

EMPLOYMENT IN METROPOLITAN PHOENIX

August 2000

Prepared for the Morrison Institute for Public Policy
School of Public Affairs
College of Public Programs
Arizona State University

As part of the
Brookings Growth Case Study

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Note: The maps included in this report were produced by the Information Technology Research Support Lab – GIS Services, Arizona State University.

GEOGRAPHIC DEFINITIONS

Metropolitan Phoenix/Phoenix Metropolitan Area: Metro areas consist of one or more counties. The Phoenix metro area consisted only of Maricopa County (which has more than 9,200 square miles) until the results of the 1990 census were tabulated, when Pinal County (which has more than 5,300 square miles) was added to the metro area. Because of this recent addition and since most of the population of Pinal County lives scattered across the county at some distance from Maricopa County, Pinal County has been excluded from Metropolitan Phoenix in this analysis. Since Maricopa County encompasses a substantial land area, most of which is unsettled, countywide data essentially are equivalent to those of the built-up area in Phoenix and surrounding cities. Thus, “Metropolitan Phoenix” may be used to refer to county data or to a more focused look at the developed portion of the metro area.

Phoenix Urbanized Area: Urbanized areas are defined by the U.S. Bureau of the Census, with the boundaries updated every 10 years based on decennial census data. Inclusion in the urbanized area is based on a variety of factors, most notably population density and settlement patterns. The Phoenix urbanized area in 1990 consisted of only 741 square miles, including the extension into Pinal County in the Apache Junction area, compared to more than 14,500 square miles in the officially defined metropolitan area. Analyses of population density use the urbanized area definition.

MAG Planning Area: The Maricopa Association of Governments defines an area that already is developed or is expected to be mostly developed by 2020. While its 1,768 square miles are nearly 2.5 times the land area of the 1990 urbanized area, the planning area still is much smaller than the metropolitan area. It includes considerable land currently vacant or used for agriculture, mostly in the southeast corner of the county, to the southwest and west of the developed area, and to the north and northeast. Because of Indian Reservations, the boundaries of the developed area largely are fixed to the south and in part of the east. In the northwest, the planning area does not extend much beyond Sun City West and Sun City Grand.

Regional Analysis Zone: Defined by MAG, Maricopa County is divided into 145 RAZs. The typical RAZ within the Phoenix urbanized area consists of around 10 square miles but in outlying areas of the county a RAZ may encompass many square miles. Employment cores defined in this paper were based on RAZs.

Traffic Analysis Zone: MAG divides RAZs into TAZs, most of which consist of one square mile. TAZs were used to define the employment subcenters discussed in this paper. In most employment subcenters TAZs generally ranged from one-eighth to one-half square mile in area.

EMPLOYMENT IN METROPOLITAN PHOENIX: SUMMARY

Midtown Phoenix and Downtown Phoenix (including the state capital) formed the primary employment core of Metro Phoenix in 1995. This primary core had substantial employment, a very high employment density, and an employment-to-population ratio that was three times the county average. The primary core made up only 1.0 percent of the planning area defined by the Maricopa Association of Governments (MAG), but accounted for 11.2 percent of the metro employment and 3.6 percent of the population.

A secondary employment core contiguous to the primary core stretched southeast from the primary core to Downtown Tempe, extending south in Tempe and north through Downtown Scottsdale. The only other area meeting the specifications of the secondary core was the Metrocenter Area of Phoenix, to the northwest of the primary core. The secondary core had much lower employment density than the primary core, but the density was high compared to the rest of Metropolitan Phoenix. Employment per 1,000 residents was twice the county average.

The primary and secondary cores combined (including Metrocenter) accounted for 32 percent of the metro employment, 13 percent of its population and just 4 percent of the land in MAG's planning area. The primary-secondary core was surrounded by a tertiary core and a near-tertiary area that had above average employment densities and at least average employment-to-population ratios.

In general, employment was most concentrated in the center of the urbanized area and progressively became less dense with distance from the center. The major employment-poor areas were in south Phoenix west of Central Avenue and south of South Mountain (the Ahwatukee – Foothills area). In addition, the fringe of the urban area on the west and north formed a nearly continuous employment-poor area.

The Phoenix metropolitan area's "favored quarter" for employment in 1995 – the metro area's highest employment densities outside the primary core – extended from Chaparral Road in Scottsdale to Baseline Road in Tempe. Downtown and South Scottsdale's success can be traced to being adjacent to the favored residential quarter that extends from the area around the Phoenix Mountains through north Scottsdale. In the 1990s, the favored employment quarter has been extending north in Scottsdale through the favored residential quarter.

The presence of Arizona State University, proximity to Sky Harbor Airport, and access to the region's first two freeways contributed to the portion of Tempe north of Baseline Road becoming the largest employment center outside of the primary core in Phoenix. Employment also was above average south of Baseline Road, extending into the secondary favored residential quarter of South Tempe and Ahwatukee – Foothills.

Considering residential and economic factors, the Phoenix metro area's favored quarter stretches from north of Squaw Peak in northeast Phoenix through Paradise Valley, Scottsdale, and Tempe to south of South Mountain in southeast Phoenix.

Employment Subcenters

Employment subcenters were defined as having at least 10,000 workers and a density of at least 6,400 employees per square mile. The 11 employment subcenters in Metro Phoenix in 1995 housed 361,000 workers, nearly 29 percent of the metro total, in just 30 square miles (less than 2 percent of the metro planning area).

Six of the subcenters, including the most prominent – Downtown Phoenix/State Capital and North Central Avenue – are clustered on a diagonal running from southeast to northwest.

Major transportation routes play a role in this clustering, related to railway, highway and airport access.

Half of the subcenters had high concentrations of employment in the finance, insurance and real estate (FIRE), services, and government sectors, with little manufacturing, retail trade, wholesale trade or construction. Other subcenters had considerable manufacturing and wholesale trade employment, but little employment in services, FIRE or retail trade.

Four additional areas came close to meeting the subcenter criteria in 1995. Three are developing subcenters located along the northern urban fringe: 19th Avenue and Beardsley Road – in the far north Black Canyon Freeway corridor, Scottsdale Ranch, and the Scottsdale Air Park. The latter two likely achieved subcenter status by 2000.

Employment Growth

Very substantial increases in employment and employment density occurred in Tempe between 1990 and 1995, with considerable gains in adjacent areas to the west and southeast of the city. The Downtown Tempe/Arizona State University and 48th Street and Broadway Road employment subcenters were near the top of the 11 subcenters on each of three measures of growth: numeric employment increase, percentage employment growth, and change in employment density. North Scottsdale, portions of the north Black Canyon Freeway, and the I-10/I-17 area of the southwest Valley also experienced strong growth.

A decline in employment occurred in the primary employment core between 1990 and 1995. Downtown Phoenix lost more than 6,000 jobs, but the remainder of the primary core experienced small gains in employment. However, employment in the primary core rose between 1994 and 1997, including a solid increase in Downtown Phoenix. Employment in each of the secondary, tertiary and near-tertiary cores rose a strong 21 to 22 percent between 1990 and 1995, while the advance in outlying areas was 50 percent. Population growth also was more than twice as fast in the outlying areas than in the cores. Employment density, however, rose most in the core areas.

Faster employment growth in non-core areas is inevitable. With the population of the metropolitan area increasing so rapidly, residential housing continues to expand outward from the core. These new neighborhoods need to be served by nearby retail and service establishments. Thus, growth of businesses serving the local population is far greater in non-core than core areas.

Industries and Clusters

The wholesale trade, public administration, and transportation, communications and public utilities industries were concentrated in a few locations in 1995, mostly in the primary-secondary core. The services and finance, insurance and real estate industries were moderately dispersed across the metro area, with considerable employment in the primary-secondary core. Employment in construction and retail trade was more dispersed across the urbanized area. Manufacturing represents a unique case, with employment concentrated in certain areas: southwest Phoenix, portions of Chandler, Mesa and Tempe, and the primary-secondary core.

Economic development in Metro Phoenix focuses on several industrial clusters that are of particular significance to the metro economy or targets for future growth. Cluster employment in the primary core was limited in 1995. Much of the aerospace and information clusters were located outside the core, especially in the southeast and northwest parts of the metro area. Software was concentrated in secondary core areas. Tourism, the largest cluster, mostly was

located in the primary-secondary core, but a sizable portion of the accomodation portion of the cluster was in the favored quarter northeast of the primary-secondary core.

Despite experiencing an overall decline in employment between 1990 and 1995, the primary core gained employment in the FIRE, services and public administration industries. With employment declines in all other industries, the industrial mix in the primary core shifted considerably.

The industrial mix of jobs in the primary-secondary core was weighted toward professional positions requiring substantial education. In contrast, core residents were concentrated in blue-collar positions requiring less education. While this suggests a spatial mismatch, the number of jobs in these blue-collar fields in the primary-secondary core exceeded the number of core residents working such jobs. Shorter than average commute times of core residents indicate that many find employment close to home.

Economic Development

The metro area's success in attracting jobs – whether by startups, expansions of companies already established in the area, or moves/expansions of companies without a previous presence in the Valley – relates to a number of site selection factors on which the area compares favorably. These include availability of a skilled workforce (ease in attracting workers from outside the area); labor costs; educational opportunities and quality, including the education infrastructure; availability of land and leased space; and telecommunications infrastructure. Most of these factors also are important to the selection of a site within the Valley. In addition, city responsiveness and proximity to Arizona State University or other institutions of higher education are factors companies use to choose their specific location. These lists of important factors vary considerably by industry cluster and by type of facility, such as a manufacturing facility versus a headquarters.

EMPLOYMENT CONCENTRATIONS WITHIN METROPOLITAN PHOENIX IN 1995

The 1995 employment database produced by the Maricopa Association of Governments counted employment of 1,264,800 at 84,732 establishments in Maricopa County. (An establishment is a single physical location at which business is conducted. Most companies consist of only one establishment, but a retail chain, for example, might have many establishments across the county.)

This database was analyzed geographically and by industry. The geographic locations of businesses were analyzed by industry using the 10 divisions (one-digit level) of the Standard Industrial Classification (SIC), which encompass all establishments and employment. The analysis also was performed for 11 industrial clusters, which are of particular significance to the Arizona economy and/or are targets for future growth. These clusters as a whole accounted for 24 percent of all county employment, but only 14 percent of all establishments.

Employment Cores

Two adjacent Regional Analysis Zones (RAZs) comprise the primary core of the county's employment in 1995: Midtown Phoenix and Central Phoenix (which includes the state capital). These two RAZs by far had the highest employment density, with more than 6,800 jobs per square mile. In addition, employment per 1,000 residents was at least 2.5 times the county average of 501 (see Table 1). Moderate-to-strong concentrations of employment occurred in at least seven of the eight industrial divisions with appreciable employment. (Mining employed only about 1,000 in Maricopa County; much of the employment in agriculture – only 2 percent of the county total – was in rural areas of the county.)

Total employment in this primary core was nearly 142,000, a little more than 11 percent of the county total. In contrast, the core included just two of the county's 145 RAZs. The 17 square miles were 0.2 percent of the county total and 1.0 percent of the MAG planning area. Less than 4 percent of the county's population lived in this primary core. Employment per 1,000 residents was 1,578 and employment per square mile exceeded 8,200.

In five other RAZs (see Map 1), the employment density ranged from 4,100 to 4,800 workers per square mile and the employment-to-population ratio was above average. Of the eight industrial divisions, five to seven had at least a moderate employment presence in each of these RAZs. Four of these RAZs are contiguous and adjacent to the primary core: Downtown and South Scottsdale, Downtown and West Tempe (which includes Arizona State University), Central Tempe, and East Phoenix from I-10 to Van Buren Street (which includes Sky Harbor International Airport). In addition, the Metrocenter Area of Phoenix was a secondary employment core, not adjacent to other primary or secondary core RAZs.

Just more than 20 percent of the county's workforce was located in this secondary core, compared to its being home to 10 percent of the population. Employment per 1,000 residents was 1,060, double the county average. Employment density was 4,390.

In the combined primary-secondary core, employment per square mile was 5,259 and the employment-to-population ratio was 2.4 times the county average. Nearly 32 percent of employment, but only 13 percent of population, was located in less than 1 percent of the county's area and 4 percent of the MAG planning area.

