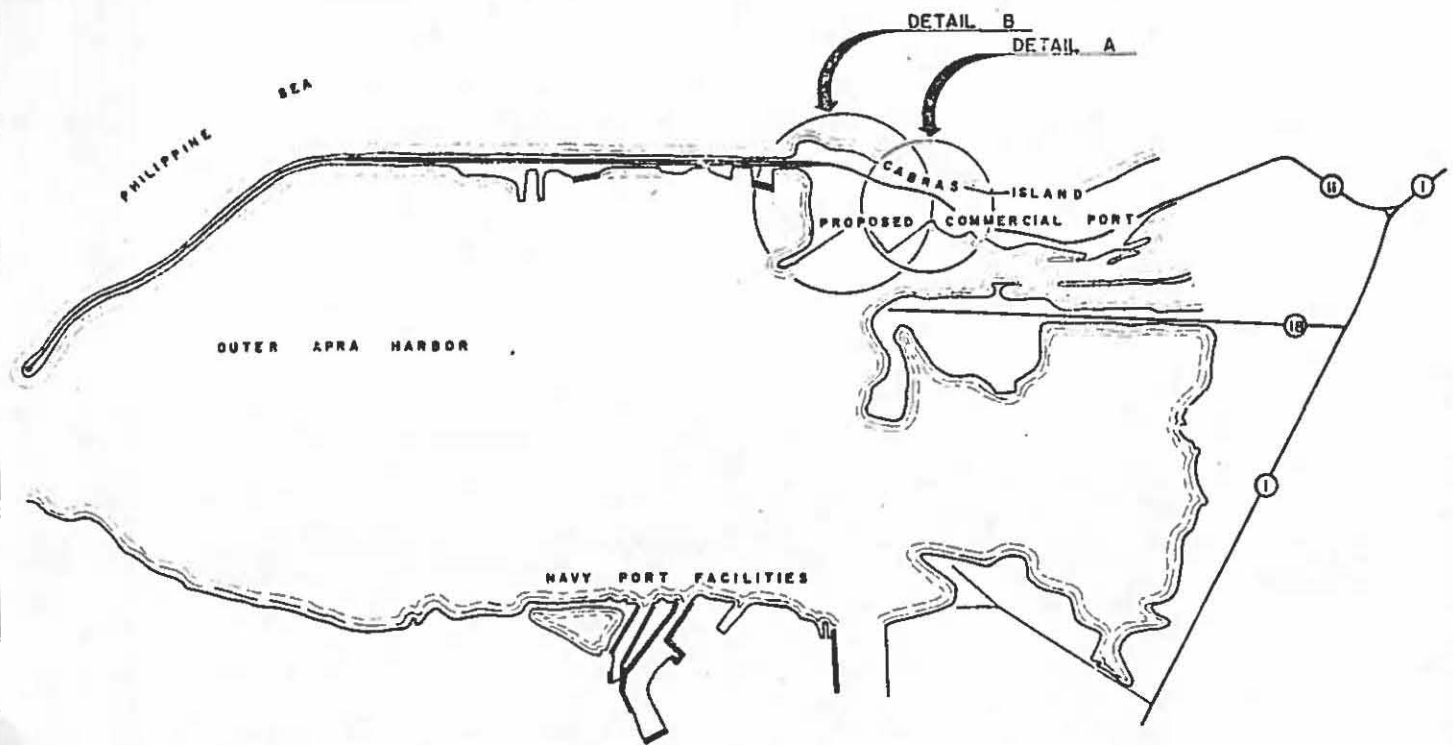
The creation of a new deep-water harbor in the outer Apra Harbor area on Cabras Island as recommended by Tudor Engineering Company, Study of Apra Harbor, January 1964, independent of the military, would be very advantageous to the people of Guam. It can lead to new industries and to the expansion and increased operational efficiency of existing industries which are dependent upon shipment of goods by water. Property fronting on the harbor or located in the immediate vicinity thereof will have great industrial potential with the development of the Commercial Port of Guam (Chart 24).

Detail (A) shows the plan recommended by the Tudor Engineering Company which encompasses an area of 35 acres. Detail (B) shows the plan recommended by the Division of Planning, which encompasses an area of 50 acres. Plan (B) is a revision of Plan (A) in that it takes in an additional 15 acres of the United States Coast Guard Station that is to be abandoned the latter part of 1965.

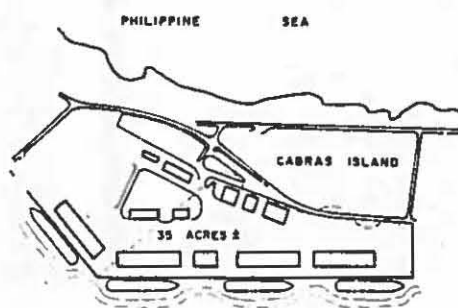
Guam is a port of call for several shipping lines. More than 40 different ships visit Guam on regular schedules each year, for example:

United States Steamship Companies: Pacific Far East Lines from the West Coast of the United States calls at Guam an average of three times a month. They are primarily cargo vessels, even though they may carry a few passengers.

American President Lines from the West Coast and East Coast of the United States calls at Guam an average of twice a month. They are also primarily cargo ships.

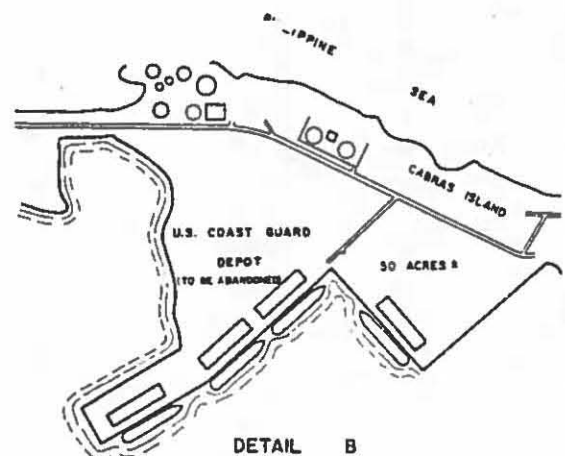


EXISTING APRA HARBOR FACILITIES



DETAIL A

TUDOR ENGINEERING COMPANY COMMERCIAL
PORT PROPOSAL



DETAIL B

REVISION OF PROPOSED COMMERCIAL PORT BASED
ON THE USE OF VACATED U.S. COAST GUARD DEPOT



PROPOSED COMMERCIAL PORT FACILITIES

TERRITORIAL PLANNING COMMISSION • GUAM

MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT

SCALE AS INDICATED

JANUARY

1946

CHART NO. 24



Foreign Steamship Companies: (Include four lines from Australia, two lines from Japan, and two small lines from the Trust Territory Islands.)

The Crusader Shipping Company carries cargo; Dominion Lines of Australia carries cargo once a month; The Indo-China Steamship Company of Australia carries cargo; Pacific and Orient Lines of Australia stops regularly at Guam with 1,400 to 3,600 tourists on the way to the Orient; The Daiwa Navigation Company of Japan carries manufactured goods and foodstuffs to Guam; NYK Lines of Japan has recently begun carrying cargo to Guam; Saipan Shipping Company carries cargo to Guam and various Trust Territory Islands; Rota Shipping Lines also carries cargo to Guam and Islands of the Trust Territory.

Local Steamship Companies: Pacific Navigation System is engaged in mainland and foreign trade; Micronesia Lines serves Guam, Islands of the Trust Territory, and Japanese Ports.

The amount of revenue tonnage imported, exported, and transshipped to and from Guam for the Fiscal Years 1963-1964 and 1964-1965 is as follows:

	<u>Imports</u>	<u>Exports</u>	<u>Transshipment</u>
July 1, 1963 to June 30, 1964	178,440	43,022	22,122
July 1, 1964 to June 30, 1965	193,638	49,414	30,219

Commercial Air Facilities

The Island of Guam is served by two military air bases, namely, Andersen Air Force Base (located at the extreme northern end of the island and exclusively a Strategic Air Command), and Military Air Transportation Services (MATS) facilities. MATS serves military and military dependents only, with an average of two passenger flights westbound and two eastbound each week. The average number of passengers originating on Guam is over 1,800 per month; those terminating average about 1,700 per month; and through passengers average over 5,500 per month. Cargo shipments have averaged 125 tons shipped and 350 tons received. A variety of Air Force and charter equipment, including jets, is used.

The present commercial air facilities are located at the Naval Air Station, which is located northeast of Agana, about central-island. The location of the existing facilities poses a security problem for the Navy and an inconvenience for the public.

The new facilities, now under construction, are expected to be completed by early 1966. The new facilities are located on

25 acres of land transferred from the Navy to the Government of Guam, near the northeast end of the Naval Air Station (Chart 25).

These new facilities consist of a 29,400 square foot terminal building, an airline service building, parking lots, hard stands, and fueling facilities. The new air terminal will have its own access from Marine Drive, Route 1, without entering through the Naval Air Station.

At the present time, Guam is served by Pan American World Airways (PAA), Trust Territory Air Lines (TTA), Guam Air Lines (GAL), and Micronesian Air Lines.

PAA is the only commercial air line that serves Guam from the Orient and from the United States Mainland. PAA has six flights westbound and three flights eastbound each week. Of the six flights westbound, three are passenger and three cargo. The three flights eastbound are passenger (20% of passengers each way are disembarked on Guam; 80% are through passengers). Aircraft in operation are primarily Boeing 707 Jets.

