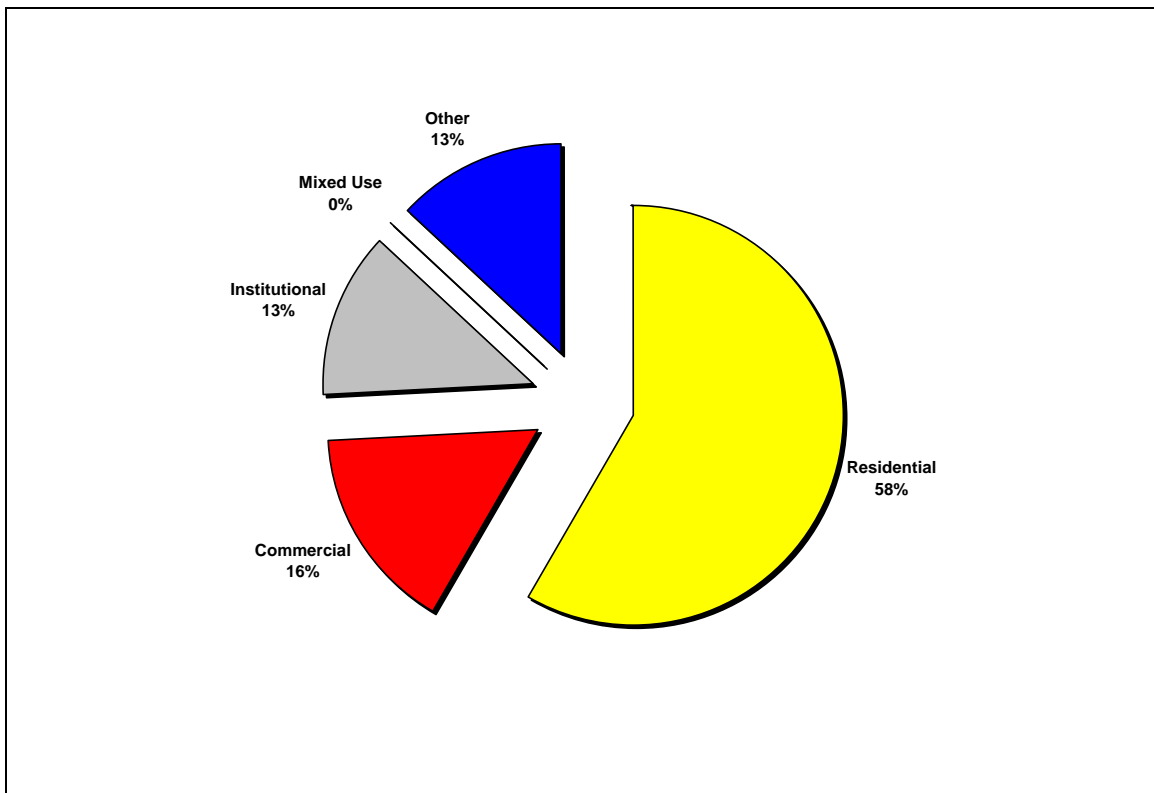


Inglewood Outer

Inglewood Outer had a trip capture rate of 33%, comparable to Hawthorne Boulevard.

Inglewood Outer had a walker rate of 27%, lower than the other centers but higher than any corridor.

A majority of the land in the Inglewood Outer study area is devoted to residential land, but significant portions are also devoted to institutional and commercial land. The area contains some shopping centers and Daniel Freeman Medical Center.



With a trip capture rate of 0.28, Inglewood-Outer performs slightly higher than El Segundo-Outer. The population density in this center is 14,210 per square mile, higher than the median of 12,493. The job density (5,865) is also above the median (4,785), but is substantially below the rates for the centers with the highest trip capture rates (Torrance-Inner, 8889; Torrance-Outer, 9718; Riviera-Inner, 13,808).

The densities for retail outlets are lower than the medians on all counts. Neighborhood function business density is 127.3 per square mile (the median is 188.7), while the density figures for apparel and specialty stores are 6.4 and 13.6 per square mile

respectively (the medians are 7.9 and 31.5). The figure for restaurant density is 17.3 per square mile (the median is 30). The rates for services are mixed. Personal car services are less dense (22.7 per square mile) than the median (40.3), but because of the presence of Daniel Freeman Memorial Hospital in the vicinity, doctors and dentist offices are 2.5 times as dense (128 per square mile) as in the median case (49.7).

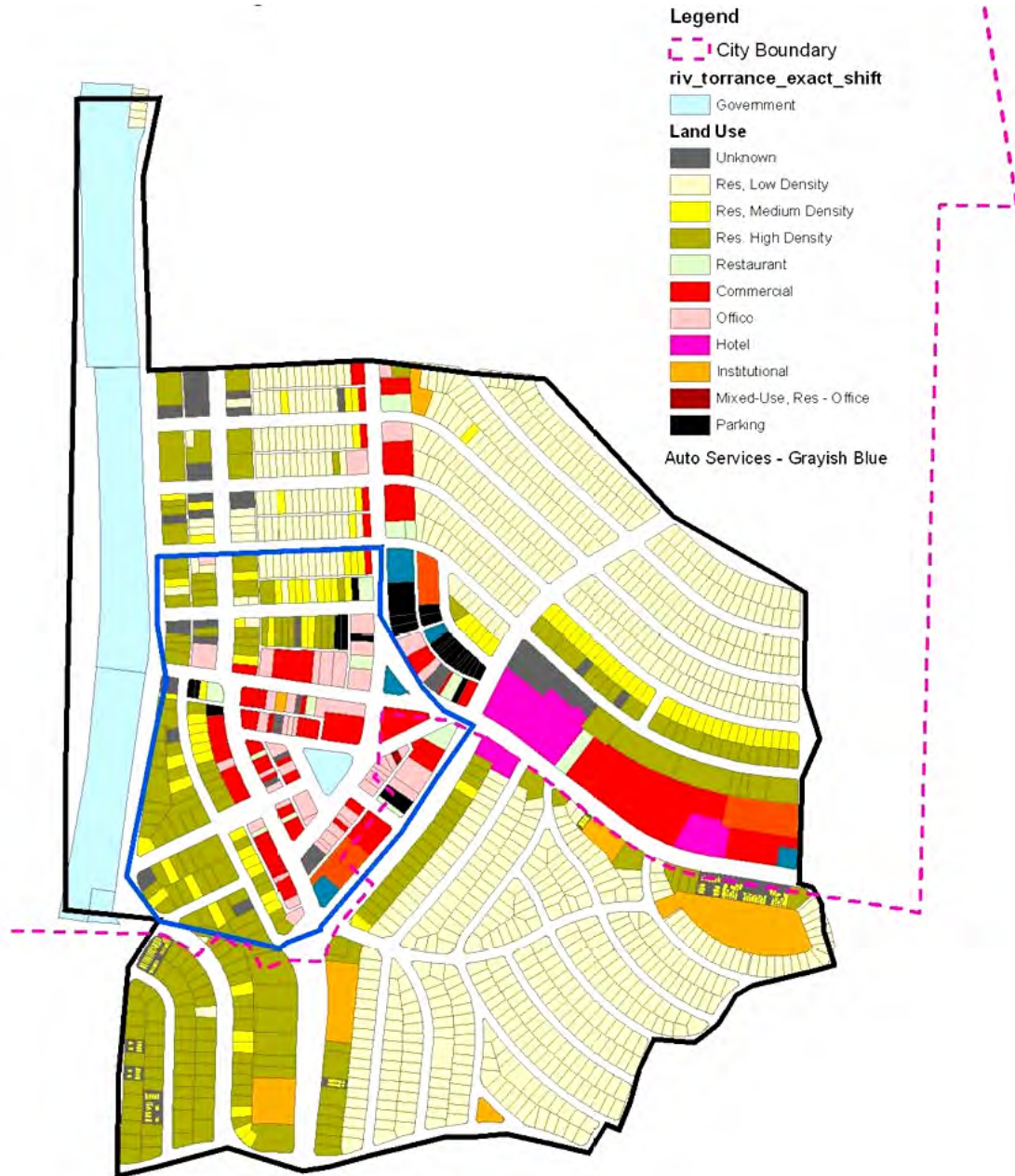
Viewed on a population basis, jobs occur at a slightly higher rate than in the median case (.41 jobs per resident versus .33), however the rate for neighborhood function businesses is only 61 percent of the median (9 shops per 1000 residents versus the median of 14.8). With 0.4 apparel shop, Inglewood-Outer is just slightly below the median of 0.5; but the rate of 1 specialty shop per 1000 residents is less than half the median (2.4). There are also only 1.2 restaurants per 1000 population compared with the median of 2.7. The personal care services per 1000 residents rate is 1.6, while the median rate is 2.8. Conversely, there are 9.0 medical and dental offices per 1000 residents, substantially higher than the median figure of 5.6.

The mode-split for Inglewood-Outer is 0.27, which is near the middle of the pack (0.255), a position suggested by the near median job density. While clothing and specialty stores represent the median proportion of retail outlets, densities are low compared to those in the areas where the mode-splits are high.

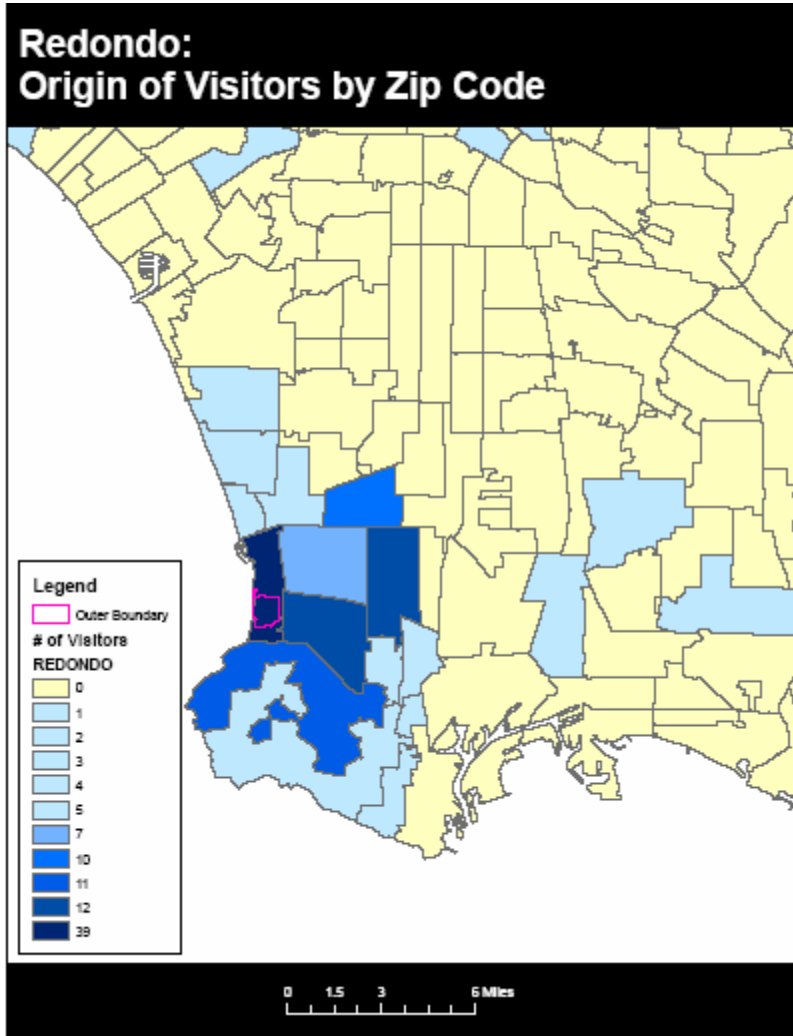
Inglewood-Outer has the highest number of automobile-related businesses among the study area (32), as well as the second highest number of churches (21) among our study areas. It has a fairly high concentration of grocery stores (4 including a Vons), and pharmacies (5 including a Savon and a Walgreens). There is one local coffee shop here and 3 video rental places. The barber to beauty shop ratio is 1-to-14.

Riviera Village

In conducting this analysis we identified an “inner” and “outer” area of Riviera Village based largely on 1/4- and 1/2-mile radii from the triangular parking lot bounded by Avenue del Norte, Via del Prado, and Elena Avenue. The inner area of 64 acres encompasses the village’s commercial core, which is located in Redondo Beach. The outer area of 431 acres includes commercial areas along Pacific Coast Highway as well as a wide variety of residential neighborhoods ranging from high-rise towers along the ocean to single-family neighborhoods to the east and south. These neighborhoods are divided between Redondo Beach and Torrance.



