APPENDIX C

Methods for Determining Concentrations of People

One criterion used in the *Riverside County Airport Land Use Compatibility Plan* is the maximum number of people per acre that can be present in a given area at any one time. If a proposed use exceeds the maximum density, it is considered inconsistent with compatibility planning policies. This appendix provides some guidance on how the people-per-acre determination can be made.

The most difficult part about making a people-per-acre determination is estimating the number of people likely to use a particular facility. There are several methods which can be utilized, depending upon the nature of the proposed use:

- **Parking Ordinance**—The number of people present in a given area can be calculated based upon the number of parking spaces provided. Some assumption regarding the number of people per vehicle needs to be developed to calculate the number of people on-site. The number of people per acre can then be calculated by dividing the number of people on-site by the size of the parcel in acres. This approach is appropriate where the use is expected to be dependent upon access by vehicles. Depending upon the specific assumptions utilized, this methodology typically results in a number in the low end of the likely intensity for a given land use.

- **Maximum Occupancy**—The Uniform or California Building Code can be used as a standard for determining the maximum occupancy of certain uses. The chart provided as Table C1 indicates the required number of square feet per occupant. The number of people on the site can be calculated by dividing the total floor area of a proposed use by the minimum square feet per occupant requirement listed in the table. The maximum occupancy can then be divided by the size of the parcel in acres to determine the people per acre. Surveys of actual occupancy levels conducted by various agencies have indicated that many retail and office uses are generally occupied at no more than 50% of their maximum occupancy levels, even at the busiest times of day. Therefore, the number of people calculated for office and retail uses should usually be adjusted (50%) to reflect the actual occupancy levels before making the final people per acre determination. Even with this adjustment, the UBC-based methodology typically produces intensities at the high end of the likely range.

- **Survey of Similar Uses**—Certain uses may require an estimate based upon a survey of similar uses. This approach is more difficult, but is appropriate for uses which because of the nature of the use, cannot be reasonably estimated based upon parking or square footage.

Table C2 shows sample calculations.

	Use	Minimum Square Feet per Occupant
1.	Aircraft Hangars (no repair)	500
2.	Auction Rooms	7
3.	Assembly Areas, Concentrated Use (without fixed seats)	7
	Auditoriums	
	Churches and Chapels	
	Dance Floors	
	Lobby Accessory to Assembly Occupancy	
	Lodge Rooms	
	Reviewing Stands	
	Stadiums	
	Waiting Areas	3
4.	Assembly Areas, Less Concentrated Use	15
	Conference Rooms	
	Dining Rooms	
	Drinking Establishments	
	Exhibit Rooms	
	Gymnasiums	
	Lounges	
	Stages	
	Gaming	11
5.	Bowling Alley (assume no occupant load for bowling lanes)	4
6.	Children's Homes and Homes for the Aged	80
7.	Classrooms	20
8.	Congregate Residences	200
9.	Courtrooms	40
10.	Dormitories	50
11.	Dwellings	300
12.	Exercising Rooms	50
13.	Garage, Parking	200
14.	Health-Care Facilities	80
	Sleeping Rooms	120
	Treatment Rooms	240
15.	Hotels and Apartments	200
16.	Kitchen – Commercial	200
17.	Library Reading Room	50
	Stack Areas	100
18.	Locker Rooms	50
19.	Malls	Varies
20.	Manufacturing Areas	200
21.	Mechanical Equipment Room	300
22.	Nurseries for Children (Daycare)	35
23.	Offices	100
24.	School Shops and Vocational Rooms	50
25.	Skating Rinks	50 on the skating area; 15 on the deck
26.	Storage and Stock Rooms	300
27.	Stores — Retail Sales Rooms	
	Basements and Ground Floors	30
	Upper Floors	60
28.	Swimming Pools	50 for the pool area; 15 on the deck
29.	Warehouses	500
30.	All Others	100

Source: California Building Code (1998), Table 10-A

Table C1

Occupancy Levels—California Building Code

Example 1

Proposed Development: Two office buildings, each two stories and containing 20,000 square feet of floor area per building. Site size is 3.0 net acres. Counting a portion of the adjacent road, the gross area of the site is 3.5± acres.