TTA is operated by PAA under contract with the Trust Territory Government of the Pacific Islands, Saipan. There are three flights weekly between Saipan and Guam, one flight each week southwest to Yap and Koror, and one flight each week southeast to Truk, Ponape, Kwajalein, and Majuro. These flights carry both passengers and cargo. Aircraft in operation consists of the DC-4 on the Guam to Saipan route, and two SA-16 Albatross throughout the Trust Territory. All three flights operate out of Kobler Field, Saipan.

GAL is a privately-owned air line with scheduled and chartered flights. There are five to ten regular weekly flights to Saipan and one weekly flight to Palau. All flights operate out of Guam and carry both passengers and cargo. Aircraft in operation consists of the twin engine Beechcraft.

Philippine Air Lines and Japan Air Lines are both considering Guam as a regular route stop for their flights. Because of the lack of facilities and the Naval security, it has been difficult for PAA to grant clearance. However, when the new commercial facilities are completed, new flights will be considered and initiated.

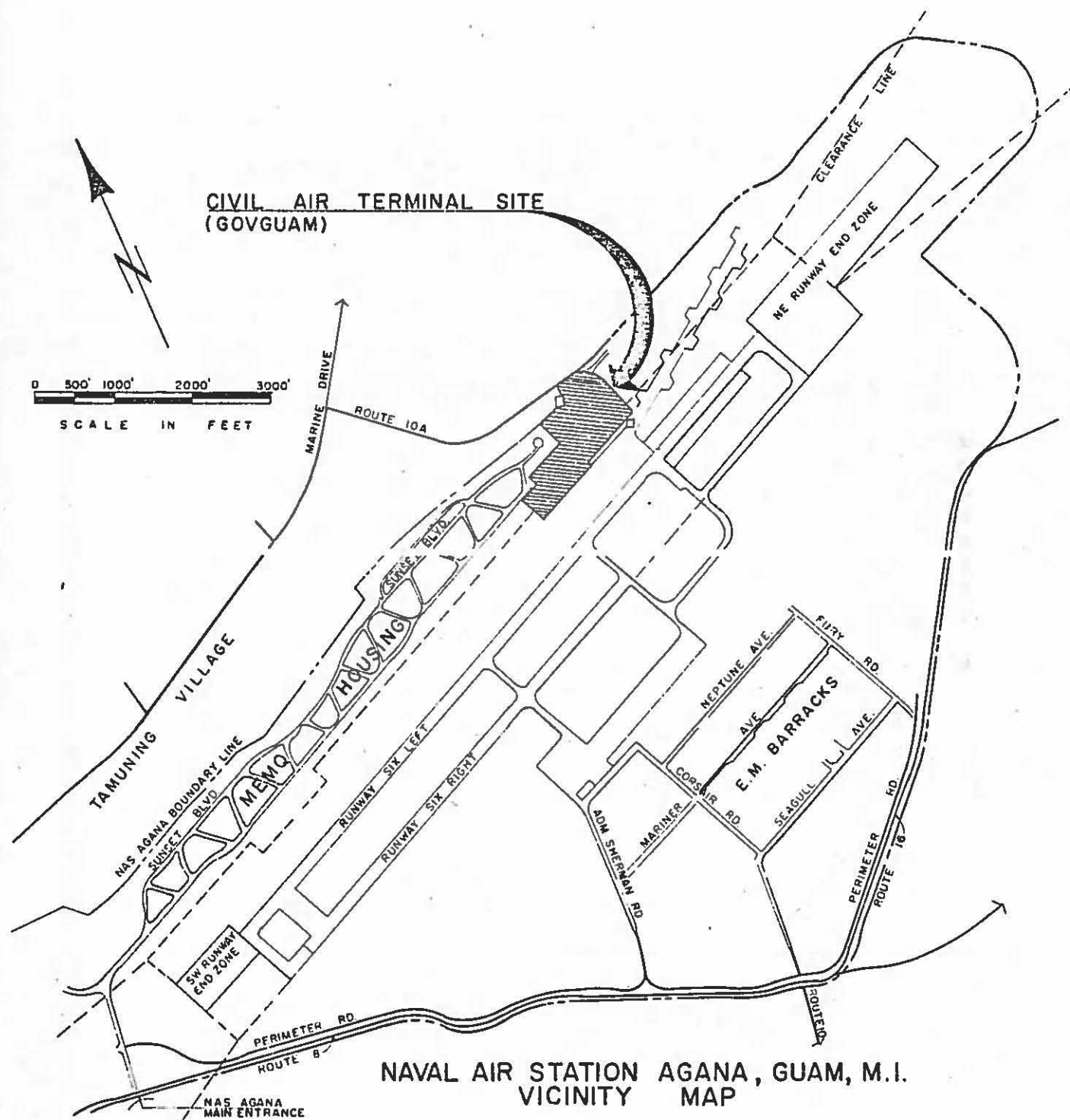


CHART NO. 25

CIVIL AIR TERMINAL FACILITIES

JANUARY

1966

PARKS, RECREATION AND OPEN SPACE ELEMENT

Goal - to develop a Park and Recreation System that will meet the leisure time demands and needs of all age groups on Guam, and to preserve open space for the satisfaction and enjoyment of future generations.

Increased production and personal income combined with a reduced work week, allow the people of Guam more free time for leisure time activities than ever before in Guam's history. A significant portion of leisure time is consumed by recreational activities, mainly outdoor recreation. Forecasts for the future indicate even greater emphasis on recreational activities which, coupled with Guam's growth in population and potential tourism, will severely strain the sparsely developed recreational facilities unless future needs and demands are properly assessed and satisfied.

The need for proper recreational facilities is not limited to urban living but extends beyond its boundaries. There are too few public recreational areas along the shoreline and in the hill or woodland areas to serve the families who want to get away from the monotony of urban life. There is a need for more public beaches, boat harbors, marinas, camp and picnic sites, mountain parks, and other open spaces. Fish and game reserves, animal sanctuaries, and historic sites are also required as part of the overall recreational requirements of the island.

The provision of public open space for recreational purposes should not be undertaken haphazardly, but tailored to serve the needs of the various age groups. Moreover, retention of special natural features and the preservation of historic sites should be seriously considered by the people for the enjoyment of all.

The ultimate goal of the Master Plan is a well-balanced community providing places to work, live and relax. Too often, the need to earn a living and to provide the material things has limited man's scope and opportunity to enjoy the natural beauties of the forest, valley, river and sea. Every opportunity to acquire and protect open areas, playgrounds, beaches and valuable historic sites should be exploited or they may be lost to the public in the urbanizing process.

Recreation facilities play an important role in today's concept of living. One of the criteria in determining a good neighborhood is its proximity to the play area.

The spacing requirements and service areas for the groups served by playgrounds, playfields, and schools are similar and combined facilities desirable and feasible. The school playground

complex serves compatible age groups and is economical since the area requirement and the development costs of the combined facilities are less when compared to separate facilities.

General recreation requirements such as beach and mountain parks, marinas, etc., should be designed to serve the general public. If possible, the various types of facilities should be evenly distributed (population-wise) to serve each particular municipality. (The approximate location of parks and recreational facilities to accommodate the anticipated 1985 population is shown on the Park and Recreation Map, Chart 27.)

For urban recreational areas, it is possible to set standards for area requirements. No such standard seems applicable or available to forest and beach parks, fish and game reserves, marinas, and small boat harbors. A comparison with other areas can be made, but this is not considered an exact measure of the area required for regional recreational facilities. There are, however, ample areas suitable for this type of park and every effort should be made to provide them.

TYPES OF RECREATION AREAS

Regional Parks - The two major requirements for regional recreation facilities are natural topographic features and size.

There is a growing need for areas of relaxation which only the broad, open spaces of mountains, forests and beaches can provide. This can be more effectively met by the Government of Guam and the Federal Government through the preservation of large forest and mountain areas and land bordering on streams and ocean. The following list itemizes the recreational needs best provided on a regional island-wide basis:

1. Mountain and forest parks (camp and picnic sites).
2. Beach parks (camp and picnic sites).
3. Historic sites.
4. Animal sanctuaries.
5. Fish and game reserves.
6. Marinas and small boat harbors.

District Parks - A district park is a multiple-purpose area and is the type that provides a variety of facilities primarily for the use of young people and adults; however, a section may be developed as a playground for the children of the immediate neighborhood.

Compared with the neighborhood park, the district part has a larger radius of influence; serves an area four or five times that of a neighborhood park and could be used by all age groups.

A district park should serve four or five neighborhoods and should be located in an area adjoining an intermediate or high school.

The desirable park requirements to adequately serve a community are as follows:

1. A park within 3/4 mile to 1 1/2 mile of all residences depending on population density and ease of access.
2. For urban areas, one acre park for each 1,000 persons.
3. Size of Park - 10 to 25 acres for each 10,000 to 25,000 persons.
4. Provide the following features:
 - (a) Playfield for such games as baseball, softball, football, soccer, etc.
 - (b) Paved courts for tennis, basketball and volleyball.
 - (c) Children's playground.
 - (d) Fieldhouse for supervised activities.
 - (e) Lawn areas for games such as croquet, archery, lawn bowling, etc.
 - (f) Off-street parking facilities.