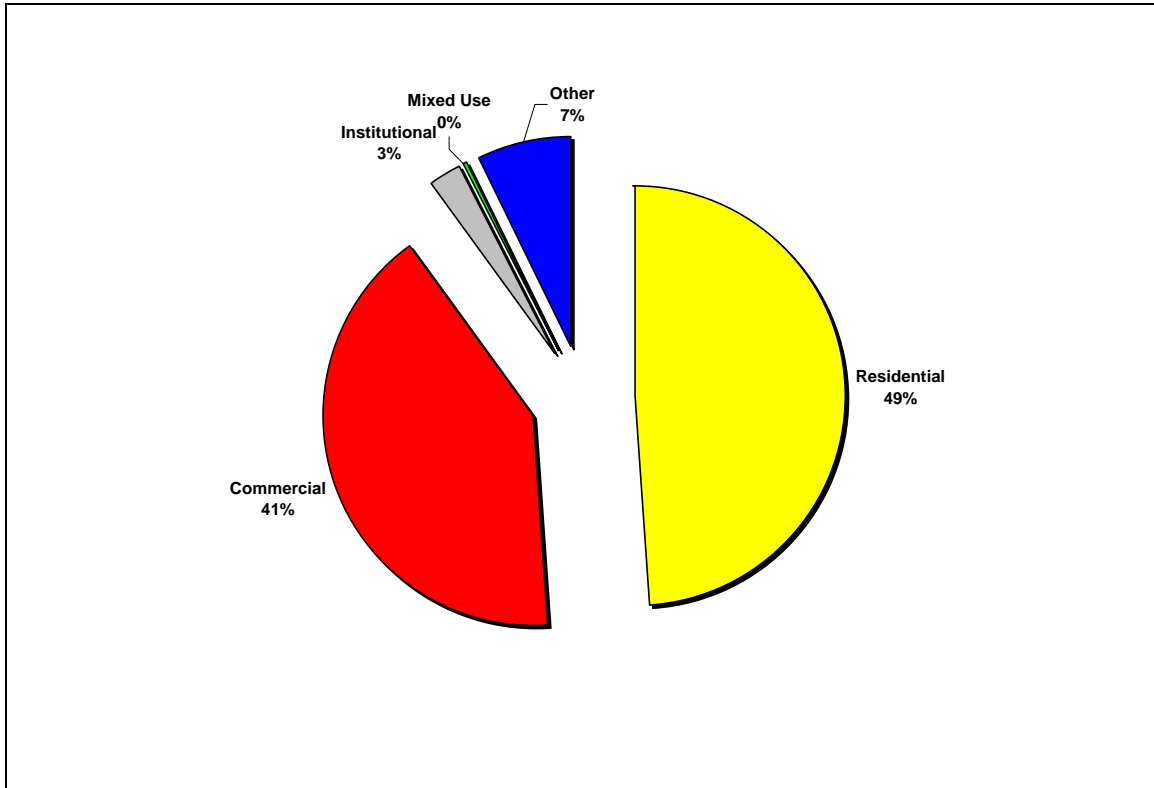
Riviera Village draws from a large geographical area than any other center we studied. Most respondents to our intercept survey were not from the Riviera Village zip code. Of those from the outside, most were from Torrance or the Palos Verdes Peninsula. This is probably because Riviera Village serves these areas for high-end retail of various kinds.



Inner Riviera Village

Inner Riviera Village had the second-highest trip capture rate (54%) and the highest walker rate (71%) of any study area.

Slightly less than half the land in Riviera Village Inner is devoted to residential use. More than 40% is devoted to commercial use, the highest figure of any study area.



The inner area of Riviera Village ranks highest on most density measures, including population density, total retail density, clothing and specialty shop density, and food and liquor shop density. It has the third highest density of restaurants (141.7 per square mile, but because the area is small, the actual number is 12). It also ranks highly on the business services-to-total businesses ratio (the second highest). Apparel and specialty shops account for 27.7 percent of neighborhood function businesses—the highest percentage among the study group (median is 18.8 percent).

On population-based measures, Riviera Village-Inner ranks first in apparel shops per 1000 population, as well as for personal care services, food and liquor shops and medical and dental offices. It ranks second for total retail outlets, restaurants, antiques and used goods shops, and specialty shops on a population basis. It has nearly 7.5 times as many retail outlets per 1000 persons and 10 times as many food product retailers per 1000 population as the median study area.

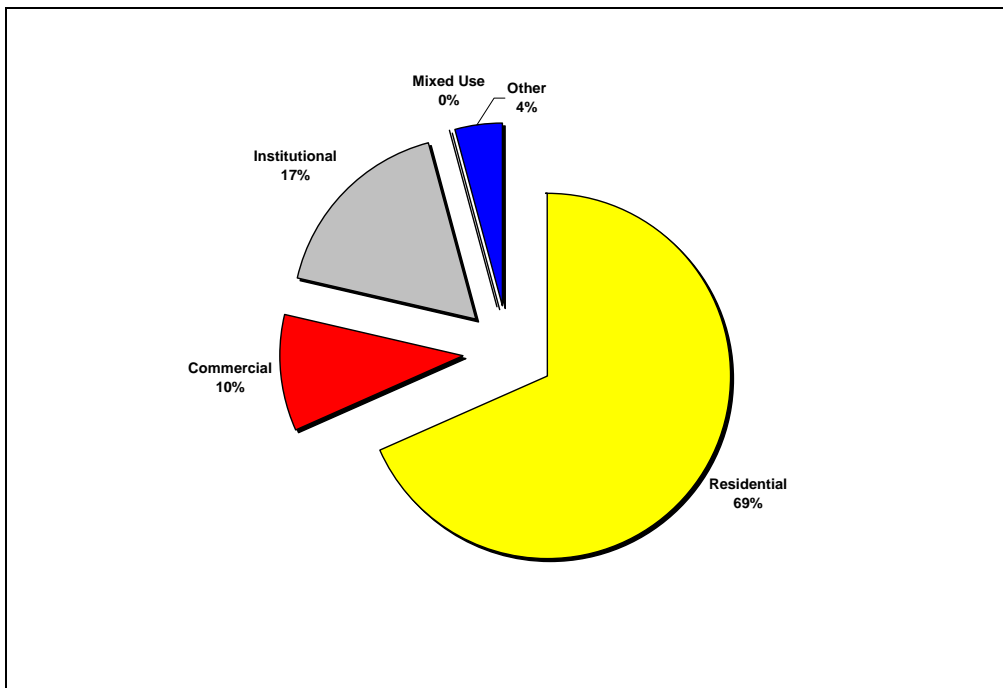
Riviera Village-Inner has the highest job density and accordingly it also has the highest mode-split, with 71 percent of all trips to the center reported to be walking trips. The rich mix of retail shops and restaurants apparently contribute to this. Both apparel and specialty shop densities are 183 per square mile in Riviera Village. The next highest rate for apparel is 22.2 per square mile (in Torrance—Inner, which ranks third in mode-share). Restaurant density is 141.7 per square mile in Riviera Inner. This is only the third highest rate (El Segundo-Inner is first with a rate of 157.1; Torrance-Inner is second with 155.6 per square mile); and restaurants only account for 10.7 percent of neighborhood function businesses (the median is 15.4 percent). In fact in each of the three areas ranking highest in trip capture restaurants comprise a below-median percentage of neighborhood function businesses. The highest ratio is found in El Segundo-Inner, followed by Gardena-Outer.

Riviera Village-Inner has more coffee shops than any of the study areas—4 including a Starbucks’s. It has 2 grocers, one of which is a Trader Joe’s. There are no video stores, no auto-related businesses and only one church. The ratio of barber shops to beauty salons is 1-to-43.

Riviera Village Outer

Riviera Village Outer had the second-highest trip capture rate (52%) and the highest walker rate (43%) of any outer study area.

The land use mix is very similar to the corridor study areas, with 63% residential and 10% commercial.



As was the case with Torrance-Inner and Torrance-Outer, proximity seems to matter with respect to trip capture. Though the Outer portion of Riviera Village ranks lower than the Inner portion on several measures, its proximity to the rich-dense center may influence trip capture or it may just be that residents have a stronger preference for walking than most. Job density here is one-tenth that of the Inner portion and far below both the average and median figures for the study group. In fact, there are only three measures on which Riviera Village-Outer ranks at or above the median. Business services constitute nearly 27 percent of all businesses; the average is 16.7 percent, so perhaps business owners find it convenient to walk to buy supplies or services. There are also more personal care businesses per 1000 residents here (4.0) than on average (3.8), and the percentage of apparel and specialty stores relative to neighborhood function shops (9.1) is roughly half the median (18.8 percent).

Even though job density is believed to be somewhat influential on mode-split, Riviera Village Outer is low in this area (1,354 jobs per square mile versus the median 4,785 per square mile). Population density (10,630 residents per square mile) is above the median (4,785 per square mile).

The ratio of coffee shops-to-churches found in Riviera Village-Inner is reversed in the Outer area: 4 churches, 1 local coffee shop. There is a major chain grocer here (Albertson's), but no video rental shops. The barber-to-beauty shop ratio here is 1-to-23.

Downtown Torrance

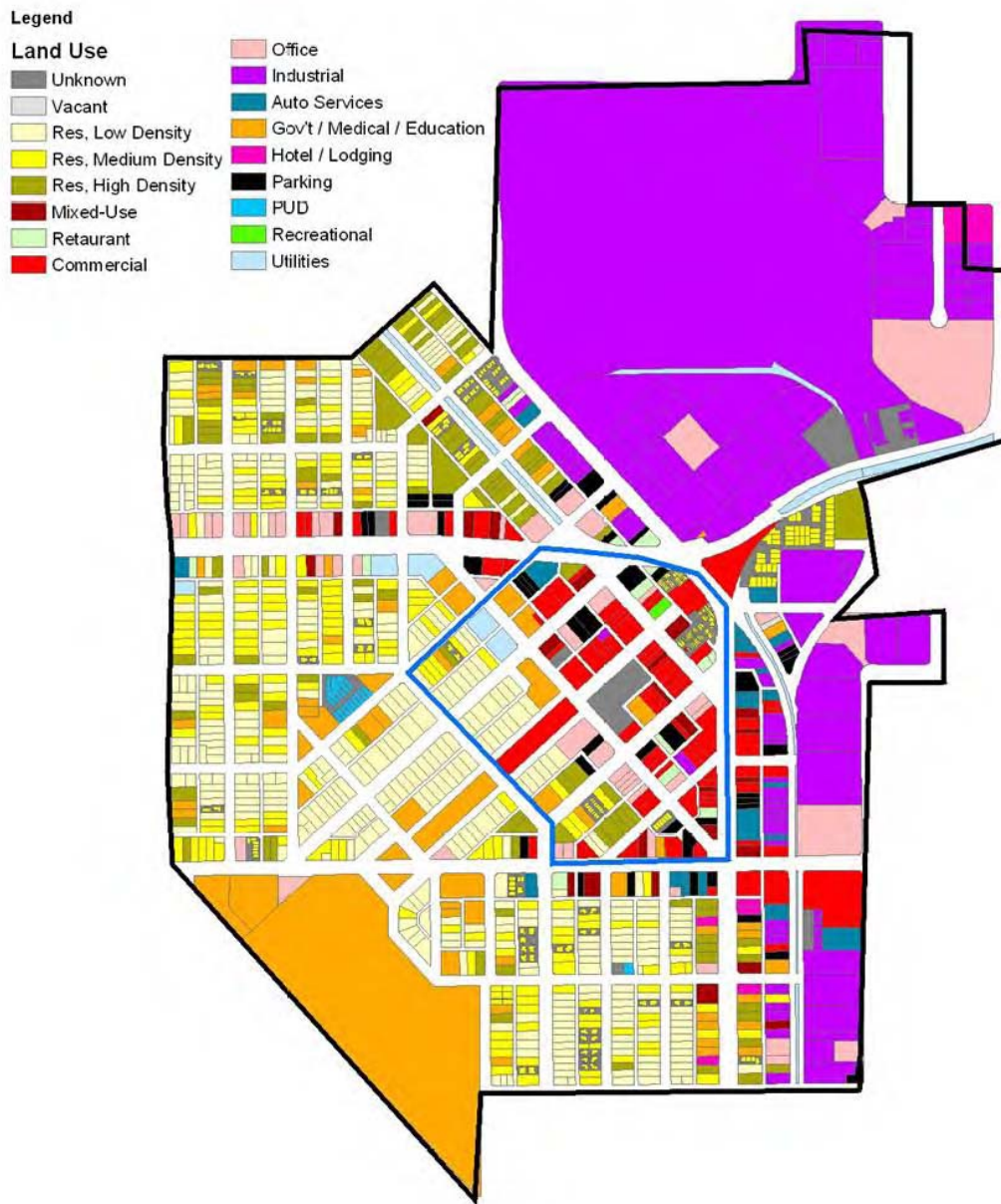
Downtown Torrance is an especially interesting case study for this project because while the commercial core is laid out in village-like fashion, similar to Riviera Village, it retains the flavor of a “planned industrial suburb” in quintessential Los Angeles fashion, surrounded not just by housing but also by large job centers.

For our purposes, Downtown Torrance was defined very much along the classic lines first laid out by the designers who created it almost a century ago. The inner area, 54 acres in size, is bounded by Torrance Boulevard on the north, Cabrillo on the east, Carson on the south, and El Prado and Engracia to the west. The larger area – encompassing 429 acres – stretches approximately from Harpers on the north to 220th on the south and from Madrid on the west to Western on the east.



