

**GUAM
COMPREHENSIVE HOUSING STUDY
2009**

**Prepared by
Guam Housing and Urban Renewal Authority
2009**



GHURA

Guam Housing and Urban Renewal Authority
Aturidat Ginima' Yan Rinueban Siudad Guahan
117 Bien Venida Avenue, Sinajana, Guam 96910
Phone: (671) 477-9851 • Fax: (671) 472-7565 • TTY: (671) 472-3701



**EQUAL HOUSING
OPPORTUNITY**

October 15, 2009

Buenas yan Hafa Adai,

It gives me great pleasure to present the Guam Comprehensive Housing Study of 2009.

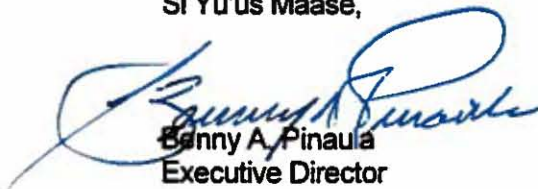
Guam is faced with many challenges. It is important that we are prepared to respond to changes in the economic climate and the upcoming military build-up. The Guam Comprehensive Housing Study is one resource of viable information that will assist in planning for future expansion and prosperity of our island. From housing supply & demand, to adequate & affordable housing, this study represents and addresses many of those concerns.

GHURA is committed in providing fair and affordable housing to those in need. Our goals are to ensure that during these changing times, the entire island and its' people will benefit from the forecast of economic growth. The information provided in this study allows for strategic planning and managed community development at all levels.

We have forged our relationships with the public, private and military communities. With their continued support and our commitment to those we serve, our future and the needs of the entire community of Guam will be met, for years to come.

We would like to thank PCR Environmental Inc. and SMS Research & Marketing for their hard work in compiling and analyzing the data, the Guam Build Up Office and subcommittees, Government of Guam agencies and employees, private-sector businesses and individuals, numerous non-profit organizations, the Federal Government and the U.S. Military, in their cooperation and participation in this study.

Si Yu'us Maase,

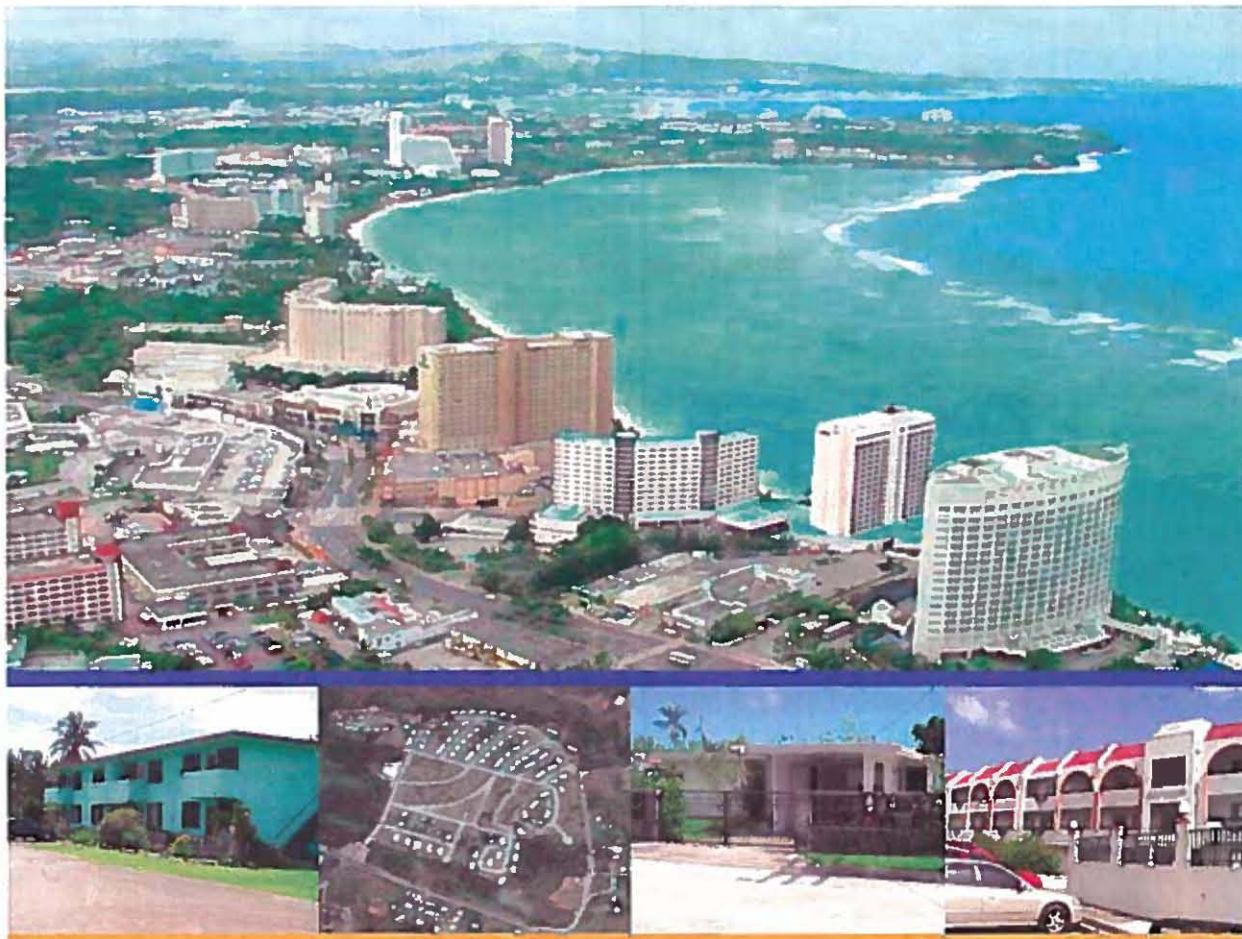


Benny A. Pinault
Executive Director

Guam Comprehensive Housing Study, 2009

GHURA-RP&E-08-002

August 31, 2009



Prepared for:

Executive Director
Guam Housing and Urban Renewal Authority
Aturidat Ginima' Yan Rinueban Suidat
Guahan
117 Bien Venida Avenue
Sinajana, Guam 96910
Tel: 671-477-9851

Prepared by:

PCR Environmental, Inc.
111 East Sunset Blvd.
Barrigada, Guam 96913
(Tel) 671-473-3560



In association with:

SMS Research & Marketing Services, Inc.
1042 Fort Street Mall, Suite 200
Honolulu, HI 96813





111 East Sunset Blvd., Barrigada, Guam 96913
Tel: 671.473.3560 • Fax: 671.473.3563 • Email: info@pcrguam.com
Web: <http://www.pcrguam.com>

August 31, 2009

Mr. Benny Pinaula
Executive Director
Guam Housing and Urban Renewal Authority
117 Bien Venida Avenue
Sinajana, Guam 96910

Subject: Guam Comprehensive Housing Study, 2009

Hafa Adai Mr. Pinaula,

PCR Environmental, Inc. and SMS Research & Marketing Services are pleased to present the Guam Comprehensive Housing Study, 2009.

We believe the study has fulfilled all of the objectives GHURA set forth at its inception. It includes description of Guam's current housing conditions, the prospects for growth in Guam's housing stock through 2030, an exposition of the expected impact of a proposed military build-up on Guam between 2012 and 2015, and a housing model, which we believe will be more useful than those of the past and more easily adaptable in the future.

It has been a pleasure to work with you and your staff, the staff of several other Government of Guam agencies, and the many members of Guam's housing industry who have contributed selflessly to the project.

We look forward to working with all of you in the process of introducing the Study to the people of Guam.

Sincerely,

Tara N. Perez-Steffy, CEO
PCR Environmental, Inc.

Jim E. Dannemiller, Executive Vice President
SMS Research and Marketing Services, Inc.

TABLE OF CONTENTS

Executive Summary.....	v
Fundamental Housing Data.....	v
Current Housing Situation for Guam Residents.....	vi
Housing Demand.....	vi
Housing Preferences.....	vii
Financial Qualifications.....	vii
Modeling Housing Futures, Developing Housing Policy.....	viii
Issues.....	ix
1. Introduction.....	1
1.1 Purpose and Need.....	1
1.2 Methods.....	1
1.3 Relationship to Previous Guam Housing Studies.....	2
1.4 Relationship to Other Guam Plans.....	2
1.5 Structure of This Report.....	3
2. Current Situation.....	5
2.1 Socio-Economic Profile.....	5
2.1.1 Population and Households.....	7
2.1.1.1 Population Growth.....	9
2.1.1.2 Location of Population.....	12
2.1.2 Income.....	13
2.1.3 Employment.....	14
2.2 Housing Inventory.....	17
2.2.1 Housing Characteristics.....	17
2.2.2 Housing Cost by Type.....	19
2.2.3 Housing Unit Condition.....	21
2.2.4 Housing Production.....	22
2.3 Housing Market.....	23
2.3.1 Homeownership Market.....	24
2.3.2 Rental Housing Market.....	24
2.4 Housing Demand on Guam.....	29
2.4.1 Homeowners.....	29
2.4.2 Renters.....	30
2.4.3 Military Residents.....	31
2.4.4 Estimating Demand.....	33
2.4.5 Housing Preferences.....	34
2.4.5.1 Buyer Preferences.....	35
2.4.5.2 Renter Preferences.....	36
2.4.6 Estimating Qualified Demand.....	37
2.4.6.1 Current Monthly Shelter Payment.....	37
2.4.6.2 Perceived Affordable Payment.....	37
2.4.6.3 Savings.....	37
2.4.6.4 Annual Household Income.....	38
2.4.6.5 Shelter-to-Income Ratios.....	40
2.4.6.6 Qualified Demand Estimate.....	41
2.4.6.7 Housing Demand and Supply in an Unaffordable Market.....	42
2.4.7 Hidden Homeless and At-Risk of Homelessness.....	43

3. Housing in the Next Two Decades	46
3.1 Without Military Buildup	47
3.1.1 Assumptions and Parameters	47
3.1.2 Demographic Projections, Unconstrained	49
3.1.3 Projected Housing Demand and Policy Reactions	51
3.1.4 Characteristics of Needed Units	52
3.1.5 Special Needs Housing Units	53
3.2 With Military Buildup – Minimum Impact	54
3.2.1 Model Parameters	54
3.2.2 Demographic Projections	54
3.2.2.1 Population and Households	54
3.2.3 Projected Housing Demand	56
3.3 With Military Buildup – Heavier Impact	59
3.3.1 Model Parameters	60
3.3.2 Demographic Projections	60
3.3.3 Projected Housing Demand	61
3.4 Special Types of Housing Units	62
3.5 Conclusions	62
4. Challenges and Opportunities	65
4.1 Challenges	65
4.1.1 Housing Costs	65
4.1.2 Land Availability	65
4.1.3 Locating New Development	66
4.1.4 Zoning	66
4.1.5 The Military Buildup	67
4.1.6 The Structure of Guam's Housing Market	68
4.2 Opportunities	69
4.2.1 Assisted Housing	69
4.2.2 Work With Military	70
4.2.3 Inclusionary Housing Policy	71
5. Data Recommendations	72
5.1 The Importance of Continuity	72
5.2 The Importance of a Housing Inventory	72
5.3 The Importance of Market Data	73
5.4 The Importance of Production Data	74
5.5 The Importance of Basic Data	74
6. Appendix	76
6.1 Appendix A: Glossary of Terms	76

INDEX OF TABLES

Table 1: FAS Migration Population in Guam through 2008	6
Table 2: Guam Population by Village, 1980, 1990, 2000, and 2008	13
Table 3: Guam Household Income Distribution, 1990, 2000 and 2009	14
Table 4: Jobs and Population by Village, 2008	16
Table 5: Population and Housing Unit Annual Growth by Decennial Years, 1970-2000	18
Table 6: Housing Characteristics, 1980-2009	18
Table 7: Vacancy Status by Condition of Unit, Guam 2009	21
Table 8: Building and Construction Permit Summary (2005-2008)	22
Table 9: Median Monthly Housing Costs by Region, 2009	30
Table 10: Median Monthly Housing Costs by Military Status, 2009	32
Table 11: Interest in Moving to a New Home by Current Tenure, Guam, 2009	33
Table 12: Housing Preference by Tenure	34
Table 13: Shelter-to-Income Ratios Among Current Movers, 2009	40
Table 14: Summary of Payments for Affordable and Available Units, 2009	41
Table 15: Hidden Homelessness and At-Risk of Homelessness, 2009	44
Table 16: Model Assumptions - Fixed Parameters	48
Table 17: Model Inputs - Variable Parameters	49
Table 18: Unmet Demand and Needed Units – Unconstrained Model, 2010-2030	51
Table 19: Characteristics of Needed Units – Unconstrained Model, 2010-2030	53
Table 20: Estimated Demand for Special Needs Housing Units	53
Table 21: Estimated Demand for Special Needs Housing Units	54
Table 22: Parameters for the Minimum Impact Military Buildup Model	54
Table 23: Unmet Demand & Needed Units – Minimum Impact Model, 2010-2030	56
Table 24: Parameters for the Heavier Impact Military Buildup Model	60
Table 25: Unmet Demand & Needed Units – Heavier Impact Model, 2010-2030	61

LIST OF FIGURES

Figure 1. Required Information by Data Source	4
Figure 2. Guam Regional Boundaries, 2009	8
Figure 3. Resident Civilian and Military Population of Guam, 1970 to 2009	10
Figure 4. De Facto Population of Guam, 1970-2009	11
Figure 5. Population Density of Guam, 2000.....	12
Figure 6. Employment on Guam, 1980 to 2009.....	15
Figure 7. SFD Real Estate Transactions & Median Sales Price, 1999-2008	19
Figure 8. Condominium Real Estate Transactions & Median Sales Price, 1999-2008.....	20
Figure 9. Number of Rental Advertisements by Year	25
Figure 10. Number of Rental Ads and Median Advertised Rent Amount by Year	26
Figure 11. Rental Unit Location by Year	27
Figure 12. Section 8 Rental Data	28
Figure 13. Federally Owned Land on Guam	31
Figure 14. Guam Mover Households at HUD Guideline Levels, 2008	39
Figure 15. Effective Demand and Housing Supply by HUD Income Ranges, 2009	43
Figure 16. Guam Population (Unconstrained), Civilian and Military, 1980-2030	50
Figure 17. Guam Population with Buildup, Civilian and Military, 1980-2030	55
Figure 18. Detailed Military Population with Buildup, 2010-2030	55
Figure 19. Comparing Unconstrained and Minimum Impact Buildup Models, 2010-2030.....	57
Figure 20. Comparing Minimum-Impact and Heavier-Impact Models, 2010-2030	62

EXECUTIVE SUMMARY

In January of 2009, the Guam Housing and Urban Development Authority (GHURA), acting at the request of the Housing Subcommittee of the Civilian Military Task Force (CMTF) awarded a contract to conduct the Guam Comprehensive Housing Study, 2009. The objectives of the project were to: (1) produce a Comprehensive Housing Study for Guam, and (2) to develop a dynamic, interactive Housing Model that will be used to generate forecasts of housing need for Guam. While the focus was on studying Guam's housing situation in general, the study was expected to consider and develop forecasts for the proposed military expansion on Guam.

The project was awarded to the consultant team of PCR Environmental, Inc. and SMS Research & Marketing Services. The project team reviewed past studies, interviewed key experts on Guam, gathered existing data, conducted surveys, analyzed data and developed the interactive model that was needed. This report summarizes the results of that work.

FUNDAMENTAL HOUSING DATA

Population: The population of Guam has grown at a relatively steady pace over the past forty years. Decade-on-decade growth rates were between 10 and 15 percent between 1950 and 1970. Between 1970 and 1990 Guam's population grew at rates of almost 25 percent per decade. In the nineties, population growth was about 16 percent and the Census Bureau estimates that the growth rate for this decade will be about 15 percent. The last Census puts Guam's population at 154,805 and the best estimate for 2009 is that Guam's total civilian and military population is just over 176,000 people.

Housing Stock: The total number of housing units in Guam in 2009 is about 53,673 units. The inventory grew by 25 percent between 1980 and 1990, and 35 percent in the nineties. In this decade a more moderate growth rate of 12.5 percent is expected.

Households: Guam is a family place. In 2000, 97 percent of Guam's people lived in households and 83 percent of those are family households (married couples, nuclear families, extended families or single-parent households). The remaining three percent were in group quarters and 44 percent of those were military personnel in barracks housing. That general profile of households has been fairly stable for the last four decades. Household sizes are relatively high on Guam, but have been decreasing slowly. Average household sizes recorded for the last four Census years were 4.83 in 1970, 4.07 in 1980, 3.97 in 1990, and 3.89 in 2000 when the total number of occupied housing units¹ on Guam was 38,769. Even a small change in average household size is important when forecasting housing need.

Home Ownership: At 48 percent in 2000, Guam's home ownership rate is one of the lowest in the United States. Based on the 2009 Housing Demand Survey, the current homeownership rate is only slightly higher in 2009 (49.5 percent) than in 2000. In general, a down housing market, such as that experienced in Guam between 1999 and 2004, often provides opportunities for first-time homebuyers.

¹ Throughout the analysis and reporting of data for GCHS 2009 we have followed the U.S. Census convention of defining households and occupied housing units as identical. The number of occupied housing units, or households, is equal to the total housing stock minus units held for use by non-residents and vacant units.

Housing Prices: Median sales prices for single-family homes dropped steadily from 2000 to 2003. The next five years, however, saw an 87 percent increase in the median sales price. The results for multi-family (condominium) sales prices showed a similar but more pronounced pattern. The median sales of condominiums fell sharply from \$120,000 in 1999 to \$75,000 in 2003. It then rose even more dramatically, more than doubling in four years to \$160,000 in 2007.

Average shelter costs for renter households in Guam rose by 40 percent between 2003 and 2006. Advertised rents² went up 20 percent during the same period. Increases in advertised rents first appeared in 2001 and began to taper off in 2005. As the percentage of renters paying the higher rents increased, the average shelter cost for all renters rose sharply between 2003 and 2005.³ The peak of the current run-up in advertised rents was July of 2006. Since that time, advertised rents have been falling.

CURRENT HOUSING SITUATION FOR GUAM RESIDENTS

At the end of 2008, Guam had 44,548 households. The estimated population that year was 176,401 and the average household size was just under 4 persons. This survey again showed that planning for housing in Guam centers on planning for young families. Approximately 70 percent of all households on the island include children under the age of 18, while less than one-quarter of all households include senior citizens. But Guam also has many complex households. In one-fifth of all households, multiple families reside in a single housing unit.

The homeownership rate is still low – slightly less than 50 percent in 2009. Overall, 67 percent of all households live in single-family dwellings, 11 percent in duplex or multiplex⁴ units, 14 percent in apartments, and just over 5 percent reside in condominium units. Homeowners are mostly in single-family homes or condominiums.

Guam's median household income increased by approximately 28 percent from 1990 to 2000. Since 2000, median household income (according to the Demand Survey) has risen to nearly \$44,000, an increase of 12 percent. The median household income among homeowners was \$47,200. U.S. Department of Housing and Urban Development (HUD) income guidelines express income in terms of the median household income for Guam, adjusted for household size. Median incomes for the island in HUD's calculations rose from \$47,900 in 2007 to \$49,900 in 2008.

HOUSING DEMAND

More than half (52 percent) of all Guam households were interested in moving to a new unit in the future. The rest of the households (48 percent) stated that they never intended to move from their current unit. They felt they were living in the home where they would live out their lives and had no intention of moving elsewhere. That was true for 71 percent of current homeowners and 21 percent of Guam's renter households.

² Rent data are taken from two sources. The Housing Demand Survey measured monthly rent for all renter households. The Rent Study measured average monthly advertised rents.

³ That is, rents paid by all renter households lagged advertised rents.

⁴ Multiplex units are defined as residential structures that include between 3 and 4 separate residences.

HOUSING PREFERENCES

Among Guam households that want to move, 45 percent plan to own their next unit and 34 percent expect to rent their next home.⁵

Buyer Preferences: Most potential buyers (86 percent) wanted single-family homes. About half would accept a condominium unit if they could not find a single-family unit in their price range. Asked about the fewest number of bedrooms they would accept, buyers said they would need a minimum of two (38 percent) or three bedrooms (44 percent). Similarly, most could live with one (43 percent) or two bathrooms (47 percent). The smallest acceptable unit was 1,225 square feet, on average. Over forty percent of buyers would choose to live in Northern Guam, typically in the villages of Dededo and Tamuning. Among the 61 percent of buyers who indicated a preference for North or Central Guam, 40 percent of those would at least consider purchasing a home in Southern Guam.

Renter Preferences: Among those who wanted to rent, 64 percent wanted single-family homes. About 23 percent preferred an apartment and the rest expressed no strong preference regarding the unit type. Like buyers, renters preferred three or four bedroom units (76 percent), but 97 percent of future renters in Guam will accept a unit with one less bedroom and 66 percent could live with one less bathroom than they initially requested. The strongest preference was for two-bedroom, one-bath units. Renters were willing to live with just over 1,000 square feet in their next home, which was 18 percent smaller than the minimum unit size for buyers. Like the potential buyers, Guam's future renters want to live in Dededo and Tamuning in the North (42 percent) or in Central Guam (21 percent). About one-third of those with a preference for North or Central Guam would consider renting in the South.

FINANCIAL QUALIFICATIONS

Of course, not everyone who wants to buy or rent a new unit will be able to do so in the next few years. The Housing Demand Survey included many items to measure the relative ability of potential buyers or renters to purchase certain housing products.

Median home values have been climbing since 2003, indicating that a homeowner who has been in their unit for three or more years may have sufficient equity available for a down payment on a new unit. About 34 percent of all potential buyers own their own homes, and 57 percent of those have been living in that unit for more than three years.

Buyers without equity must have sufficient savings to apply toward a down payment. Nearly three-quarters percent of all prospective buyers have at least \$5,000 in family savings or investments. But by their own best estimate, only 67 percent of current owners without equity, and 49 percent of current renters would be able to gather \$40,000 as a down payment.

About 23 percent of all potential buyers have household incomes in excess of 140 percent of the HUD median. While there is no set income required for financing of this type, the 140 percent level is usually suitable for borrowing 85 percent of \$450,000. That may be offset if

⁵ The remaining 11 percent reported their intention to move in with family or friends (occupy without payment of cash rent), or were unsure whether they would buy or rent their next unit.

more than one adult in the household is employed, which is the case for about 62 percent of potential buyers in Guam.

The monthly mortgage payment may be easier to manage. About 28 percent of potential buyers say they can afford to pay \$1,700 or more each month. Among current homeowners, 45 percent are already paying more than \$1,500 a month in mortgage and utilities. Many renters who want to buy will have to increase their monthly shelter payment substantially when they move to home ownership. Only 29 percent of current renters are paying more than \$1,500 a month for shelter.

MODELING HOUSING FUTURES, DEVELOPING HOUSING POLICY

The dynamic, interactive housing model developed for this study is known as the Guam Housing Model Version 4.6 (GHM4.6). It forecasts population and households, housing stock and new production, market volume and prices, and "needed units". Needed units are a low income housing production level designed to satisfy three objectives: (1) to reduce the level of unmet demand among targeted households; (2) to restrict doubling up to less than two percent of the households on Guam; and (3) to maintain a limit on unmet demand among target households at no more than 400 qualified and unqualified households per year. Most needed units are located at the lower end of the housing market and will likely be produced by government agencies or by public-private partnerships. For this report, we tested three market scenarios, of which two will be covered here.

The Unconstrained Scenario: The unconstrained scenario forecasts demand in the absence of the military buildup. It predicts a population increase of 24,394 persons by 2020 (11.8 percent), and another 25,600 people (12.0 percent) by 2030.⁶ The unconstrained scenario describes a relatively uneventful future for Guam's population in which the military segment grows just a little slower than the civilian population over the next twenty years. This model does *not* attempt to account for natural disasters, and does not assume either national or international economic downturns.

This model predicts a total demand of 5,986 housing units between 2010 and 2020, and another 6,919 units between 2021 and 2030, inclusive. Total demand is a measure of housing activity and includes transfer of existing units, owned or rented, from one occupant to another. The unmet demand in the no-buildup model (the number of households that are unable to secure the unit they need) averages about 727 units per year from 2010 to 2020 and 850 units per year from 2021 through 2030. The total number of needed units, those that must be produced over and above what the Guam housing market will normally produce, is 5,734 units between 2010 and 2030.

Military Buildup Scenario: Our first estimate of the impact of the proposed Guam military buildup was designed to measure the minimum possible effect on Guam's housing market. This scenario suggests that 20 percent of military personnel and their dependents will live off-base, and that workers who migrate to Guam to take on-base jobs will all be housed in civilian housing units. The remaining 80 percent of military households will be housed on-base and all construction workers will be housed in temporary housing. No secondary or induced impacts on the economy are assumed and no additional in-migration will ensue.

⁶ These reflect the population goals reported in the 2030 Guam Transportation Plan.

Using the minimum impact scenario, GHM4.6 predicts that the total population of Guam will grow by 57,368 persons between 2010 and 2020. That is 35,384 more people (161 percent more) than if the military buildup did not occur. The population of Guam will grow to 240,326 persons by 2020 (27 percent), and reach 268,366 people (11 percent) by 2030.⁴⁷ The total number of needed units, those that must be produced over and above what the Guam housing market will normally produce, is 9,088 units between 2010 and 2030.

During the course of preparing the Guam Comprehensive Housing Study for 2009, we encountered literature, data, and expert opinion suggesting that the proposed military buildup in Guam would have greater impact than might result from the minimum impact scenario. Specifically, there were those who felt that the 80 percent on-base rule might underestimate the actual off-base rate and that actual on-base housing might be significantly lower. That of course would cause us to underestimate the impact of the buildup.

Civilian-Military Task Force (CMTF) data suggest that some construction workers will remain in Guam after the buildup and some observers expressed doubt that 100 percent of them would be housed in temporary units for the duration. There were others who felt that there would be secondary or induced effects on Guam's economy stemming from the buildup. If substantial resources flow to the island to support a massive buildup of the armed forces, the resulting increase in economic activity and job opportunities may attract even greater in-migration. All of those possibilities would significantly increase activity in Guam's civilian housing market. The greater demand would run ahead of supply in the short run, causing major increases in housing demand and reducing availability of housing units for Guam's local residents.

A maximum impact model for Guam was also developed to present forecasts for a slightly more dramatic buildup scenario.

ISSUES

Development areas: Deciding where to locate new housing developments is a challenge that has caused some discussion. Some feel encouraging additional development in southern villages will make more housing available there. It would open up southern villages to people who might like to move there and ease the pressure on development in the north and central regions. Continued building in the North means further development over Guam's aquifer and exacerbates a density issue that some feel is becoming a problem.

Others feel efforts to get people to buy in the South will be futile. Southern villages lack infrastructure and some think building costs are higher because of it. Guam buyers tend to share the perception that the South has few jobs, transportation to job centers is time consuming, and southern villages typically offer less entertainment, facilities and amenities. Some were skeptical and noted that raising production in the South by a hundred percent would not divert enough North and Central development to save the aquifer or significantly reduce densities. Besides, there are many Guam residents who love – and want to preserve – the rural lifestyle and ambience of villages in the South.

Zoning: There is a belief in Guam that, because the zoning process is long and cumbersome, it is frequently bypassed. Most interview respondents felt zoning laws were outdated and sometimes ineffective. Some felt that the situation was more serious and that "spot zoning is a misnomer for Guam" since "it happens all the time." One observer said that, "Developing on

Guam is like developing in the Wild West." Our analysis of applications for zoning and land use variances indicated some support for the last two ideas⁷.

Changing zoning laws is unlikely to be a simple matter. Not only is the zoning code complex, but more than thirty years of spot zoning makes the zoning map very complicated. There are as yet no agreed upon guidelines for a code that might constitute a good zoning solution for Guam. When we asked why Guam's zoning law had not been revised since it was first written, the answer was usually the same: "People in Guam," we were told, "do not like to be told what to do with their property."

Military Buildup: Clearly, one of the hottest topics in Guam in 2009 is the military buildup. Many experts in Guam feel that the buildup will be good for the island because it will foster positive changes in the economy. With respect to housing in Guam, these observers believe that the overall improvement in the economy will lead to increased demand for additional and improved housing, and that will lead to increased housing supply, which will appear as an induced benefit of the buildup itself. Increased choice for all buyers and renters is a good thing.