Neighborhood Parks - This is the basic community recreational center where neighborhood children, ages six to fourteen years are provided play opportunities. Activities such as field sports (football and baseball), court games (basketball, volleyball and tennis), general playground equipment, and supervised activities (nature studies, dancing, model making, weaving) should be available.

The park provides a place where pre-school children can play under parental supervision; young people and adults may enjoy games and other activities, and on occasion, the entire neighborhood can gather for community meetings and programs.

Since the neighborhood parks primarily serve children of elementary school age, these areas should adjoin the elementary schools which should be located within walking distance of most homes. A neighborhood park should be provided within one-third mile of every home and not to exceed one-half mile. The school-playground facility should not be located on major traffic thoroughfares or highways.

There are many advantages in locating a neighborhood park adjacent to public schools, provided there is adequate land for each. Such a combination provides a complete center for neighborhood activities, and every residential neighborhood should have a building that can be used for indoor social and recreational activities and some of the school buildings such as auditoriums and cafeteria can be used as such.

The following is an indication of the essential features required of a neighborhood park:

1. Walking distance--in urban areas, playgrounds should be within one-third mile of each home, and not more than one-half mile in extreme cases. This standard may be difficult to maintain in sparsely developed communities.
2. The size of neighborhood parks vary with the population of the neighborhood. Each neighborhood needs at least one acre of playground for every 1,000 persons. The minimum playground should be large enough to provide one softball field or a minimum area of about 2.5 acres.

<u>Population of Neighborhood</u>	<u>Size of Playground Needed</u>
2,000	2.5 Acres
3,000	3.0 Acres
4,000	4.0 Acres
5,000	5.0 Acres

In neighborhoods with populations exceeding 5,000, more than one park should be provided. If an adequate area is not available and the area falls short of the space standards, the developed play area should be restricted to children's use.

3. Neighborhood park playgrounds should provide the following features:

- (a) Corner for pre-school children (totlots).
- (b) Apparatus area for older children (playlots).
- (c) Open space for informal play.
- (d) Surfaced areas for court games (tennis, handball, volleyball, paddle tennis, shuffleboard).
- (e) Small field for games such as softball and touch football.
- (f) Sheltered house and covered area for crafts, story telling, dramatics.
- (g) Wading pool.
- (h) Corner for table games and other activities for older people.
- (i) Well landscaped grounds.

Playlots or Totlots are small open spaces for pre-school children. Activities of these children must be under constant parental supervision. If there is adequate yard area within single-family residential areas, playlots are not necessary, though highly desirable.

In apartment areas where population density is high and open yard areas are lacking, totlots serve an important function. Open areas, of about 5,000 square feet to serve each 160-unit apartment, are desirable.

If these areas cannot be located in the block they serve, or if it is impractical to establish many lots, then a totlot up to 10,000 square feet may be established to serve up to 500 families.

Golf Courses. The game of golf has become an integral part of community living. With more people taking up golf as a form of recreation, golf courses have now become necessary adjuncts to community park planning, and become more prominent as our tourist industry expands.

Golf course sites should provide the following:

- 1. Sufficiently large areas to provide ample space for fairways, clubhouse and parking facilities; area of

approximately 200 acres for 18-holes.

2. Availability of water and other utilities.
3. Location within easy commuting distance to the community it is to serve.
4. One 18-hole golf course for every 50,000 persons is the standard to follow, if possible.

Botanical Gardens provide enjoyable open areas for the young and old and promote plant research. Here again, there is no set standard as to the size requirements. Topographic and climatic conditions are the important considerations. In our climate, opportunity for the development of this type area with a wide variety of plant material is unlimited.

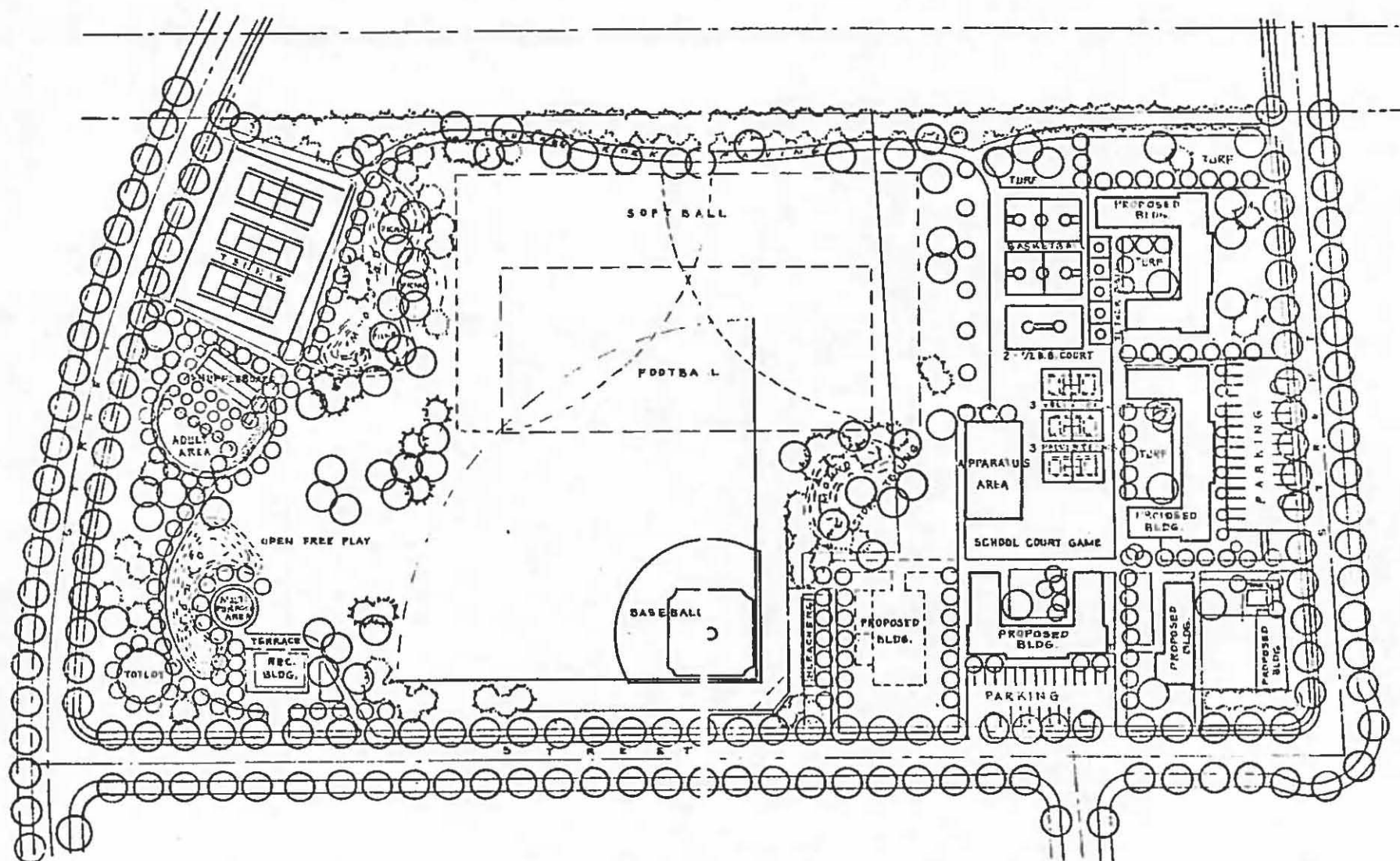
Beach Park and Picnic Sites offer the population an opportunity to get away from the routine of working and enjoy the relaxing setting of beach and mountain retreats. The primary purpose is to provide large areas of natural beauty in which people can engage in a variety of activities. Standards and size requirements are not rigid for these facilities, but accessibility to mountain parks and good swimming areas for beach parks are the prime considerations.

Access to Beach Areas. Public access to beach frontage should be mandatory to permit utilization by fisherman, skin divers, surfers, swimmers, and others who wish to enjoy our ocean. Adequate off-street parking should be provided. As our population increases and as more vacant beach lands are developed, the problem of access becomes more acute.

In order that Guam may have a Park and Recreation Program that will meet the needs, desires and habits of its growing population, the following recommendations are made:

1. Recreational activities be provided which will satisfy the needs and desires of all age groups (pre-school, school age, teenagers, adults and senior citizens).
2. Park and recreation space needs and facilities be related to the socio-economic patterns and conditions present in each municipality and neighborhood on Guam.
3. Guam provide a comprehensive range of recreational activities - active and passive, organized and unorganized, programmed and unprogrammed.
4. That the comprehensive planning techniques used by Guam in its future land use planning continue to be applied in planning its parks and recreation system.

5. Spatial location of park and recreation areas in Guam's neighborhoods and the character of the facilities and uses designed into these parks be related to existing and proposed land uses in a manner calculated to protect and enhance surrounding property values while achieving the utmost in access and service to the community.
6. Adopt and further emphasize a legislative policy favoring the multiple use for recreational purposes of public facilities such as flood control channels, creeks and rivers, water conservation reservoirs, college campus, and other school facilities.
7. Establish requirements for the dedication by the developer of the land, the improvements, and the facilities needed for recreational purposes in large-scale developments.
8. Encourage the development of private and commercial recreation facilities--such as golf courses, swimming pools, tennis clubs, etc., in order that they may help meet the future leisure-time needs.