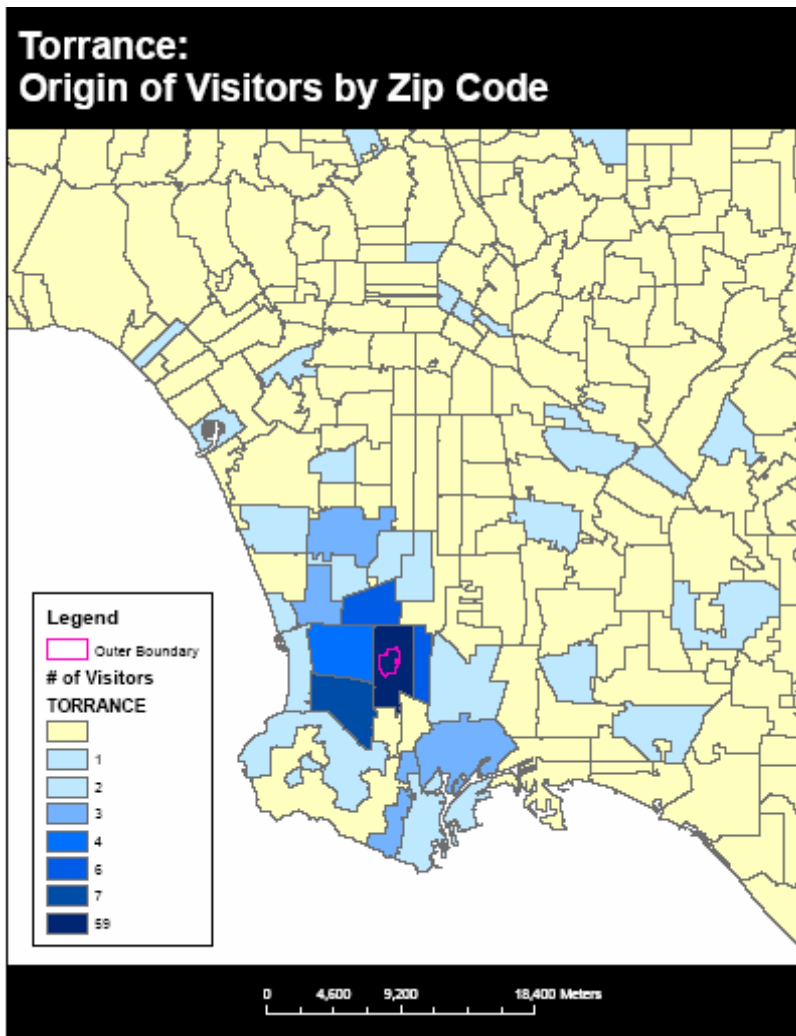
The land use pattern of downtown Torrance is remarkably faithful to the plan laid out by Olmsted. Industrial uses are located northeast of Van Ness and east of Cabrillo, with Honda dominating the landscape north of Torrance Boulevard and east of Van Ness. Residential uses predominate to the west, southwest, and south, although Torrance High School is located in this area as well. Retail and commercial uses predominate in the commercial core, although a few high-density residential projects have been built there in the last decade. Almost 30% of the land is devoted to commercial use in the inner area, but the overall land use profile is diverse.

Old Torrance - Parcel Land Use



Downtown Torrance is characterized by small-scale retail and restaurants in the commercial core and a variety of industrial businesses outside the core. The outer area is dominated by Honda, technically characterized as a “wholesale trade” business, which is located across Torrance Boulevard from the commercial core and has approximately 4,000 employees. Partly for this reason, job density is remarkably consistent across both the inner and outer area.

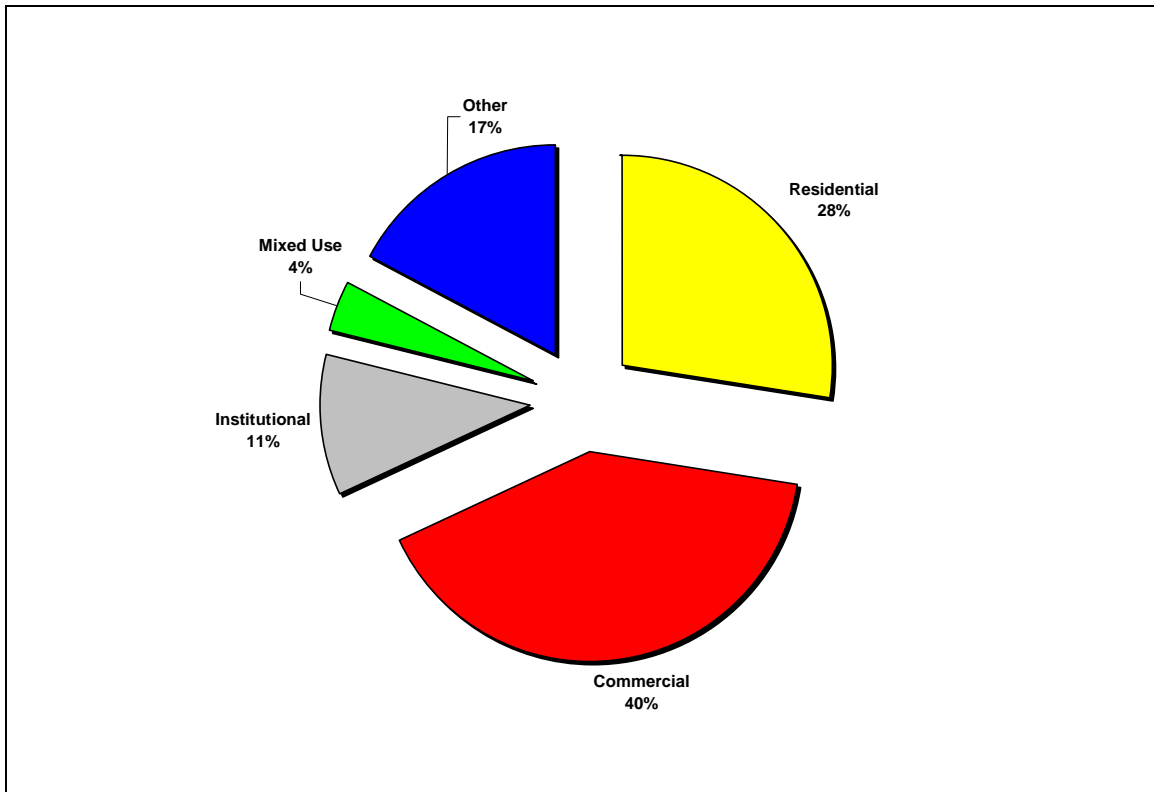
The intercept survey found that most visitors were from Torrance-area zip codes, with a few scattered in far distant zip codes, perhaps because they work at Honda.



Inner Torrance

Inner Torrance has the highest trip capture rate of any study area (69%) and the second-highest walker rate (59%).

It also has the lowest percentage of land devoted to residential of any study area (28%).



Since for this sample there is a relatively high negative correlation between trip capture and population density (-.716), it is not surprising that the area ranks below average in population density compared to all study areas, but it ranks high in other density measures. It ranks second in the number of neighborhood function businesses per square mile (1133.3) and first in density for antique shops, specialty stores. With 7 food and liquor retailers it ranks second in this category; the per-square-mile rate is 77.7 while the median for all study areas is 15.7. It also ranks among the top three in several other density measures: second in density for all retail outlets, personal care services, restaurants and medical and dental offices.

Another way to view the data is with respect to resident population, and in this regard the Inner area of Downtown Torrance outranks most other study areas. With 1.07 jobs per resident, it ranks third with a rate more than twice the average for all study areas and more than three times the median rate. When neighborhood function businesses are measured against population, Inner Torrance has 136.7 retail outlets per 1000 residents—

6 times the median rate. It ranks first in the number of restaurants, specialty shops, and antique and used goods shops, florist and wedding shops and medical/dental offices on the 1000 population basis. It ranks second for the number of personal care services, apparel shops, neighborhood services and food and liquor shops, and third with respect to home and garden furnishings and improvement stores.

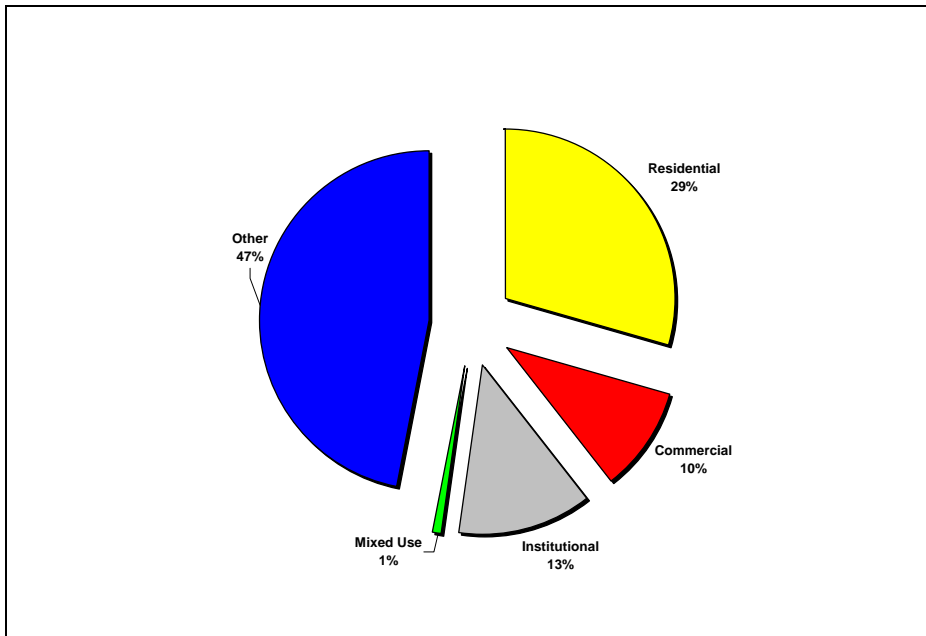
Other characteristics which seem to contribute to Inner Torrance’s high trip capture rate include its higher-than-median ratio of clothing and specialty shops to neighborhood function businesses (.226 versus .188), and its high ratio of medical and dental offices per 1000 population (29.5 versus the median 5.6). The ratio of business services to all business is also slightly above average.

Characteristics that distinguish Torrance-Inner from other areas are the concentration of antique shops and pawnbrokers and the relatively high number and variety of specialty shops compared to the resident population. Curiously there are no coffee shops. While Torrance has a large number of food and liquor retailers relative to the size of its population, no major supermarket chain has a store here. There is one pharmacy, not affiliated with a major chain. The ratio of barber shops to beauty salons is 1-to-14.

Torrance Outer

Torrance Outer had the highest trip capture rate of any outer area (54%) and a high walker rate as well (32%).

Like Torrance Inner, Torrance Outer has only about 29% residential land. The area is dominated by “other” land – mostly industrial land such as that used for American Honda.



The Outer portion of Downtown Torrance ranks second on trip capture (.51) and just barely behind Inner Torrance. Though its population density is slightly lower than the Inner area, its job density is higher—about 9700 jobs per acre, which places second among the study areas. In every other density measure, it appears that Outer Torrance benefits from its proximity to Inner Torrance. Its neighborhood function business density (128.4 outlets per square mile) is below the median (188.7) for all areas. The density of food and liquor shops (11.9) is below the median (15.7), and that for clothing and specialty stores (22) is below both the average (74.8) and the median (37.7).