Others believe that the arrival of the additional military personnel and their dependents in addition to the contract and construction workers, who will support the move, will put strong pressure on Guam's housing market. Demand will surge ahead of supply, and prices will rise even higher than in the last decade. Good for the housing industry; not so good for Guam renters and would-be homeowners.

Many of the comments were based on an unspoken assumption that many, if not all, of the new residents arriving to support the buildup will be active participants in Guam's housing market. Our analysis strongly suggests that this may not occur. Certainly the actual results will depend on the relative numbers of personnel and dependents who live on- and off-base. It will also depend on the relative numbers of construction workers who are housed in temporary worker's housing. If the rates fall heavily toward on-base and temporary housing, the impact of the buildup on Guam's housing market may be more positive than negative. If more jobs at higher wages push income up faster than excess demand develops, then the affordability index in Guam will fall. More people will have more choice in their housing arrangements, and homeownership will increase.

⁷ For additional detail regarding zoning, see the Department of Land Management section in the Technical Report

1. INTRODUCTION

1.1 PURPOSE AND NEED

The Guam Housing and Urban Renewal Authority (GHURA), on behalf of the Housing Subcommittee of the Governor's Civilian/Military Task Force (C/MTF) released RFP#: GHURA-RP&E-08-002 requesting proposals from qualified consultants to design and conduct a Comprehensive Housing Study for Guam. In a formal bidding process, GHURA selected PCR Environmental, Inc. and SMS Research & Marketing Services, Inc. to perform the Housing Study and to produce an interactive housing model capable of predicting Guam's future housing needs.

The study was intended to provide an update to previous Comprehensive Housing Studies conducted in Guam and to provide the information and analysis required to support housing planning and policy development. The need for new and updated housing information was particularly important in 2009 to support housing planning to accommodate the impending military buildup associated with the relocation of Marines from Okinawa.

The objectives of the study were to examine Guam's housing market, analyze future housing needs, and identify potential challenges and recommendations to support the Subcommittee's goal of adequate and affordable housing for the people of Guam. Understanding Guam's current housing situation and developing a reasonable prediction of future housing requirements will support policy development to mitigate the impacts of a military buildup.

1.2 METHODS

The Guam Comprehensive Housing Study required a substantial effort to locate, assemble, and analyze large amounts of information on Guam's housing conditions. The study design (Figure 1) was straightforward. It made use of data from seven broadly defined collection efforts to develop four work products. Data collection includes three projects to gather secondary housing data: assembling existing housing data, reviewing policy papers, plans, and reports; and a literature search to provide information from published sources. Primary data collection efforts included a housing demand survey conducted among a sample of 1,500 Guam households, a series of public meetings to gather data from community members, a set of key informant interviews, and a housing inventory study to gather data by observing a systematic sample of housing units. Information from these sources was analyzed in several phases to produce a description of current housing conditions in Guam (population, economic, housing policy, permitting procedures, and housing issues including homelessness, housing for the elderly, housing for disabled persons, and housing production); a housing demand analysis, including an interactive housing model; and a needs assessment that included the description of housing opportunities and challenges, and development of recommendations if needed.

A more detailed description of the study method has been prepared in an accompanying document: "Guam Comprehensive Housing Study, 2009 - Technical Report".

1.3 RELATIONSHIP TO PREVIOUS GUAM HOUSING STUDIES

The Guam Comprehensive Housing Study 2009, like its predecessors in 1992⁸ and 1997⁹, developed estimates of future housing needs in Guam by looking at past housing market performance. As we shall see, data and policy documents available in Guam are well suited to that analytical strategy. With the exception of the periodic, albeit random, impact of natural disasters Guam's population and housing stock have changed at a relatively steady pace over the last thirty years.¹⁰

Differences between the previous two studies and the Guam Comprehensive Housing Study, 2009 stem primarily from differing objectives over the years and, to a smaller extent, differences in research technology. We have preserved series continuity wherever possible. The major point of discontinuity is in the housing model. The previous model could not be altered or provide the flexibility required for long-range planning. The new model was designed to be more flexible and more useful to Guam housing planners without reprogramming.

The other major change from past comprehensive housing studies is the impending military buildup resulting from U.S. military base closures in Japan. Although full details are not yet available, if and when the transfer of military personnel and operations from Okinawa to Guam take place, it will result in a substantial increase to the population of Guam. That, in turn would affect many aspects of life in Guam, including housing. Because the details of the plan have not been finalized, the Comprehensive Housing Study makes provision for estimating future housing need with and without the buildup.

1.4 RELATIONSHIP TO OTHER GUAM PLANS

This study owes much to the many planning activities occurring concurrently in Guam over the last two years. The study follows modeling and forecasting procedures adopted by the Guam Transportation Plan¹¹, especially its population forecast. That forecast does not differ significantly from others that have appeared recently, but it includes a more comprehensive explanation and documentation. The transportation plan also included a useful treatment of the military buildup from which our work has benefited.

This study also benefited from work reported in the Land Use Plan¹², which set forth policy and plans for residential land use and housing. Those policy issues form the parameters for residential development in Guam over the next two decades.

⁸ *Guam Comprehensive Housing Study*. Prepared for The Guam Economic Development Authority and the Guam Housing Corporation. Prepared by Duenas & Associates, Inc., and the Urban Institute, October 1992. This is one of several reports filed under this project.

⁹ *GHURA 1996 Housing Needs Program: Phase I Update Forecasts of Guam's Housing Needs for 1998*. Prepared for the Guam Housing and Urban Renewal Authority. Prepared by Duenas & Associates, July 1997.

¹⁰ This oversimplified description of major trends is adequate for this argument and it ignores important impacts of military base closings (Base Realignment and Closure Commission (BRACC) 1993 and BRACC 1995), the Compact of Free Association Act of 1985 (P.L. 99-239), and the Compact of Free Association Amendments Act of 2004 (P.L. 108-188) among other significant socio-economic trends.

¹¹ Guam Department of Public Works, *2030 Guam Transportation Plan*, Guam Islandwide Program Management Services, Task Order No. 1A: PB DPW FHWA-GU-NH-IPMS (002), prepared by Parsons Brinkerhoff International, Inc., December 2008.

¹² Guam Bureau of Statistics and Plans, *Draft North and Central Guam Land Use Plan*, prepared by ICF International, January 2009.

The Guam Waterworks Water Resources Master Plan¹³ provides parameters for development over the next two decades and addresses the military buildup in preparing the plan and recommendations. The Port Authority of Guam's Master Plan Update¹⁴, the State Plan on Aging¹⁵, the Guam Consolidated Housing Plan¹⁶, among others have also been helpful in our analysis of housing data and the need for additional housing stock that may result from the buildup.

1.5 STRUCTURE OF THIS REPORT

The first section of this report covers the current housing situation in Guam. It describes the population of people in households, the housing units available to house them, the Guam housing market as defined by the real estate transactions and prices by which families get housing, and finally it describes the human aspect of housing using data taken from our housing demand survey.

The second section describes the forecast for housing under three conditions. We present forecasts for an unconstrained model (without a military buildup) and second, a model that examines the effects of the proposed military buildup on Guam. One takes a very conservative approach to estimating impact. The other takes a look at the possibility of a more significant impact on Guam housing.

In the third section we discuss housing forecasts and present a series of challenges and opportunities for housing planners in Guam. Finally, we present some recommendations to address the data quality and acquisition that face housing planners in Guam today.

In a separate document we have produced a Technical Report that presents the details of our methods of data collection and analysis. Also contained in the Technical Report, are extensive sets of data tables summarizing the primary data collected in the course of this study.

¹³ Guam Waterworks Authority, *Population and Land Use Forecast: Final WRMP*, Report Volume 1, Chapter 6, July 2007.

¹⁴ Port Authority of Guam, Jose D. Leon Guerrero Commercial Port, *Master Plan Update 2007, Public Comment Draft*, prepared by PB Guam, February 2008.

¹⁵ Guam Department of Public Health and Social Services, Guam State Office on Aging, Division of Senior Citizens, *Guam 2008-2011 Four Year State Plan on Aging*, August 2007.

¹⁶ Guam Housing and Urban Renewal Authority. *Guam Consolidated Housing Plan, 2005-2009*. <http://www.ghura.org/commdev/2006ConPlan.pdf> (accessed August 1, 2009).

Figure 1. Required Information by Data Source

	Secondary Data			Primary Data Collection			
	Published Data	Policy Papers	Published Sources	Demand Survey	Public Meetings	Informant Interviews	Housing Inventory
I. Existing Conditions							
Published Data							
Population	✓		✓				
Housing units, numbers	✓		✓				✓
Housing units, type, class	✓		✓				✓
Economic	✓	✓	✓			✓	
Prices	✓		✓			✓	
Production		✓	✓			✓	✓
Permitting		✓	✓		✓	✓	
Policy Documents							
Housing policy		✓	✓		✓	✓	
Building codes		✓	✓			✓	
Permitting process	✓		✓			✓	
Land use codes		✓	✓			✓	
Housing Issues							
Homelessness		✓	✓		✓	✓	
Elderly housing		✓	✓		✓	✓	
Housing for disabled		✓		✓	✓	✓	
Low-mod housing		✓	✓		✓	✓	✓
Mass transit		✓	✓		✓	✓	
Production issues	✓		✓		✓	✓	
II. Demand Estimation							
Demand estimates	✓			✓	✓	✓	
Tenancy	✓			✓			✓
Buyer/renter characteristics	✓			✓			
Preferred tenancy				✓			
Preferred unit type				✓			
Interest rates	✓					✓	
III. Needs Assessment							
Current housing				✓			
Crowding	✓			✓			
Condition of unit	✓			✓			
Age of unit	✓			✓			
Years in unit				✓			
Preferred housing				✓			
Fiscal qualifications				✓			
Demographics				✓			

2. CURRENT SITUATION

A comprehensive study of housing must begin by conducting an inventory of what exists. Housing is defined by the existing housing stock: its numbers, characteristics and recent patterns of change. Guam's existing housing stock was developed in response to the shelter needs of Guam's population. The extent to which the housing stock must change is determined primarily by the expected change in the number of families and households in Guam, combined with their financial ability to acquire housing units. This oversimplified characterization of Guam's housing market becomes more complicated when we consider that different types of housing needs and affordability will drive the need for different types of units, tenancy arrangements, prices, and amenities. Finally, this study places a bit more emphasis than usual on the differences between civilian and military housing needs in light of future military actions. The following discussion of the current housing situation in Guam is the basis for estimating short and long term housing needs on the island.

2.1 SOCIO-ECONOMIC PROFILE

Guam is the westernmost territory of the United States and the largest landmass in the Northern Marianas Islands. The island is 49 km long and 6 to 14 km wide. Guam became a possession of the United States in 1898 after the Spanish American War. It was occupied by the Japanese during World War II, and recaptured by the Americans in 1944. Guam officially became an unincorporated territory of the United States by virtue of the Organic Act of 1950, and began to function as an independent economy in 1962 with the termination of U.S. Navy security restrictions.

The most important economic sectors in Guam are the visitor industry and the military. The economic history of the islands reflects that pattern. Guam's economy is periodically disrupted by serious natural disasters including typhoons and earthquakes. Otherwise, the major impacts on economic welfare are associated with events related to its two major industries. Thus we see the economy fueled during the eighties by a rise in Japanese tourism and watch it fall again with the bursting of the Japanese bubble in 1991. During the nineties, a series of events affected Guam's economy, including the Asian economic crisis and the Korean Airlines crash. The recession of the 1990s was also fueled by two rounds of military base closings. The international tourism market and the Guam economy were hit hard during the present decade by the events of September 11, 2001, the SARS outbreak in 2003, wars in the Middle East, and most recently by a worldwide recession. It was revived again in 2005 with the announcement of military plans to increase personnel and activity for Marines, Air Force, and Navy in Guam.

Guam's population is quite young, with a median age of 27 years in 2000. The island's people are multi-ethnic as is true for many of the Pacific Islands. The largest components of the population are the indigenous Chamorro (37 percent), Filipinos (26 percent), Micronesians (17 percent), and Caucasians (7 percent).

Migration

Also like other Pacific Islands, Guam's multi-ethnic population was formed by multiple waves of immigration over many years. The most recent arrival group is that from the Freely Associated

States (FAS). Their story is a special one and one that has immediate implications for housing development in Guam.

The Federated States of Micronesia (FSM) and the Republic of the Marshall Islands (RMI) signed a Compact of Free Association with the United States in 1985. The Republic of Palau (Palau) joined the COFA in 1994. The COFA continued many of the formal relationships between the Pacific Territories and the United States that had existed since the end of World War II. In 2003, the COFA was renewed. It continued most of the same political agreements, changed some immigration laws, and added a formal commitment of "Compact Impact" funding for areas most affected by the influx of COFA migrants (including Guam). Impact funding helps the governments of these localities cope with the expense of providing services to immigrants from the RMI, FSM, and Palau.

Before 1986, immigration from the Freely Associated States had been restricted and Guam had only marginal in-migration from the Federated States¹⁷. There were only about 730 migrants from Freely Associates States to Guam before 1986. Between the COFA signing and 1997, their number had grown to 2,739, a 250 percent increase over 11 years. Then between 1997 and 2003, the end of the COFA agreement FAS migration to Guam actually reversed and the net growth¹⁸ in the FAS population of Guam actually dropped by two or three percent. Since the COFA renewal in 2003, the average annual rate of FAS in-migration to Guam has returned to about the same level as existed between 1997 and 2003¹⁹.

Table 1: FAS Migration Population in Guam through 2008

Year	Total Population of Guam	FAS Members		Net Period Growth Rate
		Number	Percent	
Pre-COFA (1980)	105,979	730	0.7	
1990	133,152	2,739	2.1	250%
1997	146,799	8,338	5.7	194%
2003	163,593	9,098	5.6	-2.3% ¹¹
2008	175,878	18,305	10.4	94%

Total out-migration from the Freely Associated States was notably higher than Table 1 might suggest. Hawaii and the CNMI received many of FAS migrants. But Guam's proximity to the Freely Associated States, and the island's healthy economy during the heavier migration periods, drew the lion's share of the migration²⁰. That same nearness to the FAS also made back-migration easier during the pre-Renewal period.

The profiles of FAS migrants to Guam differed substantially for the two waves of in-migration. The first wave was comprised mainly of unattached males seeking employment and educational opportunity. Among this group, about 60 percent had a high school diploma and some had

¹⁷ See Levin, Michael, 2007 Status of Micronesian Migrants in the Early 21st Century.

¹⁸ Net growth is total growth minus natural increase. Thus even though the FAS population of Guam grew from 8,338 to 9,098 over six years, the level of migration actually dropped. That indicates net outmigration at the end of the original COFA period.

¹⁹ The annual rate of immigration from 1997 to 2003 was 15.9%. The annual rate between 2003 and 2008 was 14.0% according to Levin, op.cit.

²⁰ In 2003, for example, Guam's 9,098 COFA immigrants greatly exceeded the numbers arriving in Hawaii (5,091) and CNMI (3,097).

migrated to Guam to take advantage of programs designed to assist people seeking higher education. In 1997, 52.4 percent of COFA migrants resided in single-family units and 45.5 percent in multi-family units (apartments). Only 4.5 percent owned their homes – 4.4 percent were bought and had a mortgage; one tenth of one percent owned a home outright.

The second wave included many more men with spouses and dependents. Only about 45 percent had a high school diploma. This trend is consistent with decreases in grant and scholarship programs available to FAS high school graduates. As fewer college prospects are able to afford the cost of tuition and living aboard, fewer high school graduates were arriving in pursuit of an education. By 2003, while most of the new FAS migrants were still renting, 62.6 percent were living in single-family homes and fewer (36.3%) were living in apartments. Homeownership grew to 9.4 percent – 6.8 percent had acquired a mortgage and 2.6 percent owned their homes.

The increase in FAS families matched the decrease in students. We might expect that newer arrivals from the Freely Associated States were less educated and less skilled. The net result was greater pressure on Guam's housing market, particularly the rental market. In 2009, GHURA reported that 208 FAS households (1,040 residents) were living in assisted housing. That was 31 percent of all assisted housing families. Another 631 FAS households with 3,014 residents were receiving Housing Choice Vouchers (HCV), amounting to 27 percent of all HCV recipients. In all, 4,054 of Guam's 18,305 FAS immigrants were receiving some form of assisted housing assistance in 2009. That means that, based on GHURA reports of housing assistance incidence rates, and the most recent FAS population estimates, FAS migrants are almost three times as likely to require housing assistance as are Guam families in general.

2.1.1 Population and Households

Population growth leads to the formation of new households²¹ and the need for new housing units to accommodate those households. We have to understand Guam's population profile and growth pattern to predict its future growth rate and composition. In order to do so, we need to know population demographics, number of persons in households or group quarters, geographic distribution across the Island, and socio-economic characteristics.

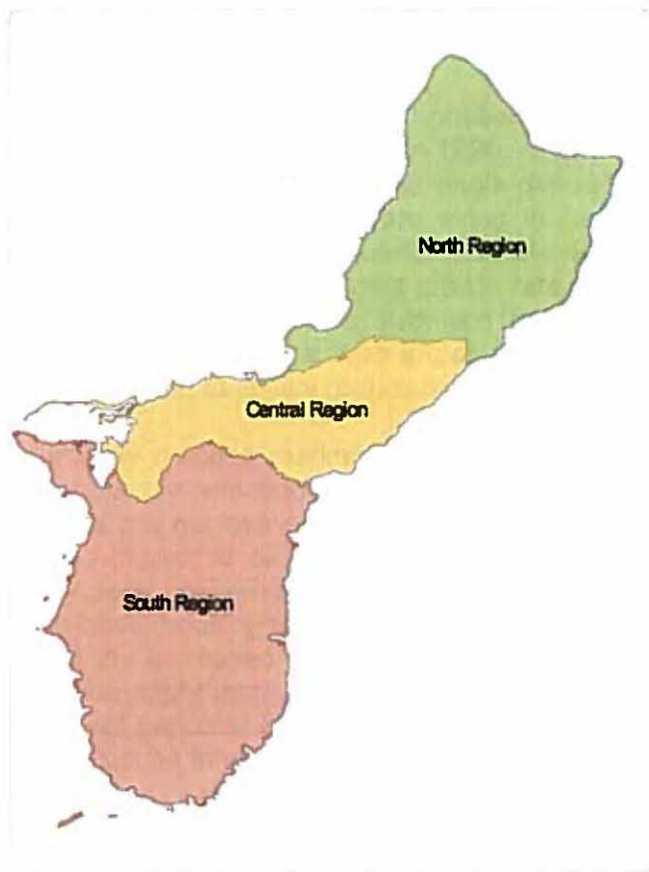
Guam's military population has been an important factor since the end of the Spanish American War and U.S. military presence is a central feature of life in Guam today. In this study, military population estimates and forecasts were more important than usual. With the impending buildup, Guam's population is expected to grow significantly and rapidly over the next five years. Such rapid population growth can have significant impacts on everyday life and housing needs.

The primary source for population data on Guam is the U.S. Decennial Census of Population and Housing. Those data are the most reliable information on Guam's population and were the foundation for this study. The Government of Guam produces useful reports that augment Census data. Most notable among those are the Guam Population Profile and the annual Guam Statistical Yearbook. The Bureau of Statistics and Plans (BSP) produces both of these sources and they include important population estimates for intercensal years.

²¹ Household formation is a function of net natural increase and net in-migration.

According to recent Guam estimates, the 2008 population of Guam was about 176,401 persons. In 2000, the U.S. Census put the population at 154,805. The projected 2030 population without military buildup will be about 222,000. That suggests a 26 percent growth in population between 2008 and 2030. With the military buildup, the population projection is 253,000, a 44 percent increase from the present population. Much of that growth is expected to occur in Northern and Central Guam.

Figure 2. Guam Regional Boundaries, 2009



According to 2000 Census data, the villages of Dededo, Tamuning, Yigo, Barrigada, and Mangilao are home to about 67 percent of Guam's population -- both military and civilian. The buildup will most directly affect the districts that currently house military bases: NCTS Finegayan (Dededo) for the Marines, Navy Base Guam (Santa Rita) for the Navy, and Andersen Air Force Base (Yigo) for Air Force personnel. Consequently, villages in the northern part of the island, which continue to attract new residential development, are expected to accommodate a major share of new housing development spurred by an increase in military personnel and operations in Guam.

Several sources have set forth population projections for Guam over the next twenty years. We have reviewed projections from U.S. Census and several long-range planning documents. For the Guam Comprehensive Housing Study, 2009, we plan to closely follow the projections found in the 2030 Guam Transportation Plan (GTP). We adopt these projections primarily because GTP presents reasonable projections with and without military buildup, makes some comment

on the impact of population growth on housing, and includes in-depth treatment of assumptions and procedures behind its projections. In addition, GTP provides forecasts for population at the village level under both baseline and military buildup conditions. We note that alternative population projections we have reviewed do not produce radically different figures. The adoption of one over the others will not make major differences in our housing projections.

Households are the operative population change units for housing studies. The manner in which the population is distributed across households is the key to generating reasonable estimates of additional housing supply needed to accommodate population growth. The statistical relationship between the two data series (population and households) contains full information on the results of the household formation process.

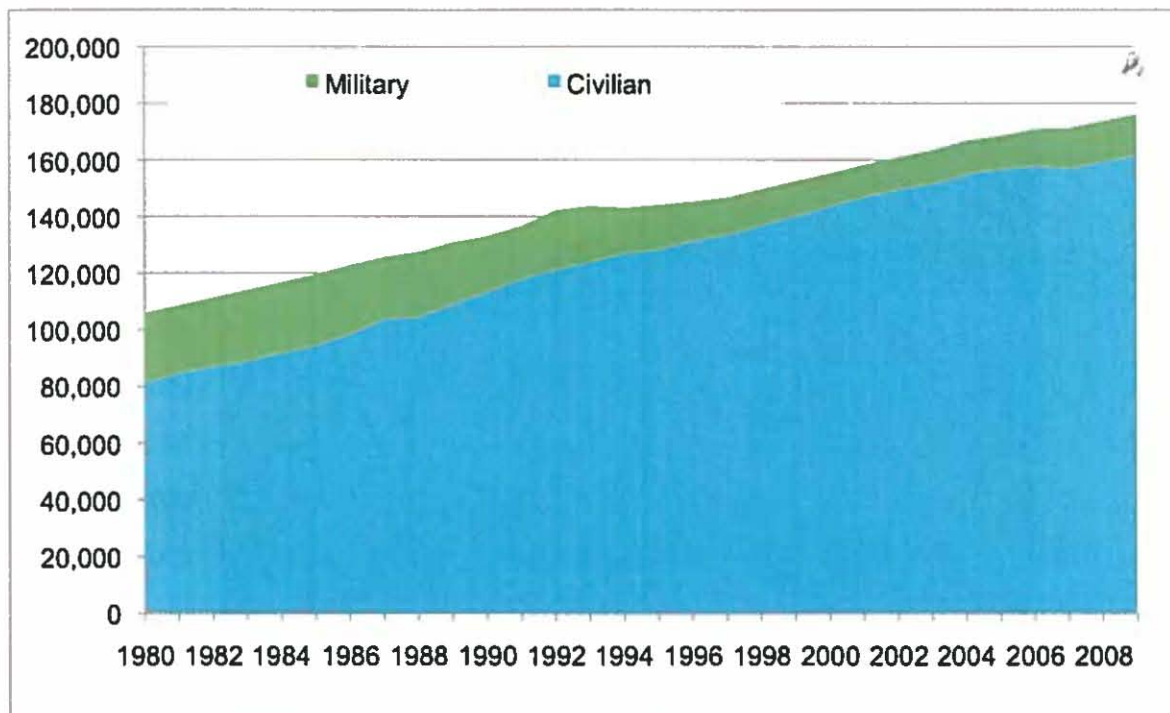
In 2000, there were 38,769 total households on Guam. That was an increase of 24 percent over the number of households in 1990. Eighty-three percent of those were family households (e.g., married-couple families and single-parent householder). In 2000, 150,928 (97 percent) of Guam's 154,805 residents were living in households. The remaining three percent were classified as living in group quarters. About 44 percent of those in group quarters were living in military quarters. The 24 percent growth rate of households in Guam from 1990 to 2000 is about the same as the population growth rate for the decade. The number of people in group quarters dropped, largely due to a drop in persons living in military quarters (6,086 in 1990 to 1,710 in 2000), reflecting the initial rounds of base closings on Guam.

The military housing market is generally independent of the local housing market. Barracks populations are removed from the household population, and on-base military households live in units that are not available to civilian households. That is not to say that military households have no impact at all on the local market. Certain factors that impact the market include: military personnel who choose to live off-base, military dependents who have to or choose to live off-base, housing for temporary construction workers, and the housing for civilian workers to support the increased military population. There is even the potential that the Guam civilian population might increase in response to improved economic conditions on the island. These factors will certainly be of interest in modeling the possible impacts of the impending military buildup, just as they were important at times of increasing and decreasing military populations in the past.

2.1.1.1 Population Growth

The population of Guam has shown a relatively steady growth over the past forty years. Decade-on-decade growth rates were between 10 and 15 percent between 1950 and 1970. In the two decades between 1970 and 1990 Guam's population grew at rates of almost 25 percent per decade. In the nineties, growth was about 16 percent and the Census Bureau estimates that the growth rate for this decade will be about 15 percent. Our best estimate for 2009 is that Guam's total civilian and military population will be just over 176,000 people.

Figure 3. Resident Civilian and Military Population of Guam, 1970 to 2009



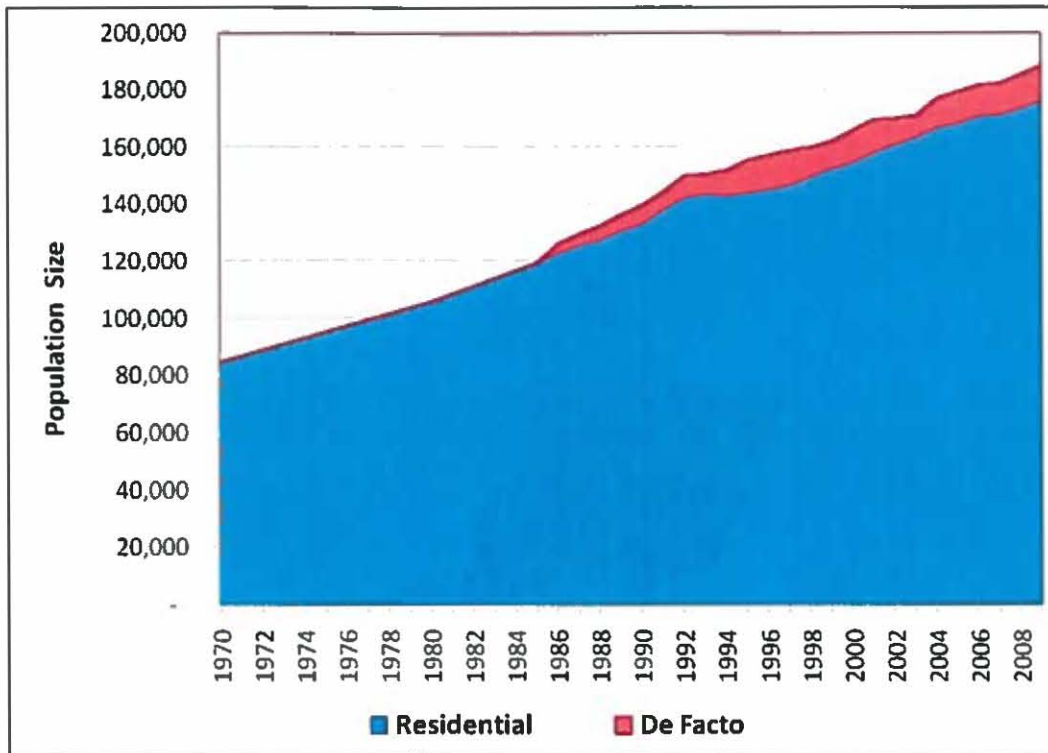
Source: Guam Transportation Plan, 2009.