TYPICAL DESIGN PLAN
PARK AND SCHOOL COMBINATION

CHART 26

PUBLIC SERVICES AND FACILITIES ELEMENT

Goal - to maintain a coordinated plan for public services, facilities, and buildings in order to provide optimum services to the health, safety, cultural, and educational needs of the people in the expanding urban areas of Guam.

Water. The civilian population on Guam at the present time consumes approximately 1,900,000,000 gallons of water per year. Of this amount, the United States Navy furnishes 1,300,000,000 gallons and the government (from its own sources) furnishes the remaining 600,000,000 gallons.

The present per capita consumption of water for the civilian population varies from 70 to 100 gallons per day. This includes leakage in lines. As more modern houses are constructed, and as sewer systems and more service industries develop, consumption is estimated to increase to 100 gallons per day per capita. Thus, the projected water requirements are:

<u>Population</u>		<u>Water Requirements</u>	
1965	53,900	1965	1,900,000,000/year
1970	61,000	1970	2,200,000,000/year
1975	68,600	1975	2,500,000,000/year
1980	76,400	1980	2,800,000,000/year
1985	85,100	1985	3,000,000,000/year

There are two basic sources of water on Guam. The first of these is ground water which occurs in a fresh water lens which forms at sea level under the coralline plateau that makes up the northern half of the island. Ground water also occurs in perched water tables where a permeable layer (usually coralline limestone) is underlain by an impervious layer (usually basalt). There is some indication that perched water tables are scattered throughout the southern portion of the island, and that the quantities available from these sources will be significant in servicing the scattered settlement in the southern region. At present, the northern lens supplies Andersen Air Force Base, the villages of Dededo and Yigo, Naval Communication Station, and Harmon housing.

The perched water tables are presently untapped, but are being developed in the Chalan Pago and Malojloj areas. The second source of water is surface run-off which is collected in reservoirs, treated, and pumped out. At present, most of the water used on the island comes from this source. The Navy maintains and distributes from the Fena, Almogosa, Bona system. This surface water system serves Agat, Piti, Asan, Agana, Agana Heights, Sinajana, Mongmong, Toto, Barrigada, Chalan Pago, Ordot, Tamuning, and portions of Santa Rita, as well as the Naval Magazine, Naval Station, Commander Naval Forces Marianas, and Naval Air Station.

Government of Guam surface water systems supply Yona, Talofofo, Inarajan, Merizo, Umatac, and portions of Asan and Santa Rita. At present, all water consumed in the civilian community, with the exception of those areas serviced by surface water systems controlled by the Government of Guam, is supplied by the Armed Forces System.

The present agreement between the Navy and Government of Guam limits the water available to Government of Guam from the Fena system to a total of 1,186,250,000 gallons per year (Chart 28).

For the development of future water sources for the Government of Guam, reference is made to the Kennedy Engineers Water Supply Report, dated June, 1965. Layne International Water Development Specialists are presently under contract with the Government of Guam to develop test wells determining future ground water sources throughout the island. The Government of Guam has, therefore, chosen to develop ground water sources prior to development of the more expensive surface water plants.

Recommendations:

1. The future water source in the northern half of the island is the proposed development of additional wells to augment the existing, as the need increases. Since a large fresh water lens of appreciable depth does occur under the permeable limestone, the possibility of developing a major water source in this area is feasible.
2. For the future water source in the southern half of the island, it is proposed that the use of the existing springs by diverting and storage of surface water and construction of wells would be adequate for future demands.
3. Rigid control on pumping of the wells is essential to safeguard the population from saline content, contamination, and overdrafting the wells beyond their natural rechargeable point. To provide assurance of satisfactory bacterial quality, filtration and chlorination will be needed until

1966



	EXISTING	PROPOSED
6" TO 10" WATER LINES		
12" TO 16" WATER LINES		
18" TO 24" WATER LINES		
STORAGE FACILITY		
WATER SOURCE		

CHART 40



TERRITORIAL PLANNING COMMISSION • GUAM

MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT

[illegible]

such time the quality of water meets the United States Health Standards. This will depend on the new island-wide sewage system now under construction and on other means of eliminating ground water contamination.

4. The future water system for the Navy and Government of Guam should be independent of each other, except for inter-connecting points to allow the Navy or Government of Guam to draw from the other's sources if the need should arise. This will protect the systems against unfiltered and, unsoftened ground-water.

Refuse Disposal. Refuse Disposal on Guam at the present time is limited to a private firm and the Government of Guam.

The private firm has very limited facilities and only provides service to individuals with whom they have contracts. The Government of Guam only provides disposal of rubbish and garbage for public buildings, areas, and government housing.

In most instances, property owners have been disposing of their own refuse. This practice has created a problem since the people do not have proper facilities to dispose of the refuse and it has been collecting on property throughout the island creating blight to the area as well as a health hazard. The Government of Guam has initiated island-wide clean-up campaigns during certain times of the year to dispose of rubbish and garbage on private property. The Government has furnished the men and equipment for this program and it has met with continued success.

As the population of Guam increases, the need for refuse disposal facilities remains critical. The clean-up campaigns will not be adequate to avoid the blighting effect on the landscape and health hazards to the public.

Recommendations:

1. Refuse disposal facilities be provided by private concerns under franchise from Government of Guam. If not economically sound, this service should be provided by the Government of Guam. In either case, the objective is to maintain adequate service at minimum expense to individual citizens utilizing the service.
2. Public disposal grounds maintained by Government of Guam can be used as fill-and-cover areas to create land for parks or other recreational facilities after disposal

operations cease. The re-use of these disposal areas will further contribute to a pleasant physical environment.

Telephone Service. Telephone service on Guam within the different municipalities and military areas is provided by the United States Navy. Telephones are not considered as vital a necessity as water, power, and sewer, but rather a service offered and furnished by the Government of Guam to the public.

At the present time, there are five telephone exchanges on Guam, four of which are owned and operated by the United States Navy. These are located in Ordot, Tamuning, Harmon and Andersen Air Force Base. The other exchange, located in Agana, is operated by the Government of Guam. All of these telephone exchanges are linked together to form a single unit throughout the island (Chart 29).

As the population of Guam expands and the demand for additional telephones increases, the United States Navy and the Government of Guam will be able to provide service with no obstacle except for the additions of telephone cable and telephone exchanges.

Electrical Power. The existing power system on Guam is divided into three categories according to its function:

1. Island-Wide Power System Jointly-Used Facilities owned and operated by the United States Navy to serve the needs of the military and also contribute to meet the requirements of the civilian population.
2. Island-Wide Power System for Department of Defense Power Facilities owned and operated by the United States Navy, and consisting of installations which operate exclusively to serve the needs of the Department of Defense and other Federal Government agencies (exclusive of the Government of Guam).
3. Public Utilities Agency of Guam Facilities owned and operated by the Government of Guam and consisting of the distribution plants in service which function primarily to serve the civilian population.

Future requirements from 1965 to 1980, as recommended in the proposal by the Rogers Engineering Co., Inc., Preliminary Report on Evaluation of Island-Wide Power System, are based upon continued operation and transmission facilities of both the Government of Guam and the United States Navy (Chart 30).

It is anticipated, because of strategic military location in the Pacific Far East areas, that Guam can expect a national defense activity or at least a continued growth of present functions. It is estimated that the current and future power system instituted by the Government of Guam will be effective to serve the expansion of new housing and any light industry and tourism introduced on Guam.

It is further anticipated, that because of construction and expansion of military and Government facilities, a minimum increase of five per cent (5%) power output for the next ten to fifteen years will be sufficient.

Recommendations:

In order to maintain a sufficient power supply, it is recommended that the future power plant be built in three increments. The first increment would be required sometime in 1968 with a capacity of 25,000 kw. The second increment would follow in 1971 or 1972 with a capacity of 25,000 kw; and the third increment subject to future evaluation and developed to incorporate scientific achievements particularly in the nuclear field.

Recommended site location for the future power plant is along the northwest coast of the island. Factors of island-wide land distribution and existing transmission lines necessitate that location be somewhere between upper Tumon and Hilaan Point. Further, the power plant must be situated on the shore having direct and easy access to sea water for cooling purposes. Two specific locations are recommended by the Rogers Report.