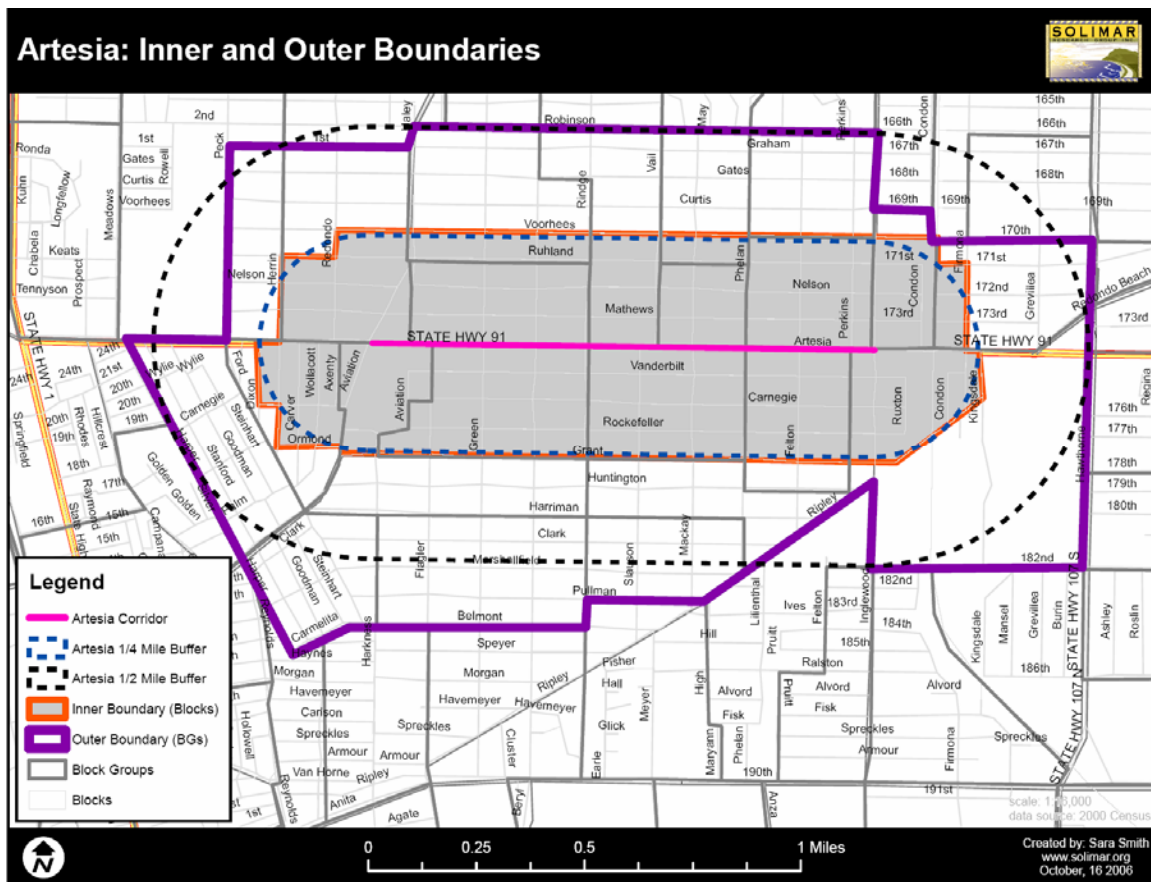
The Outer portion of Downtown Torrance also ranks high on jobs per population (1.71), a measure which seems to have significant explanatory power, but it ranks just slightly above the median for neighborhood function businesses per 1000 population (22.6 versus 14.8). It also ranks above median for the number of medical and dental offices, in which the ratio in Outer Torrance is 7.4 while the median is 5.6. As would be expected given the above-median neighborhood function ration, those for personal care services, specialty shops, neighborhood services, florist and wedding shops, food and liquor stores, and restaurants are also above the respective medians.

The Outer portion of Downtown Torrance ranks in the second tier of study areas with respect to mode-split with about 32 percent of trips reported as walking trips. In nearly every density measure—those we would expect to influence walking—Outer Torrance ranks below both the average and the median. It has slightly fewer clothing and specialty stores relative to the total number of neighborhood function businesses—17.4 percent — than the median (18.9 percent), and restaurants comprise 12.8 percent of neighborhood function businesses, which is below the median (15.4 percent).

Torrance-Outer has 18 automobile related businesses. It has 3 grocery stores, but no major chain. There is no pharmacy, no coffee shop, and 1 video store. The ratio of barber shops to beauty salons is 1-to-11.

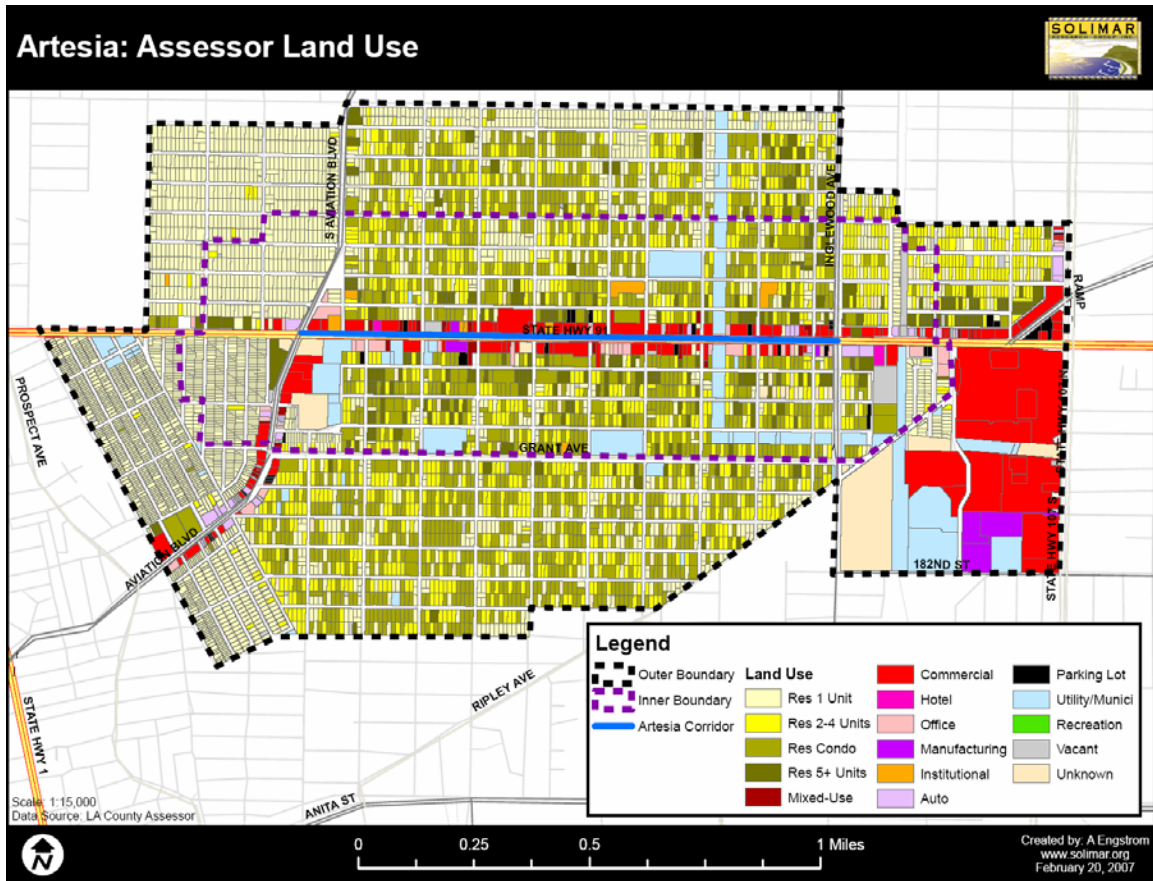
Artesia Boulevard

The 1,309-acre Artesia Boulevard study area is in the northern section of city, between Pacific Coast Highway and Hawthorne Boulevard. The corridor itself is defined by east-west running Artesia Boulevard (State Route 91), between Aviation Boulevard and Inglewood Avenue. It is approximately 1.5 miles south of the Metro terminus. The ¼-mile inner area surrounding the corridor is 522 acres, while the ½-mile outer area is 787 acres. The corridor is served by three municipal bus agencies, with the MTA’s South Bay Galleria Transit Center just blocks away.



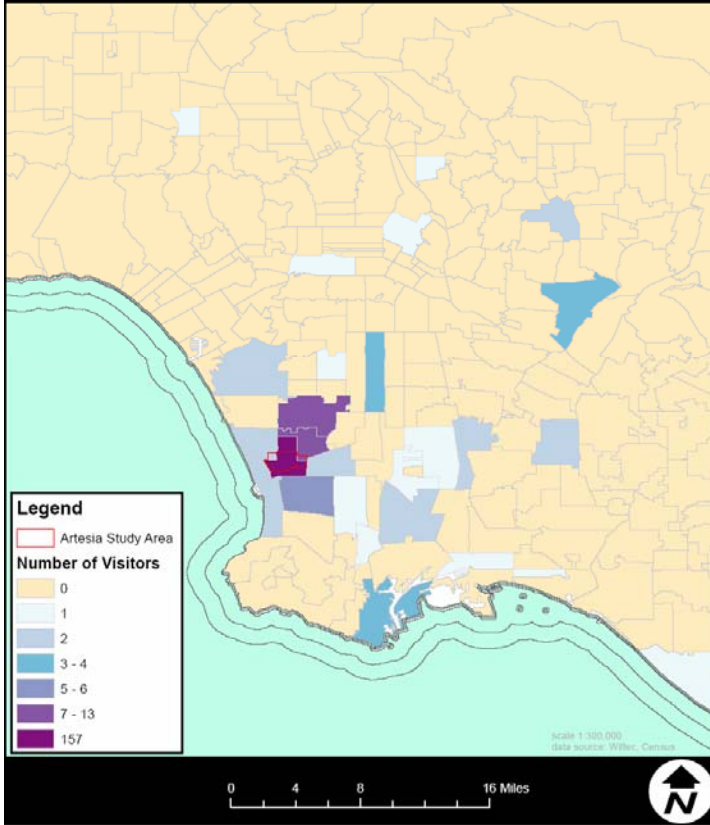
land use pattern of the Artesia Corridor can be best described as a thin “spine” of commercial land penetrating an area of mostly low and medium-density residential land. Unlike Gardena Corridor, commercial land use in the Artesia Corridor area adheres tightly to corridor itself, contained, for the most part, to the blocks lining it. It is not distributed along perpendicular streets. One exception to this pattern is the very significant area of commercial land that is the Galleria at South Bay shopping center, a regional consumer destination located at the far eastern end of the study area. While there

is some high-density housing surrounding Artesia Boulevard, residential land use is largely devoted to medium and low density housing.



Our intercept survey found that the overwhelming majority of respondents live in the immediate zip code, though a few lived elsewhere, especially in adjacent zip codes to the north.

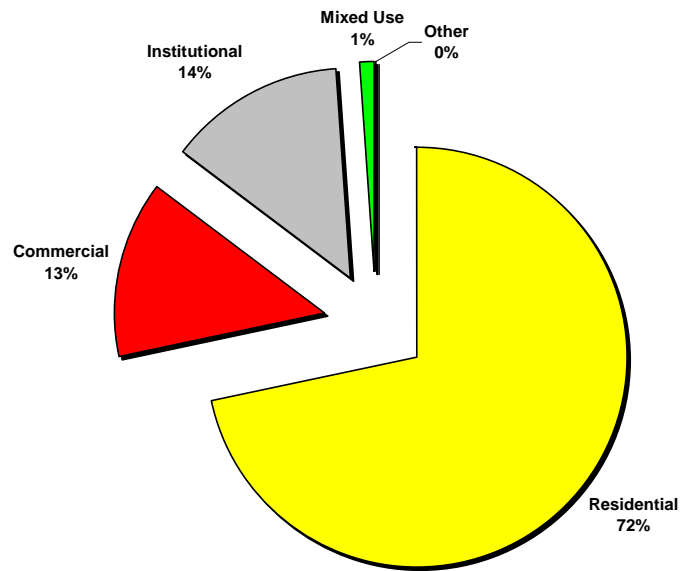
Artesia Boulevard Corridor: Origin of Visitors By Zip Code



Inner Artesia Boulevard

Inner Artesia Boulevard performs well by corridors standards on trip capture (31%) but was the single worst-performing inner area in terms of mode split (only 11% walkers).

Some 72% of the land is devoted to residential use, highest of any inner study area.



Densities for total businesses, retail businesses, clothing and specialty shops, medical and dental offices and food product retailers are below the respective medians. Only for personal care services (40 per square mile) and restaurants (31.7 per square mile) are the densities equal to or above the median. Because the number of business is relatively low, the proportion of retail to business is high compared to other study areas (0.37) versus the median of 0.26). Groceries constitute about the same proportion of neighborhood serving businesses as the median case. Apparel and specialty shops constitute a proportion slightly higher than median (21.3 percent versus 18.8). Restaurants, too, are present at a rate higher than the median (16.8 percent versus 15.4 percent).

The situation is similar on a population basis. Artesia-Inner has 0.16 job per resident, just slightly more than half the median of 0.3 jobs per resident. With 12.7 neighborhood function businesses per 1000 population, it is well below the median of 14.8. No other area has fewer apparel shops per 1000 residents. The rate for Artesia-Outer is less than half (0.2) that of the median (0.5). The number of restaurants per 1000 residents (2.1) is slightly below the median rate (2.7). The rate for Torrance-Inner, which has the highest

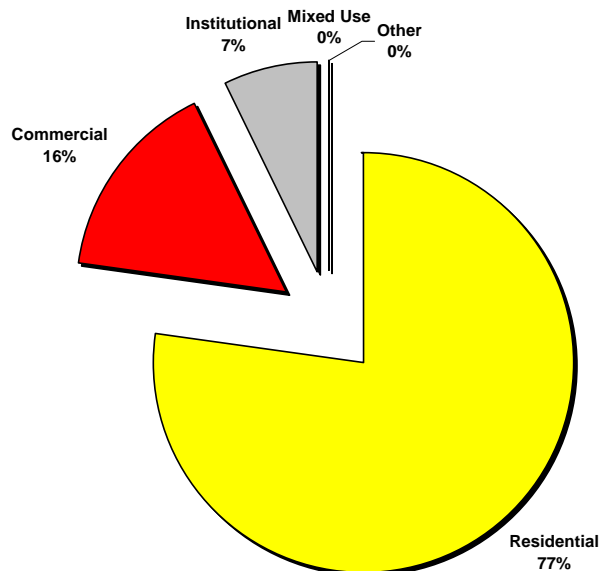
trip capture rate, is 18.8 restaurants per 1000 residents, nearly 9 times greater. The rate food retailers is nearly 9 times higher in Torrance-Inner and for medical and dental offices it is 13 times higher, while for personal care services it is about 6 times higher.