Population changes in the past have been inadequately documented for Guam. Anecdotal information suggests that at least some observers believe that short-run, intercensal changes in population may have produced a much less steady growth pattern. It is quite possible that economic growth and stagnation may have prompted significant population changes that were not captured by U.S. Decennial Census reports²².

Over the last thirty years, pressure on Guam's resources and infrastructure grew in response to increases in the number of visitors present on the island. Tourism growth began in 1967 and increased dramatically between the mid-1980s and the early 1990s. The *de facto* population of the island, being the sum of the resident population and the average daily census of visitors, increased as shown in Figure 4.

²² We are suspect that fluctuations in the military and civilian populations were more varied than suggested in Figure 3. Using the existing intercensal estimates, our forecasts may be flatter than would be otherwise estimated and probably lack the influence of economic, military, and natural disasters that actually occurred. The demands on housing production and on the rest of Guam's infrastructure will also be forced into the net-decade pattern of growth resulting from the limitations of available data.

Figure 4. De Facto Population of Guam, 1970-2009



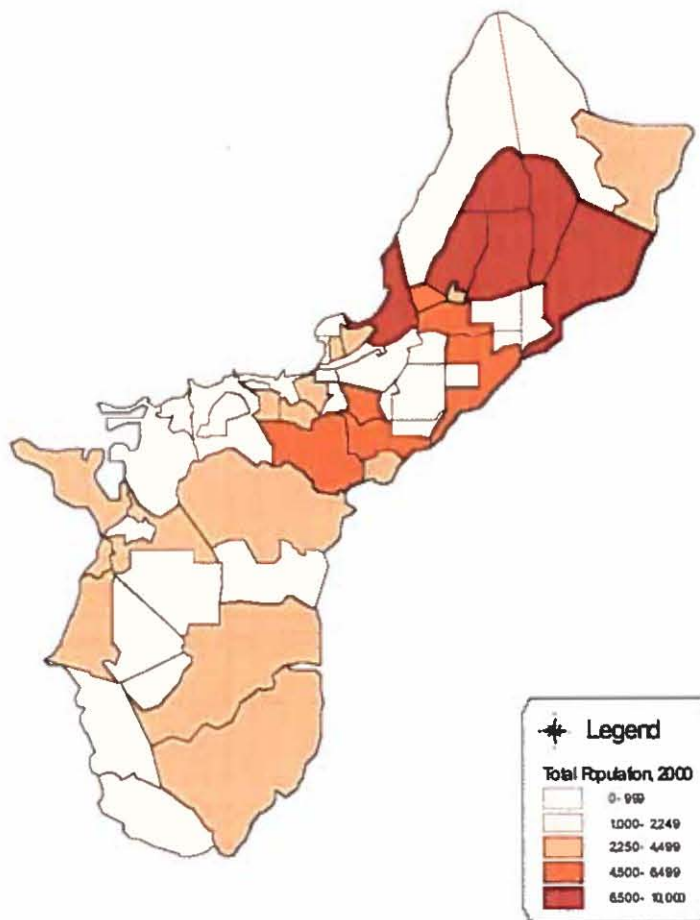
Source: Pacific Center for Economic Initiatives, University of Guam

But while the visitor industry affects Guam's population and economy, evidence suggests its impact on Guam's housing situation is negligible. The change in visitor population does not result in significant demand for additional housing units, does not affect the production of housing units, and does not directly affect rental or sales prices on the island. Unlike some international visitor destinations, Guam visitors do not make substantial use of the residential housing stock by generating demand for large numbers of bed & breakfast units or creating a broad market for temporary visitor units (residents renting to visitors on short-term contracts). Our conversations with key information sources in Guam's visitor and housing industries produced strong agreement that the visitor and residential housing sectors have little or no overlap in Guam. Our investigation of housing stock in addition to current rental and sales patterns produced no evidence to the contrary.

2.1.1.2 Location of Population

The distribution of Guam's population and housing stock has changed relatively little in the recent past. The population has long been concentrated in the North and Central regions of Guam as shown in Figure 5.

Figure 5. Population Density of Guam, 2000



Source: Guam Bureau of Statistics and Plans, Geographic Information Systems

Over time, the settlement patterns for the island have changed slightly. The changes in geographic distribution seen in Table 2 tell the story of Guam's development over the last several decades. Tamuning and Yigo changed places in 2000 during Tamuning's major growth spurt. Santa Rita declined drastically during the nineties due to the BRAC base closings, and has grown more slowly since then. Otherwise, village growth patterns are very similar over the last three decades.

Table 2. Guam Population by Village, 1980, 1990, 2000, and 2008

Village	1980	1990	2000	2008
Dededo	23,644	31,728	42,980	49,137
Yigo	10,359	14,213	19,474	22,128
Tamuning	13,580	16,673	18,012	20,471
Mangilao	6,840	10,483	13,313	15,319
Barrigada	7,756	8,846	8,652	9,332
Santa Rita	9,183	11,857	7,500	8,522
Yona	4,228	5,338	6,484	7,563
Mongmong-Toto-Maite	5,245	5,845	5,845	6,642
Chalan Pago-Ordot	3,120	4,451	5,923	6,535
Agat	3,999	4,960	5,656	6,426
Agana Heights	3,284	3,646	3,940	4,477
Sinajana	2,485	2,658	3,052	3,242
Talofofo	2,006	2,310	3,215	3,653
Inarajan	2,059	2,469	2,853	3,469
Merizo	1,663	1,742	2,163	2,457
Asan	2,034	2,070	2,090	2,351
Piti	2,866	1,827	1,666	1,893
Hagåtña	896	1,139	1,100	1,164
Umatac	732	897	887	1,009
Total All Villages	105,979	133,152	154,805	175,790

Source: U.S. Census Bureau, 1980, 1990, 2000; SMS, 2009.

2.1.2 Income

Household income is the primary determinant of housing affordability in any housing market. Bankers, developers, and real estate brokers recognize income as one of the basic qualifications for housing finance and therefore for all housing sales. Property managers know that household income determines the ability of the renter to make payments on time. For very low-income families, government programs are made available based on income guidelines established by the U.S. Department of Housing and Urban Development (HUD). Changes in income define the level of affordability on both rental and sales markets, therefore affecting housing demand and supply in a fundamental manner.

Some recent figures for Guam's household income median and distribution are presented in Table 3.

Table 3. Guam Household Income Distribution, 1990, 2000 and 2009

Income	1990	2000	2009
Less than \$5,000	1,626	3,808	6,768
\$5,000 to \$14,999	4,182	3,896	4,664
\$15,000 to \$24,999	6,495	4,758	5,526
\$25,000 to \$34,999	5,581	4,842	5,695
\$35,000 to \$49,999	5,625	6,357	6,866
\$50,000 to \$74,999	4,888	7,175	10,921
\$75,000 to \$99,999	1,704	3,982	6,085
\$100,000 or more	1,272	3,951	6,859
Total all Households	31,373	38,769	53,384

Source: U.S. Census Bureau, 1990, 2000; Guam Housing Demand Survey, 2009.

In 2000, an annual household income of \$55,000 for a young couple with no children renting in Yigo might have produced enough disposable income to finance a home purchase over the course of a few years. A household income of \$55,000 for a family with eight children might place them below the poverty line and certainly would not indicate a lot of disposable income.

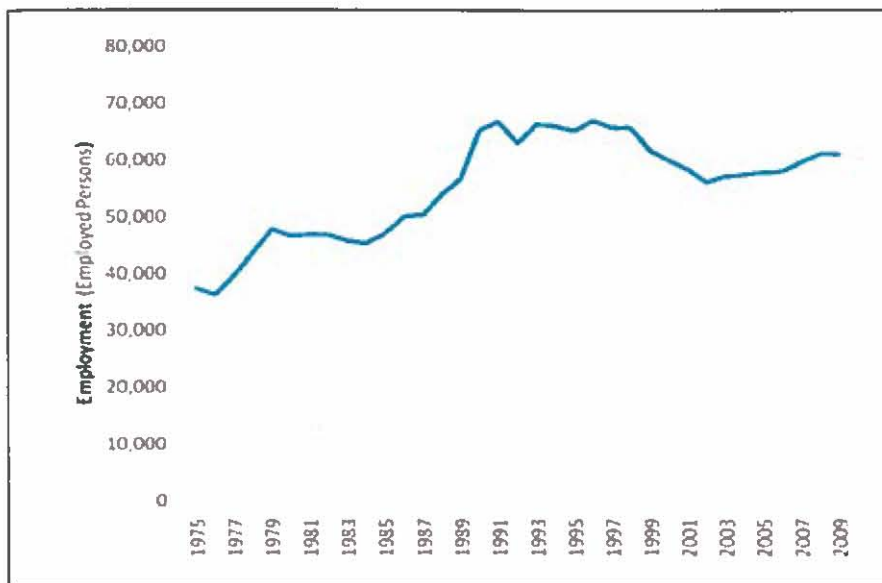
What is needed is an income figure that is adjusted for household size. HUD's annual household income guidelines provide that kind of information. They are available annually, can be applied to individual households or larger populations, adjust income for household size, and because they are based on a regular distribution around the median income, can be easily applied to a broad range of housing problems.

2.1.3 Employment

The number of jobs available at any given time is an important determinant of the state of Guam's economy. The ratio of jobs to employable adults (the employment rate) drives housing need. If many of the Island's breadwinners are fully employed, demand for housing increases. When the number of jobs stops growing or shrinks, housing demand will fall.

As in all economies, the number of jobs on Guam fluctuates with economic activity. And just like the economy as a whole, jobs and employment fluctuate in response to changes in international economies, the deployment of military personnel, and natural disasters. The same chain of events that affected Gross Domestic Product affected jobs over the last two decades, including: the Asian economic boom (and bust) of the late eighties, the rapid growth of tourism which began at the same time, a set of U.S. military base closures in the nineties, earth quakes and typhoons, including two major storms in the present decade, and the disastrous events that affected international tourism in recent years – 9/11, SARS, warfare in the Middle East, and more.

Figure 6. Employment on Guam, 1980 to 2009



Source: Guam Department of Labor.

As seen in Figure 6, the number of jobs grew quickly through the late seventies, dropped off a bit in the early eighties, then began to climb dramatically again as tourism and Japanese investment grew. Job growth ceased in the early nineties, although total employment remained fairly level throughout the decade, fueled by continued construction on the Island. The combined effects of declining tourism and the latent impact of lower military spending caused employment to drop between 1998 and 2002. From the low tide of 2002-2003, the number of jobs has climbed steadily to the present.

The location of jobs also affects housing conditions in Guam. The full impact of the distribution is complex, with some people desiring to live near their work and others preferring to live far from it. The foundation for that analysis is shown in Table 4, where we compare the number of jobs and the population of each village. Ranked by the ratio of households to jobs, we can see that the top four villages -- Hagåtña, Tamuning, Santa Rita, and Piti -- are job centers. The next five villages are relatively balanced with respect to jobs and residences, and the rest of the villages are residential centers.

Table 4. Jobs and Population by Village, 2008

Village	Population	Jobs	Jobs per Household
Hagåtña	1,164	10,104	35.6
Tamuning	20,471	28,611	5.7
Santa Rita	8,522	6,505	3.1
Piti	1,893	1,258	2.7
Barrigada	9,332	2,833	1.2
Asan	2,351	598	1.0
Yigo	22,128	4,111	0.8
Mangilao	15,319	2,946	0.8
Mongmong-Toto-Maite	6,642	1,142	0.7
Agana Heights	4,477	732	0.7
Yona	7,563	696	0.4
Sinajana	3,242	302	0.4
Dededo	49,137	3,502	0.3
Chalan Pago-Ordot	6,535	244	0.2
Talofof	3,653	134	0.2
Inarajan	3,469	146	0.2
Umatac	1,009	47	0.2
Agat	6,426	267	0.2
Merizo	2,457	81	0.1
Total All Villages	175,790	64,259	1.5

It is likely that future growth of Guam's housing stock will follow the same pattern as shown in Table 4. Housing stock in residential areas will continue to grow. A possible change in the coming decade is the reaction of residents to transportation problems that will be manifested in the daily commute. Concerns about traffic congestion were expressed in our public meetings. The perception of the commute as onerous may lead to higher demand for housing units in close proximity to the jobs centers as transportation congestion increases.

If the military buildup in Guam contributes to more lengthy and difficult commutes, demand for units in Hagåtña and Tamuning, and perhaps in Barrigada, Asan, and Mangilao, is likely to increase. Military expansion is expected to occur near AAFB and Naval Base Guam as well as in NCTS Finegayan. If those areas are the locus of new jobs, and if people want to reduce their travel time, then demand for housing may increase in Dededo, Yigo, Santa Rita, and Piti.

2.2 HOUSING INVENTORY

The third piece of information needed for a housing study is the number of housing units used to shelter Guam's households. This usually begins with an inventory of all residential housing units, from which those unavailable to Guam residents are subtracted. Unavailable units are those used for transient or temporary residents (hotel rooms, visitor rentals, second homes, etc.), uninhabitable units, and vacant units. For each available unit, data on unit size, unit configuration (bedrooms and baths), units per structure (single-family or multi-family), construction materials, unit condition, price, and monthly shelter payments is required. To support assessment of the impending military buildup, a housing inventory for Guam would also include data identifying units that have been and are currently used by military households.

2.2.1 Housing Characteristics

A combination of data sources was used to determine the characteristics of Guam's current housing inventory. Decennial data compiled by the U.S. Bureau of the Census provided measures for 1980, 1990 and 2000. The Housing Unit Survey and Housing Demand Survey, in combination with the Department of Public Works (DPW) building and occupancy permits data, served as the foundation for the 2009 data.

As outlined in the table below, the total number of housing units in the Guam jumped by as much as 68 percent between 1970 and 1980. A more moderate increase in the total number of housing units (25 percent) occurred between 1980 and 1990.

A construction boom in the 1990s produced a 35 percent increase in total housing stock. Some might characterize that level of development as over-building for the market. The vacancy rate jumped from just under 11 percent in 1990 to almost 19 percent in 2000. During this same period, a greater number of multi-family units were built than in any previous era (although single-family units continued to be the dominant unit type in Guam's housing stock).

Most of the housing development in Guam occurred in the villages of Dededo, Tamuning, and Yigo. These three villages account for 30 percent of the island's land area and contain more than 53 percent of Guam's residential housing units. About 54 percent of all jobs are located in these three villages, so it is not surprising that they serve as major residential centers.

With an abundance of product available to the market at the end of the nineties, Guam has experienced an increase in the overall housing stock of less than 13 percent (or about 6,000 units) between 2000 and the present.

Finally, we can compare the growth rates for population and housing stock in Guam over the last few decades (Table 5). The rapid growth of pre-1980 Guam housing stock²³ was followed by a decade in which housing development kept pace with population growth. During the nineties, construction outpaced population growth and vacancy rates rose. This is consistent with expert opinion in Guam, and with the results of analyses of DPW occupancy permits.

²³ Growth rates for the seventies are based on numbers for which we find little solid agreement among Guam observers. Unconfirmed opinion seems to suggest that Guam's early Census figures may have been less accurate than more recent counts. We report the numbers here for historical purposes, but have chosen not to base any of our policy-relevant conclusions, or our housing modeling, on those numbers.

Table 5. Population and Housing Unit Annual Growth by Decennial Years, 1970-2000

	1970-79	1980-89	1990-1999	2000-2009
Population	2.21%	2.28%	1.51%	1.25%
Housing Units	5.41%	2.23%	3.07%	1.26%

Source: U.S. Census Bureau, 1970, 1980, 1990, 2000. SMS, 2009

During the present decade, population had a chance to catch up with the housing inventory. The pace of construction slowed (especially for multi-family units), and some balance was restored to Guam's housing situation. Growth rates for both the population and the housing inventory were quite high relative to those of previous decades. This seems consistent with reports from the Bureau of Statistics and Plans (BSP). In fact, our own estimates are somewhat lower than those published by BSP.

Table 6. Housing Characteristics, 1980-2009

	2009		2000		1990		1980		1970	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
TOTAL HOUSING UNITS	53,673	100.0	47,677	100.0	35,223	100.0	28,091	100.0	16,680	100.0
Occupied Housing Units	44,548	83.0	38,769	81.3	31,373	89.1	24,834	88.4	15,569	93.3
Vacant Housing Units	9,125	17.0	8,908	18.7	3,850	10.9	3,257	11.6	1,107	6.6
For seasonal, rec. use	183	2.0	196	2.2	130	3.4	198	6.1	4	0.4
Tenure										
Owner-occupied	22,319	50.1	18,747	48.4	14,308	45.6	11,469	46.2	7,165	46.0
Renter-occupied	22,229	49.9	20,022	51.6	17,065	54.4	13,365	53.8	8,404	54.0
Unit Type										
Single Family Dwelling	35,216	79.1	30,559	78.8	25,206	80.3	20,967	84.4	15,079	96.9
Multi-Family Dwelling	9,332	20.9	8,210	21.2	6,167	19.7	3,867	15.6	490	3.1
Number of Bedrooms										
Studio	178	0.4	3,139	8.1	526	1.7	499	2.0	---	---
One bedroom	2,940	6.6	6,249	16.1	2,947	9.4	2,504	10.1	---	---
Two bedrooms	12,251	27.5	12,450	32.1	10,312	32.9	8,551	34.4	---	---
Three bedrooms	19,022	42.7	11,744	30.3	12,871	41.0	9,385	37.8	---	---
Four bedrooms	7,039	15.8	4,045	10.4	3,935	12.5	3,411	13.7	---	---
Five or more bedrooms	3,074	6.9	1,165	3.0	780	2.5	484	1.9	---	---
Village										
Agana Heights	1,244	2.8	1,058	2.7	939	3.0	827	3.3	625	4.0
Agat	1,512	3.4	1,298	3.3	1,135	3.6	853	3.4	780	5.0
Asan-Maina	622	1.4	552	1.4	565	1.8	526	2.1	552	3.5
Barrigada	2,447	5.5	2,097	5.4	1,975	6.3	747	3.0	1,230	7.9
Chalan Pago-Ordot	1,780	4.0	1,573	4.1	953	3.0	660	2.7	512	3.3
Dededo	11,622	26.1	10,016	25.8	6,963	22.2	5,104	20.6	2,067	13.3
Hagåtña	310	0.7	268	0.7	367	1.2	294	1.2	453	2.9
Inarajan	755	1.7	644	1.7	488	1.6	392	1.6	307	2.0
Mangilao	3,695	8.3	3,190	8.2	2,427	7.7	1,709	6.9	667	4.3
Merizo	533	1.2	471	1.2	390	1.2	351	1.4	266	1.7
Mongmong-Toto-Maite	1,869	4.2	1,633	4.2	1,573	5.0	1,312	5.3	843	5.4
Piti	533	1.2	474	1.2	480	1.5	422	1.7	236	1.5
Santa Rita	1,958	4.4	1,780	4.6	2,287	7.3	2,131	8.6	1,529	9.8
Sinajana	844	1.9	742	1.9	641	2.0	573	2.3	633	4.1
Talofofo	844	1.9	738	1.9	521	1.7	398	1.6	322	2.1
Tamuning	6,724	15.1	5,953	15.4	4,982	15.9	4,067	16.4	2,039	13.1
Umatac	176	0.4	162	0.4	162	0.5	130	0.5	130	0.8
Yigo	5,344	12.0	4,634	12.0	3,370	10.7	2,424	9.8	1,946	12.5
Yona	1,735	3.9	1,486	3.8	1,155	3.7	914	3.7	432	2.8

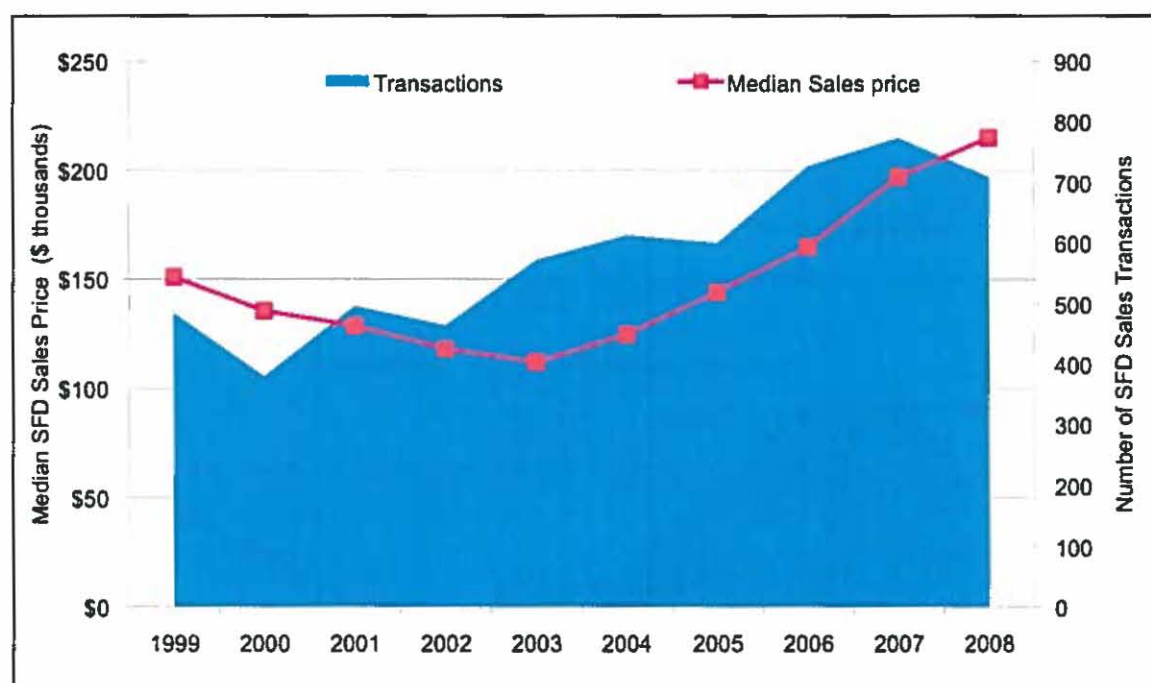
Source: U.S. Census Bureau, 1970, 1980, 1990, 2000. SMS, 2009

2.2.2 Housing Cost by Type

Activity and prices in Guam's housing market are key elements in understanding and forecasting housing conditions. The data for the eleven years between 1999 and 2009 are presented below²⁴.

Coming out of the economic doldrums of the early 2000s, the median price of a single-family home on Guam fell steadily until 2003. It then increased by 87 percent over the next five years (Figure 7). Early reports for the first few months of 2009 suggest that prices have continued to fall. Perhaps the year-end figures will show prices were flat this year. The price run-up is reported to be second only to the impact of the Japanese bubble economy on Guam housing prices in the late eighties.

Figure 7. SFD Real Estate Transactions & Median Sales Price, 1999-2008



Source: SMS, based on analysis of data provided by Guam Multiple Listing Service (MLS), Guam Bureau of Statistics and Plans (BSP), First Hawaiian Bank (FHB), and Guam Department of Revenue and Taxation, Affidavits of True Consideration, special tabulations 2000 through 2009.

Market activity (number of transactions) grew during the entire decade with dips in 2000, 2002, and 2005. Transactions followed the price trend between 2005 and 2007, and then dropped significantly (8.4%) in 2008. Data reported for the first few months of 2009 suggest that the

²⁴ The data series are notably shorter than series we have presented thus far. The quality of data, the extent to which different sources match each other, and the exact definition of terms in these measurements cause some concern about the precision with which we can measure market conditions. The general trends exhibited by all sources, however, are broadly consistent across time and provide a measure of confidence for modeling future housing conditions.

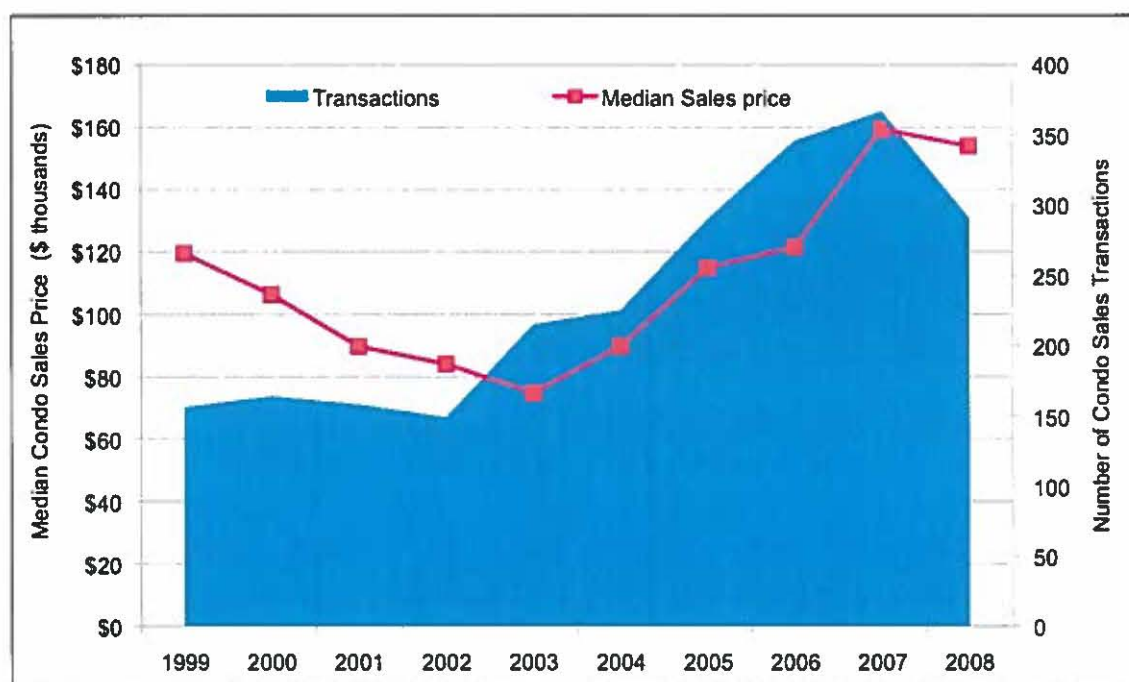
number of transactions has fallen off markedly and end-of-year figures are expected to reflect the same large decreases in market activity for single-family units.

The pattern of sharply falling activity and slower, lagged decreases in price are characteristic of a housing market in decline after a run-up. The length and depth of the decline is difficult to predict due to the lack of detailed data for the period following the previous run-up. If there were no counter shocks (like a major military buildup) in the market, we might expect that the decline will continue until the market adjustment in price has been realized. Price may fall back to 2004 or 2005 levels, depending on the condition of the economy and its effect on the affordability index.

Similar data are available for the multi-family housing market, here represented by condominium sales since 1999. The results for condo sales prices show a similar but more pronounced pattern of the one we found for single-family sales prices. The median sales price of condos fell sharply from \$120,000 in 1999 to \$75,000 in 2003. It then rose even more dramatically to \$160,000 in 2007. The price more than doubled in those four years.

The number of condominium sales transactions was flat during the first three years covered here, and then rose steadily from 150 in 2002 to 350 in 2007. The activity was more than doubled, suggesting multiple sales of the same units during that period and that the year 2000 vacancy rates reported in the U.S. Census were being absorbed.

Figure 8. Condominium Real Estate Transactions & Median Sales Price, 1999-2008



Source: SMS, based on analysis of data provided by Guam Multiple Listing Service (MLS), Guam Bureau of Statistics and Plans (BSP), First Hawaiian Bank (FHB), and Guam Department of Revenue and Taxation, Affidavits of True Consideration, special tabulations 2000 through 2009.

The end of the run-up for condominium sales on Guam was also more dramatic than for single-family housing units. Between 2007 and 2008, activity dropped a remarkable 37 percent. The median sale price fell by three percent. Data for the first quarter of 2009 suggest continued drops for both market activity and prices. Again, we expect the number of transactions to fall faster than the price, and to continue until the market adjusts price inflation established by the run-up. Major changes in demand, of course, would change that prediction.