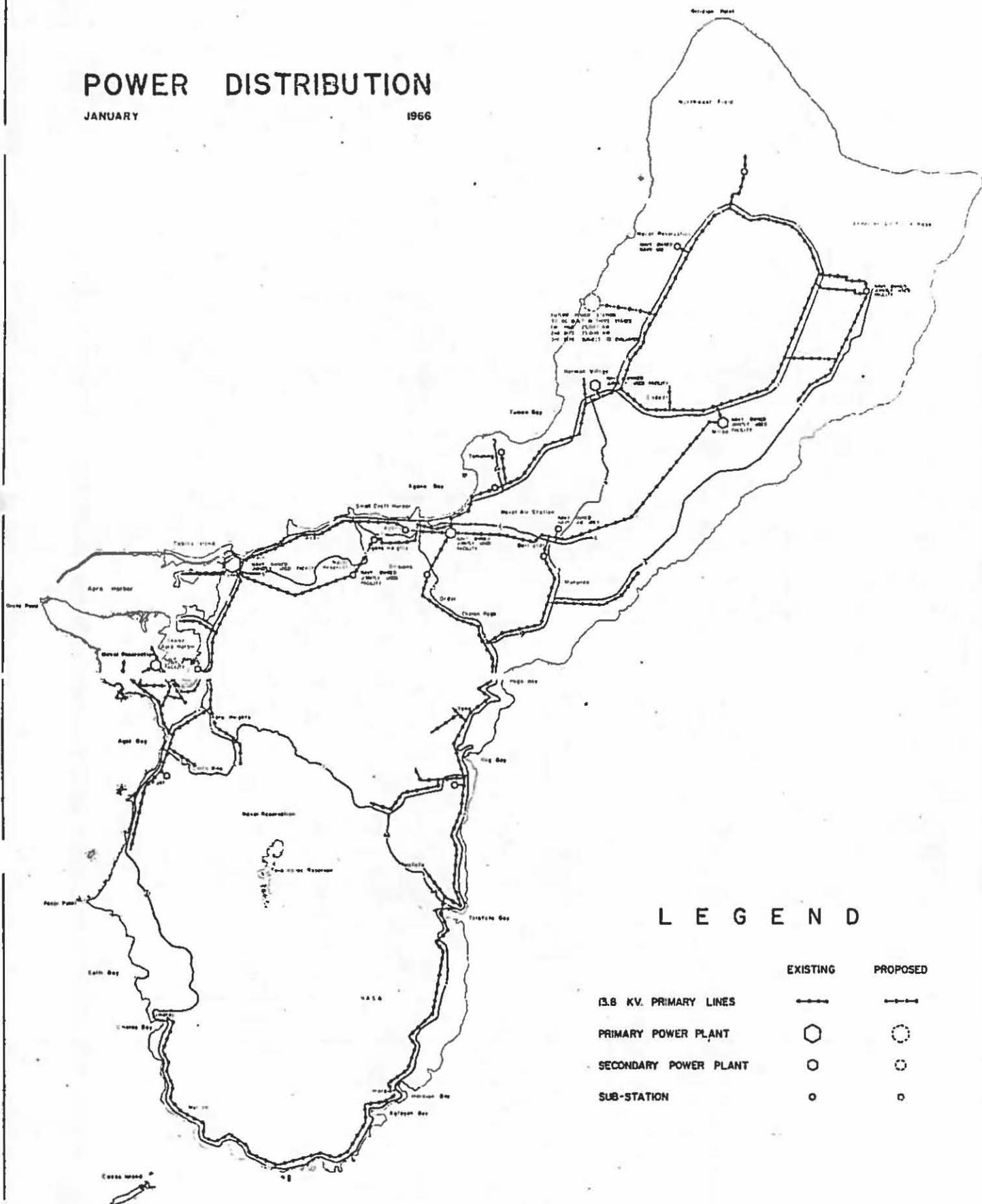
The first location is in the Gogna Beach area in upper Tumon Bay. From a land development point of view, this location is highly undesirable. The Tumon Bay Area from Ypao beach to Amantes Point is a desirable resort and recreation area. Tumon Bay, easily accessible from the new air terminal and the Agana-Tamuning areas, is yet unspoiled by urban development, and has a high scenic value. If Tumon Bay is to develop as a resort area, it is inconceivable that a power plant with its associated nuisances of diesel oil fumes and transmission yards be allowed to blight the air and the landscape. This site cannot be recommended as a location for a power plant.

The alternate location, proposed by the Rogers Report, lies north of the Naval Communication Station Beach area, between Tanquisson and Hilaan Points. It meets all the site requirements necessary for a power plant location, except that the fuel and electrical transmission lines would have to be extended somewhat further. This site is totally surrounded by military lands, and will in no way interfere with the development of the civilian community. It is well hidden and offers no blighting influence over development, either civilian or military. This site is preferred over the Gogna site.

POWER DISTRIBUTION

JANUARY

1966



LEGEND

	EXISTING	PROPOSED
13.8 KV. PRIMARY LINES	—	---
PRIMARY POWER PLANT	○	○
SECONDARY POWER PLANT	○	○
SUB-STATION	○	○

CHART NO. 30



TERRITORIAL PLANNING COMMISSION • GUAM

MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT

THIS MAP IS A PRELIMINARY MAP AND SHOULD NOT BE USED FOR ANY PURPOSE OTHER THAN THE ONE FOR WHICH IT WAS PREPARED.

Sewage Disposal Facilities. At the present time, only two civilian communities, Agana and Agat, are served by a sewage system of any significant size. The other civilian communities on Guam do not have sewage systems and are badly in need of improvement and supplementation. The rapid urbanization of many areas, together with the increased demands upon water supply facilities have made the present systems of pit privies, cesspools, and leaching areas inadequate to safeguard our water resources against contamination and pollution. Even the more complex systems discharging into the ocean through outfalls are only partially effective because storm damage to the lines has resulted in discharge of the wastes inside the reef and into beach areas.

Sewage systems are designed to serve the single function of protecting water resources against contamination and pollution by sewage and related waste matters.

Reference is made to the Engineering Report prepared by Metcalf and Eddy Engineers on Sewerage and Sewage Disposal Facilities for Government of Guam, dated February, 1965. The Government of Guam has based its policies and recommendations for an island-wide sewer system on this report (Chart 31).

The design of the new sewer system is based on the projected population increase in the civilian communities throughout the island up to the year 1980. Allowances have been established for light industries and business areas. The new sewage system will be constructed as not to contaminate ground water, streams, shores, and beach areas.

The sewerage and sewage disposal facilities are to be constructed in three stages:

Stage I, on which construction has already started, forms the initial core of the Central Sewage District. Areas to be serviced in this stage are Agana and the Naval Air Station (which are presently served but need improvements), portions of Tamuning, Sinajana, and Agana Heights. It is estimated that 11,900 persons will be connected to the system at the completion of this stage.

Stage II, includes the expansion of the sewage system within the Central Sewage District, to be started immediately following the completion of Stage I. Completion of this stage will effectively eliminate coastal and ground water pollution along the northwest coastline from Hoover Beach eastward to Tumon Bay, and includes the

civilian communities of Barrigada, Mongmong, Tumon, Dededo, Asan, Piti, Yona, and the military areas of Nimitz Hill and the Naval Hospital. At present, two-thirds of the civilian population of Guam live within this area, and it is predicted that this proportion will continue through 1980.

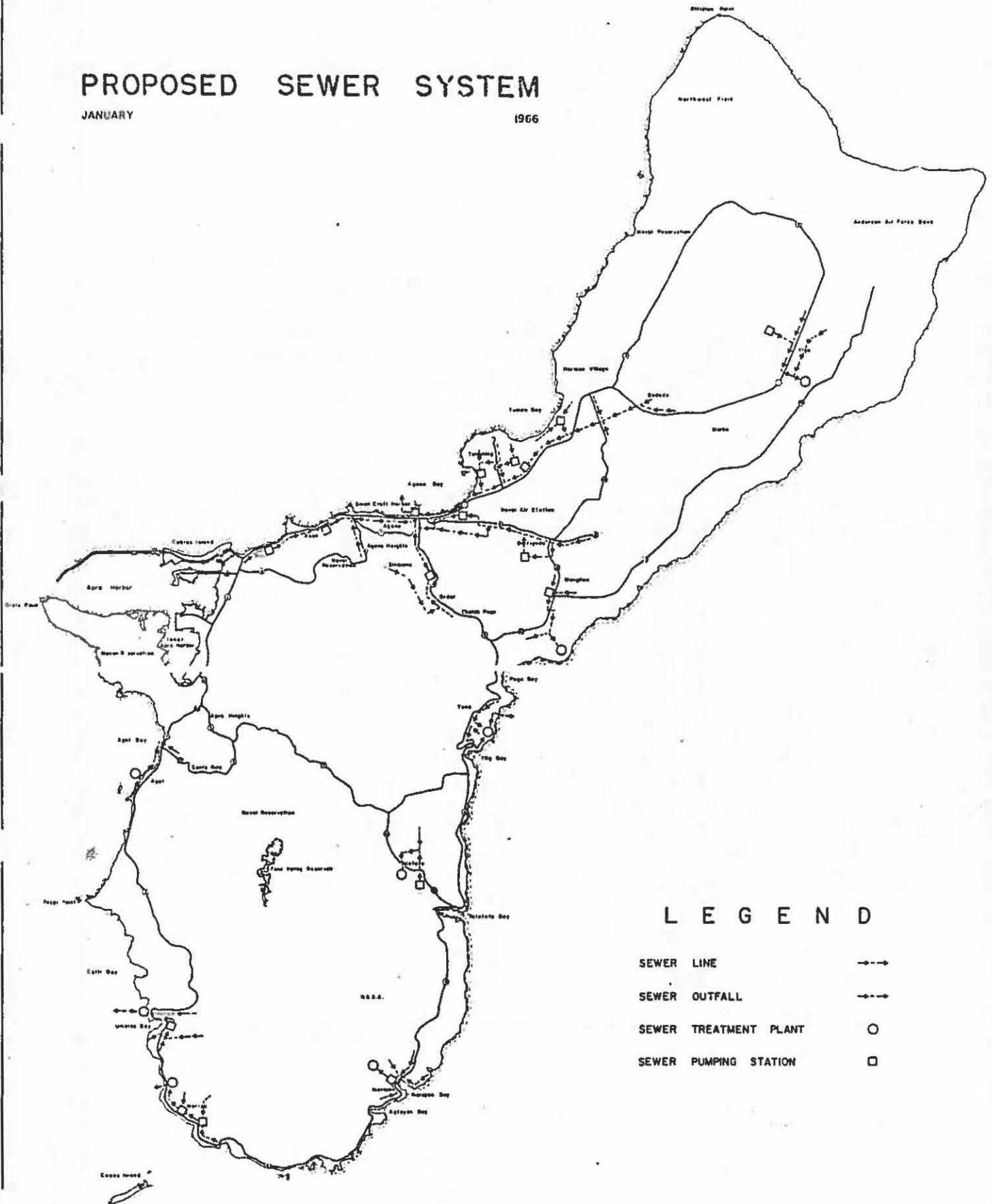
Stage III will be the completion of the Central Sewage District System including the construction of primary treatment works, and construction of complete systems for the outlying districts of Agat (whose existing system needs enlarging and remodeling), Santa Rita, Inarajan, Mangilao, Merizo, Talofofo, Umatac, and Yigo.