**TABLE 1
METROPOLITAN PHOENIX EMPLOYMENT CORES, 1995***

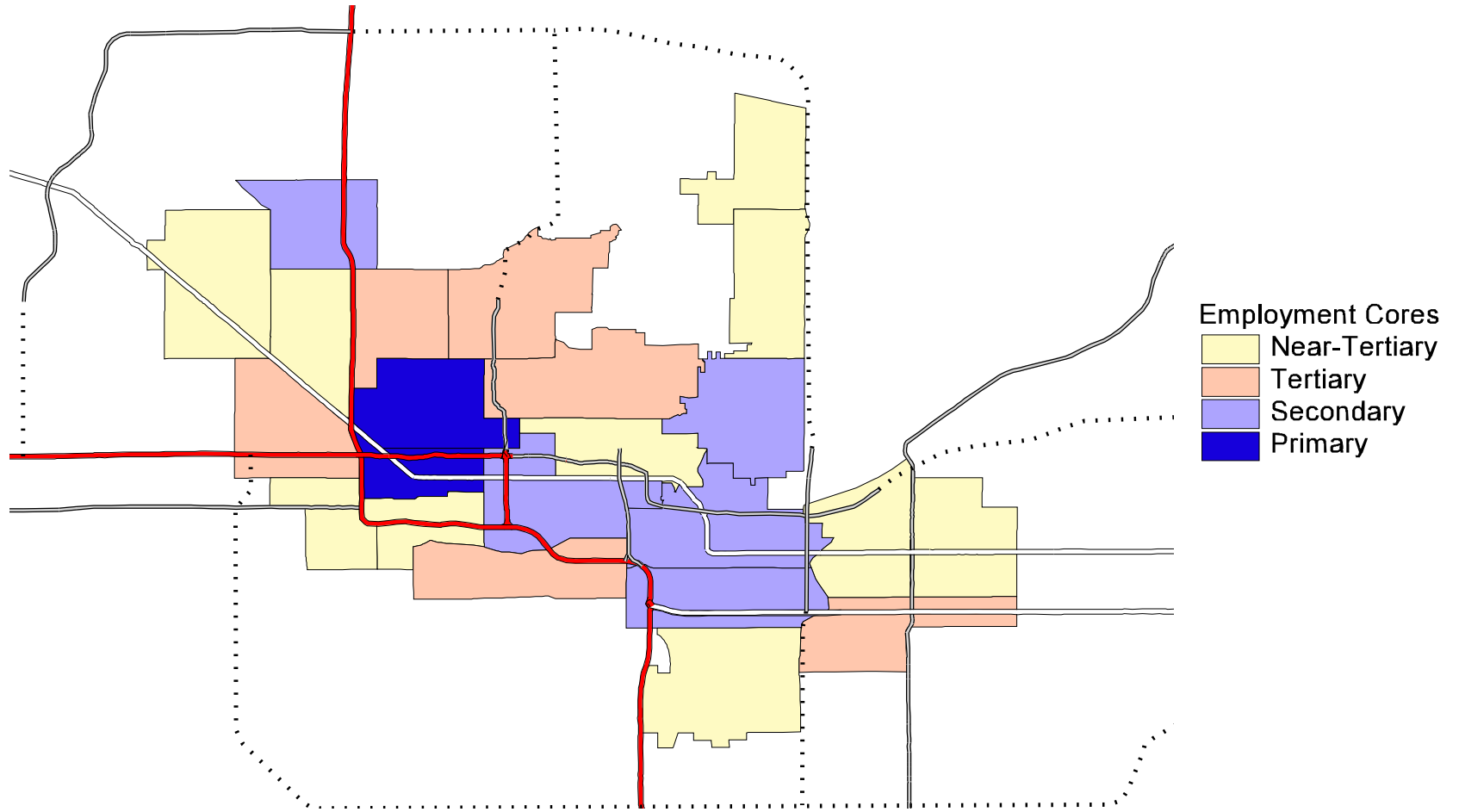
RAZ	Description	Square Miles	Population	Employment	Ratio**	Employment Density
	<i>Maricopa County</i>	9,226	2,526,427	1,264,800	501	137
	Primary Core					
270	Midtown Phoenix	11.37	62,744	78,044	1,244	6,864
275	Central Phoenix	5.89	27,231	63,895	2,346	10,848
	<i>Primary Core Total</i>	17.26	89,975	141,939	1,578	8,224
1.4%	<i>Primary Core Percentage of County</i>	0.2%	3.6%	11.2%		
	Secondary Core					
287	East Phoenix – I-10 to Van Buren Street	12.55	22,883	53,384	2,333	4,254
297	Central Tempe	10.92	48,874	44,905	919	4,112
288	Downtown and West Tempe	13.84	52,988	66,684	1,258	4,818
272	Downtown and South Scottsdale	12.07	64,297	50,021	778	4,144
243	Metrocenter Area of Phoenix	9.49	54,710	43,463	794	4,580
	<i>Secondary Core Total</i>	58.87	243,752	258,457	1,060	4,390
3.4%	<i>Secondary Core Percentage of County</i>	0.6%	9.6%	20.4%		
	<i>Primary-Secondary Core Total</i>	76.13	333,727	400,396	1,200	5,259
4.8%	<i>Primary-Secondary Core Percentage of County</i>	0.8%	13.2%	31.6%		
	Tertiary Core					
260	Uptown Phoenix	8.90	49,213	25,349	515	2,848
261	Biltmore/Squaw Peak Area of Phoenix	8.50	31,033	29,741	958	3,499
271	East Phoenix – Thomas Road to Camelback Road	13.74	59,108	51,239	867	3,729
309	Southwest Mesa	10.05	47,214	29,130	617	2,899
296	Southeast Phoenix	10.78	27,435	32,611	1,189	3,025
269	West Central Phoenix – Van Buren to Grand	10.79	56,987	35,240	618	3,266
	<i>Tertiary Core Total</i>	62.76	270,990	203,310	750	3,239
4.1%	<i>Tertiary Core Percentage of County</i>	0.7%	10.7%	16.1%		
	<i>Primary-Secondary-Tertiary Core Total</i>	138.89	604,717	603,706	998	4,347
9.0%	<i>Primary-Secondary-Tertiary Core % of County</i>	1.5%	23.9%	47.7%		
	Near-Tertiary Status					
258	Downtown Glendale	15.31	87,618	30,398	347	1,985
259	West Central Phoenix – Grand to Northern	9.29	61,208	17,588	287	1,893
263	North Scottsdale – McCormick Ranch	10.14	34,599	21,795	630	2,149
247	North Scottsdale – Airport Area	9.15	11,414	22,849	2,002	2,497
289	Northwest Mesa	10.20	57,060	27,880	489	2,733
290	Central Mesa	10.99	72,587	27,820	383	2,531
308	South Tempe	15.66	50,876	27,268	536	1,741
286	South Central Phoenix	6.10	15,443	15,170	982	2,487
285	Durango Area of Phoenix	6.44	13,794	14,526	1,053	2,256
276	East Phoenix – Van Buren Street to Thomas Road	8.44	37,425	20,409	545	2,418
	<i>Near-Tertiary Total</i>	101.72	442,024	225,703	511	2,219
6.9%	<i>Near-Tertiary Percentage of County</i>	1.1%	17.5%	17.8%		
	<i>Core and Near-Tertiary Total</i>	240.61	1,046,741	829,409	792	3,447
15.9%	<i>Core and Near-Tertiary Percentage of County</i>	2.6%	41.4%	65.6%		

* Employment and population data are expressed as of July 1.

** Employment-to-population ratio expressed per 1,000 residents

Source: Calculated from Maricopa Association of Governments data.

**MAP 1
EMPLOYMENT CORES IN METROPOLITAN PHOENIX, 1995**



Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

This primary-secondary core can be expanded by adding six RAZs adjacent to a primary or secondary RAZ. Employment density of these RAZs ranged from 2,800 to 3,700, with each RAZ having an employment-to-population ratio above the countywide average. Each had three to five industrial divisions with at least a moderate concentration of employment. In this tertiary core, 16 percent of the county's workers were employed. Population in this core was 11 percent of the total. The employment-to-population ratio was 1.5 times the average and employment density was 3,239.

With the addition of these tertiary RAZs, the area of employment concentration forms a contiguous mass ranging from the Metrocenter Area in the northwest to Southwest Mesa in the southeast. Only one RAZ (East Phoenix – Van Buren Street to Thomas Road) within this contiguous area did not qualify as at least a tertiary area. In the rest of this paper, reference to “the core” includes the primary-secondary-tertiary RAZs unless otherwise noted.

Ten other RAZs are shown in Table 1 as “near-tertiary status.” All are contiguous with the primary-secondary-tertiary core, except the North Scottsdale – Airport Area RAZ, which is adjacent only to another near-tertiary RAZ. Employment density ranged from 1,700 to 2,700 while the overall employment-to-population ratio of these 10 RAZs approximated the county average. In contrast, the ratio was only 60 percent of the county average in the balance of the county.

Including these near-tertiary areas, the primary-secondary core is entirely encircled. Thus, employment is most concentrated in the center of the urbanized area and generally becomes less dense with distance from the center.

Employment Subcenters

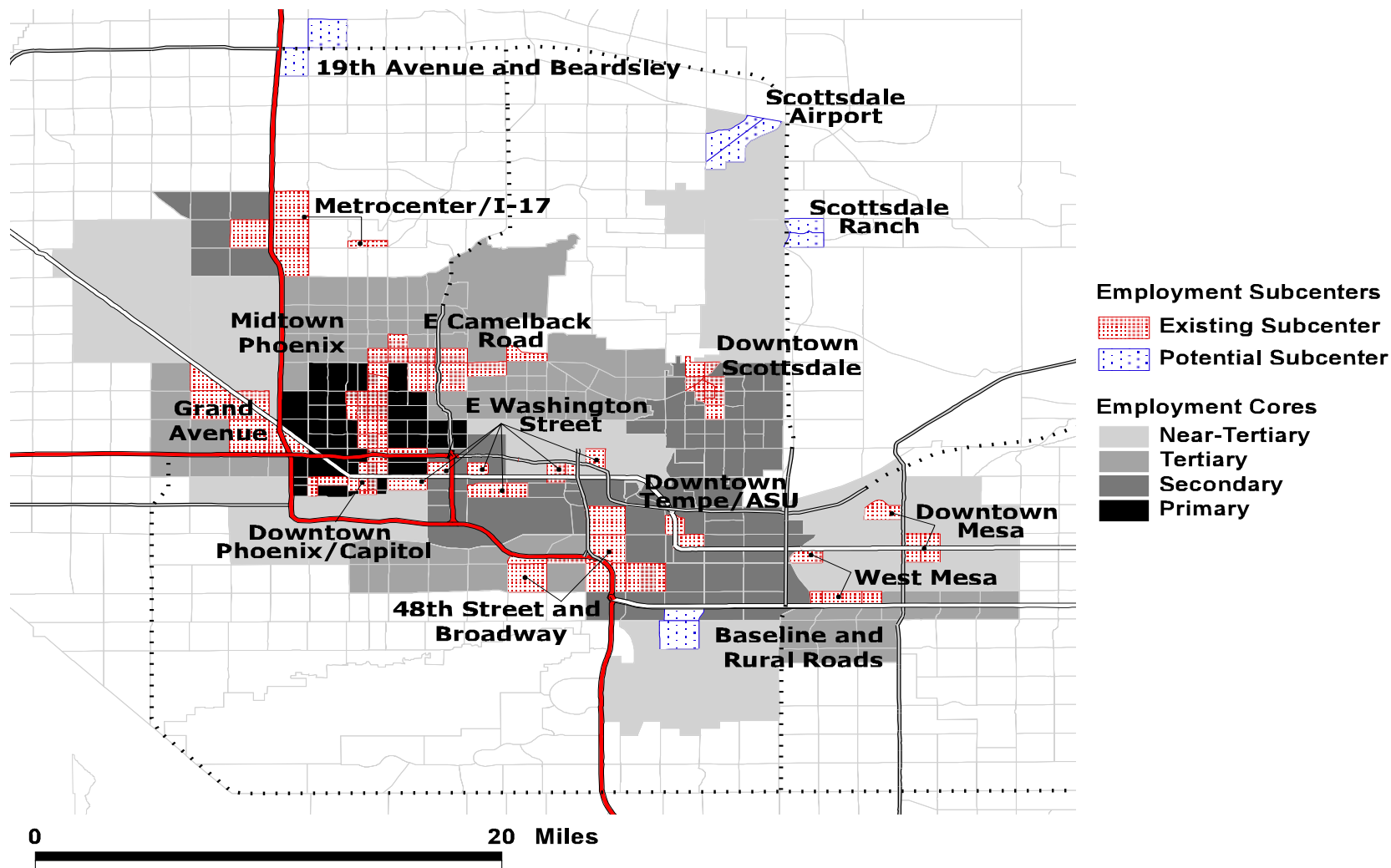
Employment subcenters, following definitions used by McDonald and McMillen, are aggregations of Traffic Analysis Zones (TAZs) with at least 6,400 employees per square mile that result in a total of at least 10,000 workers. The TAZs are not necessarily adjacent, but must be within 1.5 miles of each other.

In 1995, only 11 employment subcenters were found in all of the Phoenix metropolitan area (see Map 2 and Table 2). Together, these subcenters housed 361,000 workers in 1995, nearly 29 percent of the county total, in just 30 square miles (0.3 percent of the total). Their employment density exceeded 12,100.

The land area of most of these subcenters is approximately 1 to 2.5 square miles, though a few cover 4 to 5.5 square miles. Employment densities also range widely. While Downtown Tempe/Arizona State University had the highest density, this occurred over a small geographic area. The most prominent subcenters in terms of employment density and total employment were Downtown Phoenix/State Capital and North Central Avenue. These two subcenters are adjacent and could be considered as one employment subcenter. However, the East Camelback Road subcenter also is adjacent to the North Central Avenue subcenter and the East Washington Street subcenter is within 1.5 miles of the Downtown Phoenix/State Capital subcenter. Since these subcenters have varying industrial mixes and are thought of as distinctive areas by residents, they are shown separately.

Each of the RAZs included in the core contains at least part of one of these subcenters (Map 2). Most subcenters cross RAZ boundaries. The only subcenter not within this core is that of Downtown Mesa, which is within a near-tertiary RAZ. This is the most marginal of the 11 subcenters, with the least employment and second-lowest density.

**MAP 2
EMPLOYMENT SUBCENTERS IN METROPOLITAN PHOENIX, 1995**



Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

TABLE 2
METROPOLITAN PHOENIX EMPLOYMENT SUBCENTERS, 1995

Subcenters in 1995	Employment	Square	Employment	
		Miles	Density	Core
Downtown Phoenix/State Capital	47,432	1.68	28,233	Primary
North Central Avenue	48,164	2.12	22,719	Primary
East Washington Street	30,928	2.62	11,805	Secondary
Downtown Scottsdale	21,993	1.48	14,860	Secondary
Downtown Tempe/Arizona State University	19,934	0.69	28,890	Secondary
48th Street and Broadway Road	56,962	5.53	10,301	Secondary/Tertiary
Metrocenter Mall/Black Canyon Freeway	39,804	4.09	9,732	Secondary
Grand Avenue	32,338	4.52	7,154	Tertiary
East Camelback Road	35,830	4.11	8,718	Tertiary
Fiesta Mall/Superstition Freeway	15,220	1.29	11,798	Tertiary/Near-Tertiary
Downtown Mesa	12,676	1.51	8,395	Near-Tertiary
TOTAL	361,281	29.64	12,189	
Developing Subcenters				
Baseline Road and Rural Road	9,204	1.48	6,219	Secondary/Near-Tertiary
Scottsdale Air Park	12,662	1.83	6,919	Near-Tertiary
Scottsdale Ranch	9,338	0.94	9,934	Outlying
19th Avenue and Beardsley Road	11,453	1.79	6,398	Outlying

Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

In addition to the 11 subcenters, four developing subcenters were identified, three at the northern fringe of the Valley. The developing subcenters of the Scottsdale Air Park and 19th Avenue and Beardsley Road met the total employment and density requirements, but only one of two TAZs in each met the density requirement. The latter subcenter is dominated by one major employer. The Scottsdale Ranch area fell short on total employment. The fourth developing subcenter, which did not meet either the employment or density minimums, was in Tempe, not far from the southeast edge of the 48th Street and Broadway Road subcenter.

Employment by Industrial Division

Several RAZs in the core, including both in the primary core, had a high percentage of their workforce in the services and finance, insurance and real estate divisions. In addition, the primary core, especially the Central Phoenix RAZ, had considerable government employment. The three tertiary RAZs to the north and northeast of the primary core, as well as the near-tertiary North Scottsdale – McCormick Ranch RAZ, also had industrial mixes centered on services and FIRE, with retail trade substantial in the Uptown Phoenix and Biltmore/Squaw Peak Area RAZs (see Map 3). Each of these RAZs had 63 to 76 percent of their workforce employed in services, FIRE or government, compared to 49 percent countywide.

Several core RAZs had little employment in services and FIRE, but considerable manufacturing, wholesale trade, and transportation, communications and public utilities (TCPU) employment, including the secondary core RAZ of East Phoenix – I-10 to Van Buren Street and the tertiary and near-tertiary RAZs south and west of the primary core. The sectoral share of construction also was above average in these tertiary/near-tertiary RAZs. The near-tertiary South

Tempe RAZ largely fits this grouping, except that retail trade rather than TCPU employment was significant.