2.2.3 Housing Unit Condition

In the absence of intercensal data for 2009 the condition of Guam's housing stock was unknown. A reliable measure of the condition of housing units is a crucial component of any comprehensive housing study because it provides information useful in estimating the need for renovation and forecasts possible changes in the rate at which units will fall out of the stock. The lack of reliable data on unit condition, and our interest in getting another measure of vacancy rates, prompted us to develop the Housing Unit Survey. Although beyond the scope of the original project, we conducted personal observations on a probability sample of Guam Census blocks to record housing conditions.²⁵

Detailed assessments were conducted for housing units in 80 blocks throughout the island of Guam. Each housing unit was coded for unit presence, vacancy status, single-family or multi-family structure, number of units, and condition of unit. Analysis of the resulting data indicates that housing units in the Northern part of the island are more likely than units in the Central or Southern regions to be dilapidated. This coincides with the greater numbers of metal, rather than concrete, housing units located in the North. Single-family dwellings are more likely to be found in poor condition than are multi-family units and 99 percent of multi-family units are constructed of concrete. Sixty-three percent of single-family homes are completely concrete.

Table 7. Vacancy Status by Condition of Unit, Guam 2009

	Condition of Unit									
	Sound		Deteriorated		Dilapidated		Unable to Determine			
	Count	Col %	Count	Col %	Count	Col %	Count	Col %	Count	Col %
Vacancy Status										
Occupied	28,952	94.8	13,701	88.4	5,169	70.0	234	96.6	48,044	89.6
Vacant	938	3.1	1,536	9.9	2,166	29.3	5	2.0	4,645	8.7
Unknown	79	0.3	4	0.0					83	0.2
Not determined	566	1.9	258	1.7	50	0.7	28	1.5	901	1.6
Group Total	30,536	100.0	15,499	100.0	7,384	100.0	266	100.0	53,673	100.0

The Housing Unit Survey was expanded to cover the 53,673 housing units on Guam in 2009. Results are shown in Table 7. About 89.5 percent of the housing units we observed were occupied. Eliminating the cases for which we were unable to assign a vacancy status, the estimate vacancy rate for Guam in 2009 was 8.8 percent. That is notably lower than the 19

²⁵ For a detailed discussion of the methodology and data associated with the Housing Unit Survey, see the Technical Report.

percent recorded in the 2000 Census, and is consistent with real estate experts' reports and our own data estimates. It is yet another piece of evidence to suggest that market activity during the last nine years reduced the housing vacancy rate on Guam.

A little over 57 percent of the housing units on Guam were in sound condition in the summer of 2009. Observers classified 29 percent of the housing stock as "deteriorated" meaning that the unit was in need of some repair or refurbishing and the general upkeep of the unit was lacking. Finally, 14 percent of all housing units on Guam were rated as "dilapidated." Those units were structurally damaged, missing the roof or a wall, and clearly uninhabitable.

Ten percent of the occupied units were classified as dilapidated. That means there may be as many as 5,200 occupied housing units on Guam with serious need for repair or renovation. Vacant units, of course, were much more likely to be dilapidated. Almost half of them (47%) were in bad shape. It may be that those units are not suited to repair and should be considered unusable.

2.2.4 Housing Production

Housing production data is the "supply" side of the supply-and-demand housing model developed for the current study. Data on building permits, occupancy permits, and demolitions maintained by the Guam Department of Public Works (DPW) are a particularly rich source of data for estimating annual housing unit production on Guam. Those data have been used frequently and effectively in past housing studies and were employed again in 2009.

Between 2005 and 2008, DPW issued 1,802 new-unit building permits with a total value of about \$684 million (Table 8). That was about 64 percent of the total permits issued for all purposes and 85 percent of the value of permitted construction. The "Other" category includes permits issued for construction of hotels, apartments and condominiums that would increase the estimate for total housing unit construction.

Table 8. Building and Construction Permit Summary (2005-2008)

Type of Construction		FY 2005		FY 2006		FY 2007		FY 2008	
		Number	Value	Number	Value	Number	Value	Number	Value
Residential	New	273	36,943	300	59,289	323	91,054	357	62,637
	Addition	147	6,940	121	4,466	130	5,556	167	7,052
Commercial	New	7	8,948	16	9,257	15	24,026	9	5,786
	Addition	79	15,115	98	25,065	90	9,951	84	11,208
Other	New	167	65,911	131	77,955	110	152,455	94	89,466
	Addition	19	6,056	15	7,382	27	6,519	24	13,767

Source: Guam Department of Public Works

Note: Values are reported in thousands of current US dollars.

The Department of Public Works provided us with expanded data for all building permit activity (permits issued and value of permits) monthly, since 1990. We extracted the residential permit data from those files to develop a permit activity analysis for the last 19 years. The result showed a large volume of permitting activity in the nineties that lasted almost up to the end of the decade. Permitting for multi-family units, especially apartments and condominium units were especially high during the last decade. That is consistent with the higher vacancy rates recorded in the 2000 Census. The permitting data showed large-scale decreases in housing permit activity in the first five years of the present decade. Permits for multi-family units dropped to zero in several of those years, indicating a response to the heavy activity of the nineties and the high vacancy rate in 2000.

DPW also manages and documents all of the occupancy permits for Guam. Occupancy permits are required before newly constructed buildings can be occupied. As such, they record the sum of new construction in place at the end of each year. The Department made those permits available for this study. We scanned the permits and used the resulting data as the basis for our analysis and as the foundation data for the production function in the housing model. Results of the analysis were similar to the permitting activity analysis, demonstrating that high rates of residential construction in the 1990s were followed by an abrupt decrease in construction in 2000 that lasted until 2005. Rates of construction for single-family and multi-family residential units have trended upward every year since 2004. The increase is slightly slower for multi-family units.

2.3 HOUSING MARKET

Key participants in Guam's housing and real estate sector tell us that the Guam market has been characterized by stable or slow growth over the last thirty years. They also tell us that Guam's housing market is sometimes erratic and sensitive to internal and external shocks. We have found both observations to be accurate. Census data show a general trend in which production will keep up with demand, allowing steady growth in sales and prices. Within that general picture, external shocks have prompted sales price run-ups several times in the past. The most recent run-up occurred between 2004 and 2007. A market lull in the late nineties and early part of this decade allowed vacancy rates to rise and prices to hold steady. After 2003, demand grew sharply and prices more than doubled in four years. Some say the run-up was spurred by speculative investments from off-island investors and increased federal/military spending. Some cite declining mortgage interest rates as a contributing factor. All agree that Guam's housing market health brought about a decrease in lender foreclosure activity, steady sales growth, and increasing aggregate sales volume. Local consumer confidence and foreign investor confidence in Guam's real estate market was further strengthened by reaction to the expected influx of reassigned U.S. military personnel to the island. Housing prices are presently below those of the late 1980's Japanese boom period, but Guam real estate continues to remain a bargain for overseas investors.

Before 2007 property values were increasing in anticipation of the buildup. Offshore demand, primarily from Korea, Japan, and the U.S. mainland, increased and there was evidence of speculative buying. The Guam housing market remains attractive to U.S. investors not only because property from U.S. territories can be acquired in tax-deferred, like-kind exchanges (Section 1031 exchanges), but because the market offers an opportunity for investors to diversify their real estate portfolios with appreciating Guam properties.

The effect on local buyers may not be as positive. While vacancy rates seem to have declined somewhat during the run-up, prices moved well above an affordable level for many Guam families. Both sales prices and rents doubled. In fact, housing prices increased faster than local resident incomes. As Guam feels the effect of the worldwide economic downturn, sales have fallen notably in recent months. This situation may result in increasing pent-up demand even in the face of large inventories. There is also evidence in permit and occupancy data that production has been moving toward the top end of the market again. This is not an uncommon occurrence where external demand is high.

The three most frequently used Census statistics measuring unit condition are: (1) the presence of complete plumbing facilities; (2) housing units lacking complete kitchen facilities; and (3) units without air conditioning. In 1990, the statistics for Guam housing were 3.7 percent without complete plumbing, less than 1 percent without kitchen facilities and 31 without air conditioning. In 2000, those figures were 8 percent, 9 percent, and 17 percent, respectively. This would suggest that fewer housing units were equipped with the basic necessities in 2000 than in 1990.

2.3.1 Homeownership Market

At 48 percent in 2000, Guam's home ownership rate is one of the lowest in the United States. Based on the 2009 Housing Demand Survey the current homeownership rate is only slightly higher in 2009 (49.5%) than in 2000. That is to be expected since down markets often provide opportunities for first-time homebuyers. On the other hand, the effect of the price run-up in mid-decade might reverse that trend and increase pent-up demand for home ownership. We will have to await the results for the 2010 Census to get the final measurement.

Homeowners on Guam much prefer single-family residences and much of the rental market consists of the multi-family units. Multi-family ownership is heaviest in the north where recent sales of duplex and townhouse have made some impact on the market. Preferences however remain strong for single-family unit ownership. Comments from public meeting attendees were even stronger, suggesting that Guam people did not really accept the concept of a "starter home". "We think that you buy a home in the area where you want to live, and then you live there until you die," we were told. Despite popular preferences, there are certainly many in the market who understand the concept of buying into the market at a lower level, building equity and lender confidence, and then moving up to the kind of home you feel is right for you. But the local real estate culture may make use of multi-family programs more difficult in Guam than in some other housing markets.

2.3.2 Rental Housing Market

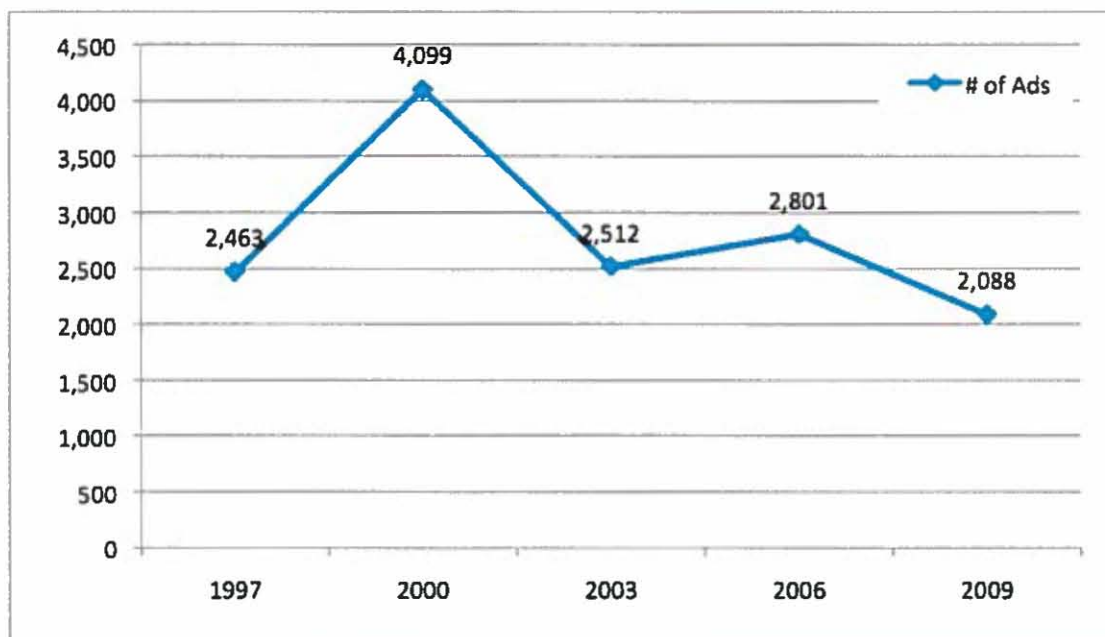
In order to perform a thorough review of Guam's current rental housing market, a comprehensive data set was constructed to identify current and historical rental availability, rental rates and other trends. Information including location, rent rate, bedrooms, bathrooms, size, property type, and furnished or unfurnished was gathered from current and historical rental advertisements. Data was collected for all months in the years 1997, 2000, 2003, 2006 and April 2009²⁶.

²⁶ For detailed discussion of the methodology and data associated with the Guam Rental Review, see the Technical Report.

These rental advertisements were analyzed to determine the range of the market by area, type and bedroom count. Among the 12,042 advertisements examined, 32 percent were single-family units. Apartments and condominium units accounted for 29 percent each. Eleven percent of advertised units were townhomes²⁷.

With the exception of 2000, the number of advertisements published was approximately 2,500 per year. In 2000, availability of rental units on Guam reached its peak with nearly 4,100 ads listed. Half of these were for multi-family units and 21 percent advertised available single-family rental units.

Figure 9. Number of Rental Advertisements by Year

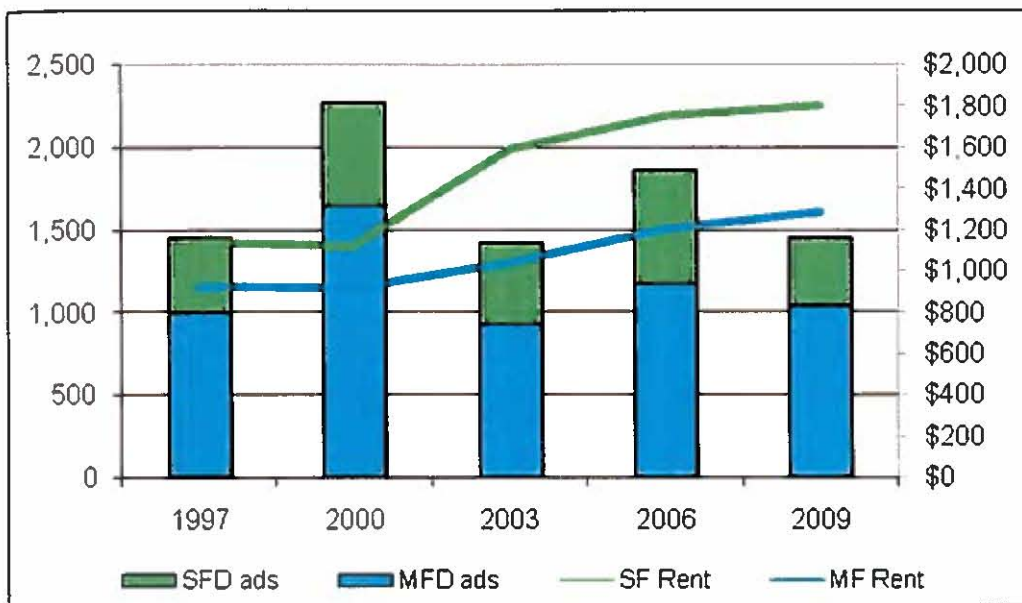


Note. 2009 is projected from ads listed in April 2009. Rental ads listed in the month of April account for an average of 8% of total annual advertisements. Total ads for 2009 are projected based on 167 ads placed in April 2009. Source: Guam Rental Study, 2009

Figure 10 (below) presents the number of rental advertisements (commonly accepted as a measure of rental market activity) and the median advertised rent price for single-family and multi-family rents between 1997 and 2009. The activity levels are similar to those shown in Figure 9. Single-family advertisements account for two-thirds of advertised rental market activity. The general trend matches the market activity level we have discussed in previous sections. There was a peak in 2000, a low point in 2003 at the bottom of the market, and a peak again in 2006. Had we measured advertised rents in 2007, we expect activity would have been higher than in 2006. Activity for 2009 is based on annualized figures for the first six months of the year.

²⁷ The 3,547 ads for which a unit type was not listed were excluded from these calculations.

Figure 10. Number of Rental Ads and Median Advertised Rent Amount by Year

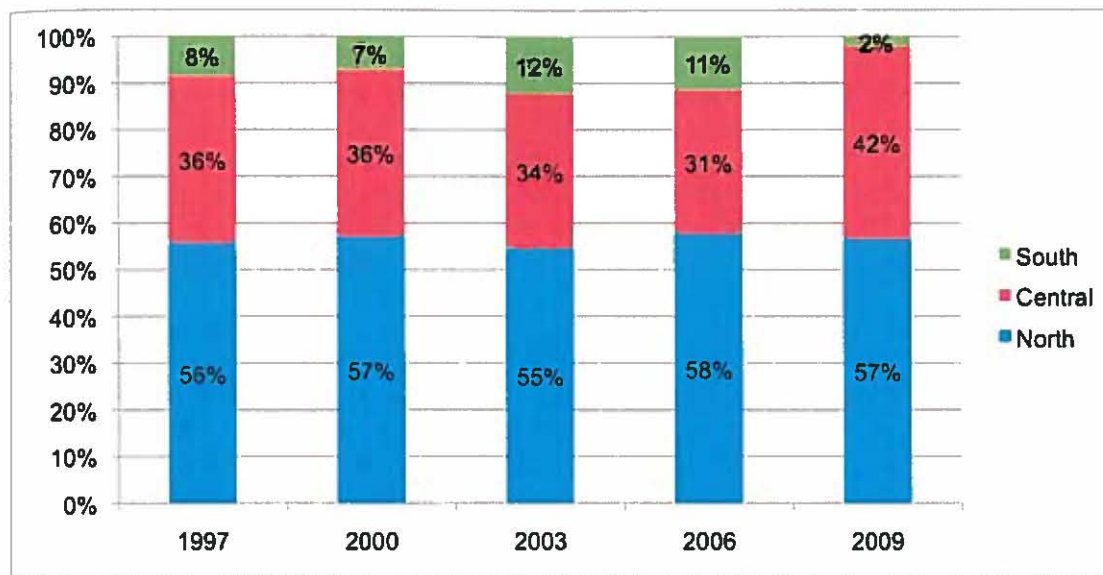


The lines in Figure 10 represent median rental prices. Prices for both types of units were flat from 1997 to 2000, and then rose steadily through 2009. Prices for single-family units are always higher than prices for multi-family units by almost 40 percent. Rents for single-family units also rose at a slightly faster rate than rents for multi-family units. Once again, if we had measured rents for 2007 and 2008 they may have been higher than our 2009 estimates.

The advertised rents are slightly higher than rents measured in the demand survey, which is to be expected. The rent study measured asking rents; those that would have to be paid by renters moving to new units. The Demand Survey measured current rents, some of which may have been negotiated years ago.

In many rental markets we find definite seasonality to rental availability. Guam's rental market does not exhibit monthly or other seasonal characteristics. In general, the number of rental advertisements is evenly distributed across all months. Availability does differ by region (Figure 11). About 55 percent of all advertised units are found in the northern region of Guam, primarily in Dededo and Tamuning where a majority of Guam's rental housing units are located. Between 30 and 40 percent of units advertised are in the Central portion of the island, and only about eight percent of listings are for rental units in the South.

Figure 11. Rental Unit Location by Year



Source: Guam Rental Study, 2009

Single Family Homes

A total of 610 advertisements for single-family homes were surveyed during the most recent 12 months of data collected. Among these, 41 percent were three-bedroom and 36 percent were four-bedroom houses. The largest counts of single-family house advertisements classified by rental area were in Dededo (17 percent), Yigo (15 percent), Barrigada (14 percent), and Tamuning (11 percent). The median rent for three-bedroom homes was \$1,566 and ranged from \$550 (Agat) to \$5,500 (Asan). Advertised rents for four-bedroom single-family homes ranged from \$900 (Tumon) to \$4,500 (Barrigada), with a median of \$1,522 for the island.

Apartments

A total of 390 apartment advertisements were analyzed for the most recent complete year of rental advertisement data collected. Approximately five percent of those advertisements were for studio apartments, 13 percent were for one-bedroom apartments, 63 percent were for two-bedroom apartments, and 19 percent were for apartments with higher or unknown bedroom counts. The majority of the apartments advertised were located in Tamuning/Tumon (40 percent), Maite (15 percent), and Mangilao (10 percent).

Guam studio apartment rents ranged from \$225 (Dededo) to \$700 (Hagåtña) with a median value of \$486. Rents for Guam one-bedroom apartments ranged from \$300 (Dededo) to \$1,200 (Tamuning) with a median of \$540 for Guam. Two-bedroom rents ranged from \$400 (Dededo) to \$1,400 (Tumon) with a median of \$689 for Guam.

Townhouses

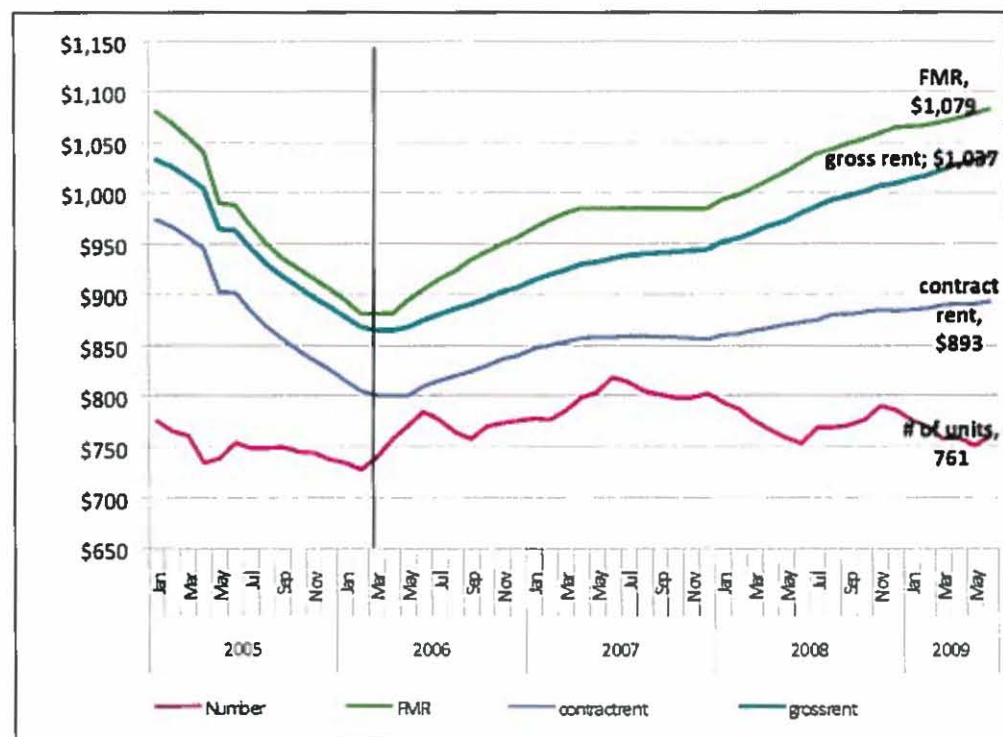
A total of 239 townhouse advertisements were surveyed, of which approximately 23 percent were two-bedroom units, 57 percent were three-bedroom units, and approximately 16 percent had four or more bedrooms. One-third of townhouses advertised for rent were located in Yigo, followed by Dededo (23 percent) and Tumon/Tamuning (14 percent). Rental rates for two-bedroom townhomes ranged from \$625 to \$2,400, with both extremes located in the Tamuning area of Guam. The median advertised rent for a two-bedroom townhome on Guam was \$1,307. Three-bedroom townhouse rents ranged from \$950 (Chalan Pago) to \$3,000 (Tumon) with an average of \$1,574 for Guam.

Section 8 Rental Units

As shown in Figure 12, average fair market rents for two-bedroom housing units²⁸ were approaching \$1,100 at the beginning of 2005. By March of 2006, however, average fair market rents had dropped to a low of \$882²⁹. Since that time, average rents have been steadily climbing to the current level of \$1,084.

Although Guam has not felt the effects of the current global economic crises to the same extent as many other markets, residents have been negatively impacted. As tourism declines, jobs are lost and budgets are cut, the need for Section 8 housing vouchers will continue to climb.

Figure 12. Section 8 Rental Data



Source: Guam Housing and Urban Renewal Authority.

²⁸ Data reported is for two-bedroom units only, as this is the most common size among rental units.

²⁹ The dip in price seen in Figure 12 around March of 2006, may be the result of policy changes related to the use of the payment standard and revisions to the way in which the utility allowance was calculated that were implemented by GHURA in the first quarter of 2006.

2.4 HOUSING DEMAND ON GUAM

At the end of 2008, there were an estimated 53,673 households residing on Guam.³⁰ Guam's estimated population at the same point in time was 176,401, resulting in an average household size of nearly 4 persons. Approximately 65 percent of all households in the island include children under the age of 18, while less than one-quarter these households include older adults. It is not surprising then that the relationship found in close to 60 percent of Guam's households is that of parents and minor children. In one-fifth of households we find multiple families residing in a single housing unit, and in an additional 14 percent are childless couples.

Planning for adequate housing for nearly 54,000 households of different sizes and structures is both complex and challenging. Guam households are almost evenly divided between homeowners and those who rent their current residence or occupy a unit without making cash payment. Sixty-seven percent of all households are housed in single-family dwellings, with another 11 percent in duplex or multiplex³⁰ units. Fourteen percent of Guam households live in apartments, and just over 5 percent reside in condominium units.

2.4.1 Homeowners

Among Guam households, 25,875 own the unit in which they live. Homeowners on Guam have typically been in their current unit for many years (median=14.9 years). These units are most often single-family dwellings (88 percent) with three bedrooms (50 percent) and two bathrooms (52 percent). Homeowner households typically include 4 persons, often parents with minor children (53 percent) or multiple families (26 percent)³¹.

More than 90 percent of homeowners rate their current residence as spacious enough to accommodate the members of their household. Interestingly, however, more than 17 percent of homeowners indicate that one or more members of their household are likely to establish their own household in a separate unit within the next 3 years. While this may be due, in part, to teenage children aging to independence, it does suggest that at least some portion of these multiple family households may prefer to reside in separate homes.

Although not impervious to the typhoons and super-typhoons that rock the island, housing units do not "fall out" of the market as often in Guam as is found in other locations, primarily due to the way in which the homes are constructed. Most of the existing owned units on the island were built with concrete exterior walls (93 percent) and roof (88 percent) in order to withstand the storms that often affect the island. It is not surprising that these structures remain today. Despite the advanced age of some homes on the island, owned units on Guam are reported to be in satisfactory (42 percent) to excellent (45 percent) condition³². Because large-scale development in Guam did not occur until the 1960s, the majority of housing units island wide were constructed after 1950 and are, therefore, not considered eligible for government programs designed to support the renovation of old housing stock.

³⁰ Multiplex units are defined as residential structures that include between 3 and 4 separate residences.

³¹ It is not clear whether the nature of the household drives the housing unit choice (i.e., households with multiple families need larger units and can pool resources in order to purchase a suitable unit), or if the size of the available housing units allows for the inclusion of additional household members.

³² Self-report data regarding unit condition obtained from homeowners' frequently results in slightly more positive ratings than would be obtained by impartial assessments.

At present, Guam homeowners have a median monthly mortgage payment of about \$1,150 per month (Table 9). Because the overwhelming majority of owned units are single-family dwellings, there is very little difference between the monthly payment amounts for all owned units and single-family dwellings. According to the Guam Housing Demand Survey data, monthly mortgage payment amounts are fairly consistent throughout the island for units of similar size and type.

Table 9. Median Monthly Housing Costs by Region, 2009

	Region						Guam Total	
	North		Central		South			
	Count	Monthly Housing Cost	Count	Monthly Housing Cost	Count	Monthly Housing Cost	Count	Monthly Housing Cost
All owned units	11,076	\$1,096	7,307	\$1,176	4,486	\$1,168	22,869	\$1,141
Owned SFD units only	9,518	\$1,063	6,518	\$1,203	4,021	\$1,197	20,057	\$1,145
All Rented Units	10,741	\$1,066	5,264	\$1,103	2,049	\$1,041	18,054	\$1,073
Rented 2 bdrm units	4,526	\$977	2,066	\$1,085	889	\$928	7,481	\$999

Owned Base: Respondents who own current unit/reported monthly mortgage.

Rented Base: Respondents who rent current unit/reported monthly rent. Occupied without payment units not included.

Note: Counts may not sum to total units due to weighting. Percentages may not sum to 100% due to rounding.

Source: Guam Housing Demand Survey, 2009

2.4.2 Renters

Close to 25,000 households living in Guam are currently renting their home. Sixty percent of these rented residences are single-family dwellings (45 percent) and duplexes (15 percent). Twenty-six percent of these households live in an apartment, with an additional 7 percent renting a condominium unit.

The median age of rented units in Guam is equal to that of the owned units (18 years). Also built to withstand the harsh elements, rental units are almost always made with concrete exterior walls (92 percent) and a concrete roof (88 percent). Unlike owned units, however, the condition of rental housing units is reported to be only fair (22 percent) to satisfactory (47 percent).

Parents with minor children account for 62 percent of all current renters. Fifteen percent of renter households include multiple families, 12 percent are couples with no children and 9 percent are single individuals. On average, there are 3.8 persons in each of these rental units.