The facilities to be provided include lateral or collection sewers, trunk sewers, pumping stations, force mains, sewage treatment works, sewage disposal, outfalls, and other related facilities.

PROPOSED SEWER SYSTEM

JANUARY

1966



LEGEND

SEWER LINE	— — — — —
SEWER OUTFALL	— — — — —
SEWER TREATMENT PLANT	○
SEWER PUMPING STATION	□

CHART NO. 31



TERRITORIAL PLANNING COMMISSION • GUAM
 MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT

THE PREPARATION OF THIS MAP WAS FINANCED IN PART THROUGH AN URBAN PLANNING GRANT FROM THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, WASHINGTON, D.C. THE PROVISIONS OF SECTION 101 OF THE PLANNING ACT OF 1960, AS AMENDED.



Storm Drainage. The problem of providing proper drainage has generally been overlooked in the past, and only after an area has undergone inundation resulting in loss of property, has there been agitation for flood control measures.

The topography of the island generally creates sizeable watershed areas in the southern half for each major stream and during times of heavy rainfall, the lowlands and coastal plains have been flooded. If the practice of filling lowlands for development does occur, providing for proper channel width to discharge water to the ocean will be required to prevent flooding.

The objectives of the drainage system are to minimize flood damage potential to life and property.

Recommendations:

The following principles offer a guide in providing adequate drainage systems:

1. Prevent urban encroachment into flood plain areas and stream banks where topographic features such as slope of land, shape of basin, ground cover, rainfall and soil conditions cause floods.
2. Limit the velocities of the water flow to a safe standard.
3. Establish stream rights-of-way for all major drainage ways in accordance with appropriate design criteria.
4. Establish tentative stream alignments and improvements where possible.

PUBLIC BUILDINGS ELEMENTS

Goal - to provide and maintain an adequate inventory for the conduct of government and essential public services located with optimum spatial interrelationship and designed to establish an example of structural excellence for aesthetic urban design.

Schools. The Government of Guam has the responsibility of designating, purchasing and building the schools throughout the various communities. Of the existing thirty-one schools in existence, only ten adequately provide the needs of the communities. The remainder are either of a temporary nature, overcrowded, sub-standard structures, limited school sites, improper location or lacking in recreational facilities.

Because of the scattered population centers throughout Guam, it is uneconomical to justify a school for every community (with respect to the service areas of one-half mile for elementary schools; three-fourths mile for junior high schools; and one and one-half miles for high schools). The Government of Guam is providing and will have to continue providing, transportation for the school age children who live outside the service area of the schools.

Proposed school sites are designated on the basis of established standards for school size and service radius, consideration for neighborhood densities, and continuity of neighborhood patterns. Additional locational criteria are derived from the community functions of the school. Residential neighborhoods focus on the elementary school and its recreational facilities. Therefore, the location of an elementary school is planned so that it is easily accessible to pedestrians throughout the neighborhood, where feasible. Junior and senior high schools have shops, gymnasiums, swimming pools, auditoriums, and playfields which are integrated with community education and recreation. This necessitates access to these facilities from areas not only within but also beyond normal school service areas.

In developing locational criteria for the college, community-wide function becomes more important than limited service area function. The college is among the most important investments of the island. It plays a major role in the cultural, recreational, and intellectual life of Guam. Its location is related to area-wide land use and circulation patterns (Chart 32).

Because of the large investment of the Government of Guam in its school system, it is desirable that maximum use be made of the facilities they provide. Toward this end, the following are recommended:

1. Improve site selection and location of the schools in the communities.
2. Provide larger school sites in order to make available the proper school facilities.
3. Upgrading of existing schools to conform with the school standards.
4. Intensify recreational use of school playgrounds and playfields as part of a coordinated island-wide recreation program.
5. Encourage and coordinate community use of classroom and specialized facilities.
6. Consider community extracurricular demands in the design of school facilities.

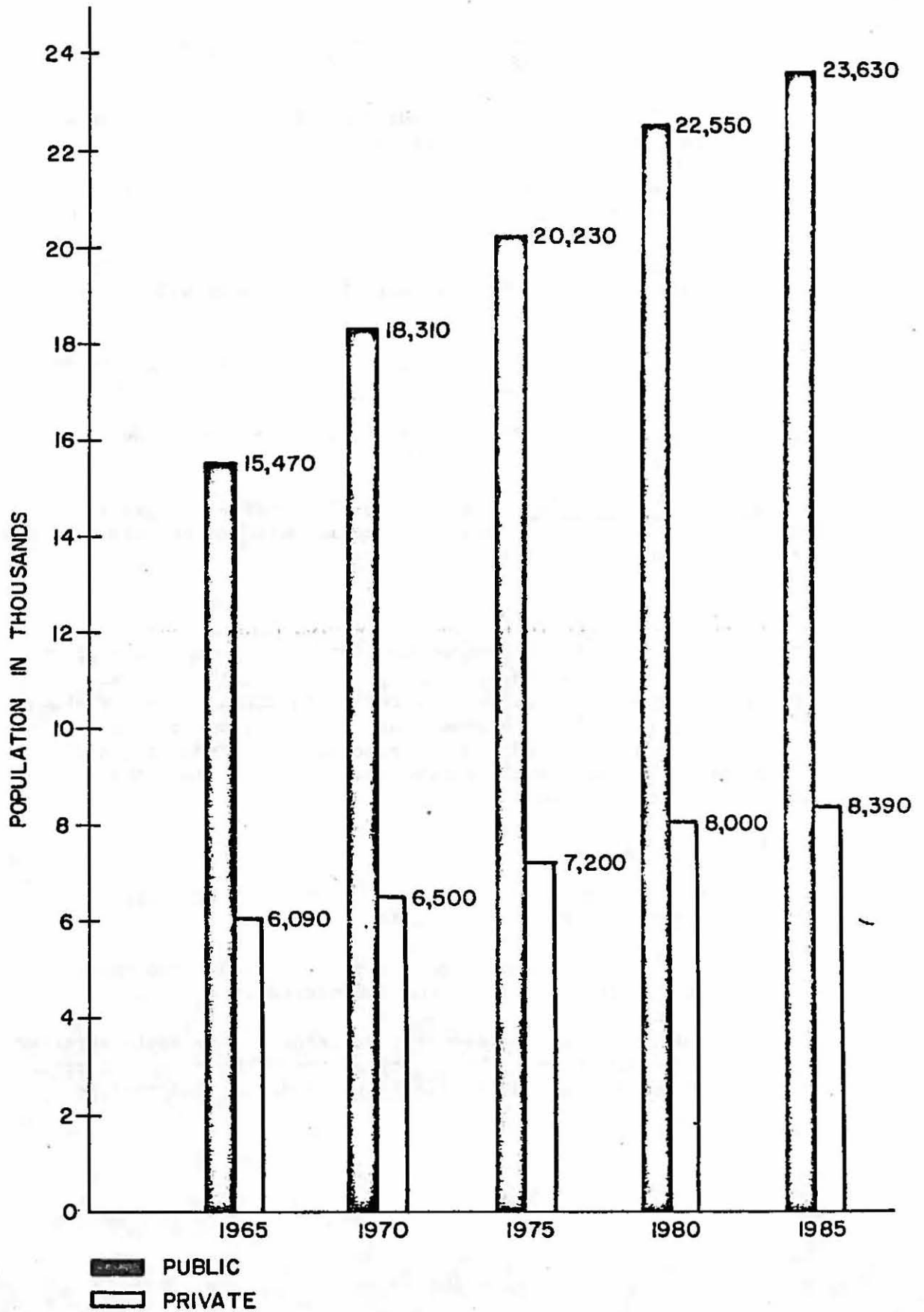
Administrative Center. Because of the desire to establish the Administrative Center in a central location within the main business district of the island, the Administrative Center was built in Agana in 1960.

Large investments in the Administrative Center complex are creating an efficient Administrative Center. The magnitude of these expenditures and the continuing need for expanded civic facilities, however, indicate that the Administrative Center should serve community functions beyond those of an Administrative Center. In designing the buildings, public spaces, and surrounding areas, consideration of non-administrative uses could increase the usefulness of this government asset.

Recommendations:

1. Encourage architectural harmony and compatibility of buildings within the Administrative Center.
2. Coordinate department activity in planning open space and circulation within the Administrative Center.
3. Control private development adjacent to the Administrative Center to enhance the beauty and function of public areas through harmony of landscaping, land use, and traffic patterns.