Artesia-Inner has two churches and two synagogues. There are three video shops, three coffee shops (including a Starbucks) and two grocers (one of which is an Albertsons). The one pharmacy is a Rite Aid. There are 13 automobile related businesses in this area. There are no barbers and 16 beauty salons.

Artesia Outer

Artesia Outer had the second-lowest trip capture rate (15%) and the lowest walker rate (4%) of any study area.

Artesia Outer also has the highest percentage of land devoted to residential of any study area (77%).



Population density in Artesia Outer is about 14 percent lower than in Artesia-Inner, but job density is 53 percent lower—the lowest of any areas included in the study. It also has the lowest number of jobs per resident (0.09). There is no measure of density for which Artesia-Outer is equal or greater than the median. This lack of density is reflected in the mode-split number; only four percent of trips to this area are reported as walking trips.

About a quarter of all businesses are classified as retail. The proportion of business serving businesses is slightly higher here than the median (0.19 versus 0.16). Though the density of food product retailers is low, the ratio of these retailers to neighborhood function businesses is slightly higher than the median (0.096 versus 0.092). The same is true of clothing and specialty shops, which comprise about 21.7 percent of neighborhood function businesses (the median is 18.8). The ratio restaurants neighborhood serving businesses is lower than the median (8.4 percent versus 15.4 percent).

The number of neighborhood function businesses on a per population basis is very low here—only 5.3 per resident. The median is 14.8 and in Torrance-Inner and Rivera Village-Inner, which rank first and third in trip capture, the rates are 136.7 and 139.6 per resident respectively. The rates for retail and services per 1000 are all well below the medians.

Artesia-Outer has a fair number of automobile-related businesses (10). It has no churches, no video rental places, no pharmacy and no grocer. It does have a coffee shop—Starbucks. There are no barbers and five beauty salons.

Gardena Boulevard

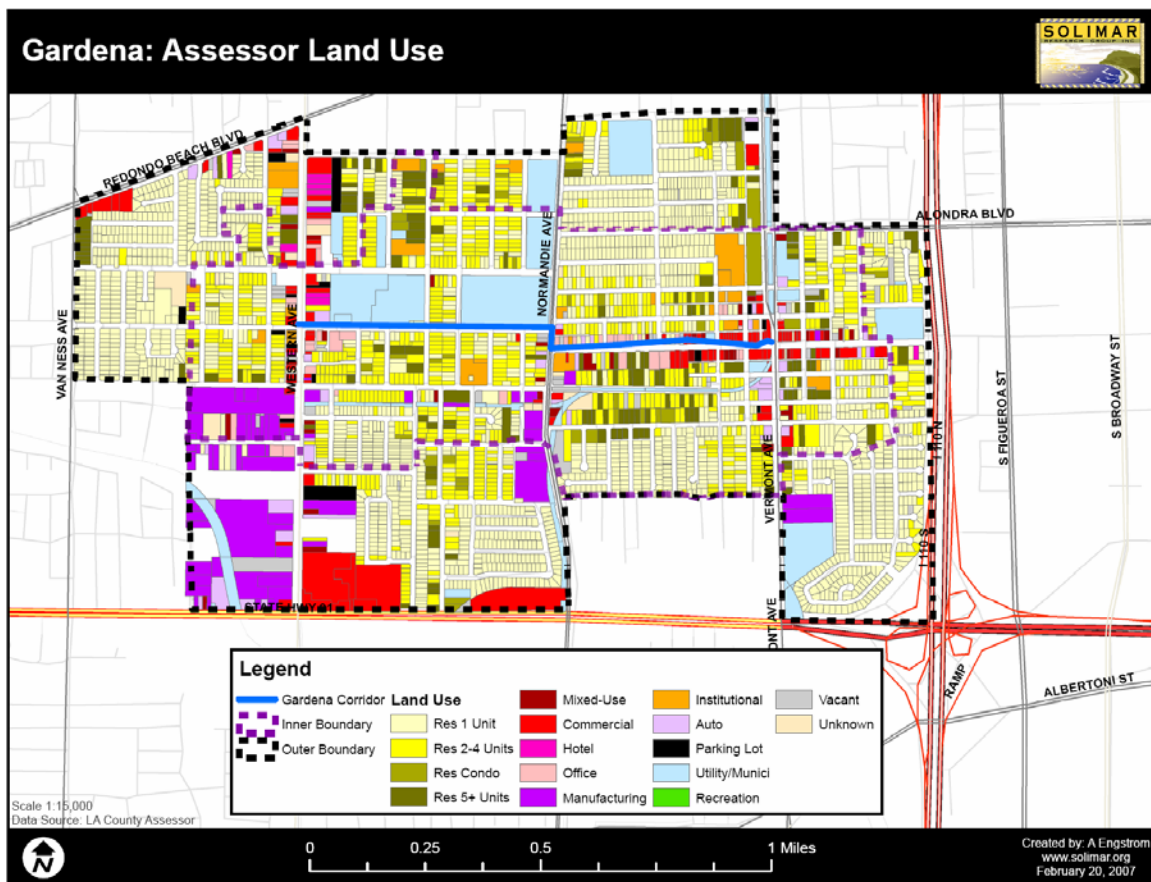
For this study, the Gardena Corridor is defined by Gardena Boulevard from South Vermont Avenue on the east to Western Avenue to the west (see Figure 2.1.1). Although not on one of the city's major arterials, the corridor connects multiple major north-south arterials and is approximately 0.5 miles south of the traditional city center, located at the intersection of Vermont Avenue & 166th Street. It is a largely walkable strip that, according to local city officials, is identifiable by residents due its pedestrian vitality and small, family-operated businesses.

The 1,036-acre corridor study area is home to the Gardena Valley Chamber of Commerce and two Los Angeles Unified School District public institutions. The approximately 495-acre, ¼-mile “inner buffer” study area surrounding the corridor is loosely prescribed by 158th, 170th, Gramercy and South Hoover Streets. The ½-mile “outer buffer,” at about 541 acres, is bounded by 157th Street to the north and 91 Freeway to the south; Van Ness Avenue to the west and the Harbor Freeway to the east.

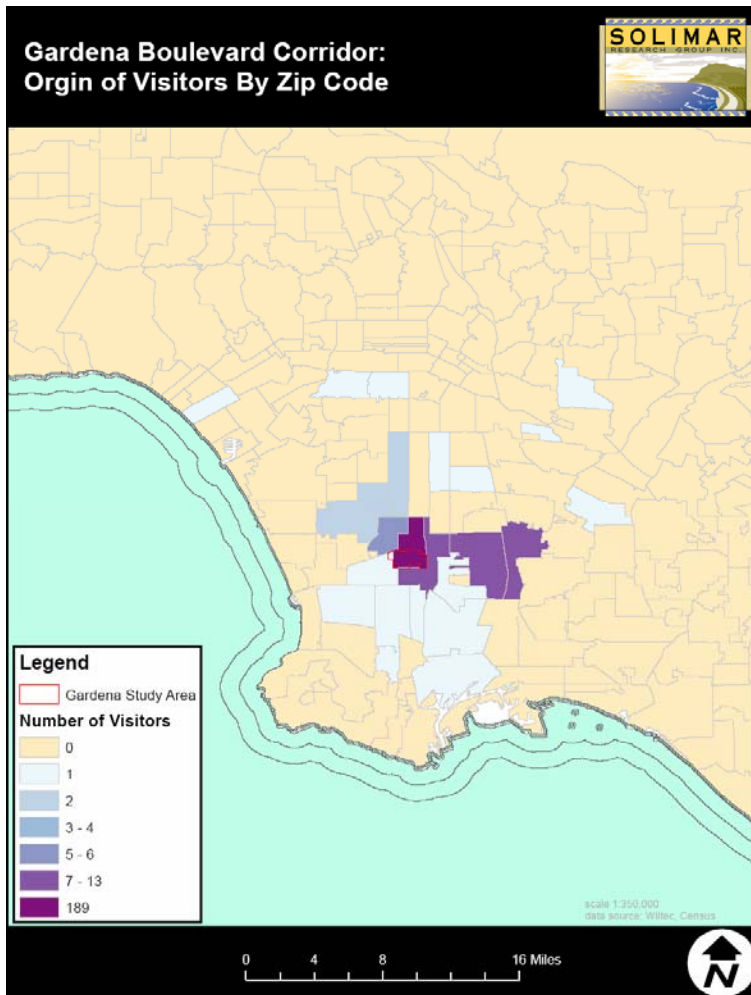
Gardena: Inner and Outer Block Boundaries with Quarter Mile and Half Mile Buffers



Unlike the mixed-use centers of planned industrial suburbs such as El Segundo, where retail and industrial land uses are clustered downtown, land use along Gardena Corridor is largely determined by the arterials that bisect it. The total corridor area is dominated by medium-density residential land. Yet this is interrupted by three considerable “pockets” of commercial use at the intersections of Vermont Ave., Western Ave. and South Normandie with Gardena Boulevard. These commercial zones are distinct in space and character, resulting in an extended commercial spread that is quite different from the mixed-use centers of this study. Lining much of the eastern side of the Corridor, just to the north, is a large swath of public/institutional land use. This area includes City Hall, schools and a community center. Industrial land is limited to an approximately ½-mile by ¼-mile rectangular area in the southwest corner of the study area.



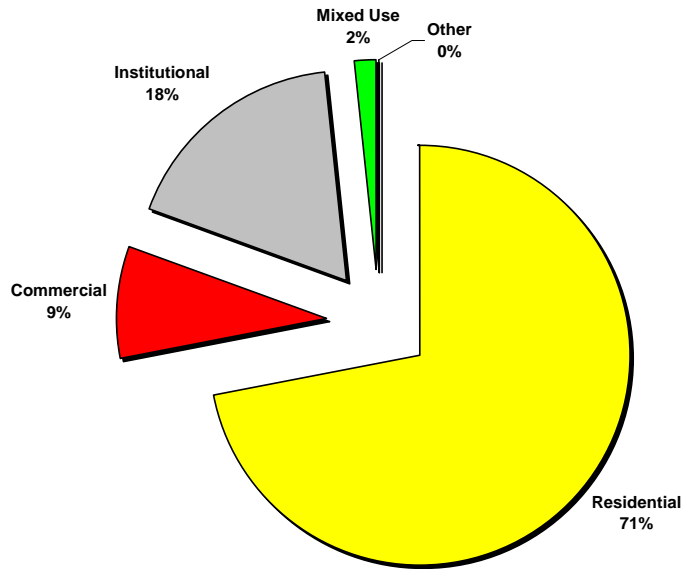
Our intercept survey found visitors to be more concentrated in the immediate zip code than in most other study areas. Some visitors came from the mostly Latino areas to the east.



Gardena Inner

Despite its hometown businesses and small-town feel, Gardena Inner had by far the lowest capture rate (11%) and the second-lowest walking rate (15%) of any inner study area.

Because of the corridor design, it also has a high percentage of residential land in the inner area (71%).



Gardena-Inner has a population density (about 14,500 persons per square mile) that is well above the median (roughly 12,500), but its job density is substantially lower (3.675 per square mile) than the median (4.785). The number of jobs per population (0.25) is also lower than the median (0.32).

Viewed in terms of density, retail outlet and services figures hover around the medians for the study group. Neighborhood function businesses are more densely situated (207.8 per square mile) than the median case (188.7 per square mile). On a population basis, neighborhood function businesses the rate is slightly lower (14.3) than the median (14.8). The per population figure for personal care services is equal to the median (2.8), but the rate for medical and dental offices is well below the median case (3.3 versus 5.6). The ratio of food and liquor shops to 1000 population of 2.2 is well above the median of 1.3.

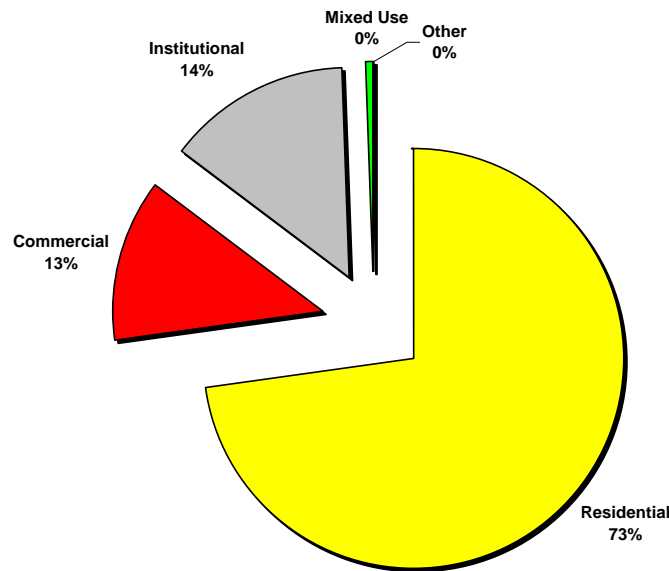
The ratio of retail to total businesses—0.34—is the second highest among the study areas; conversely, the proportion of business serving businesses to all businesses is the lowest (0.09). While the ratio of apparel and specialty shops to neighborhood function businesses is above the median (.225 versus 0.188) as is that for restaurants to neighborhood function businesses (0.175 versus .154), the ratio of food and liquor shops to neighborhood function businesses is the highest in the group (0.156 versus the median of 0.092).

