

**URBAN LANDS IN THE STATE OF HAWAII**

**Part II**

**DEMAND FOR URBAN LANDS**

**Office of Planning  
State of Hawaii**

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## **I. Methodology for Projecting the Demand for Urban Land in Hawaii**

The major urban land uses in Hawaii consist of residential, commercial, industrial, resort and public uses. Future demands for urban land were determined in ten-year increments through population and employment projections and through estimated urban land area requirements for residential, commercial, industrial, and public uses. Resort demand was not included in this study. 1/

These demands were then compared with the available supply of developable urban lands in each county and planning district to estimate the demand for additional urban lands to accommodate population and economic growth for years 2010, 2020 and 2030.

The counties' projections for population, employment and housing units were used if they were available. Otherwise, the projections are closely based on the methodology used in the 1991 Wilson Okamoto & Associates (WO) study. 2/

### **1. Residential Demand**

The demand for residential land was projected based on housing demand which is estimated using projected population growth and number of households by counties' planning districts.

As in the 1991 WO study, land area requirements generated by residential demand were estimated based on density factors for single-family and multi-family units. 3/

The extent and timing of density increases are difficult to forecast, but it is expected that single family lot sizes will continue to become smaller, and that residential densities will continue to increase in the future as more intensive use is made of available urban lands. The analysis does not take into account the redevelopment of existing urban areas at higher densities.

**City & County of Honolulu** - Population projections and distribution between the development plan areas, projected number of households, and housing units are from the Department of General Planning, Socioeconomic Projections. 4/.

Additional units, the projected units demanded in each centennial year minus housing units in 2000, are divided into single and multifamily units using the 2000 Census percentages of single family units for each planning districts.

Additional units of single and multifamily units were divided by their respective densities (units per acre), from the Department of General Planning to determine acres needed.

**County of Kauai** – There are no detailed population projections for the County of Kauai by the Planning Department other than a total population projection for year 2020. The 2010, 2020, and 2030 populations were projected by the Office of Planning (OP) based on 0.9 percent (average of 0.6 percent for low and 1.2 percent for high) projected average annual population growth rate from the Kauai County General Plan, 2000. Population projections were distributed to planning districts based on 2000 Census distributions and assuming the same distribution between the planning districts in future years as in 2000.

Household size by planning districts from 2000 Census was used, and assumed fixed through 2030, to project number of households.

Additional units needed in 2010, 2020 and 2030 were divided into single and multi family units by using the 2000 Census percentages and assumed fixed through 2030. Additional units of single and multifamily units were divided by their respective densities (units per acre) based on residential acreage in 1981, Kauai Housing Master Plan Study, and single and multi-family unit counts in 1980 Census of Housing to determine acres needed. 5/.

**County of Maui** - Population projections and number of households were obtained from the Maui County Draft General Plan 2030. 6/

The 2004 existing housing units are from the Maui County Existing Land Use Database, 2004. 7/

Percent of single and multifamily and their respective density factors are from the Maui County General Plan 2030. These figures are assumed fixed by the Plan through 2030.

**County of Hawaii** - For the County of Hawaii, population projections and distribution for 2010 and 2020 were obtained from the Hawaii County General Plan. 8/

The 2030 population was projected by OP based on the population growth rate between 2000 and 2010 and assuming the same distribution between the planning districts as in 2020.

Number of households was projected by using the 2000 average household size by the census tracts and allocating them to planning districts. These projections are also based on the 2000 Census planning districts proportion of population in households. Both are assumed fixed through 2030. Extra housing units were included to satisfy a five percent desired vacancy rate. 9/

The 2000 housing units are from the Census. Additional units in 2010, 2020, and 2030 were separated into single and multi family units using the 2000 Census percentage for each planning district. The County projections were then distributed in the respective county planning areas according to the 1991 Wilson Okamoto & Associates (WO) study.

## **2. Commercial Demand**

Commercial demand was estimated based on employment or commercial floor area projections.