PROJECTED PUBLIC AND PRIVATE SCHOOL POPULATION
FROM GRADES 1 THRU 12 1965 TO 1985



1966



	EXISTING	PROPOSED
ELEMENTARY SCHOOLS	○	○
JUNIOR HIGH SCHOOLS	○	○
SENIOR HIGH SCHOOLS	○	○
COLLEGE OF GUAM	○	○
SPECIAL SCHOOLS	○	○

CHART NO. 32



TERRITORIAL PLANNING COMMISSION • GUAM
MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT



Public Works Center. Maintenance of streets and associated facilities, including construction of certain public projects, is a responsibility of the Government of Guam. In order to economically effect a maintenance program throughout Guam, a new public works maintenance center has been constructed with larger and more modern facilities. The maintenance center provides island-wide services. As Guam continues to grow, service areas will continue to be revised.

In order to insure efficiency of operation in periods of scattered development as well as in full development, the following action is recommended:

1. Periodically review maintenance demands to determine area where development is causing overextension of facilities.

Libraries. In addition to their importance in formal education, libraries serve as important information centers and means of individual self-enrichment. School libraries, especially the College of Guam, serve most of the students' educational demands. The libraries located on the military bases serve only the military and their dependents.

Over the years, the territory of Guam has been developing a library system based on a central library. The central library should provide a large collection of books for research. It should have available audio visual materials including paintings, recordings, musical scores, photographs, film strips, movies, etc. The central library, the College of Guam and the various public and private school libraries are accessible to schools and other groups as well as to the general public (Chart 33).

The population of Guam at the present, and future projections, do not indicate sufficient size for support of a branch library system. In order that Guam may continue to provide both extensive and intensive library facilities, the following are recommended:

1. Strengthen the central library through coordination with the school system.
2. Develop and enlarge the central library.
3. Develop a mobile branch or bookmobile to circulate throughout areas of scattered development where branch facilities are not justified.
4. Integrate library collections with collections of the public museum in order to provide reference and research material in such fields as graphic arts, sculpture, architecture and archaeology.

Fire, Police, Health, and Commissioner Centers. Because of the scattered population centers throughout the island of Guam, it has been the policy of the Government of Guam to locate the Fire, Police, Health and Commissioner Centers in each community in order to adequately serve the needs of the public (Chart 33).

Fire Stations. Primary factors which must be considered in the location of fire stations are street network and traffic patterns. These two factors determine the ease with which a fire department can serve an area, and the availability of the department for immediate assistance in adjoining areas. Other factors which must be considered in order to meet required standards are intensity of land use, types of structures, frequency of fire, and adequacy of water supply.

Recommendations:

1. Frequently evaluate fire protection and review fire station service areas with regard to new development.
2. Locate new fire stations in such a way that conflict with traffic patterns of major generators may be minimized as much as possible.
3. Coordinate the development of fire stations and major streets in order to insure the maximum utilization of the stations.

Police Stations. The Guam Police Force Headquarters is located within the Government Administration Center in the Department of Public Safety Building, Agana. In addition to this centrally located headquarters; there are several substations located in the various communities throughout the island.

Based on the approved standards for police stations, the existing stations are adequate to protect the health, welfare and safety of the public.

Recommendations:

1. Location of future police stations must be in conjunction with fire stations in order to correlate service when necessary, serve the community more effectively, and be available for assistance in adjoining areas.

Commissioners' Offices. Guam is divided into 19 municipalities each having an office for the Commissioner. The function of this office is to represent the people residing in the respective area, and to work with various governmental and local agencies to preserve peace and order; to enforce sanitary and health regulations; to maintain a current population census within the municipality; and to promote health, education, economic and social welfare within the community.

Recommendations:

1. Construct new Commissioners' offices where temporary structures now exist.
2. Centrally locate these offices so they may be accessible to the community, preferably next to the Fire and Police Stations in order to save acquisition of additional lands and construction costs.

Health Centers. With a few exceptions, most of the communities on Guam have been providing Health Centers for the public. Studies reveal that these centers, as a whole, serve the public needs, but they are unable to provide the medical and technical facilities to justify their operating expense.

Recommendations:

1. Investigations should be made to determine essential location. One health center should be located in the northern half of the island, and one located in the southern portion.
2. Centers should be designed and maintained to adequately provide for the needs of the people they serve.

JANUARY

1966



	EXISTING	PROPOSED
PUBLIC HEALTH		
COMMISSIONER'S OFFICE		
POLICE		
FIRE		
GOVERNMENT ADMINISTRATION CENTER		
LEGISLATIVE BUILDING		
MUNICIPAL COURT BUILDING		
LIBRARY		

CHART NO 33



TERRITORIAL PLANNING COMMISSION • GUAM
MAP PREPARED BY PLANNING DIVISION DEPARTMENT OF LAND MANAGEMENT



COMMUNITY DESIGN ELEMENT

Goal - to maintain the highest possible urban standards in physical development by encouraging the cooperation of all groups and agencies, public and private, which have responsibility in the urban building process.

The character of a city or cities is the result of many independent decisions. The public interest in urban character is expressed through the standards and controls used to coordinate these decisions. Harmony or lack of it in civic order depends upon the goals and policies of public powers. In addition to pertinent recommendations suggested in other related elements of this Master Plan, the Community Design goal can be achieved:

1. By periodic review and updating of subdivisions, zoning, housing, building and other municipal codes. These codes express the government's commitment to the health and safety of its citizens through the establishment of minimum standards for sanitary facilities, refuse disposal, structural soundness, utilities service, street access, building intensity, housing density, vacant lot maintenance and fire prevention.
2. By promoting neighborhood design plans. These studies are developed to encourage improvement of pedestrian and vehicular circulation, coordination of public facilities with neighborhood living patterns, and compatibility of development with the natural identity of the site. Developers should continually be urged to work toward these and other improvements in design quality, which tend to strengthen neighborhood identity and amenities.
3. By encouraging individual and project design by trained professionals or design teams.
4. By attracting more national attention to good urban design on Guam through competition or participation in award programs.
5. By developing a dynamic program of revitalization, renewal and redevelopment in urban design.
6. By providing programs that contribute to visual urban order. Develop a community Street Tree Program to give character by assuring tree-lined streets throughout the island. The cooperation of private owners, developers and public service groups should be encouraged in the

implementation of a tree program. In addition to a Street Tree Program and the provisions for functional efficiency of the street system, public interest in the government's streets through the integration of signs, street trees, and street furniture controls with street development standards should be promoted.

7. By sponsoring active community participation in urban design clinics, seminars and courses.

URBAN RENEWAL ELEMENT

Goal - to maintain a continuing program of community renewal directed toward the elimination of urban blight and deterioration in all its forms within the total urban pattern.

Urban renewal is concerned with the removal and prevention of blight. The renewal of properties is a continuing process. Once a structure has passed into a stage of deterioration where performance of its function is severely hindered, and where renewal or redevelopment costs rise above the productive ability of the property, individual renewal efforts become increasingly difficult. Guam should be aware of the costs of blight in fires, typhoons, crime, social decay, and tax losses, and should assume the responsibility for supplementing private renewal efforts when necessary.

Blight can be the result of poor subdivision and development standards. Improper service by streets and other public facilities, poor structural quality, inadequate provisions for light, water or air, and incompatible land uses all contribute to the spread of blight. Substandard original design and development greatly reduce self-sufficiency of property and increase need for public assistance in renewal. High standards of development and maintenance which are strictly enforced are a basis for blight prevention. However, in cases where blight exists or tendencies toward blight are present, additional municipal action may become necessary.

The urban renewal programs for the villages of Sinajana and Yona are based on the following requirements as set forth by the Federal Housing and Home Finance Agency:¹

1. Codes and ordinances establishing occupancy and building standards.
2. A Master Plan providing a basis for coordinating community efforts.
3. A neighborhood analysis determining extent of blight and measures.
4. Legislative coordination of municipal renewal programs.
5. Funds for staff assistance, public improvements, and renewal activities.

1. Workable Program for Community Improvement, Housing & Home Finance Agency, Washington, D. C., February 1962, Pg. 4.

6. Housing inventory development providing for necessary relocation of families.
7. Citizen participation in municipal planning and renewal efforts.

Specific renewal projects are directed by the Guam Housing and Urban Renewal Authority. It receives financial assistance through the Government of Guam which is supported by the Urban Renewal Administration of the Federal Housing and Home Finance Agency, as authorized by Title I of the Housing Act of 1949, amended by the Housing Act of 1954. The Guam Housing and Urban Renewal Authority identifies five primary attributes of federally-assisted renewal programs.

1. It is a technique through which the citizen exercises a control over, and makes use of, the persistent vitality of the urban environment in order to better meet the needs of the people who live and work in it.
2. It is a system for preventing the premature obsolescence of urban neighborhoods and facilities.
3. It is a tool for the restoration of declining areas which can and should serve a longer period of useful life.
4. It is a device for the re-creation of areas which are worn out, without leaving them and the people in them to stagnate until some accident of history in the unforeseeable future stimulates new growth.
5. It is a program under which local governments, in partnership with and with maximum reliance on private enterprise undertake urban renewal with Federal Government support.

The people of Guam expressed their desire to initiate such a program by instructing their legislative body to create a local public authority to guide and direct the implementation of local redevelopment projects. The urban renewal plans, however, for Sinajana and Yona were subsequently defeated by the Eighth Guam Legislature.