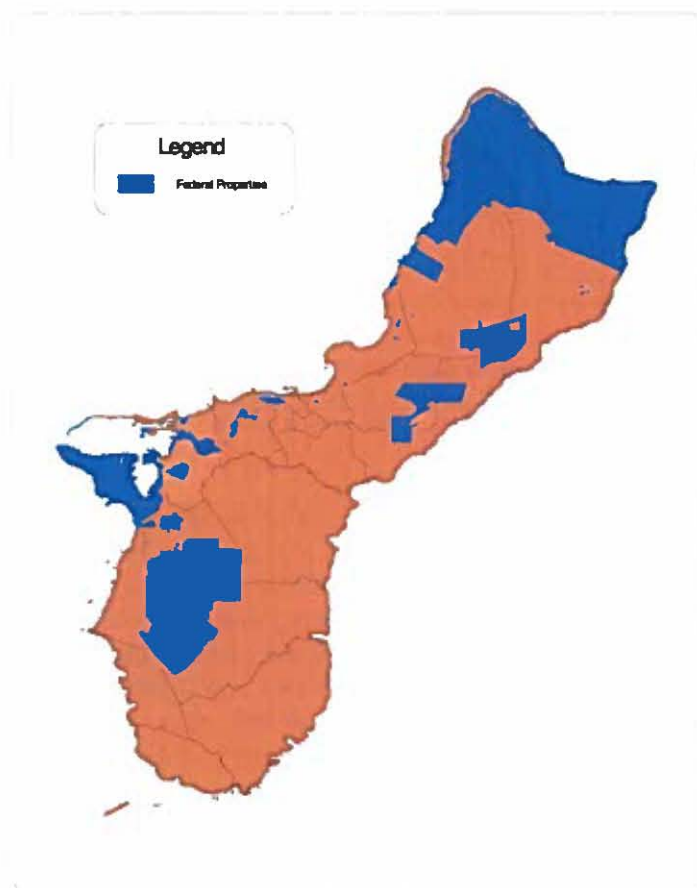
Rental units tend to be somewhat smaller than owned units, with most having two- (39 percent) or three-bedrooms (35 percent) and a single bathroom (53 percent). Despite the smaller size, however, 86 percent of renters feel their home is large enough to accommodate their household members. The finding that only 14 percent of households currently living in a rental unit anticipate a member of their household moving out within the next three years may support renters' view that their unit is roomy enough for everyone. Conversely, it may simply be an indication that the limited financial resources of these households prevents the members from moving into a unit of their own.

The median annual household income for renters on Guam is \$34,201, more than \$20,000 less than the median income for homeowners. Close to three-quarters of these households earn less than the HUD median income per year. One-third reports an annual household income of less than 30 percent of that HUD median. Thirty-seven percent of renters devote more than 40 percent of their income to shelter payments, compared to 25 percent of homeowners.

2.4.3 Military Residents

Guam's housing market and its economy are uniquely influenced by the significant military presence on the island. Substantial portions of the land on Guam are owned by the federal government, as shown on the map in Figure 13.

Figure 13. Federally Owned Land on Guam



Source: Guam Bureau of Statistics and Plans, Geographic Information Systems

Military personnel and their dependents make up approximately 13 percent of households in Guam. The majority of these households reside on one of the military bases, Andersen Air Force Base situated on the northern tip of the island or on Naval Base Guam (often referred to as Big Navy) located on the Western coast. Roughly 20 percent of these households choose to

live in housing units in the community (often referred to as living “out in town” or “outside the fence”). While these military households occupy less than four percent of the total occupied housing units island wide, they do have an influence on the housing market that will be examined in detail.

On average, 27 percent of the active duty personnel assigned to Andersen Air Force Base between 1999 and 2009 were living off base at any given time. That percentage has been climbing steadily from 21 percent in 2002 to 35 percent in 2008. Among the military personnel stationed at Naval Base Guam, approximately 21 percent choose to live off base each year.

Among military households living off base, two-thirds live in rental units and the rest have purchased the home in which they live. The rental units are most often single-family homes (50 percent), duplexes (21 percent) or apartments (10 percent). Most rentals include two- (39 percent) or three-bedrooms (35 percent) and one- (53 percent) or two-bathrooms (42 percent).

Table 10. Median Monthly Housing Costs by Military Status, 2009

	Verified Military Status		All Households
	Military HH	Non-Military HH	
All rented units	\$1,920	\$1,010	\$1,073
Rented 2 bdrm units	\$1,003	\$999	\$998
Base for all rented units: Respondents who rent their current unit and reported a value for their monthly rental costs.			
Base for rented 2BR units: Respondents who currently rent a 2BR unit and reported a value for their monthly rental costs.			
Note: Does not include cases in which the unit is occupied without payment.			
Note: Counts may not sum to total units due to weighting. Percentages may not sum to 100% due to rounding.			

Source: Guam Housing Demand Survey, 2009

Median monthly rents for military families living off base are much higher than rents paid by non-military families (Table 10). The can be attributed to several factors. Military households are more likely to rent houses (90 percent) than are non-military households (70 percent), and single-family units are generally more costly than multi-family units. Military households are often in larger, three-bedroom units whereas non-military families are more commonly in two-bedroom rental units. Real estate experts we interviewed for this study noted that high-end condominium units are disproportionately occupied by military personnel. There were some who suggested that the top end of the condo market on Guam depends on military renters for much of its revenue. Without reliable data on who rents which units at what prices, it is difficult to document the accuracy of these reports. There is little doubt, however, that higher rents for military households is consistent with these reports.

In addition, the average household size for military households (3.6 persons) is smaller than for non-military households (4.1 persons). That suggests that the tendency for military personnel to occupy larger rental units is likely a function of their ability to pay rather than the need for space. The Overseas Housing Allowance (OHA), a monthly stipend provided to military servicemen stationed in Guam, may be high enough to support military housing choices in the upper end of the rental market, and therefore to influence rental prices island wide.

2.4.4 Estimating Demand

At any given time, some of Guam households are in the market for a new unit – rented or purchased. The number of units “in the market” is of interest in the Comprehensive Housing Study and one of the primary objectives of the Demand Survey was to estimate demand for housing. The study used a step-down method of inquiry that starts by measuring interest in acquiring a new unit, adds a time dimension, investigating unit choices that might be made, and finally qualifies raw demand according to housing affordability indicated by the household financial situation, resources and limitations.

Throughout the demand section of the survey, respondents were challenged in order to develop realistic indicators of demand rather than “wants”. If the respondent told us they were expecting to move, we asked if they thought that would be very likely to happen or if they may wait a while. If they reported that they would be buying their next unit they were asked if they were pretty certain they would buy or if economic conditions might cause them to rent instead. That kind of questioning was used throughout the demand estimating section of the survey.

From the initial measure of demand (interest in acquiring a new unit), we next developed an estimate of effective demand – the number of housing units required to fill the needs of all Guam households who intend to acquire a new unit in the next two years. The process is shown in Table 11. Effective demand should not be confused with demand as measured by real estate sales activity. Real estate activity measures are taken after removing the effect of affordability and housing supply issues. The effective demand estimate is designed to allow us to measure pent-up or unmet demand in Guam. Effective demand should also not be confused with the number of housing units that will be or should be built in Guam. Many, if not most, of the units shown at the bottom of Table 11 will be supplied from current inventory.

Table 11. Interest in Moving to a New Home by Current Tenure, Guam, 2009

	Current Tenure						All Tenures	
	Own		Rent		Occ. w/out pmt.			
	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.
Total Households	22,869	100	18,054	100	2,496	100	44,419	100
Want to move to a new home	6,647	29	14,301	79	2,314	93	22,992	52
Will move in next 2 years	2,349	10	7,673	43	1,331	53	11,353	26
Will move off island	882	4	2,009	11	740	30	3,570	8
Effective demand	1,527	7	5,664	31			7,191	16

Source: Guam Housing Demand Survey, 2009.

Note: “Occupied without payment of cash rent” covers all non-owners who are living in units for which they pay no cash rent. These households may be living in family-owned units, renting for services (property managers, caretakers, etc.), households that receive housing as part of the remuneration for their jobs (clergy, teachers, etc.), and in a small number of cases, military personnel who consider their housing to be rent free.

More than half (52%) of all Guam households were interested in moving to a new unit in the future. The rest of the households (48%) told us that they never intended to move from their current unit. They felt they were living in the home where they would live out their lives and had no intention of moving elsewhere. That was true for 71 percent of current homeowners, and 21 percent of Guam’s renter households.

Not everyone wants to move right away. We estimated current demand by eliminating those who said they would not be moving for more than two years. The current demand estimate is about half of the total demand. Renters, as usual, are more likely than purchasers to be moving in the very near future.

Not everyone who will be moving expects to remain on Guam. About 31 percent of those in the current market³³ reported that they will be moving to some off-island location, mostly to the U.S. Mainland and Hawaii. That is notably higher than is generally found in other housing markets. It suggests that a substantial amount of churn exists in Guam's resident population. Nearly all of the sources we reviewed for this study, and our own population estimates, report that Guam's population grows "slowly and steadily" and that household size decreases very slowly. Therefore, if 30 percent of all households leave the Island in any given year, then as many as 16,000 households must be either newly formed or move to Guam from other places each year.

While this finding does not affect our estimate of effective demand, it may be cause for some caution in reading the housing preferences to be discussed shortly. The survey covers only existing Guam households. While it is reasonable to assume that incoming households may have similar preferences to those who will be leaving, we have no empirical evidence with which to test that hypothesis.

2.4.5 Housing Preferences

The Demand Survey measured the consumer preferences of Guam's potential movers over the next few years. The intent was to provide housing developers and planners with information to support a broad range of housing initiatives and to gather some data for the housing model.

Tenure: Among all Guam households that want to move, 45 percent plan to own their next unit and 34 percent expect to rent their next home³⁴. The pattern was consistent across all regions of the island. The preference for ownership is not always translated into reality in the marketplace, however. When those who intend to purchase a home were asked if they were certain to buy or might rent instead, approximately 20 percent acknowledged that they may have to rent or that they weren't certain they could buy a home. That would drop the purchase incidence to about 38 percent, a more reliable estimate of the actual buyer rate in the market.

Table 12. Housing Preference by Tenure

Preferred Next Tenancy	Current Tenure						Group Total	
	Own		Rent		Occ. w/o Pmt			
	Count	Col %	Count	Col %	Count	Col %	Count	Col %
Buying	3,571	54.0	5,827	42.0	1,026	44.0	10,423	45.0
Renting	1,575	24.0	5,607	40.0	523	23.0	7,705	34.0
Move in with relative, friends	116	2.0	240	2.0	57	2.0	413	2.0
Other	929	14.0	1,063	8.0	445	19.0	2,438	11.0
Don't know	398	6.0	1,270	9.0	263	11.0	1,930	8.0
Refused	58	1.0	25	0.0			83	0.0
Total	6,647	100.0	14,031	100.0	2,314	100.0	22,992	100.0

³³ Current market is defined as those households expecting to move within the next 2 years.

³⁴ The remaining 11 percent reported their intention to move in with family or friends (occupy without payment of cash rent), or were unsure whether they would buy or rent their next unit.

2.4.5.1 Buyer Preferences

Single-Family vs. Multi-Family Units: The majority of potential buyers (86 percent) preferred single-family detached homes. That is consistent with historical data and the current distribution of owner occupied homes. Guam's is largely a single-family housing market and preferences are still strong for them. Single-family units were more important to buyers in southern Guam (100 percent) than in the Central region (78 percent). The highest concentration of condo units is in Central Guam (Tamuning/Tumon and Mangilao), and fewer condo units are found in the South. Asked if they would accept a condominium unit if they could not find a single-family unit in their price range, half of the buyers (50 percent) who preferred single-family homes responded positively. Those who were willing to switch were mostly current renters and families with lower incomes. So, while there is a strong preference for single-family units, there is a reasonable expectation that multi-family units can be used to solve the homeownership needs of many first-time homebuyers.

Size and Type: Buyers are looking for homes with three (43 percent) or four bedrooms (32 percent) and two (65 percent) or three bathrooms (23 percent). In Guam's current slow-growth economy with its high cost of housing, prospective buyers recognize that they may have to settle for less than their ideal home. Asked about the minimum number of bedrooms required in their next home, buyers indicated they could make do with two (38 percent) or three bedrooms (44 percent). Similarly, they would accept a unit with one (43 percent) or two (47 percent) bathrooms. The smallest unit buyers would be willing to consider was 1,225 square feet, on average.

As noted above, the desire to own a home does not necessarily coincide with the ability to do so. Buyers may wish for four-bedroom, three-bathroom homes, but a low to moderate household income or excessive amounts of debt will limit their ability to make that purchase. Ninety-seven percent of those who plan to purchase their next home were willing to accept less than what they identified as preferable.

Location: Those who plan to purchase their next home would most often choose to live in Northern Guam (41 percent), with the majority expressing interest in Dededo and Tamuning. Central Guam (20 percent) and Southern Guam (11 percent) were also mentioned by buyers as preferred locations for their next residence.

With the buildup of military personnel in Guam on the horizon, a great deal of interest and effort has been focused on ways to maximize Guam's limited resources. Because so much of the development on Guam has occurred in the Northern and Central portions of the island, encouraging future development in the Southern region has been suggested as one way to mitigate the impact of a substantial increase in the island's population. In order to assess the feasibility of this potential approach, those households that do not already live in the South and did not include the Southern region of Guam among their preferred locations for their next home respondents were asked whether they would consider purchasing a home in the South. Forty percent of future buyers indicated that they would consider purchasing their next home in Southern Guam. Among households that stated that a home in Southern Guam was not acceptable, the majority reported that it was "just too far" from everything (65 percent). Often

cited was the long commute from Southern Guam to work, school and shopping areas, high fuel costs, and the desire to live near family members in Northern and Central Guam.

2.4.5.2 Renter Preferences

Of the approximately 23,000 households on Guam that plan to move in the future, just over one-third plan to rent their next home. The most frequently cited reasons for not purchasing a home were issues related to finances and the economy (86 percent), and moving off Guam soon (9 percent).

Single-Family vs. Multi-Family: Guam renters also preferred a single-family dwelling unit (64 percent). Many more renters than buyers voiced a preference for apartments (13 percent) and 10 percent said it didn't make much difference to them. It is clear that whether renting or buying, the Guam market has a strong preference for single-family units. The survey data confirm our literature research and conversations with people in Guam.

Size and Type: As expected, Guam renters were interested in slightly smaller units than the buyers. Renters' first choices were for three (50 percent) or four (26 percent) bedrooms. Seventy percent of them opted for two bathrooms. When we asked renters what they really needed, they were as willing as buyers to accept smaller units. This time the results were surprising. Fully 97 percent of future renters on Guam will accept a unit with one less bedroom and 66 percent could live with one less bathroom than they initially requested. The strongest preference then is for two-bedroom, one-bath units. Renters were willing to live with just over 1,000 square feet in their next home, which was 18 percent smaller than the minimum unit size for buyers.

Location: Like the potential buyers, Guam's future renters want to live in Dededo and Tamuning in the North (42 percent) or in Central Guam (21 percent). Analysis suggests that location is not specifically related to renting or buying, or to other characteristics of the unit. People most often prefer to live in the same areas where they live now. Among the smaller number of households who want to buy or rent in multi-family units, some may feel constrained to live where the multi-floor structures are located. But by far the most pressing reason to choose an area seems to be related to where one lives now, or to a lesser extent where one works. This is consistent with our conversations and research in Guam. It also lends credence to the decisions in several planning documents that future growth will occur in the North and Central parts of Guam. It may be difficult to convince people to live elsewhere.

As with prospective homeowners, renters were questioned about their willingness to rent a housing unit in the Southern part of Guam. About 7 percent of the renters said they preferred living in the Southern villages. Among those who chose locations in the North and Central regions, 36 percent said they would consider renting a place in the South. Among those who would not consider living in the South, more than three-quarters (77 percent) indicated that it was simply "too far away" from work, school, shopping, entertainment and family. Several future renters also noted the tendency for the low-lying Southern villages to suffer the greatest damage from typhoons that hit the island.

2.4.6 Estimating Qualified Demand

The major difference between housing surveys and the real estate market is that surveys do not require a respondent to be financially qualified to buy or rent. To correct for that difference, and to support our estimates of qualified demand, the Housing Demand Survey collected data on the financial situation of all participants. Five indicators of financial qualification were central to that inquiry: current monthly shelter payment, self-reported affordable monthly shelter payment, savings, and household income. We also collected information on household size for the new unit, shelter-to-income ratio, and the history of housing problems and homelessness. All of these are the types of information a loan office might need to qualify an applicant for a mortgage loan.

2.4.6.1 Current Monthly Shelter Payment

The average monthly shelter payment in Guam in 2009 was about \$962. Mortgage and utilities payments for homeowners was \$1,173, and monthly shelter payments for renters was \$861. (Ad rents in 2006 for renters were \$1,341). Guam homeowners who are planning to purchase a new home reported average monthly shelter payments of \$1,386. Current renters who planned to buy a first home reported average monthly shelter payments of \$887. On the average, therefore, Guam families planning to become homeowners are looking at increasing their monthly shelter costs by about 32 percent. Most homeowners know the expense is actually greater than that because ownership costs usually include more than just the mortgage payment and utilities.

2.4.6.2 Perceived Affordable Payment

Everyone who was going to buy or rent in the next two years was asked how much they could afford to pay each month for their next unit. The measure gives us a general indicator of what households consider affordable and what price ranges they would be looking for in the coming year. Compared against the current shelter payment, it also allows us to get a market-wide view on what new entrants are expecting. Although respondents were not questioned directly about the amount of debt they had, monthly debt is generally taken into account by persons evaluating the monthly payment they can afford.

Among those looking to buy their next housing unit, current homeowners said they could afford a median monthly payment of \$1,421. That's just slightly higher than the median monthly payment in 2009, suggesting that some of the new buyers may be looking to move up in the market. The median affordable payment for Guam renters looking to own their next home was \$1,223 for their new homes. That's realistically higher than their current rents, and suggests that they may be looking for units at slightly lower sales prices than are being sought by current homeowners. In the rental market, the median affordable rent recorded was \$816, about 7 percent higher than current rent payments. The majority of the intended renters were renters at the time of the survey, with less than 15 percent of the homeowners planning to switch to renting. Affordable rent levels for the current homeowners planning to rent their next home were a bit higher than for current renters.

2.4.6.3 Savings

Because the nature of the down payment a prospective homeowner is able to make (both in its total amount and as a proportion of the loan amount) determines what is "affordable," survey

respondents were asked about their resources available to put toward a down payment. In savings alone, potential buyers island wide reported around \$1,450. This amount was slightly higher in the Northern (\$1,568) and Southern (\$1,792) regions. Respondents were also asked to factor in money from relatives, equity in any property that would be sold, and any other sources to determine the total amount they could afford to put toward a down payment on their next home. Again, households in the Northern and Southern regions reported the highest amounts, with \$6,981 and \$6,801, respectively. Those currently residing in the Central area of Guam expect to have significantly less available for a down payment (\$4,806). With nearly one-quarter of these households currently dedicating more than 40 percent of their annual household income to shelter payments, it is not surprising that they have less accumulated wealth for a down payment.

In the end, when we applied household resources in our qualification procedure, it was the down payment that was the major problem for many potential buyers. Buyers without equity must have sufficient savings to apply toward a down payment. Nearly three-quarters of all prospective buyers have at least \$5,000 in family savings or investments. But by their own best estimate, only 67 percent of current owners without equity, and 49 percent of current renters would be able to gather \$40,000 as a down payment. Even if we dropped the down payment amount to \$25,000, 62 percent of renters and 39 percent of owners with insufficient equity reported that they did not have enough to cover the down.

2.4.6.4 Annual Household Income

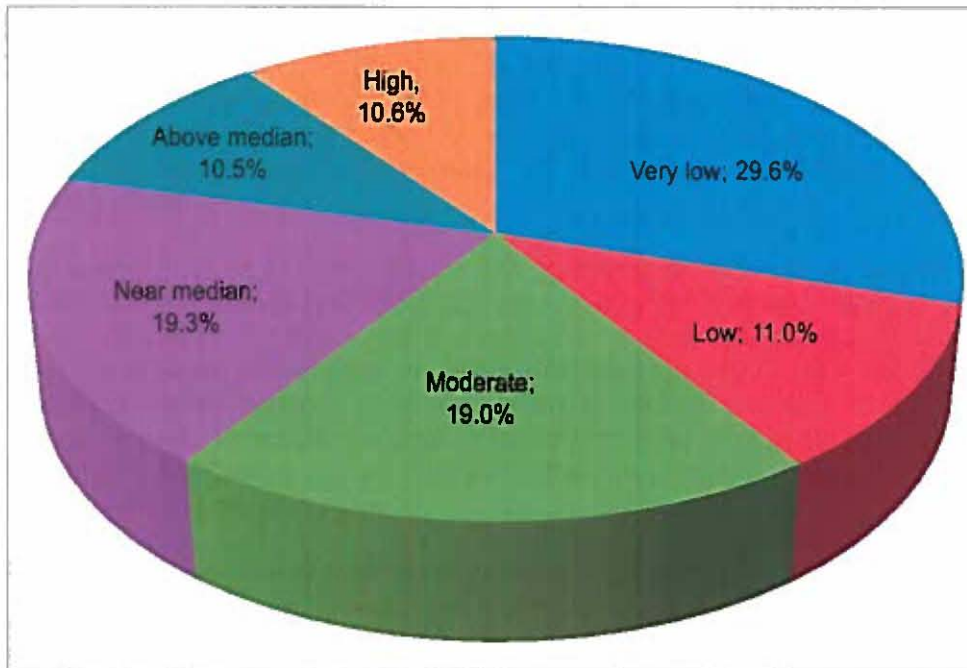
The annual household income of households planning to move is an indicator of the types of housing units Guam residents might be looking for when they move. For this study, it also served as a major indicator of the qualification of buyers and renters to acquire the unit of their choice³⁵. The average household incomes from all sources, before taxes for calendar year 2008 were gathered for all households. Prospective buyers had a median annual income of \$47,200 and the median annual income among households likely to rent was \$27,675.

HUD guidelines are particularly useful in the qualification process because they adjust household income for household size. As we shall see, HUD guidelines also provide a convenient way to describe the housing units Guam's buyers and renters will be seeking. Households with very low incomes (below 30 percent of the Guam median income) are very likely to require assisted housing of some sort (Figure 14). Low-income households (31 to 50 percent of median) are also unlikely to qualify for standard financing to buy homes. Moderate-income households are those with incomes between 51 and 80 percent of median and may have difficulty qualifying for conventional financing.

Many households in the near median income group (81 to 120 percent of median), sometimes referred to as the "gap group", are theoretically qualified for standard financing, except in cases where housing costs are very high and supply is limited. Households with incomes between 121 and 180 percent of the Guam median are usually qualified to acquire units, assuming there are sufficient affordable units in the local housing market. Those above 180 percent of median are labeled "upper income" households here and are expected to be able to secure housing without difficulty.

³⁵ Recall that their "choice" has already been adjusted to be the units they really need, rather than the one they would most prefer.

Figure 14. Guam Mover Households at HUD Guideline Levels, 2008



Source: Guam Housing Demand Survey, 2009

The distribution of mover households according to the median income guidelines published by the Department of Housing and Urban Development (HUD) is shown in Figure 14. Thirty percent of households expecting to move in the future currently earn less than 30 percent of the HUD-defined median household income for Guam. The 2009 HUD guidelines suggest that the income guideline for acquiring a home for a 4-person household in this category would be \$18,900 per year.

Among all mover households, 61 percent are low-income households³⁶. That is, 61 percent of all Guam household who will be in the market for a new unit next year will have households income below 80 percent of median. Among prospective buyers, 52 percent are low-income households. Among renters, 68 percent were in the extremely low, very low, and low-income groups.

In most housing markets, we accept the proposition that the private sector real estate market will fill the market-level demand for mover units and produce new units needed to supply new entrants. Using HUD guidelines, market-level demand is often represented by households with income above 80 percent of the local median income. Some would counsel special consideration of problems that might affect near-median or gap-group households. Low- and moderate-income households usually require some assistance in finding the right place to live. Planning for their needs falls to the assisted housing agencies. As we move into the next decade, Guam's low- and moderate-income housing market includes 61 percent of all mover households, more than 7,000 families over the next two years.

³⁶ The sum of the first three of HUD's income guideline categories –extremely low, very low, and low.

2.4.6.5 Shelter-to-Income Ratios

We noted earlier that Guam's shelter-to-income ratios³⁷ were high for some households. Specifically, about 30 percent of all households in Guam were paying more than 40 percent of their monthly income for shelter in 2009. That situation is consistent with the recent rise in housing prices that characterize Guam real estate sales over the last three years. It also suggests, however, that Guam's rental prices are higher than would be expected for a healthy housing market.

The shelter-to-income ratio affects the qualification estimation process because home loan officers use the ratio in qualifying loan applicants. In general, shelter-to-income ratios below .30 are an indication that the buyer is qualified for a standard mortgage loan. Rates up to .33 are often acceptable, depending on other applicant qualifications. All other factors held equal, shelter-to-income ratios above .40 cause a serious problem in qualifying applicants for a mortgage loan. Although the application of shelter-to-income ratios to rental agreements is less stringent, higher ratios are an indication that the prospective renter may have difficulty making the monthly payments on time.

The shelter-to-income ratios for Guam households who are going to move in the next two years are shown in Table 13. Results are shown for current owner and renters, and also for the three regions on Guam.

Table 13. Shelter-to-Income Ratios Among Current Movers, 2009

Shelter to Income Ratio	Region							
	North		Central		South		Guam Total	
	Count	Col %	Count	Col %	Count	Col %	Count	Col %
Owned Units								
less than 30 percent	386	46.9	834	79.5	357	75.0	1,577	67.1
30 to 40 percent	66	8.0	65	6.2	52	10.9	183	7.8
Over 40 percent	241	29.2	72	6.8	49	10.4	362	15.4
Not reported	131	15.9	78	7.4	18	3.8	227	9.7
Total	824	100.0	1,049	100.0	476	100.0	2,349	100.0
Rented & Occupy w/o Payment Units								
No shelter cost	761	15.1	146	5.3	424	35.2	1,331	14.8
less than 30 percent	1,776	35.1	1,152	42.0	451	37.4	3,380	37.5
30 to 40 percent	427	8.4	185	6.8	50	4.2	663	7.4
Over 40 percent	1,765	34.9	1,097	40.0	193	16.0	3,055	33.9
Not reported	326	6.4	162	5.9	88	7.3	576	6.4
Total	5,055	100.0	2,743	100.0	1,206	100.0	9,004	100.0

Source: Guam Housing Demand Survey, 2009

³⁷ The percentage of a household's monthly income required for shelter payments.

In 2009, about 44 percent of all mover households were paying less than 30 percent of their monthly income for shelter. Rates were a bit lower in Northern Guam, where most of the movers currently reside.

About 67 percent of households that own their current homes had shelter-to-income ratios below 30 percent. That includes those who have already paid off their mortgage and own their units outright. Because this group is likely to have equity in their present home, they are more likely than current renters to be qualified to purchase a new home. About 15 percent of current homeowners have ratios in excess of 40 percent. That includes a number of homeowners who purchased fairly recently and paid higher prices for their units. Regardless, their shelter-to-income ratios might make it difficult to obtain standard financing in the next two years.

Among current renters, the situation suggests that fewer households would qualify for the unit they are seeking than was found for homeowners. About 38 percent of them had shelter-to-income ratios below 30 percent and would probably have no serious difficulties with qualification. Nearly as many of them (34 percent), however, have ratios in excess of 40 percent.

It is also important to consider the households with no shelter payment at this time. Although we cannot use the shelter-to-income ratio in qualifying that portion of the demand, their very low current monthly shelter payments may create issues in trying to qualify for their next housing units. For about 15 percent of current renters then, shelter-to-income ratios will dampen qualified demand estimates.

2.4.6.6 Qualified Demand Estimate

Table 14 summarizes the qualification indicators discussed to this point. It also briefly addresses two other constraints on qualification: (1) the percent of current sales and rental units that are affordable to households with low and moderate incomes and (2) the current monthly payment required to support new units in Guam's sales and rental markets. Finally, it presents our estimate of qualified demand for housing units in Guam in 2009.