Employment projections for the City and County of Honolulu are from the County's General Planning, Socioeconomic Projections. Commercial employment includes Services, Retail, Finance, Insurance, and Real Estate jobs. Commercial square feet increase is based on one employee per 250 square feet of commercial space. This ratio was used to translate the employment projections into floor area requirements. Floor Area Ratios (the ratio of building floor area to land area) were then used to convert building floor area into land area requirements. A Floor Area Ratio of 2.0 was assumed by the Department of General Planning for the Primary Urban Center and 0.5 for outlying areas in its Development Plan Land Use Analysis. 10/

For the County of Kauai, commercial floor area projections are based on employment projections from the Kauai Long-Range Land Transportation Plan, 1997, Department of Labor and Industrial Relations (DLIR) and DBEDT 2030 SERIES. They include Information, portion of Trade, Services, Finance, Insurance, Real Estate, and 20 percent of Self-employed jobs. Acres needed are based on 58 new commercial jobs per acre from the Maui County Land Use Forecast, 2006 (see below). It is assumed similar practices exist in the industry on Kauai as on Maui.

Commercial employment projections for County of Maui are from the County General Plan 2030. They include portions of Trade, Banking, Finance, Other Services and 20 percent of self-employed jobs. Acres needed are based on 58 new commercial jobs per acre from the Maui County Land Use Forecast, 2006.

For the County of Hawaii, a similar analysis was undertaken from the employment projections. Employment projections are from the Hawaii County General Plan February 2005, DBEDT 2030 SERIES, and DLIR. It includes Information, portion of Trade, Services, Finance, Insurance, and Real Estate jobs. Commercial square feet increase is based on one employee per 250 square feet of commercial space.

Acres needed are based on floor area ratios of 0.5 for S. Hilo, S. Kohala and N. Kona, and 0.3 for other areas.

### **3. Industrial Demand**

Industrial demand was similarly based on employment projections, with land area calculated using floor area per industrial employee. Projected employment growth in each Development Plan area was multiplied by these factors to derive the additional acres needed. As indicated in the WO study, industrial activities tend to bear a stronger relationship to land rather than to floor area.

For Oahu, industrial employees per acre factors were obtained from the County Department of Planning and Permitting, Land Use Forecast for Oahu

For Neighbor Island counties, industrial employees per acre factors are based on 24 new industrial jobs per acre from Maui County Land Use Forecast.

### **4. Public Area Demand**

The final category for urban land demands involve public uses, which can entail a wide range of land uses such as schools, parks, government buildings, hospitals, police and fire stations, and facilities for water and wastewater systems. Of these facilities, schools and parks are among the most land intensive uses for which adequate land should be reserved. The anticipated land requirements for future schools and parks are projected for each of the planning areas in each county.

For schools, land area requirements were derived first by estimating the projected student enrollment in each of the planning areas. Ratios of student enrollment to total households were taken from 2000 Census data for each county, and then applied to the projected household increase (see residential unit demand tables). Facility planning standards used by the State Department of Education were then applied to the projected student enrollments. In determining the establishment of new schools, these standards currently call for 550 students per elementary school, 600 per middle school and 1,000 per high

school. Land requirements are 12 acres for elementary, 18 acres for middle, and 50 acres for high schools.

For parks, the area requirements were based on anticipated population increases in each planning area. The City and County of Honolulu Department of Parks and Recreation standard of 2 acres of park space for each 1,000 population was applied to the projected population increases in each county. 11/

## **5. Urban Area Requirements**

This section presents the urban area requirements to accommodate residential, commercial, and industrial uses, projected for the planning areas in each county using the above described methodology.

**Footnotes:**

1. Resort demand was not projected because several of the counties were in the process of updating their resort area designations which may have affected the distribution of projected visitor units.
2. Wilson Okamoto & Associates, Urban Land Requirement Study, 1991.
3. These densities need to be re-estimated and updated to reflect current practices in building industry. The Office of Planning contacted the Planning Departments of counties for up date of this information, but no new information was provided by any of the Planning Departments. This information could easily be incorporated into the tables when available to update and produce a new set of projections.
4. City and County of Honolulu, Department of Planning and Permitting; Socioeconomic Projections, February 2007.
5. See footnote 3.
6. County of Maui, Planning Department; Draft Socio-Economic Forecast, June 2006.
7. County of Maui, Planning Department; Existing Land Use Database, 2004.
8. County of Hawaii, General Plan, February 2005.
9. Federal Housing Administration and based on Census 2000.
10. See footnote 3.
11. Based on 2 acres per 1,000 populations, Planner's Estimating Guide, Arthur Nelson, 2004.

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