A. Calculation Based on Parking Space Requirements

For office uses, assume that a county or city parking ordinance requires 1 parking space for every 300 square feet of floor area. Data for the traffic studies or other sources can be used to estimate the average vehicle occupancy. For the purposes of this example, the number of people on the property is assumed to equal 1.5 times the number of parking spaces.

The average usage intensity would therefore be calculated as follows:

1) 40,000 sq. ft. floor area x 1.0 parking space per 300 sq. ft. = 134 required parking spaces

2) 134 parking spaces x 1.5 people per space = 200 people maximum on site

3) 200 people ÷ 3.5 acres gross site size = 57 people per acre average for the site

Assuming that occupancy of each building is relatively equal throughout, but that there is some separation between the buildings and outdoor uses are minimal, the usage intensity for a single acre would be estimated to be:

1) 20,000 sq. ft. bldg. ÷ 2 stories = 10,000 sq. ft. bldg. footprint

2) 10,000 sq. ft building footprint ÷ 43,560 sq. ft. per acre = 0.23 acre bldg. footprint

3) Building footprint <1.0 acre; therefore maximum people in 1 acre = bldg. occupancy = 100 people per single acre

B. Calculation Based on California Building Code

Using the CBC (Appendix C1) as the basis for estimating building occupancy yields the following results for the above example:

1) 40,000 sq. ft. bldg. ÷ 100 sq. ft./occupant = 400 people max. building occupancy (under CBC)

2) 400 people max. building occupancy x 50% adjustment = 200 people maximum on site

3) 200 people ÷ 3.5 acres gross site size = 57 people per acre average for the site

Conclusions: In this instance, both methodologies give the same results. For different uses and/or different assumptions, the two methodologies are likely to produce different numbers. In most such cases, the CBC methodology will indicate a higher intensity.

Table C2

Sample People-Per-Acre Calculations

Example 2

Proposed Development: Single-floor furniture store containing 24,000 square feet of floor area on a site of 1.7 net acres. Counting a portion of the adjacent road, the gross area of the site is 2.0 acres.

A. Calculation Based on Parking Space Requirements

Assume that local codes require 1 parking space per 1,500 square feet of use area for a furniture store. Next, assume 1.5 people per automobile for this type of use.

The average usage intensity would be:

1) 24,000 sq. ft. bldg. x 1.0 parking space per 1,500 sq. ft. = 16 required parking spaces

2) 16 parking spaces x 1.5 people per space = 24 people maximum on site

3) 24 people ÷ 2.0 acres gross site size = 12 people per acre average for the site

Again assuming a relatively balanced occupancy throughout the building and that outdoor uses are minimal, the usage intensity for a single acre would be estimated to be:

1) 24,000 sq. ft. bldg. footprint ÷ 43,560 sq. ft. per acre = 0.55 acre bldg. footprint

2) Building footprint < 1.0 acre; therefore maximum people in 1 acre = bldg. occupancy = 24 people per single acre

B. Calculation Based on California Building Code

For the purposes of the CBC-based methodology, the furniture store is assumed to consist of 50% retail sales floor (at 30 square feet per occupant) and 50% warehouse (at 500 square feet per occupant). Usage intensities would therefore be estimated as follows:

1) 12,000 sq. ft. retail floor area ÷ 30 sq. ft./occupant = 400 people max. occupancy in retail area

2) 12,000 sq. ft. warehouse floor area ÷ 500 sq. ft./occupant = 24 people max. occupancy in warehouse area

3) Maximum occupancy under CBC assumptions = 400 + 24 = 424 people

4) Assuming typical peak occupancy is 50% of CBC numbers = 212 people maximum expected at any one time

5) 212 people ÷ 2.0 acres = 106 people per acre average for the site

With respect to the single-acre intensity criteria, the entire building occupancy would again be within less than 1.0 acre, thus yielding the same intensity of 106 people per single acre.

Conclusions: In this instance, the two methods produce very different results. The occupancy area estimate of 30 square feet per person is undoubtedly low for a furniture store even after the 50% adjustment. On the other hand, the 12 people-per-acre estimate using the parking requirement methodology appears low, but is probably closer to being realistic. Unless better data is available from surveys of similar uses, this proposal should be considered compatible within *Zone B2* (100 people per average acre and 200 people per single acre) and potentially also compatible within *Zone B1* (25 people per average acre and 50 people per single acre).

Table C2, continued