Gardena-Inner has the third highest number of automobile-related businesses (29) and the third highest number of churches (18). It also has the highest number of grocers (9), though none is affiliated with a major chain. There are no coffee shops and only one video rental place. The ratio of barbers to beauty shops here is 7-to-14.

Gardena Outer

Gardena Outer had the lowest trip capture rate (6%) and the lowest walker rate (4%) of any study area.

Gardena Outer has a very high percentage of land devoted to residential (73%).



The most densely populated of the study areas (22,600 residents per square mile), Gardena-Outer has the poorest performance measures of any study area. Job density is substantially above the median in Gardena-Outer (7,140 per square mile versus 4,785), but substantially lower than the job density recorded for the areas with the highest trip capture rates (Torrance-Inner, 8,889; Torrance-Outer, 9,718, and Riviera Village-Inner, 13,808). On a jobs per population basis, this area equals the median (0.32). Neighborhood function business density is well above the median (374.3 per square mile versus 188.7).

Densities for clothing, specialty goods, restaurants and service outlets are generally greater than their respective medians. The rate for specialty shops is 57.1 per square mile, while the median is 31.5; the rate for apparel shops is 11.4 per square mile, while the median is 7.9. There are two standouts: The rate for home and garden decorating and improvement shops is 45.7 per square mile in Gardena-Outer, while the median is 13.1, and the rate for restaurants is 82.9 per square mile, which is 2.7 times the median. When viewed on a per 1000 population basis, the number of restaurants (3.7) exceeds the

median by one (2.7). There are 0.5 apparel shops per 1000 residents in Gardena-Outer, compared to 0.5 in the median case and 19.3 in Riviera Village-Inner. Personal care service outlets exist at the rate of 1.9 per 1000 population (2.8 is the median number). The population-based number for doctors and dentists offices is 2.5, while the median is 5.6; for food and liquor shops it is 0.6, while the median is 1.3 and the figure for Torrance-Inner is 9.4.

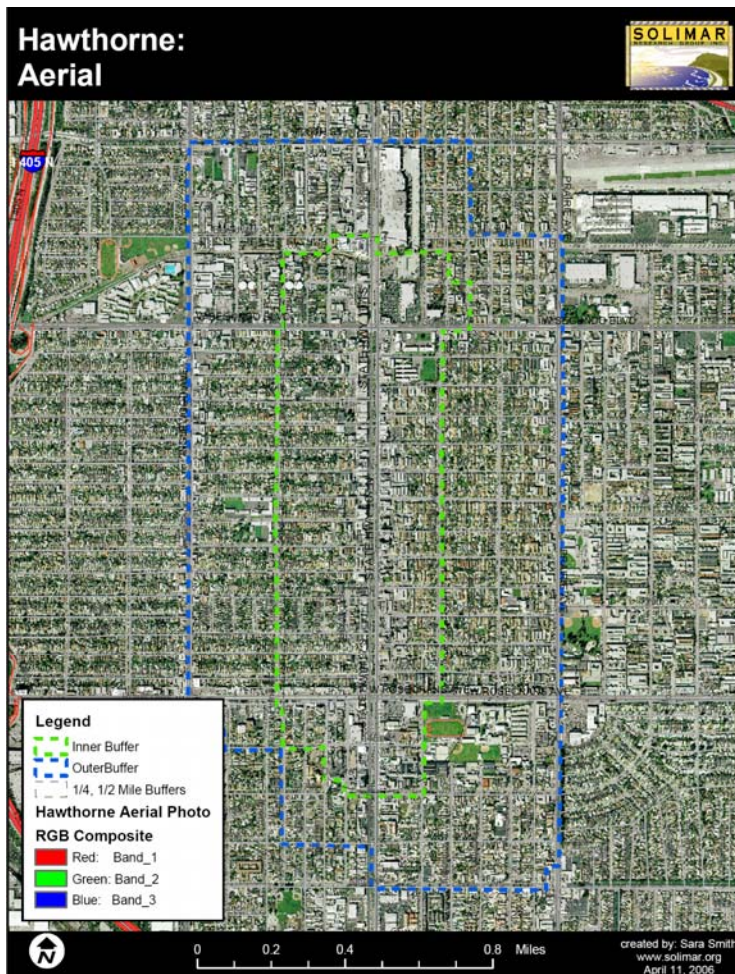
The ratio of retail to business is nearly equal to the median, but that of business serving business to total businesses is lower (0.142) than the median (0.164). The ratios of food and liquor stores to neighborhood function businesses, clothing and specialty shops to neighborhood function businesses are both below the medians for their respective measures. The ratio of restaurants to neighborhood function businesses is higher than the median (0.2214 versus 0.1541).

Gardena-Outer has one grocery, which is not affiliated with a major chain, and two pharmacies, both of which are chains (CVS and Savon). It has ten churches, a video store, and seven beauty salons, but no barber or coffee shop. There are ten automobile-related businesses.

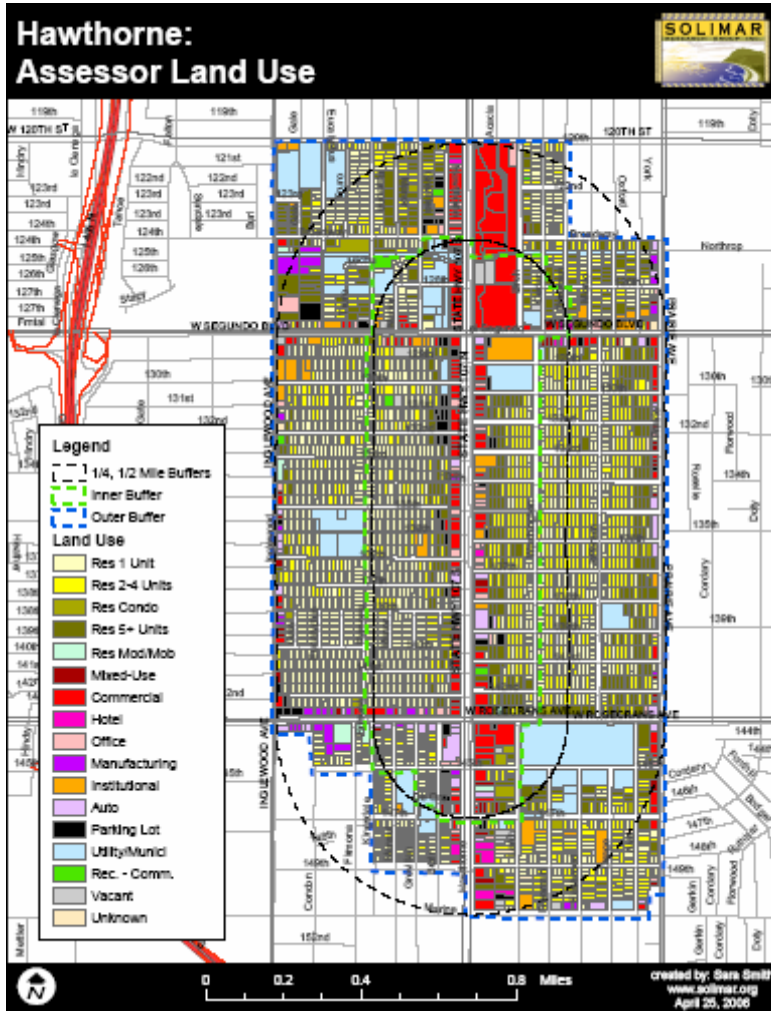
Hawthorne Boulevard

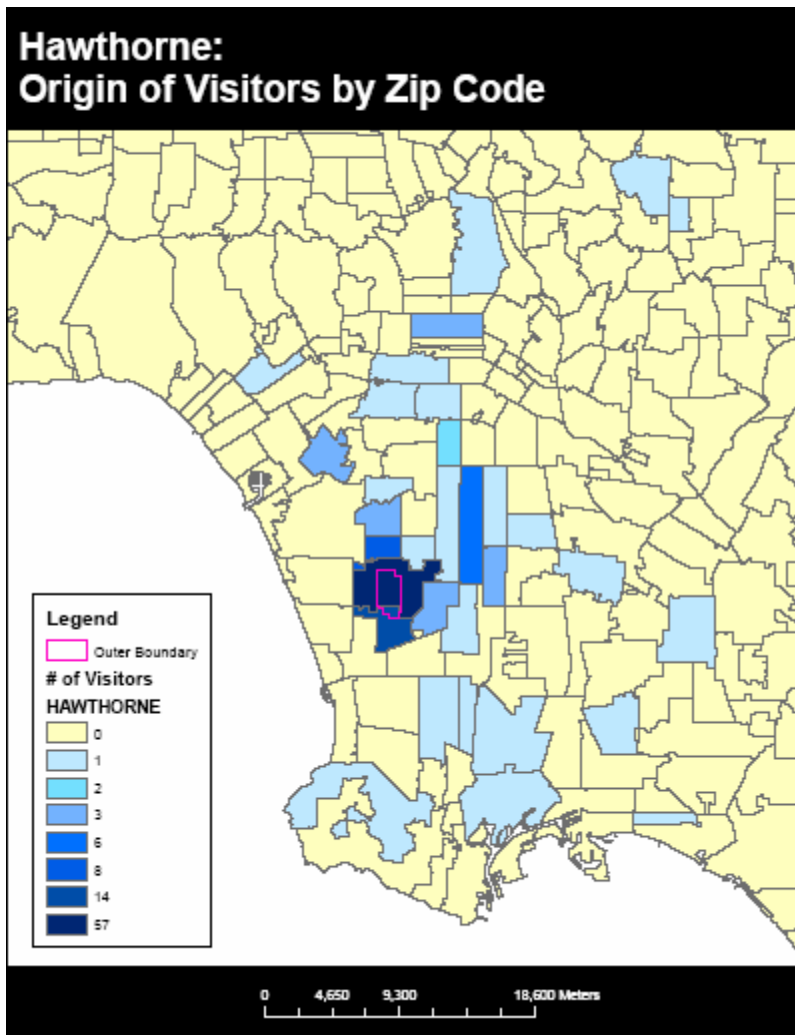
The Hawthorne Boulevard study area is centered on a one-mile stretch of this arterial street, between El Segundo Boulevard to the north and Rosecrans Boulevard to the south, in the City of Hawthorne. Although it is a corridor and not a center, we created an “inner” area as a one-quarter-mile buffer around this one-mile corridor, stretching from approximately Ramona on the West to Washington on the East and from Broadway on the north to 147th on the south. We also created an “outer” area – one-half mile from the corridor – stretching from Inglewood on the west to Prairie on the east (these too are arterial streets) and from 120th on the north to Marine on the south.

This area totals 1,145 acres or almost two square miles. Of this, approximately 395 acres is located in the “inner study area” – a buffer area one-quarter mile from the Hawthorne corridor, while 750 acres is located in the outer area, stretching from one-quarter to one-half mile from the corridor. The northern portion of the buffer area includes the closed Hawthorne Plaza Mall and is also within a half-mile of the Hawthorne Green Line station. Portions of the buffer area to the south are actually located in the City of Lawndale.



Overall the land use pattern is much more uniform than in the centers – with commercial property along Hawthorne Boulevard and residential development in the neighborhoods. Only a few variations exist, including larger commercial spaces at the major arterial intersections and more multi-family residential to the east of Hawthorne Boulevard than to the West.





The visitor intercept survey found visitors to be concentrated in the host zip code, but the bread of the market catchment area appears to be much wider than in most other study areas.

Hawthorne Inner

Hawthorne Inner has a trip capture rate of 35% and a walker rate of 18%, both of which are high for corridors.

While the population density (14,584 persons per square mile) is slightly lower than that of the Inner area, the job density (4,785 per square mile) is equal to the median rate for all areas and is higher than that of the Inner area. Other density measures are also higher than the medians. The total retail density is 232 outlets per mile. There are 47 clothing and specialty shops per square mile (29 is the median), 55 restaurants (38 is the median),

71 personal care services (40 are the median), and 110 medical and dental offices (twice the median rate of 51).

The ratio of business service businesses to all businesses approximates the median (0.169), as does the ratio of clothing and specialty stores to retail shops (0.279, automobile, airplane, and boat dealers excepted). The ratio of shops to restaurants is below the median (0.85 versus 1.03), which may have an effect on the attractiveness of the area for “just walking around,” and hence the trip capture rate.