Table 14. Summary of Payments for Affordable and Available Units, 2009

	Buyers	Renters	Total Movers
Current Monthly Shelter Payment	\$974	\$742	\$873
Affordable Monthly Shelter Payment	\$1,125	\$774	\$971
Monthly Household Income	\$4,006	\$2,399	\$3,245
Shelter-to-Income Ratio	24%	31%	27%
Household savings above \$5,000	31%	11%	23%
Calculated Affordable Monthly Shelter Payment	\$1,162	\$696	\$941
% of supply affordable	44.3%	11.4%	—
Monthly Shelter Payment for Median Price Unit	\$1,212	\$750	—
Current demand (households)	3,533	3,124	7,783
Qualified Demand Estimates (% of current)	41.5%	48.9%	45.1%

The Demand Survey data were used to estimate that about 7,783 households will be seeking a new home on Guam in 2009. Of those, about 2,992, or 38 percent, will be qualified to buy or rent. Households who are qualified to buy are those who will show up in Guam's housing marketplace in the next two years. About 1,465 of those households will be buying a unit and 1,527 will be looking for a place to rent.

The difference between current demand and qualified demand is unmet demand, or pent-up demand. In Guam in 2009, pent-up demand is estimated to be about 3,665 households – 2,068 would-be buyers and 1,597 renters who will stay where they are. Notice that pent-up demand is defined as unmet demand due to problems qualifying for financing. In the case of renters, it is based on an inability to pay that is calculated in much the same manner as the loan qualification procedure. That means that unmet demand due to lack of serious interest, due to inability to find a unit of the type or location that people want, or other non-economic issues, have been eliminated.

As a result, unmet demand is expected to fall disproportionately on households with low and moderate incomes. Households with resources – income, savings, real estate equity, multi-adult employment, credit history – usually find and acquire the housing they want and need. Households with fewer qualifications are less likely to be successful in securing adequate housing. In our literature reviews and expert interviews we did not find much discussion of this feature of Guam's housing market. It is, however, a central issue in producing housing that is affordable at all levels of the market³⁸. The next section of the report elaborates on this point.

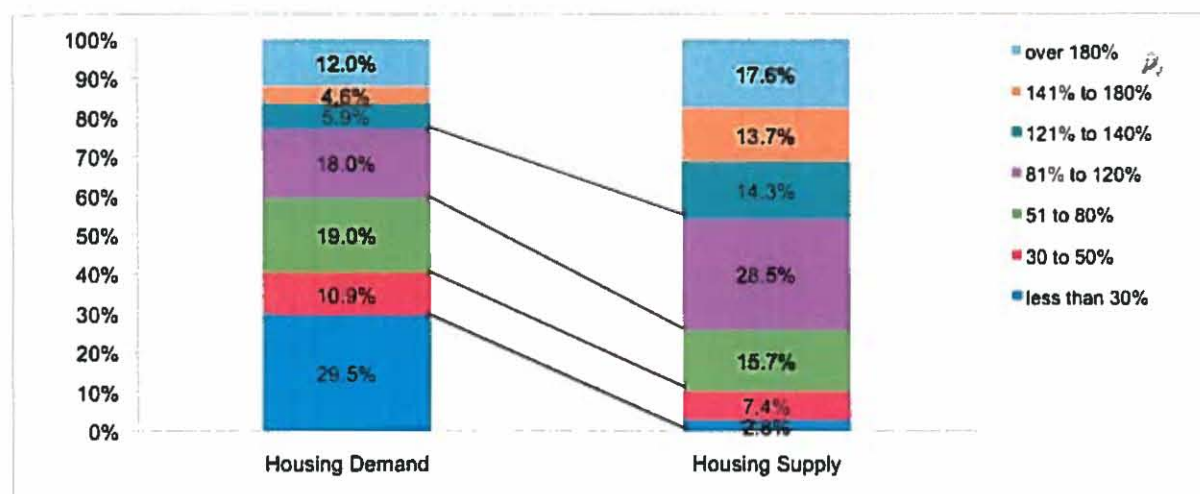
2.4.6.7 Housing Demand and Supply in an Unaffordable Market

To demonstrate the way affordable housing demand and supply are currently related in Guam's housing market, we developed the information in Figure 15. It is an attempt to describe for housing planners the disproportionate distribution of demand and supply across income categories.

In the column at the left, we used Demand Survey data to show the effective demand for buyer units in each of seven HUD income groupings. In the column at the right we used MLS sales data for 2009 to estimate the number of housing units available that might be suited to households in each of HUD's seven income groupings. The supply data were estimated by classifying housing units listed with MLS according to the household income a mortgage loan office might look for to qualify an applicant for a loan.

³⁸ The issue is not providing everyone with the home of their choice, but with planning and policy decisions that encourage the development of housing that is safe and sanitary for households at all income levels.

Figure 15. Effective Demand and Housing Supply by HUD Income Ranges, 2009



Source: Guam Housing Demand Survey, 2009

The first three income categories at the top of each column are what we might call "market level housing"; housing for which people with incomes above 120 percent of the Guam median might easily qualify. A little over 22 percent of Guam households who want to buy a new home were in the "market housing" situation in 2009. Almost 46 percent of the homes listed by MLS in 2009 were units that were affordably priced for those buyers.

The three income groups at the bottom of the figure make up HUD's low- and moderate-income classifications. That is the class for which HUD makes resources available for assisted housing programs. As we have noted, 61 percent of the total housing demand on Guam was found among low- and moderate-income households. Looking at the supply side, about 27 percent of listed units on Guam were priced at levels that might make them affordable to low- and moderate-income households.

2.4.7 Hidden Homeless and At-Risk of Homelessness

Definitions

At-Risk: Households in which members would become homeless in less than three months if their primary source of income was suddenly lost. Also called "precariously housed", these people are three monthly paychecks away from homelessness.

Hidden Homeless: Households in which more than one family share accommodations. These households include families that are doubled up (two or more families or groups of persons who are related by birth, marriage or adoption) and those that are sharing (two or more families or groups whose members are not related by birth, marriage, or adoption).

Adequately Housed: Households that are not classified as at-risk or hidden homeless.

Table 14 presents the estimated number of hidden homeless and at-risk of homelessness households and persons in Guam at the beginning of 2009.

Table 15. Hidden Homelessness and At-Risk of Homelessness, 2009

Housing Status	2009
Households	44,551
Hidden Homeless	2,286
At-Risk	10,595
Adequately Housed	31,670
Persons	175,722
Hidden Homeless	13,800
At-risk	42,506
Adequately Housed	119,415
Persons per Household	3.94
Hidden Homeless	6.04
At-risk	4.01
Adequately Housed	3.77

Source: Guam Housing Demand Survey, 2009

Characteristics of Hidden Homeless and At-Risk Households

Hidden Homeless households are frequently characterized by the presence of 2 or more minor children (61 percent), elderly members (43 percent vs. 23 percent among all households), and by virtue of their household composition and size, these households typically have 2 or more adult members employed full-time (89 percent). Hidden homelessness is most often identified in households living in a single-family home (90 percent) owned by a member of that household (62 percent). That suggests that doubling-up and sharing are more likely to occur in an owned housing unit, as opposed to a rented one. Whether as result of financial considerations, or simply a by-product of a cultural emphasis on family connection and responsibility, members of Hidden Homeless households are most often Chamorro (53 percent) or Filipino (26 percent).

It is difficult to analyze the household characteristics of the hidden homeless because the Demand Survey did not ask respondents to describe the added household members. We note, for instance that the average household size for the hidden homeless group was 6 persons, compared with 4 for the at-risk households and 3.8 for those household that have adequate housing accommodations. This finding is consistent with the definition of hidden homeless households as including more than one family. In fact, hidden homeless households on Guam typically include 3 or more generations of a family.

Unlike housing units in which Hidden Homeless reside, At-risk households were much more likely to be living in rented units (83%). As is the case for all renters, At-Risk households are more likely than Hidden Homeless or Adequately Housed households to plan to move to a new housing unit (51 percent). These households also intend to move soon, with 37 percent planning to move within the next 2 years.

The shelter-to-income ratio of At-risk households is one strong indicator that they are experiencing difficulties with regard to housing. Thirty-seven percent of At-risk households dedicate more than 40 percent of their total income to shelter payments each month, while only 24 percent of Hidden Homeless and 20 percent of Adequately Housed households pay such a large percentage.

3. HOUSING IN THE NEXT TWO DECADES

The analyses we have presented thus far are based on literature and statistics, opinions from experts, or measurements taken on the current population. They are static analyses and have limited application in estimating Guam's housing market activity for the future. To do that requires a dynamic analysis method such as simulation or modeling. It was for this reason that GHURA requested that the Guam Comprehensive Housing Study 2009 include development of a housing model for the island. The Guam Housing Model version 4.6 (GHM4.6) was delivered as a separate work product and is currently the property of the Guam Housing and Urban Development Authority.

Guam housing studies have included housing models since 1992. The model constructed for past studies was a regression-based model that predicted housing choices based on a series of demographic, economic, and housing production indicators. A hard copy of that model was not available for review for this project, but documentation and outputs were reviewed.

Based on the nature of available data, our assessment of the Guam housing market in the recent past, and the housing modeling experience of SMS, we chose to use a supply-and-demand model for the Guam Comprehensive Housing Study, 2009.

Briefly and superficially, the model works like this. Housing demand in any given year is a function of **pent-up demand** from last year plus **new households** entering the market this year. Housing unit supply is a function of **excess inventory** from last year plus **new construction** this year. If housing demand exceeds housing unit supply in any year that indicates a need for additional housing units. The production function is lagged three years; meaning that the need units generated this year may not show up until 2012.

Pent-up demand is a way of expressing the idea that there is a need for a housing unit that has not been fulfilled in the last year. It can include doubled-up households or hidden homeless persons, or delayed purchase. Failure to acquire a housing unit may be due to the lack of units, the lack of the right unit, or the lack of a unit at the right price. Pent-up demand, that is, can occur even in the presence of higher vacancy rates.

New households include households formed in the last year, households resulting from net immigration, and those that result from a decrease in average household size.

Excess inventory includes housing units that were not used to house last year's households in need. It is the inverse of pent-up demand if the vacancy rate is very low.

New Construction includes units constructed during the current year that have not yet been sold.

The 2009 Guam Housing Model is a fairly complex set of data and programming. It was developed using Microsoft Excel™ so that housing planning staff with no formal training or experience in higher order modeling languages can use it. It was developed specifically for the Guam housing market, with the capacity to handle high vacancy rates, a housing market subject to greater and more frequent shocks than calmer markets, and the ability to manipulate the effects of the impending military buildup. The model is expandable and scalable.

The model produces standard forecasts of important elements of the housing planning process: population and households, housing stock and new production, market volume and prices. They are produced for the total market and for subjections by product type (single-family and multi-family), income level (HUD income guidelines), and geography (region). It has also been designed to produce that most elusive of housing model outputs, the number of "needed units". Needed units are defined as housing units required to house all of the households living in Guam, minus the new units that will be produced by Guam's housing producers, business and government. Needed units are those required to make the Guam housing market work without unacceptable pent-up demand or excess inventory. In most cases, needed units tend to be located in the lower end of the housing market. That is, they are likely to be produced by government or by public-private partnerships. They are part of the government-provided infrastructure.

3.1 WITHOUT MILITARY BUILDUP

The model for Guam's housing market without any new changes or constraints is sometimes called the unconstrained model. It is a model of what will likely happen to housing demand and supply on Guam "if the current trends continue as they have in the recent past". It serves two purposes. First, it is the baseline model for Guam's housing market continuing from 2009. Second, it forms the baseline against which any major change in housing conditions, including the proposed military buildup, can be compared.

3.1.1 Assumptions and Parameters

The Guam Housing Model prepared for this Study is a supply-and-demand model that considers a large number of parameters in Guam's housing market, past, present, and future. In the process of developing the model, we built in a number of assumptions that define the limits of the model operation and outcomes. Because many of those assumptions cannot be usefully fixed, we designed them to be assignable parameters controlled by the user. Modifications to these assignable parameters requires considerable remodeling work.

Understanding the variable parameters is the second crucial piece in interpreting the model outcomes. Variable parameters can be changed simply by resetting the values of these variables within the model and pressing "enter". In order to assist the reader in interpreting the outcomes, we include here a description of the model assumptions and parameters. Table 16 presents our fixed modeling assumptions.

Table 16. Model Assumptions - Fixed Parameters

No.	Assumption	Comment
1	Population: Civilian Population	The resident civilian population model is taken from several Guam sources, depending for its final totals on the Guam Transportation Plan.
2	Population: Group Quarters Rate	We modeled the gradually increasing number of persons in group quarters as a function of increasing population.
3	Population: Average Persons Per Civilian Households	We modeled the gradually declining average of persons per civilian household as a function of the increasing population.
4	Population: Average Persons Per Military Households	The average for military households was modeled from Census data and remains more or less constant.
5	Population: Buildup Military and Civilian Population and Dependents	Estimates of stateside and H2B contractors and their dependents are included in the model and were taken from BSP data. "Outside the fence" workers, public and business buildup, and their dependents may be added in, but are excluded in the model's default settings.
6	Economy: Median Income	A linear model by year was found to best fit median income over the last forty years. This projection was extended to 2030.
7	Economy: Interest Rate	The interest rate is held at 5.5% percent in order to maximize affordability and not underestimate demand.
8	Demand: Distribution of Civilian and Military Populations by Income	As these distributions have remained relatively constant over the past few decades, we assumed a static distribution as measured in the Demand Survey.
9	Demand: Distribution of Demanded Units by Civilian and Military Households and by Income Levels	Derived from the SMS 2009 Guam Housing Demand Survey, this matrix describes the distribution of unit type, tenure, and price level demanded by civilian and military households at varying levels of income.
10	Demand: Total Demand	We define Total Demand as Total Households minus Occupied Units. Total Demand may also be referred to as Doubled-Up Households
11	Demand: Qualified Demand	Qualified Demand includes the fraction of households in Total Demand that qualify to enter the housing market in a given year. This fraction is modeled on affordability.
12	Demand: Unmet Demand	In a given year, Unmet Demand is calculated as Total Demand minus Net New Occupied Units, or the number of households in Total Demand that did not acquire a unit.
13	Supply: Total Stock	Total Stock is defined as the total number of inhabitable units found in the civilian housing market.
14	Supply: Inventory	Inventory is defined as the number of unoccupied units. This value is updated annually as some old units are demolished, some new units are constructed, and some units are occupied. Actually, excess inventory.
15	Supply: Available Inventory	Available Inventory is modeled as a function of appreciation of the median unit price and represents the number of units on the market in a given year.
16	Supply: Demolition Rate	The demolition rate parameter represents the net change in dilapidated or otherwise uninhabitable units. These units are removed annually from the Total Stock at a rate of 0.4%

Table 17 details the variable parameters for the unconstrained housing model, outlining the specific settings used to produce the unconstrained housing model outcomes in this section, with comments where needed. In practice, these and many other parameters of GHM4.6 are variable and the model supports fairly complex policy-relevant explorations.

The settings applied to the modeling of the constrained Guam housing model are shown in Table 17.

Table 17. Model Inputs - Variable Parameters

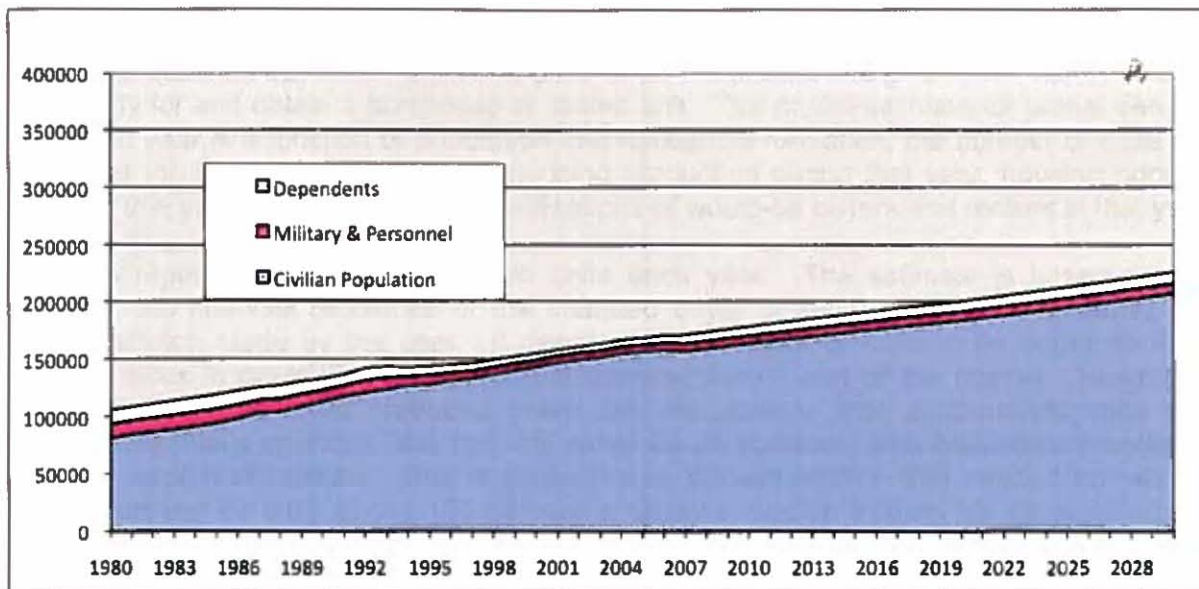
No.	Assumption	Current Setting	Comment
2	Population: Percentage of Military Households on Base	76%	Military households not living on base enter the civilian housing market. The 76% default was based on results of the Housing Demand Survey.
5	Population: Civilian Elements of Military Buildup (included only in the buildup model)	Hawaii/CONUS & H2B included, 100% in barracks, no dependents; "Outside the fence" & public/private business excluded	These parameters allow users to select which elements of the military build-up enter the housing market and what percent will actually end up in the civilian housing market. Users may select whether a group is included or excluded from the model, what percentage of that group lives in barracks, and what percentage are thought will bring dependents.
	Supply: Additional Construction (new residential units) for the years 2009 to 2030	Set to recommended levels	Additional Construction represents units introduced into the market outside of economic forces (e.g. government, policy). In the market model, preference for these units is first given to households who do not qualify to enter the housing market.

The assumptions outlined above are the centerpiece of the Guam Housing Model and, when adjusted appropriately, will provide a useful prediction of housing needs. These assumptions are important in terms of limiting possible outcomes and with respect to crafting non-market policy decisions. Many of these variables are sensitive, so minor changes can result in wildly unrealistic outputs. As in all modeling activity, reality testing is strongly recommended.

3.1.2 Demographic Projections, Unconstrained

Figure 16 shows the civilian and military population of Guam between 1970 and 2030. Numbers shown before 2010 are actual and projections are shown for years between 2010 and 2030.

Figure 16. Guam Population (Unconstrained), Civilian and Military, 1980-2030



In the unconstrained model, the population of Guam will grow by 24,394 persons by 2020 (11.78%), and by another 25,600 people (12.00%) by 2030³⁹. Growth rates for the civilian and military population segments were taken from the Civilian/Military Task Force (C/MTF) published data on the buildup. C/MTF expected growth rates are straight-line projections comparable with Guam population growth in the previous two decades.

The unconstrained model describes a relatively uneventful future for Guam's population in which the military segment grows just a little slower than the civilian population over the next twenty years. Note that the model does *not* attempt to account for natural disasters, and does not predict either national or international economic downturns.

The Guam Housing Model, 2009 (GHM4.6) projects a total of 56,117 households within the population by 2020 and 63,879 households in 2030. Overall, that's a projected 23.6 percent continuous growth rate for the twenty-year period (11.8 percent continuous growth rate for the ten-year period).

The parameter for average household size was set to decrease from 3.83 to 3.73 between 2010 and 2030. By comparison, the average household size and the average number of persons per household dropped by almost one person between 1970 and 1980, and from 3.97 to 3.89 in the previous two decades. The impact of smaller household sizes is an increase in the number of units required to house the population.

³⁹ These reflect the population goals reported in the 2030 Guam Transportation Plan.

3.1.3 Projected Housing Demand and Policy Reactions

The demand for housing is defined here as unmet demand. In GHM4.6, unmet demand is the number of qualified buyers or renters who will enter the market in a given year, minus those who will qualify for and obtain a purchased or rented unit. The model estimate for unmet demand in any given year is a function of population and household formation, the number of units on the market at the beginning of that year, housing production during that year, housing prices and rents for that year, and the financial qualifications of would-be buyers and renters in that year.

We also report the number of needed units each year. The estimate is based on unmet demand, the financial resources of the intended buyer or renter (household income), and a policy decision made by the user. It describes the number of units to be added to Guam's housing stock in order to decrease unmet demand in any part of the market. Needed units shown in Table 18 were produced under the assumptions that extra-market units will be provided by public agencies and that will serve Guam residents with household incomes less than 80 percent of median. That is equivalent to the assumption that most, if not all, of the unmet demand for units above 120 percent of Guam's median income will be supplied by the private sector. This is a reasonable assumption in view of Guam's housing market history. Guam's housing market has virtually always been able to keep pace with demand, has occasionally overbuilt for demand, and has had high vacancy rates at least since 2000.

Given the recent history of Guam's housing market, the absence of major market shocks, and the model parameter settings shown in Tables 16 and 17 above, the unconstrained housing model produces the unmet demand and needed units outlined in Table 18.

Table 18. Unmet Demand and Needed Units – Unconstrained Model, 2010-2030

Year	Unmet Demand (before Added Units)	Added Units	Unmet Demand (after Added Units)
2010	548	417	400
2011	670	260	400
2012	733	252	400
2013	764	244	400
2014	777	235	400
2015	779	225	400
2016	775	216	400
2017	768	282	400
2018	800	122	400
2019	729	184	400
2020	723	168	400
2021	712	278	400
2022	767	286	400
2023	802	295	400
2024	826	300	400
2025	843	310	400
2026	858	316	400
2027	870	325	400
2028	881	333	400
2029	891	340	400
2030	902	346	400

The needed units shown above are a function of the Guam housing model. They are a recommended production level designed to satisfy three objectives: (1) to reduce the level of unmet demand among targeted households; (2) to restrict doubling up to less than two percent of the households on Guam; and (3) to maintain a limit on unmet demand among target households at no more than 400 qualified and unqualified households per year.

Summing the units of unmet demand over the two decades shown in Table 18 will produce an unduplicated count of units and is not recommended. Summing needed units across that time is legitimate according to our model and produces a twenty-year production target for GHURA's effort to serve Guam's low- and moderate-income households. The total is 5,734 housing units.

3.1.4 Characteristics of Needed Units

GHM4.6 was designed to produce estimates of the types of units most needed by Guam households. It estimates configuration of extra-market units that will contribute most effectively to mitigating unmet demand among low- and moderate-income households. In preparing those estimates we considered the types of units needed (single-family vs. multi-family), the tenancy to be addressed (own vs. rent), the income levels of households (by HUD income guidelines), and whether the units might serve military⁴⁰ or civilian households. GHM4.6 makes use of Demand Survey data to estimate the characteristics of demand. The detailed demand structure was applied for all years to produce the characteristics shown in Table 19⁴¹.

⁴⁰ Housing units in Guam's civilian housing stock serving households with at least one active duty member of the armed services living off base.

⁴¹ More detailed results are available in the model, but such finite numbers rarely serve the housing policy function or production strategy.

Table 19. Characteristics of Needed Units – Unconstrained Model, 2010-2030

Year	Needed Units - Unconstrained										
	Total Units	Sector		Tenancy		Type		HUD Income			
		Civilian	Military	Own	Rent	Single-family	Multi-family	<50%	50-80%	80-120%	120%+
2010	417	403	14	177	240	316	101	297	120	0	0
2011	260	251	9	119	141	197	63	185	75	0	0
2012	252	244	8	120	132	191	61	179	73	0	0
2013	244	236	8	122	122	185	59	174	70	0	0
2014	235	227	8	123	112	178	57	167	68	0	0
2015	225	218	7	124	101	170	55	160	65	0	0
2016	216	209	7	124	92	164	52	154	62	0	0
2017	282	273	9	157	125	214	68	201	81	0	0
2018	122	118	4	95	27	92	30	87	35	0	0
2019	184	178	6	123	61	139	45	131	53	0	0
2020	168	162	6	120	48	127	41	120	48	0	0
2021	278	269	9	170	108	211	67	198	80	0	0
2022	286	277	9	179	107	217	69	204	82	0	0
2023	295	285	10	189	106	223	72	210	85	0	0
2024	300	290	10	197	103	227	73	214	86	0	0
2025	310	300	10	207	103	235	75	221	89	0	0
2026	316	306	10	216	100	239	77	225	91	0	0
2027	325	314	11	218	107	246	79	231	94	0	0
2028	333	322	11	223	110	252	81	237	96	0	0
2029	340	329	11	227	113	258	82	242	98	0	0
2030	346	335	11	232	114	262	84	246	100	0	0

3.1.5 Special Needs Housing Units

The housing demand survey provides information on the extent of need among certain households with at least one member of a special needs group. We have summarized some of those data in Table 20.

Table 20. Estimated Demand for Special Needs Housing Units

Population Served	2009 Population	Unqualified Demand for New Units	Unmet Demand
Elderly	5,950	698	287
Disabled	5,479	1,653	1,670
Risk of Homeless	1,000	1,000	1,000

The table shows the total Guam 2009 population for each group, reported as the number of households. Households were designated as "Elderly" when the head of household was 62 years of age or older. For disabled persons, we report the number of households with at least one member reported to have a disability that restricts mobility. Households classified as "At-Risk of Homelessness" are those who would be able to remain in their current housing unit for less than 3 months if their primary source of income was removed. Because these groups require special housing unit modifications to accommodate their needs, the information provided in Table 21 may be useful for planning purposes.

Table 21. Estimated Demand for Special Needs Housing Units

Special Need Item	% Households in Need
Wheelchair ramps	9.3%
Emergency call devices	5.2%
Special railings	3.6%
Wheelchair modification (not ramp)	1.7%
Shower seat	<1%
Bathroom grab bars	<1%

3.2 WITH MILITARY BUILDUP – MINIMUM IMPACT

Our first estimation of the impact of the proposed Guam military build-up is designed to measure the minimum possible effect on Guam's housing market. This scenario suggests that 20 percent of military personnel and their dependents will live off-base, and that workers who migrate to Guam to take on-base jobs will all be housed in civilian housing units. The remaining 80 percent of military households will be housed on base and all construction workers will be housed in temporary housing. No secondary impacts on the economy are assumed and no additional in-migration will ensue.

3.2.1 Model Parameters

The new parameters were entered to the Guam Housing Model to estimate the expected impact on Guam's housing market. Pre-2010 data, assumptions, and parameters were identical to those used in the unconstrained model (Table 16). The additional parameters, set to zero in the unconstrained model, are shown in Table 22.

Table 22. Parameters for the Minimum Impact Military Buildup Model

No.	Buildup Subgroup	Include/Exclude	% On-base or In Barracks	% Dependents Permitted
1	Active Duty & Dependents	Include	80%	100%
2	Stateside Civilian Personnel	Include	0%	100%
3	Hawaii/CONUS Contractors	Include	100%	0%
4	H2B Contractors	Include	100%	0%
5	"Outside the Fence" Workers	Exclude	N/A	N/A
6	Induced Public/Private Sector	Exclude	N/A	N/A

3.2.2 Demographic Projections

3.2.2.1 Population and Households

The figures below show the civilian and military population of Guam between 1970 and 2030. Data before 2010 are actual and projections are shown for years between 2010 and 2030.