Urban renewal projects are defined by the Urban Renewal Administration as programs of "specific activities undertaken by a local public agency in an urban renewal area to prevent and eliminate blight and deterioration. An urban renewal project may involve (1) slum clearance and redevelopment, (2) conservation

and rehabilitation, or (3) a combination of both. It may include acquisition of land, site clearance, installation of streets, parks, and other improvements, urban renewal plans, and carrying out plans for locally financed improvement of buildings in the area which are not acquired."²

Such projects are to be "(1) in conformance with the general plan of the locality, (2) related to definite local objectives as to appropriate land uses, improved traffic, public transportation, public utilities, recreational and community facilities, and other public improvements, and (3) compatible with plans or development prospects for the neighborhood or district of which the project is a part." ³

Guam presently has two proposed projects, Sinajana which covers 214.9 acres, Chart 34, and Yona which covers 85.9 acres, Chart 35. They were selected following a survey of housing adequacy and disaster following typhoon "Karen" in 1962.

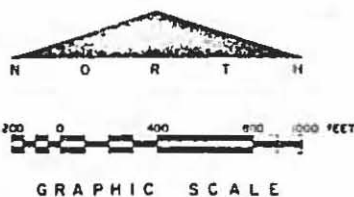
Problems of housing inadequacy persist and efforts to improve such housing continue. Inadequate housing is defined by structural, sanitary or other service deficiencies; by excessive building intensity; by inadequate public facilities, including streets; and incompatible land uses. In addition, areas of excessive housing density create problems. Overcrowding occurs on Guam in areas of older housing or disaster areas brought about by typhoon "Karen." The capital city of Agana, too, presents redevelopment problems which are requiring governmental action. To meet these continuing problems, the Government of Guam is acquiring fractional lots in Agana in order to consolidate them into parcels large enough to be used for building sites, and placed on the tax roll as improved property. Through this program, the Government of Guam is trying to establish Agana as the Central Business District of Guam and the financial center. These things can only come through the cooperation of the public with the Government of Guam.

To encourage and coordinate private renewal efforts, the following are recommended to supplement specific projects of the Guam Housing and Urban Renewal Authority:

1. Institution of a Community Redevelopment Program within the Government of Guam's planning process in order to coordinate municipal renewal efforts with the Master Plan.
 2. Increase interest on the part of all citizens, citizens'
-
2. HHFA:URA, Urban Renewal Manual, "Policies and Requirements for Local Public Agencies" Chapter 1-1, 7/3/61.
 3. Ibid, Chapter 1-2

groups, and business groups who are dedicated to improving their urban environment by participating in the redevelopment program in all its forms, and by assisting government agencies in formulating principles and objectives for island-wide redevelopment.

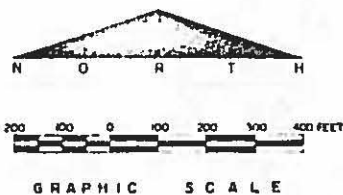
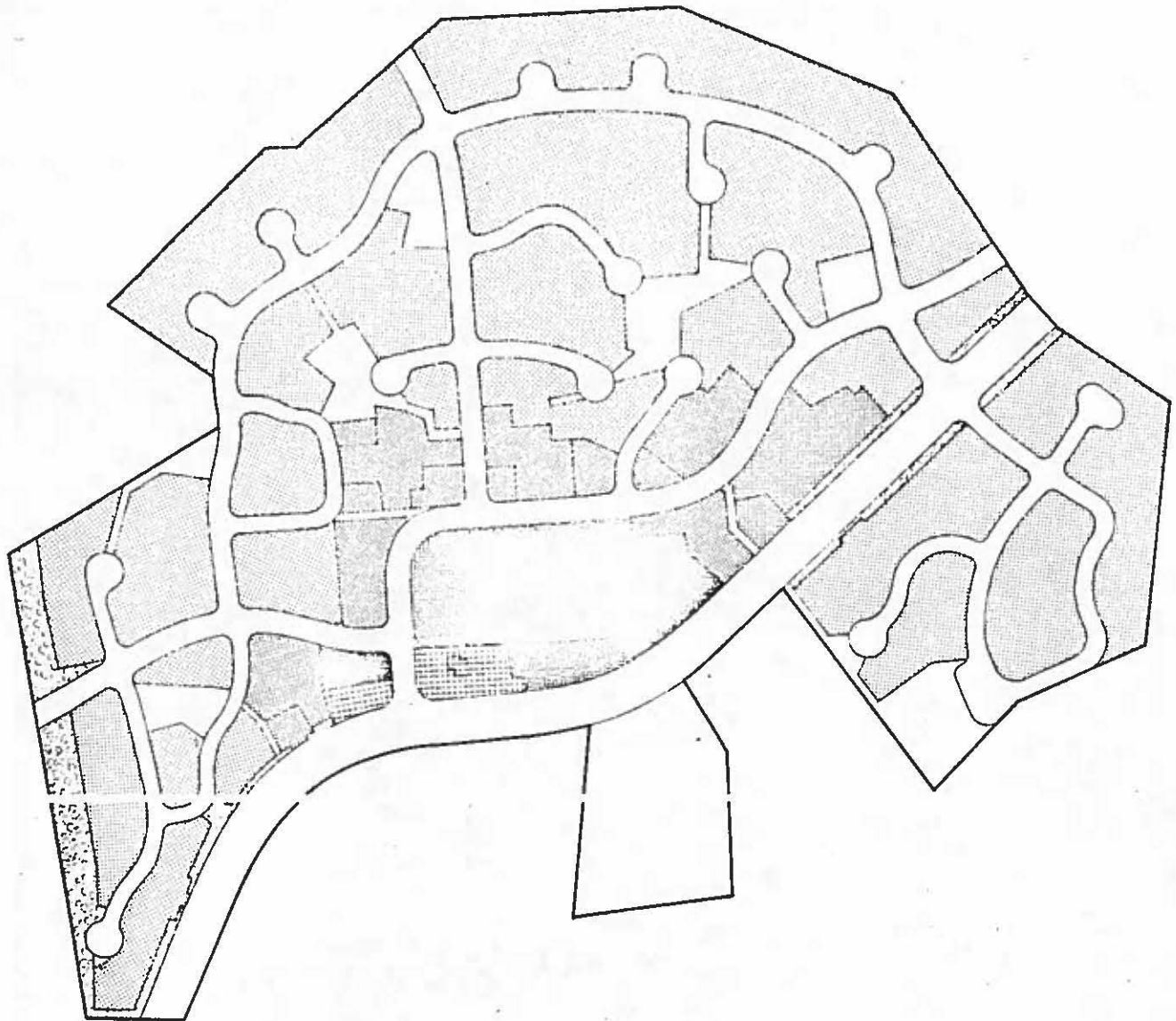
3. Encouragement of private enterprise to undertake renovation and modernization of privately owned properties.



L	E	G	E	N	D
LOW DENSITY RESIDENTIAL AREA					
MEDIUM DENSITY RESIDENTIAL AREA					
HIGH DENSITY RESIDENTIAL AREA					
VILLAGE COMMERCIAL CENTER					
VILLAGE CONVENIENCE PLAZA					
NEIGHBORHOOD CONVENIENCE CENTER					
VILLAGE CIVIC CENTER					
PARKING AREA					
RECREATION AREA					
GREEN BELT					
CHURCH PROPERTY (EXISTING)					
SCHOOL PROPERTY.					

CHART NO. 34

PROPOSED LAND USE MAP SINAJANA URBAN RENEWAL PROJECT



L E G E N D	
LOW DENSITY RESIDENTIAL AREA	
MEDIUM DENSITY RESIDENTIAL AREA	
VILLAGE COMMERCIAL CENTER	
VILLAGE CIVIC CENTER	
PARKING AREAS	
RECREATION AREAS	
GREEN BELTS	

CHART NO. 35

PROPOSED LAND USE MAP YONA URBAN RENEWAL PROJECT

BIBLIOGRAPHY

MASTER PLAN BIBLIOGRAPHY

"Study of Apra Harbor"

Tudor Engineering Company
January 1964 .

"Government of Guam Air Terminal"

Alfred A. Yee and Associates
December 1964.

"Sewage Collection and Disposal System"

Metcalf and Eddy Engineers.

"Focus On Guam"

An Economic Study Prepared by Bank of America, N.T. & S. A., 1964.

"Water Supply Report"

Kennedy Engineering Company
1964.

"Water Development Report"

Layne International Development Specialists
July 1965.

"Evaluation of Island-Wide Power System"

Rogers Engineering Company Incorporated
1964.

"Population of Guam 1960 to 1985"

Territorial Planning Commission, Government of Guam
March 27, 1962.

"U. S. Army Geological Survey of Guam"

U. S. Army Corps. of Engineers
1954.

"Policies and Requirements for Local Public Agencies," Urban Renewal Manual. Urban Renewal Administration, Housing and Home Finance Agency, Washington, D. C. Chapter 1-1, July 1961.

Urban Land Institute, The Community Builders' Handbook, Executive Edition, Prepared by the Community Builders' Council of the Urban Land Institute, Washington, D. C. 1965.

Department of Commerce Bureau of the Census, United States Census of Population, 1960, U. S. Government Printing Office, Washington, D.C., 1960.

"Workable Programs for Community Improvements," Housing and Home Finance Agency, Washington, D. C. February 1962.

Sessions, H. Douglas, New Bases for Recreation Planning, Journal American Institute of Planners, Vol. XXX No. 1, February 1964.