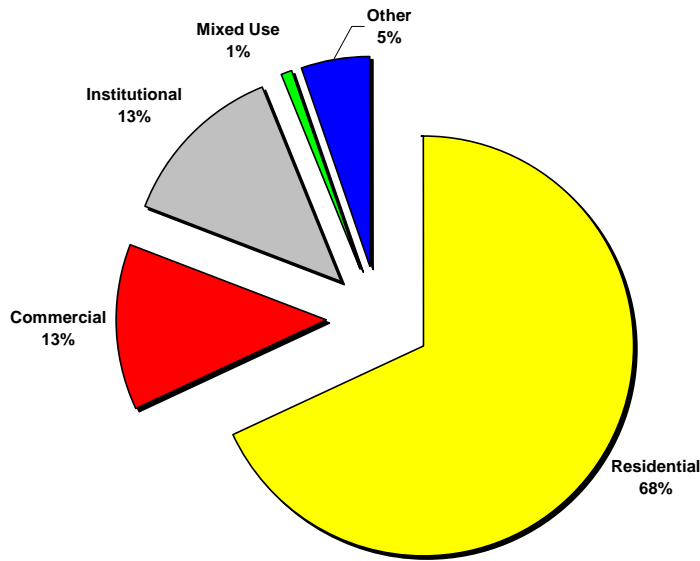
The ratio of jobs to population is equal to the median (0.33) as does the ratio of total retail outlets to 1000 residents. Other measures based on population exceed the median: 1.99 clothing and specialty stores per 1000 residents (1.83 is the median), 4.0 restaurants per 1000 residents (2.9 is the median), 4.9 personal care service businesses per 1000 residents (3.7 is the median), and 7.5 medical and dental offices per 1000 residents (5.7 is the median). Each of these measures is higher than they were for Hawthorne—Outer. This may contribute to the higher mode-split reported in the Inner region—18 percent of trips reported as walking trips versus 8 percent in the Outer area—despite the lower population density.

Hawthorne—Inner has the second highest number of automobile related businesses among our study group—31. It has 3 video shops, 3 grocers, including an Albertson’s, one coffee shop (Starbuck’s) and a pharmacy (Rite Aid). The ratio of barbers to beauty salons here is 3-to-34.

Hawthorne Outer

Hawthorne Outer recorded an excellent trip capture rate for a corridor (38%) but a low walker rate (8%).

The percentage of land devoted to residential uses (68%) is actually somewhat lower than the other corridors and more in line with the outer study areas of the centers.



While population density for this area is above the median (19,138 persons per square mile versus 12,493 per square mile), the job density (2,995 jobs per square mile) is substantially below the median (4,785 per square mile). The density of neighborhood function businesses (132.5 per square mile) is lower than the median (188.7 per square mile). The density measures for apparel stores (9.4 per sq. mi.), specialty shops (15.4 per sq. mi.), restaurants (27.4 per sq. mi.), and personal care services (35 per sq. mi.) are all below the medians (7.9, 31.5, 30.2 and 40.3 respectively). The ratio of restaurants to neighborhood function businesses is .2065, which is above the median of .1541.

The ratio of jobs to population (0.16) is less than half the median (0.33), and every population-based measure is also low. The ratio of 6.9 neighborhood function businesses to 1000 population is far below the median of 14.8. There are only one 1.4 restaurants per 1000 population, while the median for the group is 2.7. Other measures that rank below the median are medical and dental offices (1.7 for Hawthorne-Outer versus the median of 5.7), personal care services (1.8 versus the median of 2.8), food and liquor retailers (0.7 versus the median of 1.3) and specialty stores (0.8 compared to the median of 2.4).

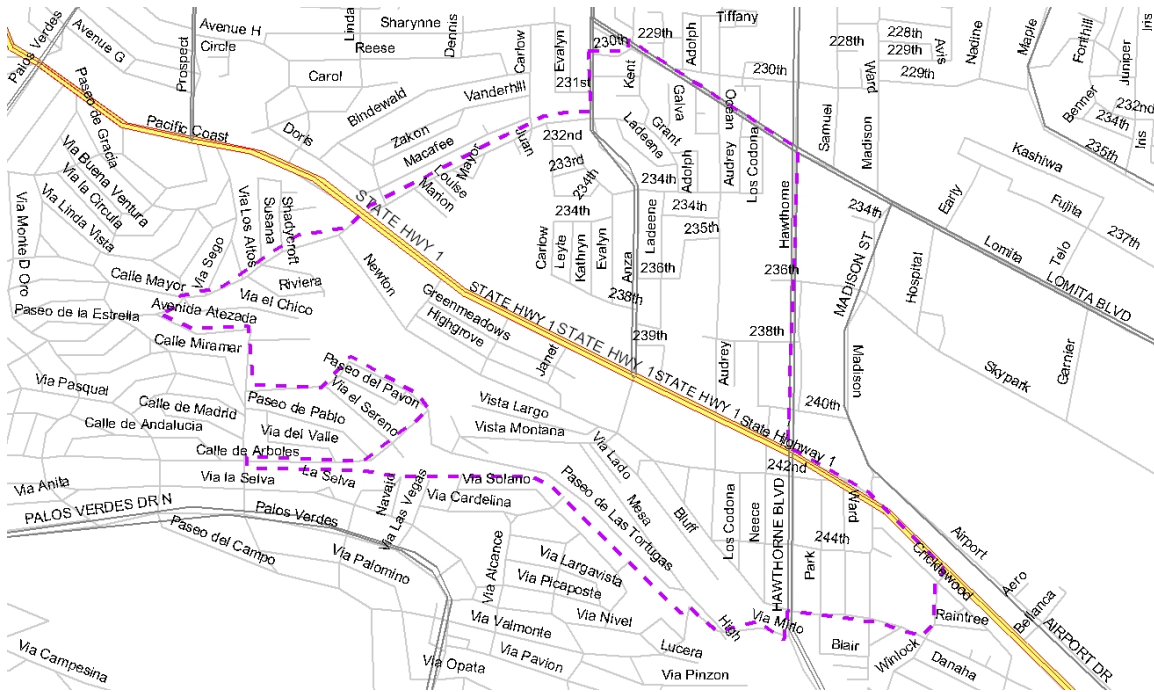
The lower than median densities and low number of neighborhood function businesses per population may contribute to the low mode-split—only 8 percent of trips to the center reported as walking trips.

Of all the study areas, Hawthorne outer has the highest concentration of automobile related businesses—44. It also has a large number of churches (22) and one mosque. While there are four grocers, none is affiliated with a major chain. There are no coffee

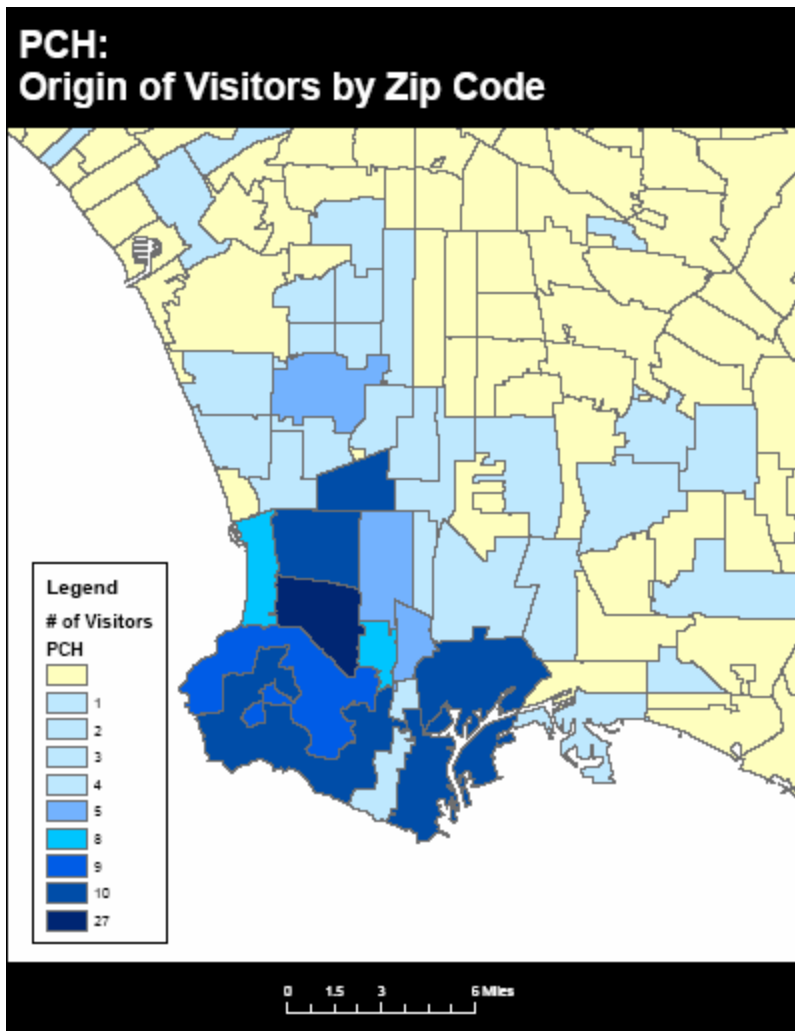
shops or video rental shops. The ratio of barber shops to beauty salons is 4-to-14. No other study area has many barbers; only Hawthorne-Inner and El Segundo-Inner come close (with 3 each).

Pacific Coast Highway

An 828-acre area around the intersection of Pacific Coast Highway and Hawthorne Boulevard was selected in Year 1 as a control area and some analysis of this area was conducted.



As the map below shows, the visitor intercept survey found a profoundly different catchment area, including the entire Palos Verdes Peninsula, suggesting that this study area probably has fewer businesses serving local neighborhood needs.



Despite its auto orientation, the Pacific Coast Highway area did better on both trip capture (48%) and walkers (24%) than any other corridor.

On density measures PCH ranks below the median, however it ranks at or above the median on many of the measures based on population. The jobs per resident ratio is 0.435, while the median is 0.328. And while total number of neighborhood function businesses per resident is higher than the median (23.1 versus 14.8), the number of restaurants per thousand residents (3.5) is higher than the median of 2.7. The numbers of clothing and specialty stores per 1000 resident are equal to the medians for these categories. Personal care services businesses occur at 2.75 times the median rate (7.7 versus 2.8). The number of medical and dental offices per 1000 residents is roughly equal to the median of 5.7. The percentage of neighborhood function businesses represented by restaurants is just slightly below the median (15.3 percent versus 15.4). Food and liquor shops comprise only 5.8 percent while the median for this category is 9.2 percent.

Conclusion and Interpretation

What study area characteristics are associated with center performance? The case studies help answer that question by illuminating the results that are described in the Quantitative Travel Behavior report and in the Performance Report which are part of the South Bay Mixed Use Districts research.

In the regression analysis (described in the Quantitative Travel Behavior report), the results showed that centers generally performed better than corridors. Most of the results that showed consistent mode shifting to walking or higher trip capture rates were from centers, with the exception of Pacific Coast Highway.¹ Why do centers perform better than corridors? The case studies give insight into two characteristics of centers that appear to be related to performance:

1. Focusing retail: The geometry of centers focuses retail activities in a single geographic area, increasing the access from the radially oriented inner and outer rings to that central village. This geometric “village” or “radial inward” orientation appears to facilitate focusing activities in ways that are accessible to a large number of residents, allowing some mode shifting to walking and, in some cases (e.g. Riviera Village) higher trip capture rates.

2. Concentrating diverse types of employment: The centers have employment concentrations that are characterized by both a diverse collection of neighborhood businesses and, in most cases, a robust and dense employment concentration. Both appear to be important, although the case studies give more insights into the role of concentrating neighborhood businesses.

One implication of the two characteristics above is a significant decrease in retail activity when moving from the inner to the outer ring of the centers. Consider Riviera Village, El Segundo, and Torrance Old Town, which consistently outperform the other study areas when judged by the travel behavior performance measures. Note that the inner rings of those three centers are the top three study areas in three key characteristics: (1) neighborhood businesses per 1,000 persons, (2) restaurants per 1,000 persons, and (3) food and liquor stores per 1,000 persons. See the information excerpted from Table 1, below.

Excerpt from Table 1, Neighborhood Services, Food/Liquor, and Restaurants per 1,000 persons

Place	Neighborhood Services	Food & Liquor Shops	Restaurants	
TOTI	5.4	9.4	18.8	per 1K pop
TOTO	1.3	2.1	2.9	per 1K pop
RIVI	9.7	13.2	14.9	per 1K pop
RIVO	0.2	0.3	2.0	per 1K pop
ESI	2.7	3.6	14.7	per 1K pop
ESO	0.0	0.6	1.5	per 1K pop

Note also that in all three of those study areas, there is a dramatic dropoff in the concentration of neighborhood services, restaurants, and food and liquor stores when going from the inner to the outer ring. While the inner ring of each of those three centers is among the top three in measures of neighborhood service, food/liquor, and restaurant concentration among the study areas, a comparison with Table 1 shows that the outer ring values for Riviera Village, El Segundo, and Torrance are all at or below study medians. The dropoff in concentration from the inner to outer ring is important. Note that, from Table 1, corridors differ from Riviera Village, El Segundo, and Torrance not so much in the concentration of neighborhood businesses in the outer ring, but in the corridors' substantially lower concentrations of neighborhood businesses in the inner ring.