Figure 17. Guam Population with Buildup, Civilian and Military, 1980-2030

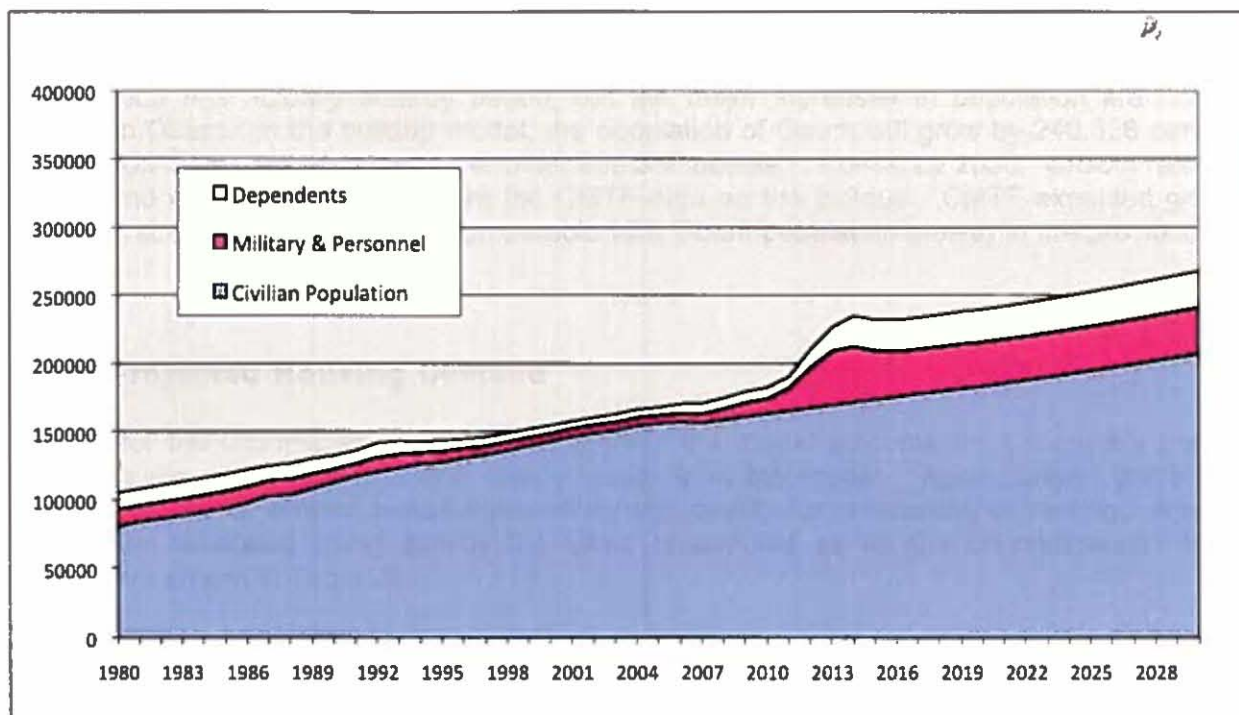
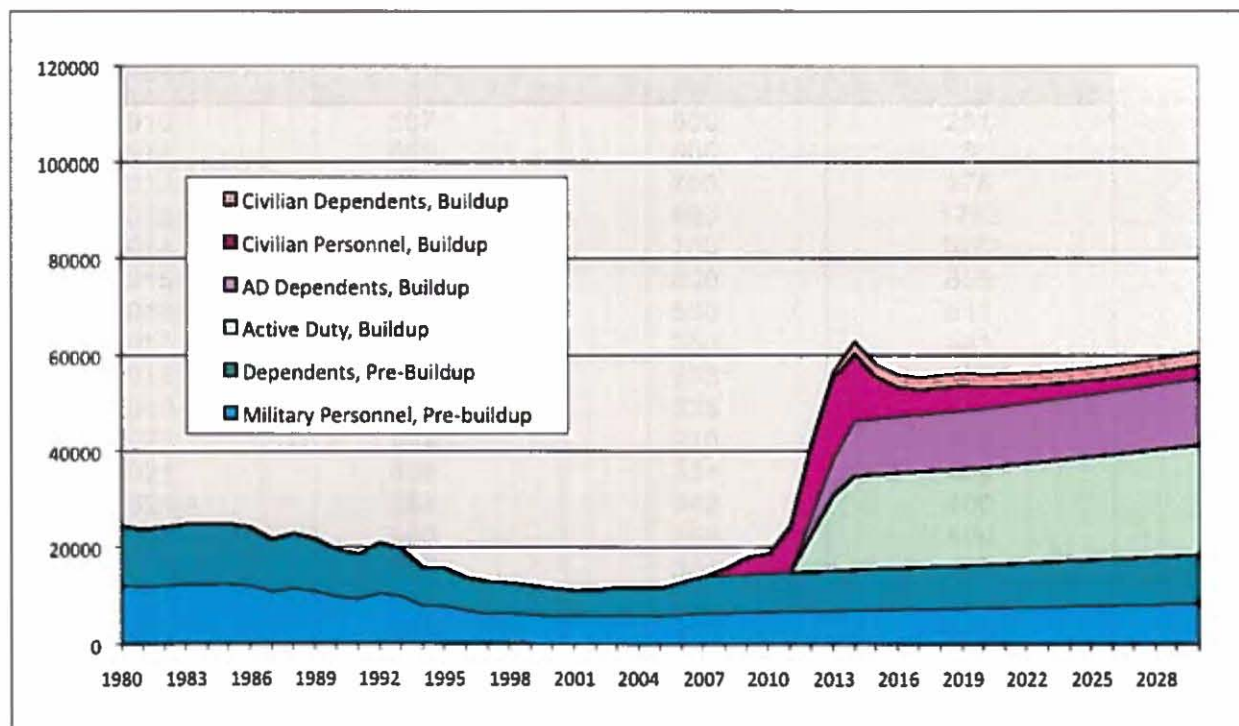


Figure 18. Detailed Military Population with Buildup, 2010-2030



The minimum impact model for Guam suggests that the total population of Guam will grow by 57,368 persons between 2010 and 2020. That is 35,384 more people (161 percent more) than if the military buildup did not occur. We might expect a substantial impact on housing.

The buildup has actually already begun, but the major increases in population are not yet evident in Guam. In the buildup model, the population of Guam will grow by 240,326 persons by 2020 (27.27%), and increase by another 268,366 people (11.04%) by 2030. Growth rates for civilian and military were taken from the CMTF data on the buildup. CMTF expected growth rates are straight-line projections comparable with Guam population growth in the previous two decades.

3.2.3 Projected Housing Demand

Just as for the unconstrained model, we present the model outcome for the military buildup model as the unmet demand and needed units from the model. Again, unmet demand is qualified buyers or renters minus households who qualify for purchasing or renting. Needed units were calculated using exactly the same procedures as for the unconstrained model. Results are shown in Table 23.

Table 23. Unmet Demand & Needed Units – Minimum Impact Model, 2010-2030

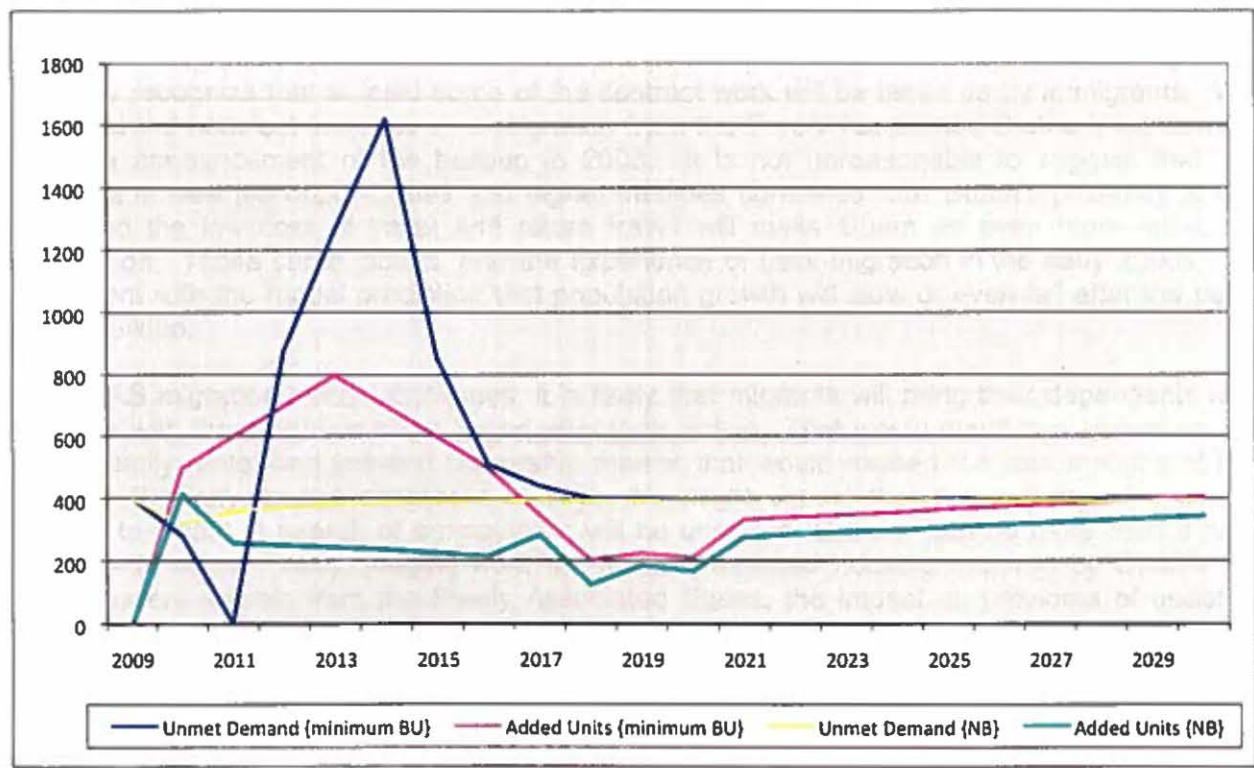
Year	Unmet Demand (before Added Units)	Needed Units	Unmet Demand (after Added Units)
2010	587	500	281
2011	685	600	3
2012	1729	700	876
2013	2305	800	1263
2014	2746	700	1622
2015	1897	600	855
2016	1420	500	511
2017	1185	350	441
2018	967	203	400
2019	879	225	400
2020	822	210	400
2021	859	334	400
2022	885	342	400
2023	903	350	400
2024	917	356	400
2025	931	367	400
2026	943	375	400
2027	954	382	400
2028	965	390	400
2029	975	398	400
2030	985	406	400

The military buildup is expected to bring military and civilians to Guam who will end up living in Guam's civilian housing stock. The market will react with increasing prices and decreasing supply in the short-run, followed by increased housing production. During the course of the initial buildup, unmet demand will be generated beyond the level expected in the unconstrained model. At its peak, the proposed military build-up includes 19,480 military personnel, plus 11,450 of their dependents and 2,461 employees for new base operations that will come from outside the Island, 2,486 of their dependents. Most military personnel will be housed on base and all H2B workers will live in temporary housing. The remaining in-migrants will end up in Guam's civilian residential housing market.

That will cause a fairly abrupt, large increase in demand that will peak in 2015. After that, demand will decrease steadily back to pre-buildup levels. The needed units will be produced in response to the sharp increase in demand. Shortly after the buildup peak there will be an equally abrupt decrease in demand for housing units.

Figure 19 presents the results in graphic form. Unconstrained demand (orange line) varies little from year to year, and supply maintains pace with demand. The shortage of units will exist for low- and moderate-income households. To attack that problem a set of units designed to reduce pent-up demand for low-mod families is recommended (pink line).

Figure 19. Comparing Unconstrained and Minimum Impact Buildup Models, 2010-2030



With the military build-up, unmet demand rises as new people arrive. The production capacity of Guam's housing industry will not likely be able to meet that demand in the short run and supply will lag demand. But the market will respond to the increased demand and produce units in greater numbers than in the case of the unconstrained model. After the peak in 2014, demand will begin to drop very quickly, returning to pre-buildup levels by around 2017. For several years thereafter, housing demand will drop well below the level of previous years. Significant housing will have been added to the stock in response to the buildup, and with the departure of many of the civilian workers, supply will exceed demand for many years. By the late 2020s, the situation will settle out.

The unmet demand, even among GHURA's low- and moderate-income families will be very high during the buildup phase as new residents arrive and vie for housing at the lower and middle levels of the market. But as the buildup winds down, more opportunities will open for them. With some overbuilding during the heaviest part of the buildup, and the decrease in demand as workers leave, prices will drop and choices will improve. Assuming that significant assisted housing construction occurs during the buildup phase, low- and moderate-income families will have greater housing opportunities in the readjustment years.

One aspect of the proposed military buildup that is not treated by GHM4.6 is the profile of in-migrating workers. The current model implicitly assumes that in-migrants will have roughly the same household types, housing needs, and resources as Guam's population in 2009. Civilian and military households are treated separately in the model. We expect that military households choosing to live off base will include roughly the same proportion of family and non-family households. Most of the experts we consulted for this study seem to agree with that likelihood. Some were less willing to accept the same assumption for contract workers.

It is reasonable to assume that increased economic activity resulting from the buildup will increase in-migration to Guam. In fact, all of the planning documents we have seen tacitly if not explicitly recognize that at least some of the contract work will be taken up by immigrants. We note that the heaviest increase in in-migration from the Freely Associated States is concurrent with the announcement of the buildup in 2003. It is not unreasonable to suggest that the prospect of new job opportunities and higher incomes combined with Guam's proximity to the FAS and the low cost of travel and return travel will make Guam an even more attractive destination. Those same factors, and the experience of back-migration in the early 2000s, are consistent with the model prediction that population growth will slow or even fall after the peak of the buildup.

If the FAS migration pattern continues, it is likely that migrants will bring their dependents and spouses with them within a short period after their arrival. That would result in pressure on the single-family rental and low-end ownership market that would exceed the assumptions of the model. Similarly, based on recent surveys, we might expect that the majority of migrants coming to Guam in search of employment will be unskilled laborers with no more than a high school education. Finally, judging from the level of assisted housing required by GHURA to serve current arrivals from the Freely Associated States, the impact on providers of assisted housing and assisted housing would also increase beyond the level of GHURA is currently experiencing.

Virtually all of the "needed units" shown in the previous table will serve low- and moderate-income households. Their number was determined according to the following assumptions:

1. The population of Guam will increase with and without the buildup as suggested in the Guam Transportation Plan;
2. The types of in-migration will be determined by occupation: military and their dependents, contract works and their dependents, and temporary construction workers;
3. The number of new households is determined by the average household size of households of different types, which is based on current household sizes and a slight downward trend in average household size over the next two decades;
4. The number and pattern of housing units needed to house the new households is determined by their type (civilian or military), preferred and qualified tenure (own, rent), preferred structure type (single-family, multi-family), and income (in quartiles);
5. Total demand estimates for each category are based on population growth, household size, and demand structure as determined by this study;
6. Unmet Demand is determined by subtracting from total demand, an estimate of the numbers of new units that will be provided by the military and the private sector housing market;
7. Needed Units were estimated by calculating a number of units that would be needed to maintain the level of doubled-up households at 400 or fewer each year, under two assumptions: (a) that Guam's private sector housing developers would provide sufficient units to serve the needs of households with incomes greater than 80 percent of Guam's median; and (b) that the needs of migrant households drawn by the military build-up would be similar to those of other households on Guam with similar characteristics.
8. That in-migration to Guam would be limited to current in-migration rates plus the migrant workers expected to take inside-the-fence contract work resulting from the buildup.

This results in the following buildup scenario. During the first part of the buildup, Guam's low- and moderate-income families will be hard pressed to find housing. If buildup funds can be used in the early years of the buildup, they will provide options for low- and moderate-income families during a very tight housing market. In the post-buildup period, those additional units, being subject to lesser demand, will reduce the severity of pent-up demand among GHURA's target population. Of course, if the assumptions of the minimum demand model are not met, the estimates total demand, unmet demand, and needed units may be different.

3.3 WITH MILITARY BUILDUP – HEAVIER IMPACT

During the course preparing the Guam Comprehensive Housing Study for 2009, we encountered literature, data, and expert opinion suggesting that the proposed military buildup in Guam would have greater impact than might result from the minimum impact scenario. Specifically, there were those who felt that the 80-percent on-base rule was an unrealistic assumption and actual rate of on-base housing might be significantly lower. Our own review of actual on-base housing ratios averaged between 72 and 76 percent over the last several years. Others suggested that at least some of the buildup construction workers, or their dependents, might move into market-level rental housing. The CMTF data suggest that some of those workers will remain in Guam after the buildup, lending some credence to the idea that not all of them would be housed in temporary units for the duration. There were some experts who felt that there would be secondary or induced effects on Guam's economy stemming from the buildup. If substantial resources flow to the island to support a massive buildup of the armed forces, the resulting increase in economic activity and job opportunities may attract even greater in-migration. In fact, one of the CMTF scenarios suggests this may occur.

All of those possibilities would significantly increase activity in Guam's civilian housing market. The greater demand would run ahead of supply in the short run, causing major increases in housing prices and reducing availability of housing units for Guam's local residents.

GHM4.6 was designed to facilitate examination of all of the issues noted above by activating the appropriate elements and setting parameters. As an example of how the model can be used to address housing policy and as a way to examine the possibility of impact greater than the minimum impact model suggests, we developed and estimated a heavier-impact housing scenario. This scenario suggests that 24 percent of military personnel and their dependents will live off-base; that all in-migrant on-base employees and their dependents will be housed in civilian housing units; that 72% percent of in-migrant construction workers and their dependents will end up in the civilian market, and that all households of stateside hires enter the civilian market. The model is capable of accounting for additional secondary or induced effects of the buildup on Guam's economy or the attendant increase in in-migration however this particular scenario excludes all induced buildup and assumes all foreign contractors will be housed in barracks.

3.3.1 Model Parameters

The parameters for the heavier impact scenario were entered to GHM4.6 and used to estimate the impact on Guam's housing market. Again, pre-2010 data, assumptions, and parameters were the same as for the unconstrained model. Additional parameters are shown in Table 24.

Table 24. Parameters for the Heavier Impact Military Buildup Model

No.	Buildup Subgroup	Include/Exclude	% On-base or in Barracks	% Dependents Permitted
1	Active Duty & Dependents	Include	72%	100%
2	Stateside Civilian Personnel	Include	0%	100%
3	Hawaii/CONUS Contractors	Include	100%	0%
4	H2B Contractors	Include	100%	0%
5	"Outside the Fence" Workers	Exclude	N/A	N/A
6	Induced Public/Private Sector	Exclude	N/A	N/A

The parameters are set to examine the scenario described on the previous page. That scenario differs from the minimum-impact scenario solely in the increased percentages of military personnel, construction workers, and off-base workers who will live in Guam communities and compete with local residents for housing.

3.3.2 Demographic Projections

The population impact for the minimum-impact and the heavier-impact scenarios are identical. The increase in military population is the same as shown in Figure 17 and the estimated number of new civilians arriving to work on construction and on-base jobs is as shown in Figure 18.

3.3.3 Projected Housing Demand

The difference between the minimum-impact and heavier-impact scenarios is in the percentage of new arrivals that will enter Guam's civilian housing market and its impact on demand. Specifically, we are interested in the impact on unmet demand and the units needed to address that situation. The model estimates are shown in Table 25.

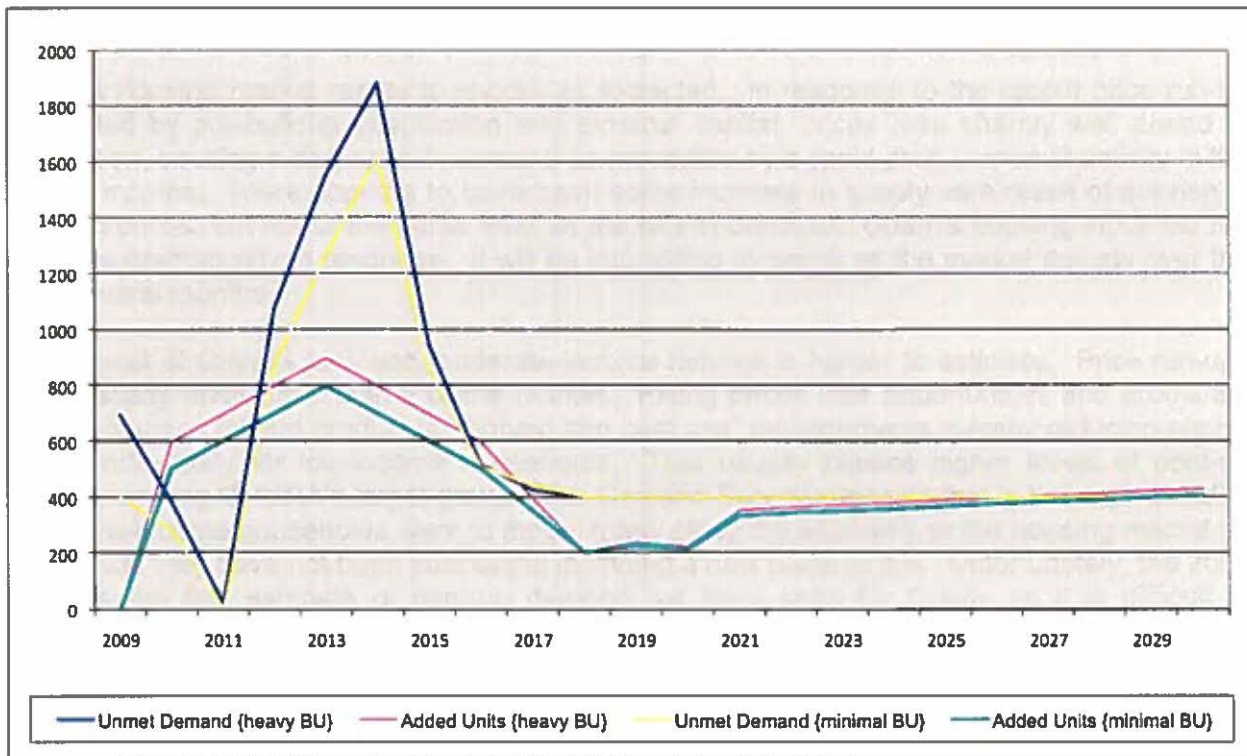
As expected, the heavier impact scenario results in higher unmet demand than for the minimum-impact model (compare Table 23). At its peak in 2014, the heavy-impact military buildup will increase total demand from 46,030 to 51,584 households (112%). Unmet demand will increase from 2,746 households to 3,170 households (115%). The total number of units that should be added to Guam's housing inventory to mitigate the impact on unmet demand rises from 9,088 to 10,120 (111%).

Table 25. Unmet Demand & Needed Units – Heavier Impact Model, 2010-2030

Year	Unmet Demand (before Added Units)	Needed Units	Unmet Demand (after Added Units)
2010	754	600	383
2011	782	700	22
2012	2047	800	1075
2013	2743	900	1553
2014	3170	800	1883
2015	2144	700	946
2016	1651	600	516
2017	1329	400	426
2018	1056	205	400
2019	938	241	400
2020	864	225	400
2021	896	357	400
2022	918	365	400
2023	936	374	400
2024	949	381	400
2025	963	392	400
2026	975	400	400
2027	986	407	400
2028	997	416	400
2029	1008	425	400
2030	1018	432	400

Total demand will peak in 2014 and then quickly drop back to pre-buildup levels by about 2018. The needed units will be produced in response to the sharp increase in demand during the earliest stages of the buildup. Shortly after the peak period demand will drop even more sharply than in the minimum-impact model. The impact is shown graphically in Figure 20.

Figure 20. Comparing Minimum-Impact and Heavier-Impact Models, 2010-2030 



3.4 SPECIAL TYPES OF HOUSING UNITS

The data on special needs housing that we presented for the unconstrained model can be applied to both of the military buildup models. Estimating the impact of the military buildup on the number of elderly, disabled, and at-risk of homelessness is outside the scope of this project. But there is little reason to propose that the new residents (especially those who remain after the construction work is finished) will be any more likely to swell the ranks of the disadvantaged than current Guam residents. Some experts suggest that some of those jobs may go to workers from the FAS, increasing the burden on public services and housing, but none have suggested that would result in disproportionate numbers of elderly, disabled, or special needs persons.

3.5 CONCLUSIONS

GHM4.6 is a very flexible and comprehensive tool for developing and testing housing policy. We have presented three housing scenarios here, and many more might be tested before final policy decisions are made. The no-buildup scenario is consistent with most of the reports we have read on Guam's housing market. Despite the fact that the market seems to respond radically to shocks including natural disasters and external economic events, the long-range picture shows a relatively steady supply-demand system that has consistently functioned with

stability. It has traditionally functioned in such a way that as supply keeps pace with, or runs a little ahead, of demand overall. We find, as in most other housing markets, that low and moderate income families do not fare as well as above-median income households in terms of supply. That is because the market produced very few units at the lowest prices and public agencies usually cannot keep pace with population increases at the low end of the market. Absent serious economic shocks, GHM4.6 reproduces Guam's market realities quite well.

Guam's housing market reacts to shocks as expected. In response to the recent price run-up generated by pre-buildup speculation and external capital, prices rose sharply well ahead of production, causing a decrease in demand as measured by a rapid drop in market activity in the last 18 months. There appears to have been some increase in supply as a result of the rise in housing prices, but not at the same level as the rise in demand. Guam's housing stock did not increase dramatically in response. It will be interesting to watch as the market adjusts over the next several months.

The impact of Guam's low- and moderate-income families is harder to estimate. Price run-ups don't usually favor the low end of the market. Rising prices limit opportunities and producers steer resources toward producing "highest and best use" developments thereby reducing supply disproportionately for low-income households. That usually causes higher levels of pent-up demand among GHURA's target group. The Demand Survey suggests that is the case in 2009. More low-income households want to move, many citing the economy or the housing market as the reason they have not been successful in finding a new place to live. Unfortunately, the 2009 study is the first estimate of pent-up demand we have seen for Guam, so it is difficult to establish the recent price run-up as the cause of the pent-up demand. There is no doubt, however, that the current market provides a very difficult environment for low-income families to realize their housing expectations.

The proposed military buildup may be one of the more dramatic shocks Guam's housing market has experienced in some time. The market will experience relatively abrupt changes in demand on the way up and again as the buildup subsides. There are advantages and disadvantages to both movements, even for low- and moderate-income families. As we have seen, the opportunity to build for the low end of the market during the early years of the buildup provides long-range benefits for GHURA's target group that are unprecedented. GHM4.6 can be used to evaluate policy alternatives for that group even beyond the scenarios treated for this report.

In the process of working on those three scenarios, several aspects of the buildup have been shown to be important in determining outcomes for Guam's housing market. First, the major driver of increased, unmet demand is the number of on-base workers who will enter the population. By any estimate the number of off-base military households is a change that Guam's housing market can handle. Current plans will significantly mitigate the impact of construction workers. But combine those with 2,500 new inside-the-fence employees, and the effect on demand will be notably greater than anything Guam has experienced in the last several decades. It is important to note, at this juncture, that none of our scenarios included a role for demand generated by migrants who might be attracted by Guam's improved economy during the buildup. Some initial work suggests that including secondary or induced demand will cause major differences in the results. It would certainly become the dominant factor in demand generation.

Second, the major problem with the buildup is not its size, but the pace at which it is scheduled to occur. CMTF parameters for the buildup suggest it will occur over the course of about three years. That produces a need for 7,924 new housing units on Guam (4,774 civilian and 3,150

military) in three years. In the past, Guam's housing industry has produced between 400 and 1,000 units per year. Adjusting to 2,600 units per year may be difficult. In any case, changing the model settings to accommodate the same amount of growth over a longer period of time produces much less unmet demand for the buildup.

Third, long-range housing need (unmet demand) is affected more by supply than by demand. That is because supply usually lags demand by a significant length of time. On Guam, the average lag may be as long as three years. The lag is caused by many factors, including the time it takes to notice that demand is increasing, the time it takes developers to plan and implement a project, and the time it takes for government to review and approve the plans. And that doesn't include any time for acquiring land use or zoning variances should they be required. The ability to anticipate demand increases enables policymakers to address the supply lag by acting ahead of events.

4. CHALLENGES AND OPPORTUNITIES

4.1 CHALLENGES

Guam's housing situation is likely to change significantly over the next five years. In an attempt to produce data for policy makers to monitor those changes, this study reviewed and analyzed a broad array of information. Six distinct themes emerged during the course of conducting the Guam Comprehensive Housing Study for 2009. They included the rising cost of housing, availability of land, geographic location, zoning, the military buildup, and the structure of the housing market in Guam.