Other core RAZs had considerable retail trade employment, with varying mixes of other industries: the secondary core areas of Downtown and South Scottsdale and the Metrocenter Area, and the tertiary Southwest Mesa RAZ. The secondary core RAZs of Central Tempe and Downtown and West Tempe had a mix of white-collar and blue-collar industries.

At the subcenter level, Downtown Phoenix/State Capital, North Central Avenue, Downtown Mesa and Downtown Tempe/Arizona State University each had considerable services, FIRE, and government employment and little retail or wholesale trade, manufacturing and construction employment. Downtown Scottsdale was similar, except for its relatively high percentage of retail trade, as was East Camelback Road, though its concentration in services, FIRE, and government was somewhat less than the other subcenters.

Employment in three subcenters — East Washington Street, 48th Street and Broadway Road, and Grand Avenue — consisted largely of manufacturing and wholesale trade, with little retail trade, services and FIRE. The Fiesta Mall/Superstition Freeway subcenter had substantial manufacturing, but also had retail trade. The Metrocenter Mall/Black Canyon Freeway subcenter stood alone in having a balanced industrial mix.

Construction (7 percent of the county's employment)

Construction employment was relatively dispersed across the urbanized area. Some companies were located near the fringe of the urbanized area, where most of the construction is occurring. However, at least moderate construction employment density occurred through much of the core, with the strongest concentrations in the Metrocenter Area and Southeast Phoenix (Map 3). The northern part of the core had weaker concentrations.

Manufacturing (13 percent of the county's employment)

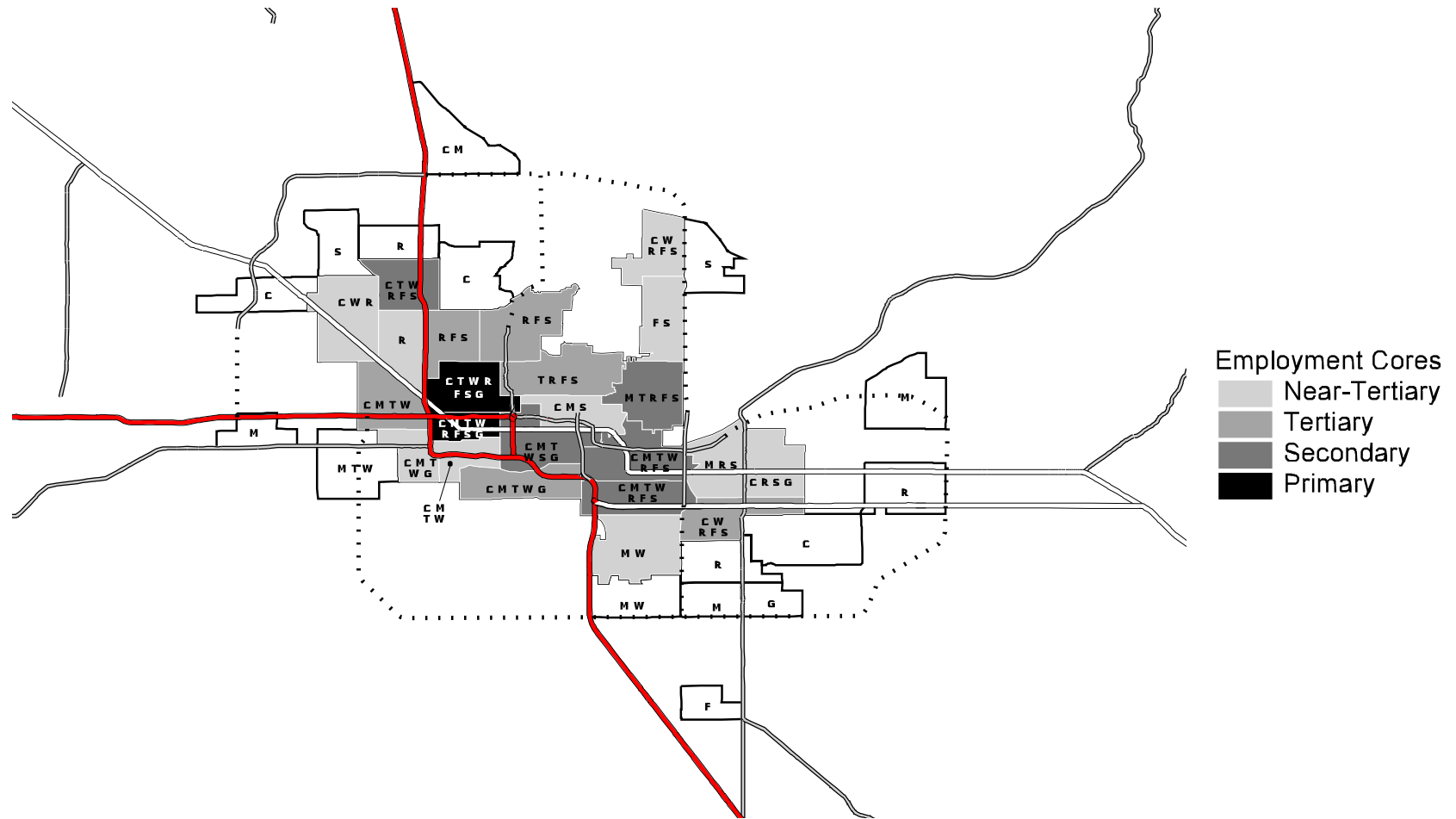
Significant manufacturing employment existed outside the core, particularly in southwest Phoenix and in portions of Chandler, Mesa and Tempe. In some of these RAZs, most of the workers were employed at just a few major establishments. This pattern of locating major manufacturing facilities in areas with little other development has persisted for more than 40 years.

Despite these major employers in near-tertiary areas and beyond, considerable manufacturing employment existed in the primary-secondary core, except in the Midtown Phoenix and Metrocenter Area RAZs. The highest densities were in the East Phoenix, I-10 to Van Buren Street and West Central Phoenix, Van Buren Street to Grand Avenue RAZs.

Transportation, Communications and Public Utilities (6 percent of the county's employment)

This industry's employment was concentrated in relatively few locations. Significant employment was found throughout the primary-secondary core, especially in the East Phoenix – I-10 to Van Buren Street RAZ. Another concentration was located in the tertiary and near-tertiary areas south and west of the primary core. Northern and eastern tertiary and near-tertiary areas had weaker concentrations. The Palo Verde Nuclear Power Generating Facility is the source of an employment concentration in the western part of the county.

**MAP 3
CONCENTRATIONS OF MAJOR INDUSTRIES IN METROPOLITAN PHOENIX, 1995**



C: Construction; M: Manufacturing; T:Transportation, Communications and Public Utilities; W:Wholesale Trade;
 R: Retail Trade; F: Finance, Insurance and Real Estate; S: Services; G: Government
 Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

Wholesale Trade (6 percent of the county’s employment)

Wholesale trade employment was found throughout the primary and secondary core, except in Downtown and South Scottsdale. Employment was particularly significant in the Central Phoenix and West Central Phoenix – Van Buren Street to Grand Avenue RAZs. In general, employment density was high in west Phoenix, south Phoenix and Tempe, but low throughout the northern part of the metro area.

As with the transportation industry, proximity to I-10 and Sky Harbor Airport have been important factors in selecting sites for wholesale trade establishments. I-10 is favored because of its direct link to the huge population in southern California.

Retail Trade (18 percent of the county’s employment)

Employment in retail trade was more geographically dispersed than in any other division. By nature, retail trade locates where a local population is underserved. Thus, retail follows housing developments and can be found at some distance from the center of the urbanized area. Examples include the Superstition Springs Mall area of east Mesa and the Paradise Valley Mall area of northeast Phoenix.

However, retail trade also was found throughout the primary-secondary core, except in the East Phoenix – I-10 to Van Buren Street RAZ. The strongest concentrations were in the Metrocenter Area and Downtown and South Scottsdale RAZs. The south and southwestern portions of the metro area had little retail employment.

Finance, Insurance and Real Estate (8 percent of the county’s employment)

Most employment in this division was located in the core. Each of the primary and secondary RAZs, except East Phoenix – I-10 to Van Buren Street, had a strong concentration, particularly Midtown Phoenix and Central Phoenix. Employment concentrations also were located in north Phoenix and north Scottsdale. Consisting mostly of white-collar office positions, favored locations for this division include downtowns and newer areas near where workers and customers live.

Services (36 percent of the county’s employment)

Services employment (which includes employment in public-sector elementary and high school districts, community colleges and universities) was located in at least moderate density throughout the primary-secondary core and in the tertiary core except for RAZs in south and west Phoenix. Concentrations were particularly strong in Midtown Phoenix and Central Phoenix. Moderate levels of employment also were found in north Scottsdale and west Mesa.

Public Administration (4 percent of the county’s employment)

Public administration was highly concentrated in just a few places, particularly in the Central Phoenix RAZ, which is the home of the state, county and city governments. Other government offices with significant employment were in the Midtown Phoenix and Durango Area (Maricopa County’s Durango Complex) RAZs. Another concentration was at Luke Air Force Base in the northwest Valley.

Employment by Industry Cluster

Cluster employment in the primary core was limited. No cluster’s share of total employment in either of the two primary core RAZs was above the county average. However,

because of the high employment density in the primary core, the employment concentration in the tourism and call centers clusters was high relative to other RAZs.

Clusters had a much larger presence in the secondary core. Central Tempe had at least a moderate concentration in five clusters, with Downtown and West Tempe and Downtown and South Scottsdale each having four clusters. Tourism was significant in all five secondary core RAZs. The information, software, and call centers clusters each had a moderate or strong presence in three RAZs (see Map 4).

The tertiary core RAZs of Biltmore/Squaw peak Area and East Camelback Road had concentrations in the software, call centers, and tourism clusters. Otherwise, no tertiary or non-core RAZ had a concentration in more than two clusters.

In the East Washington Street subcenter, cluster employment accounted for nearly half of total employment, twice the county average, with most being in the aerospace and information clusters. This subcenter had 37 percent of the county's aerospace employment. The Fiesta Mall/Superstition Freeway subcenter also had a high proportion of its employment in clusters, primarily in the information cluster. The information and software clusters were significant in the 48th Street and Broadway Road subcenter.

Aerospace

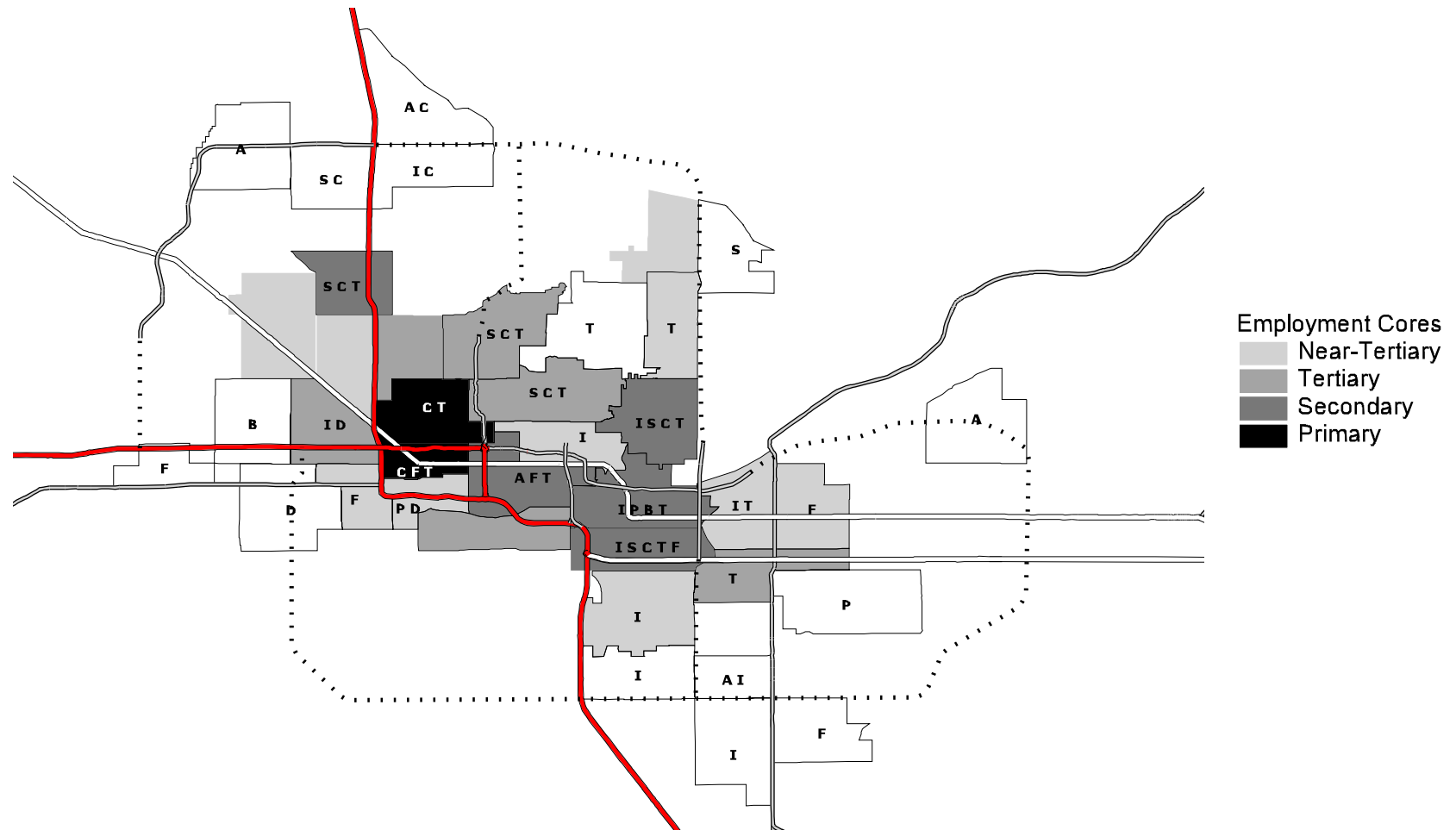
This cluster consists primarily of very large establishments that generally locate on large parcels of land near the fringe of the urbanized area. The survey of economic development professionals discussed in the last section of this paper indicates the availability of land to be a key factor in site selection in this cluster. Proximity to an airport also is a key factor. Thus, cluster employment was very highly concentrated in a few locations. Considerable employment was well beyond the core, particularly along the Black Canyon Freeway north of Beardsley Road (near the Deer Valley Airport), and in north Glendale, northeast Mesa and south Chandler. However, by far the strongest concentration was in the primary core RAZ of East Phoenix – I-10 to Van Buren Street, which includes Sky Harbor International Airport.

Information

Much of the information cluster's employment also was located outside the core (availability of land also is a key location factor in this cluster). However, the specific sites are different than those in aerospace, particularly in three RAZs in south and west Chandler and in one each in South Tempe, Northwest Mesa, and along the Black Canyon Freeway between Bell and Beardsley Roads. Little employment existed within the primary core, but significant concentrations were found in the secondary cores of Downtown and South Scottsdale, Downtown and West Tempe, and Central Tempe (close to Arizona State University, an important location factor in this cluster). The strongest concentration was adjacent to these secondary core RAZs in the gap in the core in East Phoenix – Van Buren Street to Thomas Road. Location preferences of this cluster reflect those of much of the "new economy" – dynamic, generally affluent places.