4.1.1 Housing Costs

Guam's housing costs have risen dramatically in this decade and now stand at their highest point in history. Adding significantly to the number of households on island will cause prices to rise even further. Observers in Guam have expressed concern at recent increases in housing prices. Higher prices mean fewer people can buy, fewer new homeowners, lower ownership rates, and more renters in the market. Higher prices will also make life more difficult for renters. With more households looking for the same number of units at higher prices, some will be forced out of the market. Those who can find places with family and friends will increase Guam's crowding and doubling up rates. For those who cannot, it is not unreasonable to expect that some will join the ranks of the homeless in Guam. Low-income households, for whom housing options are limited from the outset, will feel the effects of rising costs most acutely.

Recent price increases in Guam may indeed be unusual compared with long-range real estate prices in Guam. The price run-up coincided with speculative buying in response to the announcement of the military buildup. Market experts in Guam felt that climbing housing prices stemmed from a lack of infrastructure and a tendency for developers to target the high end of the market. Inadequate infrastructure means developers will be required to include infrastructure construction costs in their project budgets. As development costs increase, the burden is passed along to the consumer. When home prices begin to rise significantly, housing developers, seeking the highest and best use for their developable land, will tend to build for the high-end of the market where profits are typically highest. The increased competition at the top of the market will push prices even higher, and will, in effect, pull development resources toward even more investment at the top of the market. When that happens, choices become more limited for buyers and renters at the middle and lower end of the market (as shown in Figure 15). Thus a rapid increase in home prices can result in significant increases in pent-up demand even with increased supply.

4.1.2 Land Availability

Whether or not there is a challenge stemming from the availability of land for housing production is a matter of opinion in Guam. In fact there are three opinions. Some say there's not enough land due to the limited size of the island and the scarcity of appropriately zoned land. Others maintain that there is no scarcity of land, but a lack of infrastructure to support land development. They usually attribute this to poor government planning or lack of government oversight. Still others felt there was no lack of land at all, but that market forces and the cost of development have led to slow development. Few landowners or developers subscribed to the notion of insufficient land available.

4.1.3 Locating New Development

This issue is not the citing of individual projects, but a much broader policy decision about which regions of Guam will be developed in the future. Some observers feel it would be useful to encourage development in the South. It would make more housing units available there and open up southern villages to people who might like to move there. It would also ease the development pressure in northern and central villages. Some people in the north and central regions are concerned about increasing density. More important, continued building in the North means further development over Guam's aquifer.

Others feel that efforts to entice people to build and buy in the South will be futile. The lack of infrastructure is even more pronounced in the South, and some cited that development costs were higher there. More important, Guam buyers know that there are few jobs in the southern villages, transportation to the job centers is difficult and time consuming, and the villages offer little nightlife, few shopping opportunities, no hospitals and few community health centers. The 2009 Demand Survey supported these propositions and showed that very few people would choose a new home in the southern villages, even if the price were lower.

Development in the southern region has other strategic problems. Even if planners could increase annual housing production in the South by a hundred percent, that would not divert enough northern and central development to reduce densities in those regions by a significant amount. Finally, there are those in all regions of Guam who highly prize the rural lifestyle and ambience of village life in the south and would like to preserve it.

None of the other Guam planners⁴² have suggested that development should be shifted to the South. Research conducted for this study adds weight to their decisions. There are several broad planning strategies that might be applied to locating new housing developments. We might invoke "build where people live now", and we would have to opt for the north and central regions. Or we could counsel, "build near the magnet development" -- here the new military base construction areas in the northern and central parts of Guam. We could choose to "build where the jobs are" and that would push development to these same areas. Finally, we could choose the housing researcher's dictum of "build where the market prefers to live", and our survey would point toward developing in the northern and central regions of Guam.

4.1.4 Zoning

Experts in Guam have different opinions on many of the challenges facing Guam's housing market. But consensus was achieved around the issue of zoning. Nearly everyone who entered into the conversation about zoning laws in Guam was critical of the current law.⁴³ Most felt it was long and cumbersome and some felt that it penalized developers by adding to the cost of housing. That viewpoint was common among landowners, developers, people in real estate finance, and members of the real estate industry in general.

Some of those we interviewed felt that the zoning application process was cumbersome, rather than being lengthy; and that it was rushed to the point that mistakes were sometimes made.

⁴² The Guam Transportation Plan, the GWA Water Resources Master Plan, and the Land Use Plan all project future development in Guam will be concentrated in the North and Central regions, with or without the military build-up.

⁴³ Authors note that, unlike other housing markets with which we are familiar, there were no direct criticisms lodged against the permitting process in Guam.

This view was held by a majority of respondents of government organizations, especially those in housing production and permitting. Government agency personnel believed that there was not sufficient manpower to give the proper attention to each request that is received.

There is also a generally held belief that, because the zoning process is long and cumbersome, it is frequently bypassed. "Spot zoning," a term that encompasses a wide variety of methods for circumventing Guam's zoning law, was mentioned in many interviews and most public meetings. Most people felt the zoning laws were outdated and sometimes ineffective. Some felt that the situation was more serious and that "spot zoning is a misnomer for Guam" since "it happens all the time." One observer said, "Developing in Guam is like developing in the Wild West." Our analysis of applications for zoning and land use variances over the last decade indicates that some support may exist for the last two ideas⁴⁴. Between January 1, 1987 and November 13, 2008, there were 1,840 land use applications submitted to the Department of Land Management (DLM). Three-quarters of all applications were approved after DLM review. Zone variance, zone change and conditional use applications were the most common types submitted. Approval rates were consistently high. Across type of application and geographic location, the overwhelming majority of land use applications are approved.

Changing the zoning laws is unlikely to be a simple matter. Not only is the zoning code complex, but more than thirty years of spot zoning makes the zoning map very complicated. There are as yet no agreed-upon guidelines for a code that might constitute a good zoning solution for Guam. When we asked why Guam's zoning law had not been successfully revised since it was first written, the answer was usually the same: "People in Guam," we were told, "do not like to be told what to do with their property."

4.1.5 The Military Buildup

Clearly the hottest topic in Guam in 2009 is the military buildup. It is the major challenge facing Guam housing planners in 2009. There exist as many opinions about how it will affect housing in Guam, as there are opinion holders. Many experts in Guam feel that the buildup will be good for Guam because it will foster positive changes in the economy. With respect to housing in Guam, these observers believe that economic improvement will lead to increased demand for additional and improved housing, and that will lead to increased housing supply, which will appear as an indirect benefit of the buildup itself. Increased choice for all buyers and renters is a good thing.

Others believe that the arrival of additional military personnel, their dependents and the contract and construction workers who will support the move, will put strong pressure on Guam's housing market. Demand will surge ahead of supply, and prices will rise even higher than in the last decade. Good for the housing industry; not so good for Guam renters and potential homeowners.

Our conversations with key advisers and residents who attended the community meetings led us to believe that many of the comments were based on an unspoken assumption that many, if not all, of the new residents arriving to support the buildup will be active participants in Guam's housing market. Our analysis strongly suggests that this may not occur. Pressure on Guam's housing markets will depend on the number of personnel and dependents who live on- and off-base and the number of construction workers housed in temporary workers' housing. If those

⁴⁴ For additional detail regarding zoning, see the Department of Land Management section in the Technical Report

people are housed on base and in temporary housing, the impact of the buildup on Guam's housing market may be more positive than negative. If the buildup results in more jobs at higher wages, it may push income up faster than excess demand will develop, and the affordability index on Guam will fall. More people will have more choice in the housing arrangements, and homeownership will increase.

When the parameters of the housing model are set to reflect an 80 percent on-base rate for military personnel and 100 percent of in-migrant workers in temporary housing, it shows a need for about 4,500 new housing units on Guam over the next twenty years. That is in addition to all the units that will be produced by government agencies and the private sector housing market to support current rates of population growth. The results also support the experts who predicted that contract workers would affect the market to a greater extent than the military personnel.

There is always the possibility that the increased economic activity resulting from the buildup will draw in-migration. Several experts suggested this as a possibility. They postulated that reasonable levels of economic growth might generate in-migration as high as 20,000 persons⁴⁵ or about 5,000 additional households. All of those would be in the civilian housing market. Our analysis has not yet tested that scenario, but the housing model can be used to address the issue.

There is a possibility that the benefits of a housing boom may not be spread evenly across the population. It is reasonable to assume that the recent trend toward higher sales prices and unit rents will continue, fueled by speculation, external demand, and the assignment of the lion's share of development to high-end properties. If that is so, then it is possible that the rapid buildup will lead to lopsided development wherein low- and moderate-income families will be hard pressed to find housing at an affordable cost. We have already heard it said that the boom market will increase homelessness in the midst of plenty.

4.1.6 The Structure of Guam's Housing Market

It is convenient for this discussion to consider three characteristics of Guam's housing market: (1) tenure (own or rent); (2) type (single-family or multi-family); and (3) price range (high, middle-market, and low). It is likely that new entrants to the market will affect competition differently for each of these groups. Military personnel in particular enter the marketplace at many different levels and have wide-ranging preferences for unit types, locations, and price ranges. The study shows that few military families purchase homes; most rent. They are more likely to rent multi-family units, and tend to pay higher monthly rents⁴⁶.

Lower ranking personnel and their families prefer single-family rentals in the same price ranges as most Guam residents (\$1,000 to \$1,500 per month). They will compete directly with local residents. Senior officers and groups of single servicemen sharing space can afford to pay much higher rents, \$2,000 and up, and seem to prefer condominium properties. This market structure will temper the impact of the buildup in important ways. In the opinion of some observers, the high-rent multi-family segment of the market is overbuilt and not moving as fast as some would like. A substantial boost from the arrival of military personnel with their OHA stipends will revitalize that market segment. Few Guam residents compete in that market

⁴⁵ This was the highest forecast we encountered. Others suggested the estimate is too high, but did not supply an exact number of new residents.

⁴⁶ See section 2.3 on Guam rents.

segment, simply because they prefer single-family residences and to pay lower rents. At least in the short run, the impact may be positive with a lucrative high-end market filling the needs of new arrivals without putting pressure on the segments used by Guam families.

Two features of the military buildup could cause problems for that scenario. First, over time, the sellers in the middle market may be enticed to improve their units and raise prices to become players in the more lucrative military market. If there are enough military buyers, then the middle market inventory may shrink, developers will not invest there, and prices will rise as demand exceeds supply. Prices in the high-end rental market may decline as new supply comes into the market, but that will not significantly affect local civilian buyers.

More important, the number of civilian temporary and permanent workers who will come to Guam to support the military buildup will not be interested in the high-end rental properties. To the extent that they are cast into Guam's housing market, they can be expected to rent in the low and middle market. It is likely that these people will compete with Guam families for rental units. If a significant number of them opt to live in the community rather than in temporary workers' quarters, prices are quite likely to rise in the middle sector of the rental market.

Finally, the hopes of the owners of high-end rentals could be dashed under certain circumstances: if the buildup does not occur, if the military were to severely restrict off-base housing, or if the preferences of military personnel were to drift to a lower price level. All of these scenarios would create a very different housing situation on Guam. Demand and investment in the high-end rental market would be insufficient to revitalize that segment. Prices in that segment would fall and vacancies would increase.

4.2 OPPORTUNITIES

Many of the opportunities are clear in the discussion of challenges. Planning for Guam's housing needs in the next ten years will be challenging, but will not be without its unique resources and opportunities. Certainly the upside of the military buildup suggests the opportunity to add to Guam's housing stock and fuel economic growth that favors home buyers and renters. There are, in addition, other opportunities to consider.

4.2.1 Assisted housing

GHURA has already begun to address the major challenges posed by the expansion of Guam's housing market. Their Comprehensive Housing Plan presents details of that effort. It is important to note that GHURA's plan does not address the Guam housing market as a whole. The Authority focuses on policies and services related to developing government housing for low- and moderate-income households (earning up to 80 percent of the HUD median income for Guam annually).

In addition to plans to address homelessness, fair housing, and community development in Guam, GHURA's plan sets forth several policies and plans to address housing directly⁴⁷. In order to enable a greater number of low-income families the ability to acquire the housing they need, GHURA has proposed a six-point plan to: (1) provide new units by building or acquiring group homes and single-room occupancy units additionally by providing assistance to producers

⁴⁷ GHURA, 5-Year Strategic Plan, Specific Housing Objectives, Section 91.215 (b), p. 41.

of affordable rental units; (2) promoting sweat equity programs and new home construction for low and moderate income households; (3) offering interest free loans for first-time home buyers; (4) assisting with establishment of Section 8 Housing Choice Voucher Homeownership Program to help low income renters become home owners; (5) providing homeownership education and counseling; and (6) developing a program to offer low interest homeowner loans for rehabilitation and correcting health and safety deficiencies.

GHURA's plan also includes measures to improve assisted housing management by increasing the number of vouchers available, reducing assisted housing vacancies, and improving maintenance performance.

Perhaps most relevant to the Comprehensive Housing Study, GHURA has proposed several measures designed to remove barriers to the production and acquisition of affordable housing⁴⁸. The first plan is to revise Guam's zoning law. That places GHURA in that very large group of people who think that task will be beneficial for Guam. GHURA expects that the result will be the reduction of developer costs, referring to the cost of delayed action rather than construction costs. GHURA also plans to work toward the revision of Guam's subdivision law, for the same purpose, the promotion of affordable housing and rental units. And they have pledged their support to all other public agencies to facilitate development of affordable housing and assisted housing.

In anticipation of an increase in demand for assisted housing units, GHURA has already submitted its request for an increase of 1,000 additional Section 8 vouchers, to cover 600 three-bedroom and 400 two-bedroom vouchers, at a cost of \$15.5 million per year. They have also requested an increase in their annual allocation under IRS Section 42 Low Income Housing Tax Credits (LIHTC) from the \$2.7 million in 2009 to \$4.6 in 2011 and \$6.6 million in 2015.

4.2.2 Work With Military

The United States Department of Defense's plans to realign its forces in the Pacific has generated a set of interesting challenges for Guam and especially for Guam housing planners. If military resources are applied wisely to accomplish the move, and if the plans to move are accomplished in cooperation with Guam planners, the U.S. military can be a major opportunity for Guam. The level of military spending and spending by the Japanese government that has been arranged through the military, suggests that ample funding will be available.

The military's active participation in the CMTF indicates the willingness of the military to work with Guam to get this job done by providing the following:

1. Updates on the phased scheduling of the realignment;
2. Information on the management of the percentages of military personnel, their dependents, and contractors and construction workers and their dependents;
3. Commitments to building the kind of units that will minimize choices for personnel to move off base.

⁴⁸ GHURA, 5-Year Strategic Plan, Section 91.2110 (e), p. 46.

4.2.3 Inclusionary Housing Policy

Inclusionary housing policy⁴⁹ includes the use of any of several governmental laws, ordinances, or administrative rules to guarantee that the housing market will produce units that are affordable to low and moderate income households. The practice began as inclusionary zoning, which set about removing rules intended to forbid development of low-priced housing in areas with certain zoning codes. Inclusionary housing has come to include an array of policies and rules to require the production of affordable units. The policies usually center on deed restrictions or permitting processes that require a percentage⁵⁰ of newly developed single-family and multi-family housing units constructed to be "affordable." The definition of affordable varies across the jurisdictions that have adopted the practice. The benefits of inclusionary policy go beyond the economic arena. Many feel that the mix of affordable and high-priced housing generates more viable and comfortable communities.

Some form of inclusionary policy is particularly useful in housing markets that develop unevenly, experience significant levels of external demand, or are subject to rapid price run-ups. In these cases, housing developers, reacting to high demand at the high end of the market will focus on developing housing for the top end of the market. Without an incentive, development at the low end of the market will fall wholly to public agencies, the pace of development will slow, and low and moderate income families will suffer the consequences.

Not all inclusionary housing policy requires legal restrictions placed on development. Several experts, including the Urban Institute, have suggested that cooperative models may be superior. They suggest that cooperation between the private sector developer and local government can produce balanced housing development that serves the needs of both parties.

Guam does not currently have any comprehensive inclusionary housing policies in place. Guam has a housing market in which the demand for housing among low and moderate income households far exceeds the supply of homes suited to their needs. That suggests a need for additional affordable housing. Inclusionary housing policy is a method frequently used to accomplish that objective.

⁴⁹ Also known as "inclusionary zoning," the term as used here favors a much broader range of options aimed at the same objective – increasing production of lower-priced housing in a free market economy.

⁵⁰ Most often the percentage is between ten and thirty percent, but sometimes much higher.

5. DATA RECOMMENDATIONS

At the request of GHURA and based on our experience conducting the Guam Comprehensive Housing Study for 2009, we have developed a discussion of some issues related to the kind of data and information that is needed to plan for and manage housing policy.

The recommendations are aimed at the technical aspects of the Housing Study. The major challenges we faced in conducting the Guam Comprehensive Housing Study, 2009 were related to finding and preparing the data needed for analysis and modeling. We often found Guam data to be available and accurate, and we always found the data managers to be helpful and forthcoming. But some of the fundamental building blocks of a data system to support housing policy and planning are missing. We would like to offer our observations on this issue and to make some concrete recommendations for the future.

5.1 THE IMPORTANCE OF CONTINUITY

To a very large extent, the Guam Comprehensive Housing Study, 2009 is independent of similar studies conducted in the past. We were able to find copies of some of the reports generated from past studies and they were very useful to us. The data on which those reports were based, the survey instruments used to collect the data, and the housing models developed to analyze them were unavailable. A continuous line of data from the past not only establishes data series continuity, but also allows policy makers to compare with or link to past policy evaluations in preparing their plans for the future. Therefore, we strongly recommend the following actions to support continuity based on the present study:

1. Maintain a complete set of support materials along with the copies of the report to be delivered to the next contactor to update the housing study.
2. Preserve the housing model in electronic format to be used in policy development and review, and to support the next housing study.
3. Update the comprehensive housing study on a regular schedule, perhaps once every three to five years. It will take less time, cost less money, and better serve planners and policy developers.
4. Collect and maintain data crucial to the model on a regular basis. The first step in that process is to update the study more frequently. The second is to develop or support the collection and analysis of housing-related data on an ongoing basis. That will be the subject of our next several recommendations.

5.2 THE IMPORTANCE OF A HOUSING INVENTORY

A comprehensive housing study begins from a housing inventory. A list of all housing units available to the local housing market, along with some of their more important characteristics, is the foundation of a data system for housing planners. In Hawaii, for example, the Tax Map Key system has been converted to serve as the base for an inventory. In Guam, several files maintained by the Department of Land Management and the Department of Revenue and

Taxation might be starting points for a housing inventory. In order to develop a housing inventory from those or other files, a few guidelines will be helpful.

The following list covers the most fundamental information that must be captured in a housing inventory. The inventory must be:

1. Mutually exclusive and exhaustive
2. Frequently updated
3. Recorded at the lowest level of aggregation
4. Based on geography (or contain a geographic indicator); and
5. Computerized and addressable by commonly available software.

The inventory list must contain at least the following:

1. Number of structures per parcel;
2. Structure Use Status (residential, transient, or other);
3. Number of residential units per structure;
4. Building owner (military, government, or a non-government entity);
5. Unit size (number of bedrooms, bathrooms, and square footage of the units).

We recommend that GHURA begin discussions with the Department of Land Management (DLM) to utilize their land use files as the base for developing a housing inventory. Development of the DLM data, in conjunction with the Affidavits of True Consideration maintained by the Department of Revenue and Taxation will serve as a solid foundation for the housing inventory. We note that the process of merging DLM and Rev & Tax files has already begun in Guam, although not necessarily intended to produce a housing inventory. That project, however, is likely to bring Guam a step closer to a complete housing inventory.

5.3 THE IMPORTANCE OF MARKET DATA

It is difficult to underestimate the value of reliable measures of sales activity and housing prices in the market. In most U.S. housing markets the Multiple Listing Service (MLS) or a similar agency provide those data. MLS data contain detailed information on the number, type, size, and sales price for listed housing units each month. Other real estate sales data in the file, as well as information on land sales and rental prices, are also useful in housing analyses.

In Guam, MLS data under-represents total sales in any given month. This is true in other States as well. Listed sales exclude unlisted new sales by developers (usually at higher prices than the average). They exclude so-called "pocket sales" which have a lower than the average median price because they include gifts, inherited units, sales to family members, etc. And they exclude other unlisted sales by owners, which usually are distributed very much like listed sales. A comparison of Guam MLS sales with Rev & Tax or BSP data shows that MLS data show much lower activity levels (number of sales per month) and that median prices for units are relatively close, but a bit lower.

Developing a reliable set of data to replace or augment the MLS data would provide a valuable asset for housing planning. That could be accomplished by gathering data on unlisted sales from government sources in Guam.

We strongly recommend that GHURA begin negotiations with appropriate agencies to develop a reliable method of measuring market activity or augmenting MLS data to produce an accurate reliable source for Guam's real estate data.

5.4 THE IMPORTANCE OF PRODUCTION DATA

A housing market is a supply and demand system. To use the system to guide effective planning, we will need data on supply as well as demand. In this study we estimate demand based on several sources, including a special purpose Demand Survey. There was some difficulty finding easily available and accurate estimates of Guam's housing supply.

Guam has an excellent system for recording housing production in the occupancy permits maintained by the Department of Public Works. We depended heavily on those documents for this study and believe they might serve as a viable measure of housing production on Guam in the future. The drawback to using the occupancy permits is that they exist of paper and the series is incomplete – some forms are missing from the paper files. Another problem is that the forms are not always filled out properly, and that instructions for completing them could be improved. The forms could be improved, simplified, and formatted for image scanners making it possible to process forms quickly and inexpensively and writing results automatically to a digital file.

We strongly recommend that GHURA discuss with DPW the possibility of formalizing and computerizing the occupancy permits to serve as a basis for measuring housing production on a continuing basis.

5.5 THE IMPORTANCE OF BASIC DATA

Housing studies require a large and rich body of data on households and housing units. To the extent those data can be extracted from existing data systems, as opposed to developing them from scratch each time the study is updated, is beneficial for everyone. Whereas data such as these have been available on Guam in the past, several data collection projects have been eliminated in recent years. Funding offered by the Department of the Interior is being sought to re-establish some of the projects aimed at collecting socioeconomic data. Guam's Bureau of Statistics and Plans is working to reinstate measures such as the consumer price index, market basket and gross domestic product. The Department of Labor is pursuing funding to reinstate the quarterly household survey on employment.

Various agencies in Guam have recognized the need to create and maintain databases of key indicators. Funding offered by the Department of the Interior is being sought in order to re-establish Guam's ability to collect and distribute socioeconomic data. Guam's Bureau of Statistics and Plans is working to reinstate measures such as the consumer price index, market basket and gross domestic product, which have not been available for quite some time. Similarly, the Department of Labor on Guam is pursuing funding to begin conducting the quarterly household survey regarding employment that used to be a valuable source of information. Once compiled, providing interested parties with electronic access to information will be essential.

We strongly recommend that GHURA lend its voice, cooperation and support to these efforts to reinstate basic data collection systems on Guam. In the process GHURA may wish to negotiate for data that are specifically relevant to housing issues.

2.

6. APPENDIX

6.1 APPENDIX A: GLOSSARY OF TERMS

Acceptable Bathrooms: The number of bathrooms that are absolutely required in a new unit. Typically, acceptable bathrooms is a more accurate measure of housing characteristic for planning than first-choice preferred bedrooms.

Acceptable Bedrooms: The number of bedrooms that are absolutely required in a new unit. Typically, acceptable bedrooms is a more accurate measure of housing characteristic for planning than first-choice preferred bedrooms.

Affordable Housing Cost: The average dollar amount that a respondent reported they would be able to pay per month for a new housing unit.

At Risk for Homelessness: Households in which members would become homeless is less than three months if they suddenly lost their primary source of income. Also called "precariously housed," these people are three monthly paychecks away from homelessness.

Available Down Payment: The amount of money available to be used as a cash down payment for new housing.

Crowding Ratio: The average number of household members per bedroom per household.

Crowding Ratio by Bedrooms: Number of persons per bedroom. Does not include any rooms other than bedrooms. Households with more than 1.01 persons per bedroom are considered overcrowded [See also **Overcrowded**].

Crowding Ratio by Rooms: Number of persons per room. Includes all rooms other than closets, hallways, utility rooms, foyers, and lanais.

Doubled-up: Households that are occupied by two or more families or groups of persons who are related by birth, marriage or adoption.

Elderly: Persons 62 years of age or older.

Elderly Alone: Single member households, member is 62 years of age or older.

Elderly Couple: Two-member households, male and female, at least one of which is 62 years of age or older.

Guamanian or Chamorro: Ethnicity of persons from Guam or the Mariana Islands region.

HH: see Household

Household: Those persons residing in a common housing unit for five or more months of the year.

Hidden Homeless: Households in which more than one family share accommodations. These households include families that are doubled up (two or more families or groups of persons who are related by birth, marriage or adoption) and those that are sharing (two or more families or groups whose members are not related by birth, marriage, or adoption).

HUD: U.S. Department of Housing and Urban Development. HUD's mission is to increase home ownership, support community development and increase access to affordable housing free from discrimination. To fulfill this mission, HUD will embrace high standards of ethics, management and accountability and forge new partnerships -- particularly with faith-based and community organizations that leverage resources and improve HUD's ability to be effective on the community level. For more information visit: <http://www.hud.gov/>

HUD Income Guidelines: [See HUD Income Limits]

HUD Income Limits: Calculates income as percentage of the HUD median income for a household of a given size in a given geographic area. For information on the HUD median income and HUD income limits visit: http://www.huduser.org/datasets/il/il2008_docsys.html

HUD Median Income: The median income for a household of a given size in a specific geographic area. For detailed information on the HUD median income and HUD income limits visit: http://www.huduser.org/datasets/il/il2008_docsys.html

Imputation: A method of replacing missing values for specific variables in survey work. SMS uses a multivariate regression technique to replace missing values with the best estimate of the value for each case, based on reported values of several other related variables. For the Demand Survey, imputation was applied to age and household income.

Income: Self-reported household income for all sources, for all employed persons in the household, estimated before taxes, for the calendar year preceding the survey (2008). [See also Imputation].

Income as a % of HUD Median: [See HUD Income Limits].

Income Per Household Member: Household income divided by the number of persons living in the household.

Intention to Move: The desire to seek a new housing unit at some time in the future. Includes the desire to seek a new ownership units and the desire to seek a new rental unit.

MFD: Multi-Family Dwelling. This includes townhouses, apartments, and multiplexes with more than 4 units.

Multi-Generation Household With Elderly Member: Households with at least two generations present and at least one member 62 years of age or older.

Occupy without Payment: A type of tenancy in which the respondent occupies a housing units without payment of cash rent. Includes persons living in rent-free public units, those living in private sector, family-owner units, property managers occupying units in exchange for services, clerics living in church owner units, military dependents in on-base units, etc. Does not include individuals who have paid off their mortgage.

Overcrowded: A household with more than 1.01 persons per bedroom.

Potential Movers: Households in which the Demand Survey respondent reported an interest in moving to a new unit in the future.

Potential Owners: Households in which the Demand Survey respondent reported intent to own their next home.

Potential Renters: Households in which the Demand Survey respondent reported intent to rent their next unit.

Precariously Housed: [See At Risk for Homelessness]

Preferred Bathrooms: The number of bathrooms desired in a new unit.

Preferred Bedrooms: The number of bedrooms desired in a new unit.

Seniors: See Elderly

Shelter to Income Ratio: The percentage of total monthly households income that is used to pay for shelter costs (rent or mortgage payments). In this study, a shelter-to-income ration in excess of .30 is considered to indicate some level of financial disadvantages. A shelter-to-income ratio in excess of .40 indicates severe financial disadvantage.

SFD: A single-family detached dwelling unit, including duplexes and multiplexes up to four units.

Tenancy: There are three types of tenancy: own, rent, and occupy without payment

Unit Condition: Self-reported assessment of the overall condition of the current unit, rated on a scale from excellent to poor.

Unit Type: There are several different types of units reported in the Demand Survey including: single-family detached units, duplexes, multiplexes, townhouses, condominiums and apartments. We note that condominium in an ownership regime and not a unit type. Since nearly all condominiums in Guam are multifamily units, this classification allows a distinction between condominium apartments and standard apartments in multi-family buildings.