The semiconductor industry accounted for more than one-half of the information cluster's employment. More than three-fourths of the semiconductor employment was at just five establishments, all in the eastern part of the urbanized area: along East McDowell Road and in Northwest Mesa, South Tempe, West Chandler and South Chandler.

**MAP 4
CONCENTRATIONS OF CLUSTERS IN METROPOLITAN PHOENIX, 1995**



A: Aerospace; B: Bioindustry; C: Call Centers; D: Transportation and Distribution;
F: Food Processing and Agriculture; I: Information; P: Plastics; S: Software; T: Tourism

Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

Software

Software cluster employment was heavily concentrated in two secondary core RAZs (Central Tempe and Downtown and South Scottsdale) near Arizona State University, (an important site selection factor) and which had a strong telecommunications infrastructure, another key location factor. Lesser concentrations were in the secondary core RAZ of the Metrocenter Area and in the tertiary core RAZs of East Phoenix from Thomas Road to Camelback Road and Biltmore/Squaw Peak Area. Another strong concentration was outside the core in Scottsdale Ranch. Little employment was in the primary core.

Plastics and Advanced Composite Materials

This relatively small cluster had small employment concentrations scattered across the core, with the largest in Downtown and West Tempe. Other modest concentrations were outside the core in Northwest Gilbert and in South Central Phoenix.

Bioindustry

This cluster employed few in the Phoenix metropolitan area. Only Downtown and West Tempe and a non-core area in west Phoenix had more than minor employment.

Transportation and Distribution

Heavily concentrated in the southwest quadrant of the urbanized area from the tertiary core outward, this cluster had little employment in the core. Locations reflect I-10 and accessibility to southern California.

Agriculture and Food Processing

Despite the farming portion of this cluster occurring in the outlying portions of the county, much of the cluster's employment was within the core. The highest concentrations were along a line from Tolleson in the west, through the primary and secondary core to Central Mesa on the east. Southeast Chandler also had a concentration.

Tourism

Tourism was the largest cluster in terms of employment. It includes sectors that serve the local population as well as tourists, such as restaurants, passenger air transportation, and amusement services. Tourism employment predominantly was located in the primary and secondary cores, and in tertiary and near-tertiary areas to the north and east.

The lodging places industry is the component of the cluster most completely tied to tourism. Its strongest employment density ran from the tertiary Biltmore/Squaw Peak Area and East Phoenix from Thomas Road to Camelback Road RAZs through Paradise Valley to the strongest concentration in the near-tertiary North Scottsdale – McCormick Ranch RAZ. A high employment density also occurred in Central Phoenix.

Other Clusters

The optics cluster had hardly any employment in the Phoenix metropolitan area. Employment in the minerals and mining cluster also was quite low. The environmental technology cluster cannot be identified using the SIC. Senior living is another cluster difficult to define, mostly including sectors that serve the general population as well as seniors.

A possible cluster focused on call centers also was identified. Moderate employment density occurred in much of the primary-secondary core and in two tertiary RAZs in north central Phoenix. Another concentration was in three RAZs along the far northern portion of the Black Canyon Freeway.

Major Employers

Most establishments in the Phoenix metropolitan area in 1995 had few employees: 56 percent had fewer than five and 91 percent had fewer than 25. However, establishments with less than five employees accounted for only 11 percent of the area's total employment; those with fewer than 25 employees accounted for 33 percent. In contrast, more than 20 percent of employment was at the 0.2 percent of establishments with at least 500 employees.

Nearly 500 establishments (0.6 percent of the total) had employment of at least 250 (see Map 5a). Compared to sectoral share of employment, the manufacturing, TCPU and public administration divisions had a disproportionate number of these large establishments, while retail trade had relatively few. In manufacturing and TCPU, establishments with at least 1,000 employees were disproportionately common.

Overall, the major employers were highly congregated from Midtown Phoenix to Downtown Tempe, particularly within the area bounded by the I-10/I-17 freeway to the south and west, the 202 freeway to the north and the 101 freeway to the east. Employers of between 250 and 500 extended to the northwest along Grand Avenue. In addition, a few very large employers were located in northwest Mesa, Chandler and the west Valley.

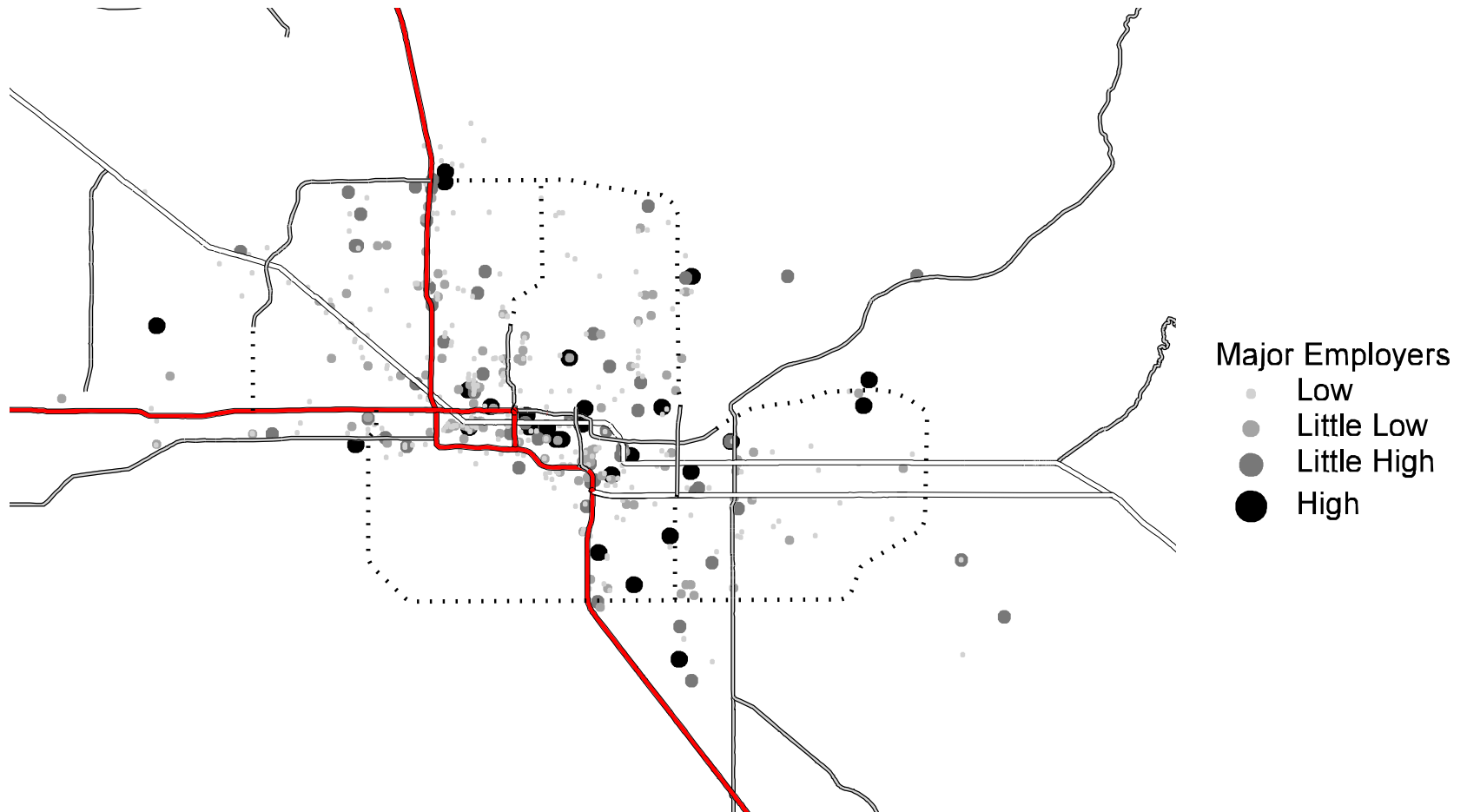
Major employers by cluster are shown in Map 5b. In particular, the information and aerospace clusters each had several establishments with at least 1,000 employees. Two information cluster establishments on East McDowell Road each employed more than 5,000.

Major employers in the tourism cluster were located primarily in northeast Phoenix, Paradise Valley and Scottsdale. The major information cluster employers were particularly in the southeast Valley, though a few were near Sky Harbor Airport and in Scottsdale/east Phoenix. Aerospace's major employers particularly were located near Sky Harbor Airport, with others near the Black Canyon Freeway and in the southeast. Major transportation and distribution cluster employers were particularly located near Sky Harbor Airport.

Non-cluster establishments with more than 5,000 employees included Arizona State University (more than 12,000, including part-time and seasonal workers, such as students working on campus), Luke Air Force Base (with more than 7,000), and one in the business services sector.

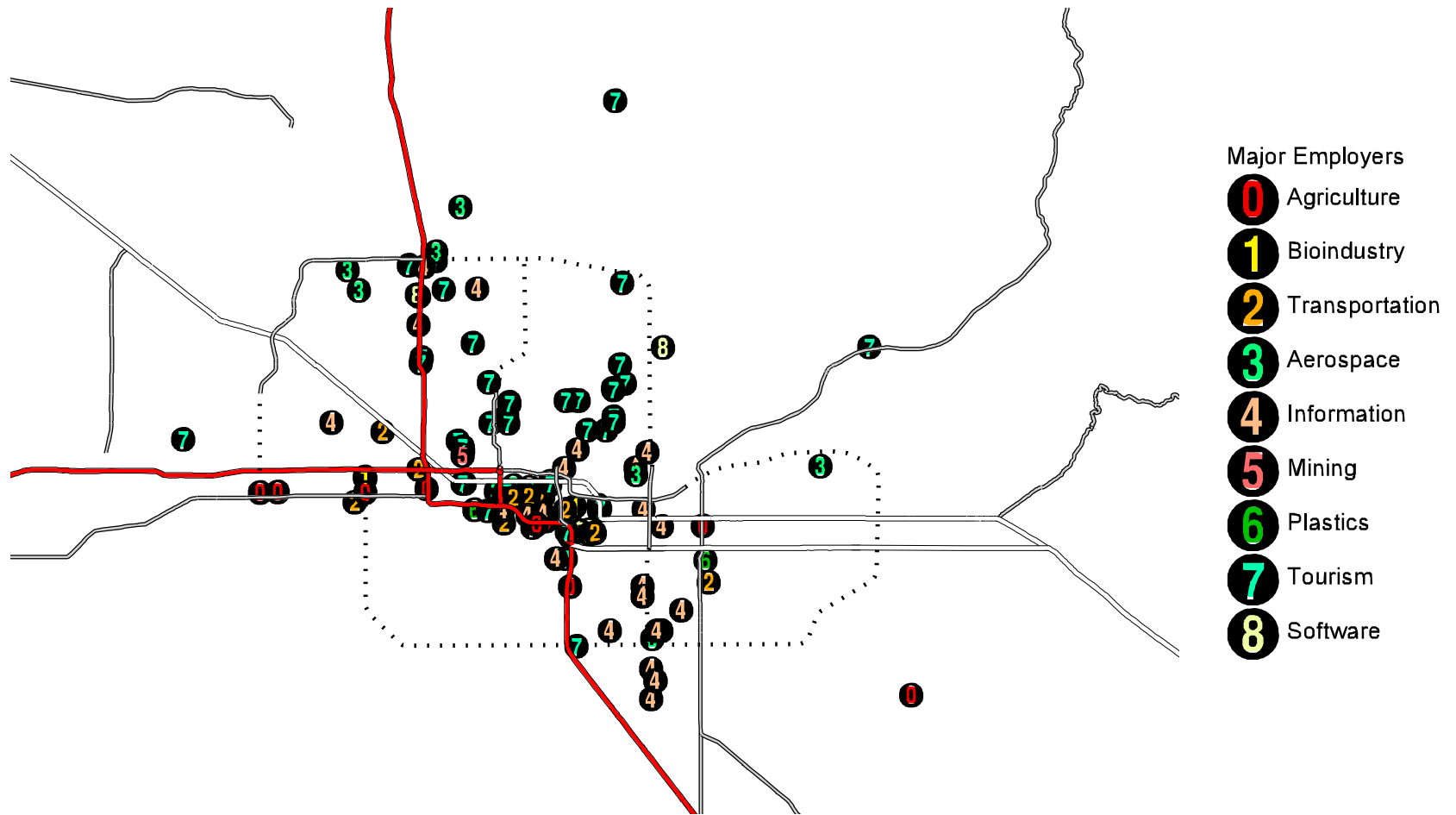
MAP 5
MAJOR EMPLOYERS IN METROPOLITAN PHOENIX, 1995

(a) BY SIZE (NUMBER OF EMPLOYEES)



MAP 5
MAJOR EMPLOYERS IN METROPOLITAN PHOENIX, 1995

(b) BY CLUSTER



Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

EMPLOYMENT GROWTH IN METROPOLITAN PHOENIX

Limited data are available to analyze change over time in locations of business establishments and employment within the Phoenix metropolitan area. The first comparison is of 1990 census data by place of work to the 1995 MAG employment database, with data from both sources being expressed at the RAZ and TAZ levels of geography. Zip code data (excluding the farming and government sectors) are available from the Census Bureau's *Zip Code Business Patterns* reports for 1994 through 1997. Zip code boundaries in some cases coincide with RAZ boundaries, but generally are considerably different. Thus, change in employment by primary, secondary and tertiary core from this source is necessarily an approximation. For a few industrial divisions, information is available by zip code from the 1987 and 1992 economic censuses produced by the U.S. Bureau of the Census.

Total, 1990 to 1995

Very substantial increases in employment, employment density, and the employment-to-population ratio occurred in Tempe between 1990 and 1995, in the secondary core RAZs of Central Tempe and Downtown and West Tempe and in the near-tertiary area of South Tempe. Considerable gains occurred in adjacent RAZs to the southeast and west of Tempe (Southwest Mesa; South Central Mesa; Northwest Gilbert; North Chandler; West Chandler; Ahwatukee – Foothills; East Phoenix – I-10 to Van Buren Street; and Southeast Phoenix – Southern Avenue to I-10).

Four RAZs in North Scottsdale, including the near-tertiary areas of McCormick Ranch and the Scottsdale Airport, also experienced substantial employment growth. Somewhat less growth occurred in three RAZs along the North Black Canyon Freeway and in the I-10/I-17 area of the southwest Valley. The latter includes the West Central Phoenix – Van Buren Street to Grand Avenue tertiary core RAZ.

A decline in employment occurred in the primary employment core (see Table 3). TAZ detail reveals that the area from 7th Street to 7th Avenue between McDowell Road and the railroad tracks at the south edge of downtown lost more than 6,000 jobs. The remainder of the primary core gained employment. Other scattered areas of the Valley also lost employment. In some cases, the decrease resulted from the closing or downsizing of a major facility (e.g. Williams Air Force Base). Other declines may reflect data limitations, especially where neighboring areas posted large gains.

Employment in each of the secondary, tertiary and near-tertiary cores rose a strong 21 to 22 percent. The advance in outlying areas was 50 percent. Population growth between 1990 and 1995 followed a similar geographic pattern. Gains through most of the core and near-tertiary area were near 10 percent, double the nation's population growth rate. In the rest of the county, population growth was 28 percent.

Faster employment growth in non-core areas is inevitable. With the population of the metropolitan area increasing so rapidly, residential housing continues to expand outward from the core. These new neighborhoods need to be served by nearby retail and service establishments. Thus, growth of businesses serving the local population is far greater in non-core than core areas.

In contrast to percentage growth, employment density climbed 590 in the core area, with the greatest gain in the secondary core. In comparison, employment per square mile rose 380 in near-tertiary areas and just 60 in outlying areas. Changes in the employment-to-population ratio were similar, being greatest in the secondary core and least beyond the tertiary core.

TABLE 3
METROPOLITAN PHOENIX EMPLOYMENT CORES
April 1, 1990 to July 1, 1995 Change

Description	Population		Employment		Ratio*	Employment Density
	Number	%	Number	%		
<i>Maricopa County</i>	<i>396,161</i>	<i>19</i>	<i>266,686</i>	<i>27</i>	<i>32</i>	<i>29</i>
Primary Core						
Midtown Phoenix	6,221	11	3,029	4	-90	266
Central Phoenix	2,150	9	-4,541	-7	-383	-771
<i>Primary Core Total</i>	<i>8,371</i>	<i>10</i>	<i>-1,512</i>	<i>-1</i>	<i>-186</i>	<i>-87</i>
<i>Primary Core Percentage of County</i>	<i>2.1%</i>		<i>-0.6%</i>			
Secondary Core						
East Phoenix – I-10 to Van Buren Street	2,534	13	5,700	12	-10	454
Central Tempe	1,028	2	11,969	36	231	1,096
Downtown and West Tempe	3,766	8	17,094	34	251	1,235
Downtown and South Scottsdale	4,604	8	3,747	8	3	310
Metrocenter Area of Phoenix	3,585	7	8,571	25	112	903
<i>Secondary Core Total</i>	<i>15,517</i>	<i>5</i>	<i>47,081</i>	<i>22</i>	<i>134</i>	<i>799</i>
<i>Secondary Core Percentage of County</i>	<i>3.9%</i>		<i>17.7%</i>			
<i>Primary-Secondary Core Total</i>	<i>23,888</i>	<i>8</i>	<i>45,569</i>	<i>13</i>	<i>54</i>	<i>598</i>
<i>Primary-Secondary Core Percentage of County</i>	<i>6.0%</i>		<i>17.1%</i>			
Tertiary Core						
Uptown Phoenix	4,470	10	3,049	14	17	343
Biltmore/Squaw Peak Area of Phoenix	2,499	9	-1,017	-3	-120	-120
East Phoenix – Thomas Road to Camelback Road	4,587	8	10,570	26	121	735
Southwest Mesa	2,313	5	5,262	22	85	524
Southeast Phoenix	2,162	9	9,566	42	277	887
West Central Phoenix – Van Buren to Grand	7,568	15	8,931	34	86	828
<i>Tertiary Core Total</i>	<i>23,599</i>	<i>10</i>	<i>36,361</i>	<i>22</i>	<i>75</i>	<i>579</i>
<i>Tertiary Core Percentage of County</i>	<i>6.0%</i>		<i>13.6%</i>			
<i>Primary-Secondary-Tertiary Core Total</i>	<i>47,487</i>	<i>9</i>	<i>81,930</i>	<i>16</i>	<i>61</i>	<i>590</i>
<i>Primary-Secondary-Tertiary Core % of County</i>	<i>12.0%</i>		<i>30.7%</i>			
Near-Tertiary Status						
Downtown Glendale	6,322	8	3,076	11	11	201
West Central Phoenix – Grand to Northern	5,479	10	377	2	-22	41
North Scottsdale – McCormick Ranch	3,316	11	7,922	57	187	781
North Scottsdale – Airport Area	1,948	21	10,749	89	724	1,175
Northwest Mesa	5,791	11	1,777	7	-20	174
Central Mesa	6,344	10	1,440	5	-15	131
South Tempe	5,260	12	12,150	80	205	776
South Central Phoenix	-185	-1	1,168	8	86	191
Durango Area of Phoenix	2,150	19	3,476	31	104	540
East Phoenix – Van Buren Street to Thomas Road	6,389	21	-3,387	-14	-222	-401
<i>Near-Tertiary Total</i>	<i>42,814</i>	<i>11</i>	<i>38,748</i>	<i>21</i>	<i>43</i>	<i>381</i>
<i>Near-Tertiary Percentage of County</i>	<i>10.8%</i>		<i>14.5%</i>			
<i>Core and Near-Tertiary Total</i>	<i>90,301</i>	<i>9</i>	<i>120,678</i>	<i>17</i>	<i>51</i>	<i>501</i>
<i>Core and Near-Tertiary Percentage of County</i>	<i>22.8%</i>		<i>45.2%</i>			

* Employment per 1,000 residents; see note in Table 4

Source: Calculated from the Maricopa Association of Governments 1995 Employment Database and the U.S. Department of Transportation, 1990 Census Transportation Planning Package.

The core accounted for 28 percent of the county's numeric employment increase, despite accounting for only 2 percent of the land area of Maricopa County, and 8 percent of the planning area's 1,768 miles. Forty-one percent of the employment gain occurred in the core and near-tertiary area.

Among the 11 employment subcenters, Downtown Tempe/Arizona State University had the largest gain in employment density and 48th Street and Broadway Road posted the greatest numeric employment increase. In each case, gains in the other growth measures also were strong (see Table 4). The Scottsdale Ranch developing subcenter had the greatest percent increase and the largest gain in employment density. Gains also were substantial in the Scottsdale Air Park and Baseline Road and Rural Road developing subcenters. In contrast, the Downtown Phoenix/State Capital and Fiesta Mall/Superstition Freeway subcenters lost employment and the increase in Downtown Scottsdale was slight.

TABLE 4
METROPOLITAN PHOENIX EMPLOYMENT SUBCENTERS
1990 to 1995 Change

Subcenters in 1995	Numeric	Percent	Density	Core
Downtown Phoenix/State Capital	-4,836	-9	-2,879	Primary
North Central Avenue	6,945	17	3,276	Primary
East Washington Street*	2,068	7	645	Secondary
Downtown Scottsdale*	469	2	263	Secondary
Downtown Tempe/Arizona State University	6,950	54	10,073	Secondary
48th Street and Broadway Road	17,452	44	3,156	Secondary/Tertiary
Metrocenter Mall/Black Canyon Freeway	9,488	31	2,320	Secondary
Grand Avenue	7,272	29	1,608	Tertiary
East Camelback Road	4,629	15	1,127	Tertiary
Fiesta Mall/Superstition Freeway	-117	-1	-91	Tertiary/Near-Tertiary
Downtown Mesa	4,018	46	2,661	Near-Tertiary
TOTAL	54,338	18	1,783	
Developing Subcenters				
Baseline Road and Rural Road	5,657	159	3,822	Secondary/Near-Tertiary
Scottsdale Air Park	5,447	75	2,976	Near-Tertiary
Scottsdale Ranch	7,526	415	8,006	Outlying
19th Avenue and Beardsley Road	2,609	30	1,457	Outlying

* For the 1990 to 1995 change statistics, the geographic definitions of these subcenters were modified slightly to fit the less detailed 1990 TAZs.

Note (Tables 3 and 4): While the full precision of the data are shown, the 1990 data originates from the 1990 census long-form survey sent to one-in-six households. Because of sampling error, all values should be viewed as approximate. Moreover, since 4 percent of the 1990 employment was not allocated to a detailed level of geography, 1990-95 changes in cores and subcenters may be overstated.

Source: Calculated from the Maricopa Association of Governments 1995 Employment Database and the U.S. Department of Transportation, 1990 Census Transportation Planning Package.

Ten of the 11 subcenters met the employment size and density requirements in 1990, though the boundaries in a few were slightly different than in 1995. The exception was Downtown Mesa, which did not meet the total employment or density requirements. Of the four developing subcenters in 1995, only 19th Avenue and Beardsley Road might have been considered a developing subcenter in 1990.

By Industry, 1990 to 1995

Despite experiencing an overall decline in employment between 1990 and 1995, the primary core gained employment in the FIRE, services and public administration industries at a pace roughly equal to that of the county. With employment declines in all other industries, the industrial mix in the primary core shifted considerably.

Relative to the entire county, gains in the secondary core were strongest in wholesale trade and TCPU and weakest in public administration. In the tertiary core, gains were especially strong in services, which accounted for more than 60 percent of the job growth. Retail trade job gains were slight. The near-tertiary area had relatively strong gains in construction and wholesale trade. Manufacturing and TCPU employment decreased. In outlying areas, retail trade and manufacturing led the growth.

The services industry accounted for nearly one-half of Maricopa County's job growth between 1990 and 1995. As in all industries, the numeric and percentage gain was greatest in outlying areas, though the differential was relatively less in services. By RAZ, the greatest gains in services employment were in Midtown Phoenix; East Phoenix from Thomas Road to Camelback Road; Central Tempe; and Downtown and West Tempe.

Retail trade provided the second largest numeric employment increase, though its percent change was only average. The largest gains were clustered in the Ahwatukee – Foothills, South Tempe, and North Chandler RAZs and in some RAZs with a major shopping mall. Retail employment declined from Midtown Phoenix south through South Central Phoenix.

Wholesale trade and construction posted the next largest numeric increases and their percent gains were above average. The construction industry lost employment in the primary core and experienced its greatest gains in RAZs in the west and northwest, as well as in Southeast Phoenix and Downtown and West Tempe. Wholesale trade had strong gains in west Phoenix RAZs and throughout Tempe and Southeast Phoenix.

The manufacturing industry's percent gain in employment was low. Many RAZs recorded large employment gains, particularly in west Phoenix, southeast Phoenix, and in west and south Chandler. Other RAZs, however, experienced large losses, especially from east Phoenix through central Phoenix and to the northwest.

Growth in FIRE and public administration jobs also were below average. Public administration jobs were lost when Williams Air Force Base closed, but nearly as many jobs were added at Luke AFB. The largest gain was in Central Phoenix, with a sizable rise in the Durango Area. Changes in FIRE employment did not follow a geographic pattern.

Overall, TCPU employment fell. Job losses were especially large in the primary core. The largest gain was in the southwest Valley.

Total, 1994 to 1997

Between 1994 and 1997, total employment rose 232,100 (24 percent) in Maricopa County, according to *Zip Code Business Patterns*. Growth occurred throughout the county, as seen in Table 5. Thus, the loss in employment in downtown Phoenix in the early 1990s was

reversed by the mid-1990s. Percentage growth was greatest in the area beyond the core and near-tertiary zone, but was positive throughout the core, exceeding 15 percent — well above the national average — in all but the primary core. Of the county’s total employment gain, 17 percent occurred in the primary and secondary core, and an additional 17 percent was located in the tertiary area. One-half was in the outlying areas.

Employment change per square mile between 1994 and 1997 varied considerably by zip code. Nearly all of the zip codes experiencing a decline in employment were located adjacent to a zip code with sizable employment gain. Smoothing out these variations provides a clearer picture of the portions of the metro area experiencing rapid employment growth.

Increases in employment density were especially strong in Downtown Phoenix, Central Tempe extending into Downtown and West Tempe, the vicinity of East Camelback Road in Phoenix, and south central Mesa. Other areas with strong gains included most of Scottsdale (from Downtown to the Air Park), the far North Black Canyon Freeway, West Chandler, and Southwest Phoenix near the I-10 Freeway.

Sectors, 1987-92

Economic growth in the Phoenix metropolitan area was unusually slow between 1987 and 1992. Retail trade employment declined through much of the core. Retail trade employment gains between 1987 and 1992 were greatest in the Superstition Springs area of east Mesa, with relatively strong growth across the northern tier of the metro area, from the Scottsdale Airport west to Arrowhead Ranch, and in south Tempe.

Services employment rose substantially in much of the metro area. Within the core, services employment change was mixed. Declines occurred along Central Avenue in downtown/midtown Phoenix and in downtown Tempe. However, the strongest gains in the metro area occurred in core areas along (1) Camelback Road from 16th Street east, (2) the Squaw Peak Freeway north of Thomas Road, and (3) along East Washington Street, including Sky Harbor Airport. Moderately strong gains occurred in central Tempe. Gains were strong in near-tertiary and outlying areas of north Scottsdale, north Phoenix, downtown Glendale and Ahwatukee – Foothills.

**TABLE 5
METROPOLITAN PHOENIX EMPLOYMENT GROWTH, 1994 TO 1997**

	1997 Number	1997 Share of Total	1994 to 1997 Change	Change, % of Total	1994-97 % Change
Primary Core	110,496	9.3%	6,350	2.7%	6%
Secondary Core	248,438	21.0	32,507	14.0	15
Tertiary Core	217,537	18.4	39,021	16.8	22
Near-Tertiary Status	219,289	18.6	36,367	15.7	20
Outlying	386,346	32.7	117,508	50.7	44
TOTAL*	1,182,106	100.0	231,753	100.0	24

* That could be allocated geographically

Source: Calculated from the U.S. Bureau of the Census, *Zip Code Business Patterns*.

In the manufacturing division, employment by zip code was not available. Of the three zip codes with the greatest increase in the number of manufacturing establishments, one was the tertiary core area of southeast Phoenix. The other two were in non-core areas of southwest Phoenix and along the Black Canyon Freeway north of Union Hills Drive. Other zip codes with substantial increases were outside the core in Gilbert, west Chandler and north Scottsdale. Two of the three zip codes with the largest declines in establishments were in the primary core. The third included part of a tertiary area in west central Phoenix.

A Look Ahead

The Maricopa Association of Governments issued a set of employment projections in 1997 that were tied to their population projections. The predictions were made at five-year intervals from the 1995 base through 2020 at the RAZ and TAZ levels of geography. MAG projected employment to rise at about the same pace as population through this period. A 17 percent gain in employment was forecast for 1995 to 2000 (less than what actually occurred) with an additional 50 percent rise projected for 2000 to 2020.

Employment in the primary core was forecast to hardly rise over the 25 years. Despite this, the two RAZs forming the primary core still would have the highest employment densities in 2020 at more than 7,000 employees per square mile.

The five RAZs forming the secondary core in 1995 were predicted to have 1995 to 2020 employment gains ranging from slight to moderate (though the percent change in all would be well below that of the overall county). The greatest increases were expected in the two Tempe RAZs, especially Central Tempe. All five of these RAZs would retain secondary core status in 2020, with employment densities of between 5,000 and 6,200. Two non-adjacent RAZs in the Southeast Valley that had essentially zero employment in 1995 also were projected to have densities of between 5,000 and 6,200 in 2020. The employment base in the Chandler Airport RAZ was forecast to begin increasing between 2000 and 2005, with an especially large gain between 2015 and 2020. The Williams Gateway Airport RAZ's gains were expected to start between 1995 and 2000 (with the opening of several colleges and universities) and continue through 2020.

Only one of the 16 tertiary and near-tertiary core RAZs identified in 1995 were projected to have a large enough employment increase to move up in status by 2020: the near-tertiary North Scottsdale – Airport Area, would reach tertiary status. Some of these RAZs would only marginally qualify as parts of the near-tertiary area in 2020. Four other RAZs in the outlying area in 1995 would move into near-tertiary status, three in the Southeast Valley: Downtown Chandler, West Chandler and Northwest Gilbert. The other RAZ is North Scottsdale – Scottsdale Ranch.

Thus, at the RAZ level, North Scottsdale and the Southeast Valley were anticipated to have substantial employment growth. The greatest percentage growth would occur in outlying areas, but none other than those already mentioned would achieve an employment density of even near-tertiary status.

Some subcenters would experience an increase in area based on the projections through 2020, but most of these changes would be modest. Several subcenters, including Downtown Mesa, Grand Avenue and those in central Phoenix, were not projected to have much of a gain in employment. Of the four developing subcenters in 1995, Scottsdale Ranch and Scottsdale Air Park would achieve subcenter status by 2000. Little further growth was anticipated at 19th Avenue and Beardsley Road, though it would reach subcenter status after 2000. Employment

was projected to increase across the Central Tempe secondary core, such that the Baseline Road and Rural Road developing subcenter might substantially increase its boundaries. However, the density throughout this subcenter would either just marginally meet or fall just short of the 6,400 per square mile requirement.

The MAG projections suggest the creation of four additional subcenters between 2000 and 2020, all in the Southeast Valley: Chandler Boulevard in West Chandler, the Chandler Airport area, the area around Guadalupe and McQueen Roads in Northwest Gilbert, and the area around Williams Gateway Airport. Based on news reports since 1997, the 1997 MAG projections might be too low on employment growth in two areas: the far North Black Canyon Freeway and Scottsdale Air Park.

EMPLOYMENT PATTERNS IN METROPOLITAN PHOENIX

For the entire urbanized area, employment density in 1995 was inversely correlated to distance from downtown Phoenix. When RAZs were used as the geographic measure of analysis, the correlation coefficient was a strong $-.75$. Except for some developing employment subcenters located away from the central core of the Valley, employment density gradually fell with distance. By TAZ, however, this inverse relationship is not as easily seen (Map 7), though the correlation coefficient was still relatively strong at $-.63$. Substantial variation in employment density can be seen in adjacent TAZs. A large part of the reason for this is that American zoning has segregated land uses for decades (e.g. a manufacturing facility is not located next to a residence which is next to a retail store).

At the RAZ level, the correlation coefficient between population density and distance from the core was $-.91$. Other than population density consistently being low beyond the fringe of development, the correlation is harder to see by TAZ (Map 8). A square mile largely zoned for commercial or industrial use will have a much lower population density than an adjacent square mile zoned primarily for residential use.

Figure 1 displays average employment density and population density by distance from downtown Phoenix in 1995. Employment density was much higher than population density downtown, but by four miles out was less than population density. Just 11 miles from downtown Phoenix the employment density dropped to less than 1,000 per square mile, compared to a population density of 2,750. Seventeen miles out (just inside the fringe of residential development), the employment density fell to less than 500 per square mile.

The location of the urban fringe, which moved from about 17 miles out from downtown Phoenix in 1990 to 18 miles out in 1995, affects employment density and percentage growth measured by distance from the urban center. The average change in employment density was high on a relatively consistent basis out to 15 miles from downtown Phoenix. It dropped off sharply beyond that. The percent change in employment rose with distance from the center, particularly beyond 16 miles out.

The employment-to-population ratio (E-P) had a moderately strong correlation ($-.62$) with distance from downtown Phoenix at the RAZ level. Hardly any correlation was measured at the TAZ level. A moderate inverse relationship existed out several miles from downtown Phoenix (see Map 9), but the E-P in more distant areas followed no pattern. A sharp drop in the average ratio in the first few miles from downtown Phoenix is seen in Figure 2. Beyond that, the ratio continued to trend down, but in an erratic way.

Employment typically follows residential development, resulting in low employment-to-population ratios in many relatively newly developed areas at the fringe. In other places, however, agricultural and manufacturing employment preceded residential development and may slow the residential spread, resulting in high E-P figures even at the fringe. Thus, a mix of population-driven and exporting jobs exists at the fringe as well as in more central locations.

Employment-Rich / Employment-Poor

At the RAZ level, employment density probably is the best measure of whether the area is “employment-rich”. At a city level, where considerable extents of largely undeveloped land may be annexed, this measure does not do as well. In this case, the employment-to-population ratio may be a better measure. Four measures of “employment-rich” can be created: density, density adjusted for distance, E-P, and E-P adjusted for distance.

FIGURE 1
EMPLOYMENT DENSITY AND POPULATION DENSITY
By Distance from Downtown Phoenix, 1995

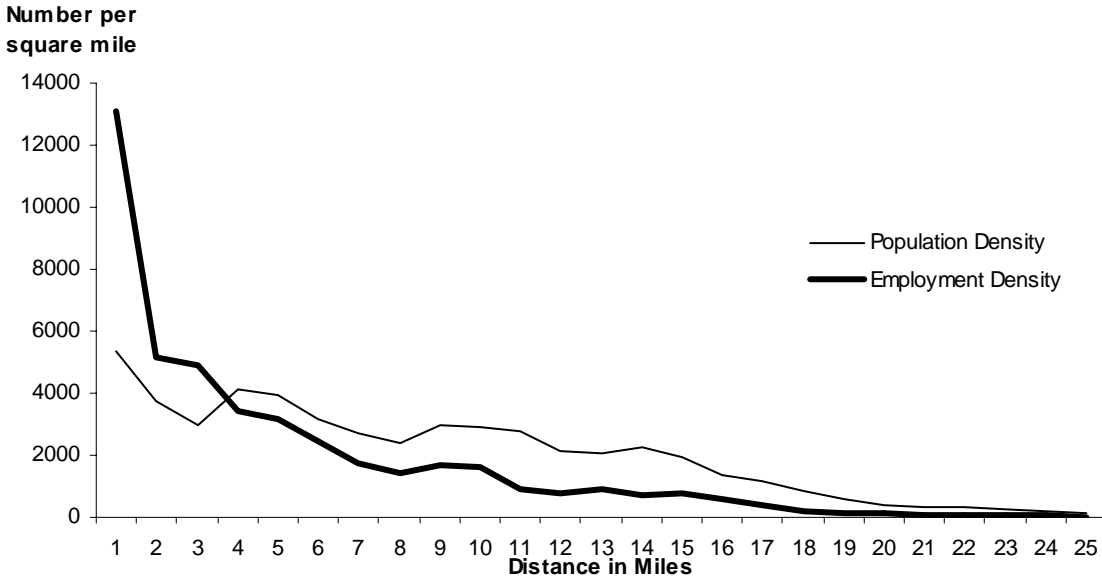
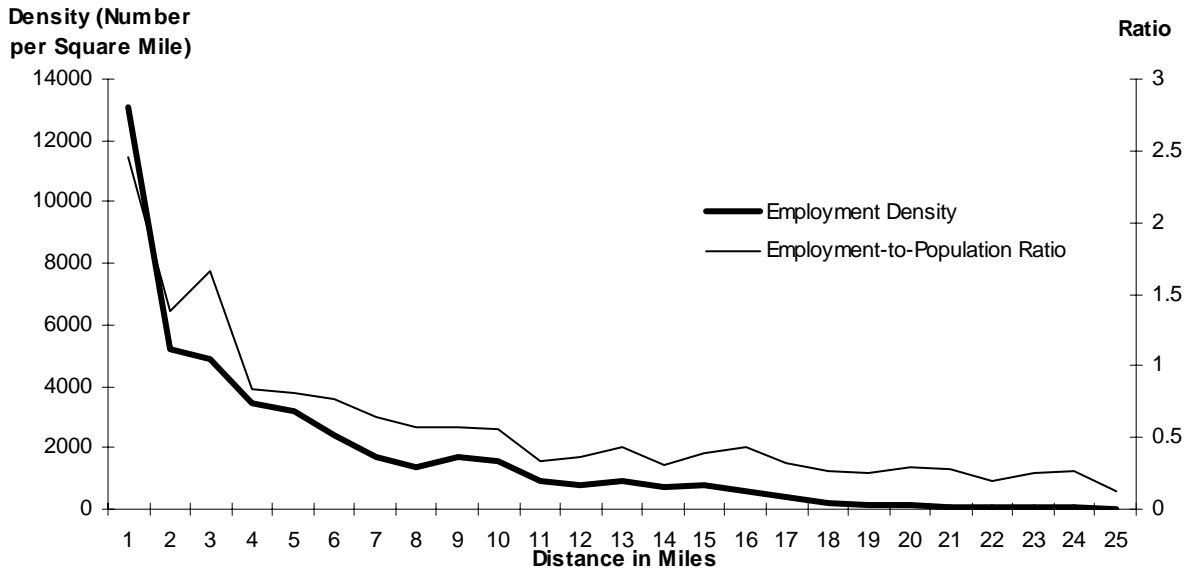
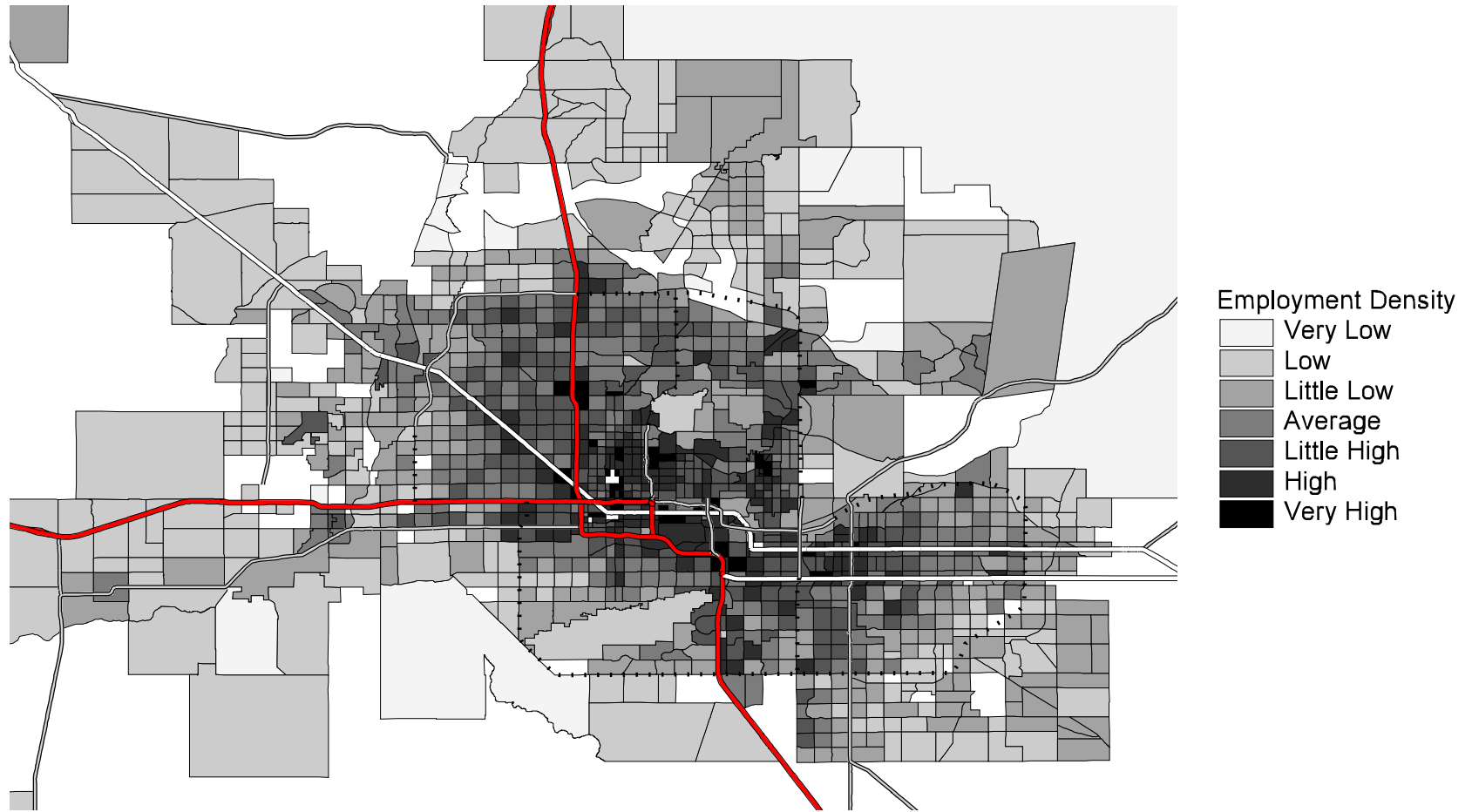


FIGURE 2
EMPLOYMENT DENSITY AND THE EMPLOYMENT-TO-POPULATION RATIO
By Distance from Downtown Phoenix, 1995



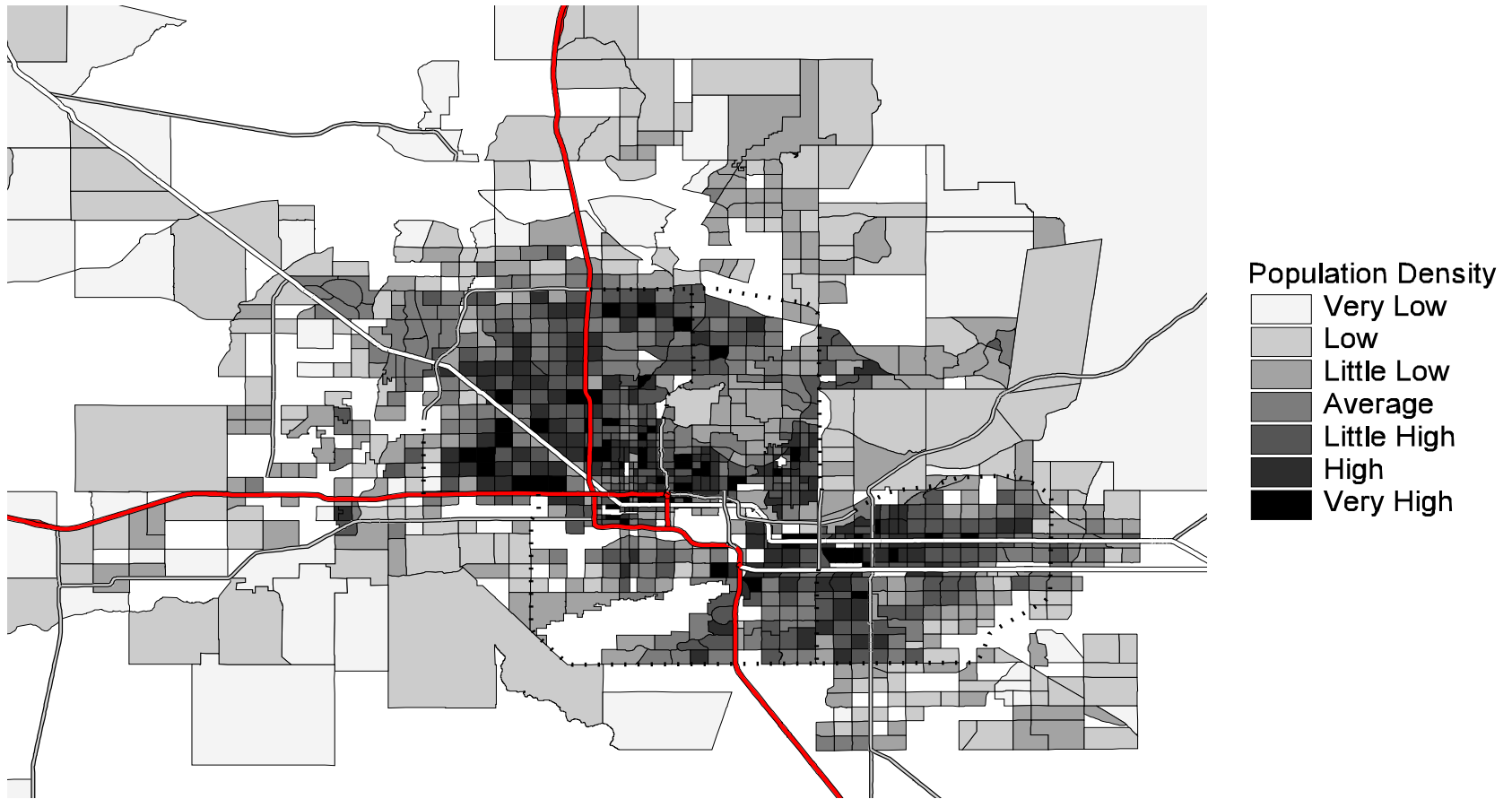
Source (Figures 1 and 2): Calculated from the Maricopa Association of Governments 1995 Employment Database and the U.S Bureau of the Census, 1995 Special Census.

MAP 6
EMPLOYMENT DENSITY IN METROPOLITAN PHOENIX, 1995
Employment per Square Mile



Source: Calculated from the Maricopa Association of Governments 1995 Employment Database.

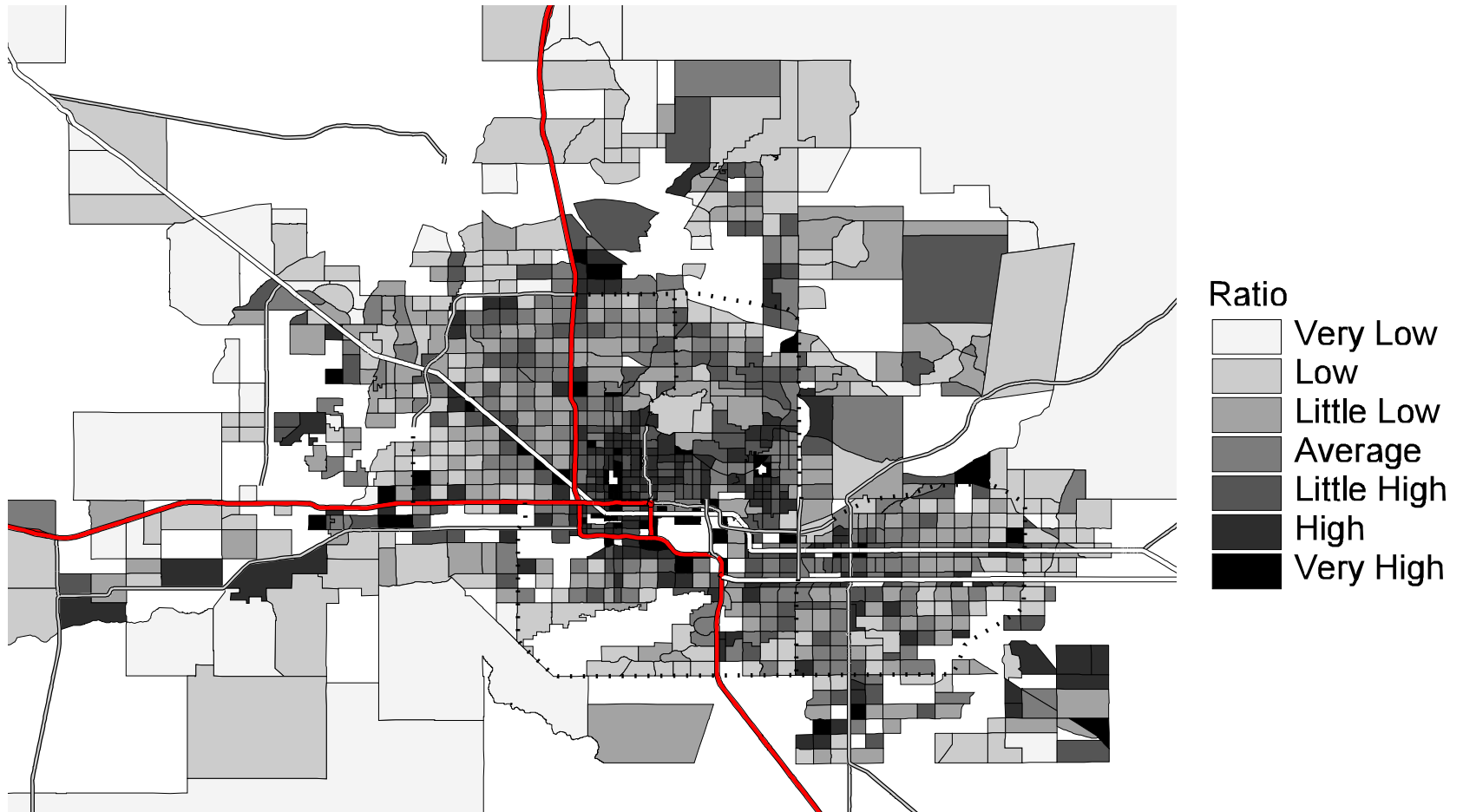
MAP 7
POPULATION DENSITY IN METROPOLITAN PHOENIX, 1995
Persons per Square Mile



Note: Density expressed by Traffic Analysis Zone.

Source: Calculated from Maricopa Association of Governments, 1995 Special Census.

MAP 8
EMPLOYMENT-TO-POPULATION RATIO IN METROPOLITAN PHOENIX, 1995
Employment per 1,000 Residents



Source: Calculated from Maricopa Association of Governments data.

Using a composite of these four measures, the most employment-rich portion of the metro area in 1995 stretched from Midtown and Central Phoenix east through Scottsdale and Tempe, including all of Tempe and all of Scottsdale except some of the far northern area. The Metrocenter Area was the only other significant employment-rich area.

Moderately employment-rich areas extended from Tempe into Mesa and into a little of Chandler. In addition, some areas close to Midtown and Central Phoenix to the west and north were moderately job-rich.

The major employment-poor areas were in south Phoenix west of Central Avenue, and south of South Mountain. In addition, the fringe of the urban area on the west and north formed a nearly continuous employment-poor area. The exceptions were along part of I-10 (e.g. Tolleson) and along part of I-17 north of Beardsley Road. In contrast, no portion of the Valley east of Scottsdale/Rural Road was employment-poor.

The change in employment density between 1990 and 1995 was considerable throughout employment-rich Tempe and Scottsdale, except for a lesser gain in Downtown and South Scottsdale. In the rest of the primary-secondary core, the Metrocenter Area experienced a large advance, midtown Phoenix a lesser gain, and Central Phoenix a decline. Some of the employment-poor southwest enjoyed an increase in density, but most of the west and north periphery experienced little gain in jobs. The exception was along the far north Black Canyon Freeway.

Employment's "Favored Quarter"

The idea of a "favored quarter" was pioneered by Robert Charles Lesser and Company. The favored quarter of a metropolitan area is that with the greatest presence of executive housing, high-end retail malls, recent highway improvements, employment growth, low commercial real estate vacancy rates, and a high share of regional economic growth.

Looking only at employment, the Phoenix metropolitan area's "favored quarter" in 1995 was Scottsdale and Tempe, especially from Chaparral Road south to Baseline Road. Outside of the primary core and East Phoenix from I-10 to Van Buren Street, the metro area's highest employment densities extended from downtown Scottsdale to south of downtown Tempe. (The only other high-density area was around Metrocenter, which is about the same distance from downtown Phoenix as downtown Scottsdale and downtown Tempe.)

Employment growth between 1990 and 1995 was impressive through the Tempe portion of this favored quarter, with strong gains extending north and south of the prime Chaparral to Baseline segment. Strong growth also extended into southwest Mesa, northwest Gilbert, north and west Chandler, and Ahwatukee – Foothills.

Considering the other qualities of a favored quarter as well, the Phoenix metro area's favored quarter extended from northeast Phoenix through Scottsdale, Paradise Valley and Tempe to south of South Mountain. The middle of the favored quarter was most favored for employment, economic growth and commercial development, but had limited executive housing. Thus, its population demographics did not match those of the two ends of the favored quarter, which were most favored demographically and residentially but had limited jobs and commercial development (except in part of North Scottsdale).

Considering distance from downtown Phoenix, all of Tempe and all of Scottsdale south of Frank Lloyd Wright Boulevard had favored employment status. In the southeast Valley, this favored status extended into Chandler and especially Mesa. Parts of northeast Phoenix also were somewhat favored. Elsewhere in the Valley, only the Metrocenter area had such favored status.

Rings, Wedges and Diagonals

In some metro areas, demographic and economic distinctions in the inner city spread outward, forming wedges. This pattern is seen in the Phoenix metropolitan area in many demographic characteristics, but 1995 employment did not fit the wedge concept. Since employment density is related to distance from downtown Phoenix, the ring concept applies. The rings, however, are tilted considerably by the heavy weight of employment in the eastern part of the metro area and the light weight in the southwest.

Another feature apparent from the employment data, and also seen on several maps of demographic variables, is the diagonal running from northwest to southeast. Of the 11 employment subcenters, three lie on a diagonal running from Downtown Tempe/Arizona State University through East Washington Street to North Central Avenue. Three other subcenters – 48th Street and Broadway Road, Downtown Phoenix/State Capital, and Grand Avenue – lie on a second diagonal about two miles southwest of, and nearly parallel to, the first diagonal. In addition, the Fiesta Mall/Superstition Freeway subcenter lies nearly on the first diagonal, though at a somewhat greater distance from the other subcenters.

Major transportation routes likely play a role in 7 of 11 subcenters being proximate to each other on northwest to southeast diagonals. Four subcenters are on old Highway 60, which ran from the east to northwest, (one of these subcenters is next to I-17 as well), another is on I-10 and another is along the Superstition Freeway. The only exception is North Central Avenue, but this was the main north-south artery for many years. Proximity to the river also contributed to the historical location of some of these subcenters.

The four other subcenters range from 3.5 to 6.5 miles north and east of the first diagonal. These include Metrocenter Mall/Black Canyon Freeway, East Camelback Road, Downtown Scottsdale, and Downtown Mesa. Downtown Mesa is on old Highway 60 and Metrocenter is along I-17, but the other two subcenters owe their popularity to the proximity to the favored residential quarter.

Of the four developing subcenters in 1995, Baseline Road and Rural Road borders the Superstition Freeway and is on the second diagonal. The three others are at the northern fringe of the Valley, a considerable distance from the diagonals.

The 1990 to 1995 change in employment density was mixed along the diagonals, ranging from very strong gains in some subcenters to declines in others.

A Tale of Three Cities

The downtowns of Glendale, Scottsdale and Tempe all are about nine miles from downtown Phoenix. In 1950, at the cusp of the explosion of growth in the Phoenix metropolitan area, the city of Phoenix was the only population center of any size, with more than 100,000 residents. Glendale and Tempe each had 8,000 residents and were connected to downtown Phoenix by the main transportation route of the time, US60. Scottsdale was several miles off Highway 60 and had only 2,000 residents. (Mesa, also on Route 60, was twice the size of Tempe, but was several miles more distant from Phoenix.)

Population growth of the three cities was roughly equal in rate through 1990, when Scottsdale had 130,000 residents, Tempe 142,000, and Glendale 148,000. Tempe's growth rate slowed substantially in the 1990s when it ran out of large chunks of developable land, while Glendale and Scottsdale kept pace with each other.

Based on this simple locational information, Tempe and Glendale should be about equal-sized employment centers, with Scottsdale smaller. In reality, however, 1995 employment data

show that Glendale has lagged far behind Scottsdale and especially Tempe. Employment growth during the 1990s still substantially favored Tempe and Scottsdale over Glendale.

Tempe always had the advantage of Arizona State University being located next to its downtown. Downtown Tempe also was as close to Sky Harbor Airport as downtown Phoenix, with Scottsdale not being as close and Glendale being much more distant. When the first (and for many years, only) freeway was built, it was equally close to downtown Phoenix and downtown Tempe, more distant to downtown Glendale, and farther yet to downtown Scottsdale. When the next freeway was built, it ran through Tempe. Thus, these factors all contributed to Tempe becoming the largest employment center outside of central Phoenix.

In comparing Scottsdale and Glendale, however, Glendale seems not to have been at a disadvantage on the basis of these locational factors. Yet Scottsdale is much more of an employment center than Glendale, despite not being served by any major transportation routes until the last few years. Scottsdale's proximity to the favored residential quarter is a major factor contributing to its strong employment growth.

Edge Cities

The Phoenix metropolitan area has nothing close to meeting Garreau's original requirements for an edge city: (1) at least 5 million square feet of leasable office space (a requirement relaxed for "emerging" edge cities); (2) at least 600,000 square feet of retail space; (3) more jobs than bedrooms; (4) perceived by the population as one place; and (5) was nothing like a city 30 years ago.

The closest the Phoenix metro area ever has come to having an edge city was when the Metrocenter area developed about 25 to 30 years ago. It met requirement (2) and loosely may have met (4) and (5). However, even in 1995, it still did not have more jobs than bedrooms and still did not have much leasable office space. Further, Metrocenter no longer is near the fringe of the metro area and is a relatively old part of the metro area.

In 1995, the metro area had three developing employment subcenters at the urban fringe. The two in Scottsdale experienced rapid employment growth in the 1990s, especially considering their distance from downtown Phoenix. When 2000 data are available, each almost certainly will meet the requirements of being an employment subcenter as defined by McDonald and McMillen in Chicago. However, neither are remotely close to meeting Garreau's requirements of an edge city.

The area around the Scottsdale Airport came closest in 1995 in that it had more employment than population. However, it did not have much retail or leasable office space and did not really meet the last two requirements. The airport and its location in the favored-quarter likely account for why this area is developing rapidly. The second developing employment subcenter is Scottsdale Ranch; it probably should be combined with the area around the Scottsdale Airport in defining a potential edge city.

The third developing employment subcenter at the northern fringe is along the Black Canyon Freeway north of Greenway Road, particularly north of Union Hills Drive. This area is unusual in that much of its 1995 employment was at a relatively small number of large establishments. Some major employers in this area in 1995 were American Express, Honeywell/Allied Signal at various locations, AG Communications and Farmers Insurance. This area did not have any of the characteristics of being an edge city. Proximity to the freeway, availability of large parcels of relatively inexpensive land, and the presence of other major employers likely are factors behind this area's growth.

SPATIAL MATCH OF EMPLOYMENT OF RESIDENTS TO LOCATION OF JOBS

In the 1990 census, employment by industry was reported by place of residence. Compared to the county total, residents of the primary-secondary core (in this section the core is defined as the primary and secondary core only) were disproportionately employed in the retail trade and services industries. Relatively few were employed in all other major industries, though none of the sectoral share differences from the county total were very large.

The 1995 MAG employment database reports employment by place of work. Relative to the county total, the core's sectoral shares were much different. The core had more jobs in the TCPU, FIRE, services and public administration industries. Fewer jobs were in the other industries, especially retail trade, construction and agriculture/mining.

A comparison of the location of jobs by industry in 1995 to the industry in which residents worked in 1990, adjusting for county changes in the industrial mix between 1990 and 1995, show significant differences in the core. Relative to the number of jobs in the core, low percentages of the residents of the core were employed in the TCPU, FIRE and public administration industries. A relatively high percentage of the residents worked in retail trade relative to the core's number of retail jobs with somewhat higher percentages in agriculture, construction and services.

Demographics of Residents of the Core

The demographics of the residents of the core are not homogenous from one RAZ to another. Thus, demographic differences between the core and the county as a whole are small for many indicators.

Slightly higher proportions of the residents of the core in 1990 were minorities, foreign born, and spoke Spanish. The average household size was a little lower than the county total, as relatively few children and relatively many of working age lived in the core.

Educational attainment was average, as was the employment-to-working-age-population ratio and the unemployment rate. A somewhat higher percentage of those employed were in service occupations, with slightly less in skilled production occupations.

A slightly higher percentage worked in the same city in which they resided. Travel times to work were shorter and fewer drove alone. Use of carpooling was average but use of other transportation modes, including buses, was more common.

Housing in the core was older than the county average. A higher proportion of the units consisted of multifamily dwellings, with lower proportions of mobile homes and single-family housing. Thus, the owner-occupied percentage was low (47 percent versus 63 percent countywide). The median value of owner-occupied housing was 16 percent below average, but the median rent equaled the county total.

The small average household size contributed to a median household income 17 percent below the county total. (The median per capita income was 11 percent below average.) Poverty rates were high, 10 percentage points above the county average of 12 percent. A higher percentage of the people received public assistance.

Demographic Differences within the Core

The Downtown and West Tempe RAZ, which includes Arizona State University, skews many of the demographic statistics of the core. The many students living in this RAZ contributed to the core's low median income while pushing up the educational attainment figures and the proportion of the population of working age. Renter-occupied multifamily dwellings were

numerous. Taken together, the characteristics of this RAZ were unlike those of any other primary-secondary core RAZ.

The rest of the core consists largely of two very disparate parts. The adjacent Central Phoenix and East Phoenix from I-10 to Van Buren Street RAZs were similar in most characteristics. Their profile was much different from that of the Central Tempe, Downtown and South Scottsdale, and Metrocenter Area RAZs. Overall, the figures of the Midtown Phoenix RAZ were between those of these disparate parts.

Compared to the county's demographic profile, the Central Phoenix-East Phoenix area was characterized by high proportions of minorities, especially Hispanics, with above average family size. The proportion of children was above average, while the percentage of elderly was low. The proportion foreign born and speaking Spanish was above average. Educational attainment was quite low.

An above average percentage used alternatives to driving alone to work. Since travel times to work do not distinguish between transportation modes, people walking or bicycling to work may increase travel times. Commute times were average in Central Phoenix and below average in East Phoenix. The proportion unemployed was relatively high while the proportion working was relatively low. Few of those employed had managerial-professional or sales-technical-administrative support occupations. Household incomes were very low and poverty rates were very high.

Housing was old, largely built in the 1950s or earlier. The housing stock consisted of relatively few single-family houses and relatively many small (two-to-four unit) multifamily dwellings. The proportion owner-occupied was very low. Rents and home values also were quite low.

On nearly every characteristic, the Central Phoenix-East Phoenix area was considerably different from the county total. The Central Tempe, Downtown and South Scottsdale, and Metrocenter Area RAZs were either similar to the county average or different in the opposite direction from the Central Phoenix-East Phoenix area.

Employment Differences within the Core

Substantial differences existed between the industries in which residents worked and the industries providing jobs in the Central Phoenix and East Phoenix from I-10 to Van Buren Street RAZs, as seen in Table 6. The jobs located downtown and at the Capital were disproportionately in the public administration and FIRE industries, while the industries in which residents worked were weighted to retail trade, manufacturing, agriculture, and construction. In East Phoenix, jobs were particularly in the TCPU and manufacturing industries, while residents worked in services, retail trade, and agriculture. While this suggests a spatial mismatch, the number of jobs in these blue-collar fields in the primary-secondary core exceeded the number of core residents working such jobs. Shorter than average commute times of core residents indicate that many find employment close to home.

The mismatch in the other core RAZs was not nearly as great. In Midtown Phoenix, jobs particularly were in the services and FIRE industries, while residents worked in trade, manufacturing and construction.

TABLE 6
DIFFERENCES IN SHARES OF EMPLOYMENT BY INDUSTRY
BETWEEN JOBS HELD BY RESIDENTS AND JOBS AVAILABLE BY LOCATION
IN METROPOLITAN PHOENIX*

	Agriculture and Mining	Construction	Manufacturing	TCPU	Wholesale Trade	Retail Trade	FIRE	Services	Public Administration
Midtown Phoenix	-0.9	-3.9	-5.0	0.0	-3.5	-5.7	5.3	13.4	0.6
Central Phoenix	-6.7	-5.7	-7.5	1.9	-2.2	-11.5	7.7	0.1	24.0
East Phoenix – I-10 to Van Buren Street	-6.5	-2.3	15.8	20.2	0.9	-12.1	-0.3	-17.5	1.8
Downtown and South Scottsdale	-0.2	-2.3	2.7	-1.4	-2.7	6.6	2.7	-3.7	-1.7
Downtown and West Tempe	-0.3	2.0	3.4	4.6	3.6	-7.8	0.2	-4.2	-1.6
Central Tempe	-0.2	-0.6	-0.1	-2.7	4.2	0.0	4.4	-1.0	-3.8
Metrocenter Area	-0.8	4.3	-4.4	2.0	-2.2	5.3	6.0	-6.2	-4.0
Primary-Secondary Core Total	-1.1	-1.2	0.4	3.0	-0.5	-4.8	2.6	-1.0	2.7

Note: A negative sign indicates that a lesser percentage of jobs are available than the percentage of residents employed. For example, 1.1 percent of the jobs in Midtown Phoenix were in the agriculture and mining industry while 2.0 percent of the employed people living in Midtown Phoenix worked in this industry.

* Compares 1990 employment by place of residence to 1995 employment by place of work, adjusting for changes in the Maricopa County total between 1990 and 1995.

Source: Calculated from the Maricopa Association of Governments 1995 Employment Database and the U.S. Bureau of the Census, 1990 Census.

SITE SELECTION FACTORS

Limited information is available on the relative importance of various site selection factors, with less available on how such factors vary from one industry or cluster to another. Thus, a survey of local economic development professionals was conducted to shed some insight on this topic. Respondents were asked to rate the importance of a list of factors in the process of choosing a city or metropolitan area in a national competition, overall and for specific clusters. Separate ratings were solicited for (1) research and development and headquarters operations and (2) manufacturing or other types of facilities. In addition, the survey asked the relative importance of the factors in selecting a specific site within the Phoenix metro area. The small number of responses should be considered in evaluating the information in this section.

Factors Used to Choose a Metropolitan Area in a National Competition

In general (the “all industries” column of Tables 7 and 8), the availability of a skilled workforce, labor costs, and educational opportunities and quality are the most important factors in deciding where to locate a research and development (R&D) or headquarters facility. The availability of a skilled workforce generally is considered the most important factor nationwide, for most types of facilities in most industries or clusters.

Other important factors in locating a R&D or headquarters facility are availability of land or leased space, the telecommunications infrastructure, the education infrastructure, and proximity to universities and research centers. How well the company is welcomed by the community and personal preferences of company executives also can be important. The only factor that is relatively unimportant is proximity to other company facilities, as seen in Table 7. Considerable variation exists among clusters in the importance of any factor.

Labor costs, workforce availability and educational opportunities also were among the most important factors to the location of manufacturing or other types of facilities. They were joined by utility costs and airports, neither of which were particularly important to R&D or headquarters facilities. Other factors noted as important for these types of operations – but not especially so for headquarters or research and development – include land costs or lease rates, availability of power and water, and regulations. In contrast, community receptivity and proximity to universities and research centers were not noted as particularly important to manufacturing or other facilities (see Table 8).

In neither type of operation were business taxes or incentives seen as especially important, though in some clusters one or the other was important. Incentives were judged to be important only for manufacturing facilities in the aerospace and high-tech clusters. Most factors in the employee quality of life and proximity categories, as well as local transportation infrastructure, also were not rated as particularly important.

Factors Used to Select a Specific Site within Metropolitan Phoenix

The overall list of factors important to selecting a site *within* the Phoenix metro area varies somewhat from that of choosing a metro area. While the availability of a skilled workforce again is one of the most important factors, it is joined by the telecommunications infrastructure, proximity to Arizona State University or other institutions of higher education, and community receptivity. Labor costs and the availability of land or leased space are other important factors. The list of important factors again varies widely by cluster (see Table 9).

TABLE 7
FACTORS USED TO CHOOSE A METROPOLITAN AREA
IN A NATIONAL COMPETITION
FOR RESEARCH AND DEVELOPMENT AND HEADQUARTERS FACILITIES

Site Selection Factors		All Industries	CLUSTERS							
			High Tech	Aero-space	Plastics & Adv Comp Materials	Software	Bio-industry	Environmental Technol.	Transportation & Distribut.	Call Centers
Business Costs	Labor	M	+	M		+				M
	Land costs or lease rates					-				
	Utilities					-		-	-	
	Business taxes			+	+			-	-	-
Availability	Skilled workforce	M	M	M		M	M	+	-	
	Land or leased space	+	+	M						+
	Power and water		+		+				-	
	Incentives					-			-	-
Infrastructure	Airports			M		+				-
	Local transportation								M	+
	Telecommunications	+	M	+		M	+			M
	Education	+	+			M		+	-	
Proximity to	Other company facilities	-		-	-	-	-		-	L
	Other companies in cluster		+			+	+		-	L
	Suppliers						+			L
	Customers		-			-		-	M	L
	Universities and research centers	+	M	M		M	M	M	L	-
Employee quality of life	Living costs									
	Climate			+					L	-
	Educational opportunities and quality	M	M	M	+	M		+		
	Traffic congestion								M	
	Crime									
Other	Community receptivity	+		M		-				
	Regulations			M			M			-
	Personal preferences of company executives	+	M			+	+			

M: most important **+**: important Blank: average importance **-**: less important **L**: little importance

Source: Survey of economic development professionals in the Phoenix metropolitan area.

TABLE 8
FACTORS USED TO CHOOSE A METROPOLITAN AREA
IN A NATIONAL COMPETITION
FOR MANUFACTURING AND OTHER TYPES OF FACILITIES

Site Selection Factors		All Industries	CLUSTERS								
			High Tech	Aero-space	Plastics & Adv Comp Materials	Software	Bio-industry	Environmental Technol.	Transportation & Distribut.	Call Centers	
Business Costs	Labor	M	M	+	+			+			M
	Land costs or lease rates	+	+	+			-				
	Utilities	M	M	M			-			-	-
	Business taxes		+	M			-	+		-	-
Availability	Skilled workforce	M	M	M				M	+		
	Land or leased space	+	+	M						M	+
	Power and water	+	+	M	+				+		
	Incentives		+	+			-			L	-
Infrastructure	Airports	M		M							
	Local transportation					-	-			M	
	Telecommunications	+	+				M	+			M
	Education	+	M				M		+	-	
Proximity to	Other company facilities					-	-			-	L
	Other companies in cluster		+				+			L	L
	Suppliers						-		+		L
	Customers										L
	Universities and research centers		M			-	M	+		L	L
Employee quality of life	Living costs						-			-	
	Climate					+			-	-	-
	Educational opportunities and quality	M	M	+			M	+			
	Traffic congestion								-	-	
	Crime								-		
Other	Community receptivity		M				-			L	-
	Regulations	+	M	+				M	M	-	-
	Personal preferences of company executives	+	+				M	+			

M: most important **+**: important Blank: average importance **-**: less important **L**: little importance

Source: Survey of economic development professionals in the Phoenix metropolitan area.

**TABLE 9
FACTORS USED TO SELECT A SPECIFIC SITE
WITHIN METROPOLITAN PHOENIX**

Site Selection Factors		All Industries	CLUSTERS							
			High Tech	Aero-space	Plastics & Adv Comp Materials	Software	Bio-industry	Environmental Technol.	Transportation & Distribut.	Call Centers
Business Costs	Labor	+	M	M		-				+
	Land costs or lease rates					-				
	Utilities		+			-			-	
Availability	Skilled workforce	M	M	M		M	+			
	Land or leased space	+	M	M				+		
	Power and water		M			-			-	-
	City incentives					-	-		L	-
Infra-structure	Proximity to an airport			M		+				-
	Easy freeway access								M	
	Telecommunications	M				M	+	+		M
Proximity to	Other company facilities					-	-	-	-	-
	Other companies in cluster						+			-
	Suppliers					-			-	L
	ASU and other colleges/universities	M	+			+	+		L	-
Employee Quality of life	Housing costs					-		-		
	Quality of K-12 educational system									
	Traffic congestion					-	-	-		
	Crime						-			
Other	City responsiveness	M	+	M						
	City regulations		+	M		-		+		

M: most important **+**: important Blank: average importance **-**: less important **L:** little importance

Source: Survey of economic development professionals in the Phoenix metropolitan area.

REFERENCES

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