Thus we return to the two points suggested above – geometry allows a substantially more robust concentration in the inner rings of centers than in the inner rings of corridors, and the three centers that perform well have a diverse mix of neighborhood serving retail. Both characteristics – concentration allowed in part by centered geography and neighborhood serving retail – appear to be important.

Note that Riviera Village, El Segundo, and Torrance have a diverse mix of neighborhood-serving business, often combined with a strong employment base. Residential density is an important characteristic of these three comparatively well-performing centers, but residential density is not the only characteristic – the diversity of neighborhood businesses and a concentration of employment is also important. Riviera Village, for example, has a full range of businesses and establishments that serve the local population, from a post office to coffee shops, specialty goods and services stores, grocery stores, and medical and dental offices. Similar points apply to El Segundo and Torrance. Torrance combines concentrations of neighborhood businesses in close proximity to the headquarters of Honda, USA. The quantitative travel behavior analysis found evidence that both neighborhood businesses and job density were positively associated with center performance, a point corroborated by the case studies.ⁱⁱ

Presumably neighborhood businesses are related to center performance (e.g. trip capture and shifting trips from driving to walking) because neighborhood businesses help match local consumer demand with locally available supplies of goods and services. While a complete assessment of matches between resident demand and the mix of neighborhood retail is beyond the scope of this study, we examined that issue in relation to two particular neighborhood businesses – restaurants and food/liquor stores.ⁱⁱⁱ (The full analysis is reported in the appendix. Here we summarize the approach and results.)

We ran regressions for trips to eat meals and trips for groceries, using the travel survey data, and we report the regression results in the appendix. Controlling for individual sociodemographic characteristics and individual attitudinal variables, we found that having more restaurants per 1,000 study area residents increases the likelihood that an individual usually walks to eat meals, and more restaurants per 1,000 study area residents also increases the likelihood that an individual's usual trip to eat meals is less than ¼ mile. The same pattern holds for grocery trips – more food and liquor stores per 1,000

study area residents increases both the likelihood that an individual usually walks to the grocery store and the likelihood that the usual grocery store trip is less than ¼ mile. The concentration of food and restaurant establishments (per 1,000 residents) is something that distinguishes the inner rings of Torrance Old Town, Riviera Village, and El Segundo – those three center inner rings have higher concentrations (per 1,000 residents) of grocery and eating places than do other study areas. The regressions in the appendix provide a formal analysis that illustrates how the concentration of those two types of retail establishments increases the likelihood that an individual walks to their center for grocery or meal trips. Based on the case study analysis, it is reasonable to believe that the story goes deeper, and that centers with a concentration of a diverse array of retail activity (possibly supported by nearby employment concentrations) do well in matching local resident demand with shopping opportunities in ways that increase center performance.

What land use change would be needed to make a corridor study area more like one of the centers? As an example, note that Riviera Village inner ring has approximately triple the concentration of both grocery and restaurant establishment types compared to Hawthorne inner ring. How much sustained planning effort would be needed to change the concentration of restaurants or food/liquor stores in Hawthorne inner ring to a concentration similar to Riviera Village inner ring? Could the market sustain an addition of so many new restaurants and food and liquor stores in Hawthorne inner ring? These are important questions, and future studies should pursue market analyses that examine whether the concentration of retail that is typical of the centers in our study can be sustained in corridors in the South Bay. One insight from this study is that centers concentrate retail activity in the inner ring substantially more than do corridors, and so the land use changes imagined to transform Hawthorne to perform more like Riviera Village might be more akin to moving establishments from Hawthorne outer ring to Hawthorne inner ring, rather than adding new establishments to the Hawthorne study area.

Overall, centered geography appears to be fundamental in ways that go beyond mere geometry. The concentration of retail activities in the centers appears to be essential to supporting neighborhood business centers that can serve an outlying population within walking distance. Centers, by their nature, draw consumers from a surrounding market, and if the distances are short enough apparently some of those trips will be by walking. Corridor geographies do not appear to be consistent with the same degree of retail concentration.

Appendix:

Regression Analysis of Grocery and Meal Trips in Relation to Concentrations of Food and Restaurant Establishments

We ran regressions for trips to eat meals and trips for groceries, using the travel survey results. For both trip types, three dependent variables were used: (1) the usual number of trips per week (to eat meals or to buy groceries), (2) whether the travel diary respondent usually walked for the trip purpose (meals or grocery shopping), and (3) whether the survey respondent stated that the usual trip distance for each trip purpose was less than $\frac{1}{4}$ mile. The independent (or right-hand side) variables include measures of the respondent's income, age, whether there are children in the household, and the number of cars per licensed driver in the household. All of those variables are intended to proxy individual demand for meal or grocery trips. We also included variables to measure the concentration of meal and grocery trip destinations. In the regressions for meal travel, we included the number of restaurants per 1,000 persons in the study area. In the regressions for grocery travel, we included the number of food and liquor stores per 1,000 persons in the study area. Study areas are divided into inner and outer rings, except in the case of Pacific Coast Highway, which was not divided into inner and outer rings. El Segundo outer-outer is not included in the below regressions, to match the inner ring – outer ring geography of the other study areas. The omitted categories for the dummy variables are the lowest income level (less than \$15,000 per year) and the oldest age variable (more than 65 years old). The regression for usual number of trips per week was estimated using negative binomial regression, and the regressions for usual mode by walking and usual distance less than $\frac{1}{4}$ mile were both estimated using probit routines.^{iv}

Regression Results, Travel to Eat Meals or Buy Groceries as a Function of Per Capita Density of Restaurants and Food/Liquor Stores in Study Area

	trips to eat meals			trips for groceries		
	number of trips per week	probability usual mode walk	probability usual dist < 1/4 mi	number of trips per week	probability usual mode walk	probability usual dist < 1/4 mi
Income from \$15-35K	-0.3768	0.5830	0.1043	-0.1653	0.2378	-0.0151
	-2.66	1.52	0.29	-1.30	0.51	-0.05
Income from \$35-55K	0.0021	-0.2855	-0.1072	-0.2251	0.0295	-0.1437
	0.02	-0.74	-0.32	-1.89	0.07	-0.46
Income from \$55-75K	-0.0227	-0.1569	-0.4622	-0.2227	-0.1009	-0.0700
	-0.18	-0.42	-1.36	-1.92	-0.23	-0.23
Income from \$75-100K	0.0810	-0.0059	-0.3969	-0.1774	0.0191	-0.1710
	0.66	-0.02	-1.18	-1.53	0.04	-0.56
Income > \$100K	0.1434	0.0579	-0.3123	-0.1672	0.2257	-0.2417
	1.20	0.16	-0.97	-1.49	0.52	-0.82
Age < 25 years	0.4248	0.4778	0.1862	-0.5189	0.7664	0.2255
	3.93	1.43	0.57	-4.17	2.21	0.72
Age from 26 - 40 years	0.2419	0.5350	0.2664	-0.2757	0.6343	0.6221
	3.44	2.37	1.25	-4.23	2.58	3.28
Age from 41-65 years	0.1084	0.4217	0.1359	-0.1472	0.2661	0.2888
	1.63	1.95	0.67	-2.49	1.11	1.57
Anychildren (= 1 if children in hh)	-0.0786	-0.2509	0.0586	0.0896	-0.3878	0.0833
	-2.06	-2.19	0.51	2.33	-2.86	0.87
Cars per licensed driver	0.0012	-0.0272	-0.1166	-0.0319	-0.0803	0.0716
	0.03	-0.23	-0.75	-0.75	-0.54	0.63
Restaurants per 1,000 residents	0.0022	0.0572	0.0465			
	0.54	6.06	4.58			
Food and liquor shops per 1,000 residents				0.0128	0.0845	0.0744
				1.77	4.60	4.66
Constant	0.8599	-1.9743	-1.4747	1.1198	-2.1045	-1.6969
	6.18	-4.76	-3.70	8.77	-4.26	-4.82
Number of observations	1359	1327	1321	1408	1392	1392
Pseudo R-squared	0.0136	0.0781	0.0443	0.0088	0.0729	0.0435

Notes: Negative binomial regression used for usual number of trips per week, probit used for probability of usual mode = walking and probability of usual distance < 1/4 mile. Z-statistics in italics below coefficients. Variables significant at 10 percent two-tailed level shown in bold.

While our focus is on the retail concentration variables – the number of restaurants and the number of food and liquor stores per 1,000 study area residents – we first discuss the significant demographic variables. Briefly, the regression results show that younger persons without children in the household eat out more and go to the grocery store less.

Individual factors are not as important (i.e. statistically significant) in determining the probability of walking or the likelihood that the usual trip is less than ¼ mile, with the exception that young and middle-aged persons are more likely to walk than are the elderly.

The retail concentration variables are highly significant in the regressions for usual mode by walking and usual distances less than ¼ mile, but less significant in the regressions for the usual number of trips per week. The general pattern is that the number of trips per week is determined by individual and household characteristics, not so much by study area characteristics (in this case, retail establishment concentration), while the usual mode and usual distance are associated with study area characteristics. This is consistent with the pattern of results from the quantitative travel behavior analysis. More restaurants per 1,000 study area residents increase the likelihood that an individual usually walks to eat meals, and more restaurants per 1,000 study area residents increase the likelihood that an individual's usual trip to eat meals is less than ¼ mile. The same pattern holds for grocery trips – more food and liquor stores per 1,000 study area residents increases both the likelihood that an individual usually walks to the grocery store and that the usual grocery store trip is less than ¼ mile. The number of food and liquor stores per 1,000 study area residents is significantly positive, at the ten percent two-tailed level, in the regression for the number of grocery store trips, providing evidence that concentrations of food and liquor stores induce additional grocery trips, reinforcing a conclusion from the quantitative travel behavior analysis.

Next we discuss the magnitude of a change in the concentration of restaurants or food and liquor stores. For probit regressions, magnitudes are interpreted as a change in the probability of an outcome for a change in an independent variable. For example, we would want to know the change in the probability that a person's usual mode (for meal or grocery trips) is walking given a change in the concentration of retail establishments (the number of restaurants or food and liquor stores per 1,000 persons.) That effect cannot be read directly from the regression coefficients in the above table, as the coefficients show the change in a cumulative normal probability density. Without going into full detail, one has to work backwards from a change in the cumulative normal probability density to a change in probabilities to understand the marginal effects – how, e.g., the probability of walking to meals changes with a change in the number of restaurants per 1,000 study area residents. We use the `dprobit` routine in the Stata software package to calculate these marginal effects. The resulting magnitudes are as follows:

For a one unit change in the number of restaurants per 1,000 persons, the probability that a survey respondent usually walks for meal trips increases by 0.00765.

For a one unit change in the number of food and liquor stores per 1,000 persons, the probability that a survey respondent usually walks for meal trips increases by 0.00754.

We work through examples to illustrate these magnitudes. Increasing the number of restaurants per 1,000 study area residents by 10 will result in a 0.07 (or 7 percent) increase in the probability that a study area resident usually walks to meal trips. The

increase in the number of restaurants per 1,000 residents is similar to the gap between the values in Hawthorne inner ring (3.0 restaurants per 1,000 study area residents) and Riviera Village inner ring (14.9 restaurants per 1,000 study area residents.) If the restaurant concentration in Hawthorne inner ring is increased from 3.0 to 13.0 restaurants per 1,000 study area residents, the probability that a resident of Hawthorne inner ring will usually walk for meal trips increases by 7 percentage points (or by 0.07, if probability is represented as a proportion from 0 to 1.) A change in restaurant concentration from 3.0 to 13 per 1,000 residents implies an increase from 27 to 118 restaurants in Hawthorne inner ring (based on Hawthorne inner ring's population of 9,042) – a very large change. Let us assess the impact of a somewhat more reasonable change. If the number of restaurants in Hawthorne inner ring increased by 10 (which is approximately a one-third increase in the existing number of restaurants in that study area), the number of restaurants per 1,000 study area residents would increase from 3 to 4.1 (27 plus 10 divided by 9.042), which implies approximately a 0.00765 (or 0.765 percent) increase in the probability that a Hawthorne resident will usually walk to eat meals. Given that there are 9,042 Hawthorne inner ring residents, an increase in 10 restaurants in Hawthorne inner ring would imply that 69 more residents would usually walk for meal trips.

The change in probability from increasing food and liquor stores is, by happenstance, of a very similar magnitude. If the number of food and liquor stores per 1,000 residents were increased from Hawthorne inner ring's current value of 2.2 to Riviera Village inner ring's current value of 13.2, that would increase the likelihood that a Hawthorne inner ring resident usually walks for grocery trips by approximately 0.07 (or 7 percent). A more realistic increase in the concentration of food and liquor stores per 1,000 residents, from 2.2. to 3.2, would be associated with an increase of 0.00754 in the probability of usually walking to the grocery store, which would translate into an additional 68 (of the 9,042) Hawthorne residents who usually walk to buy groceries.

Having spoken about these changes as if they are causal, a caution is in order. The regression models shown above are intended to give insight into associations and possibilities, and certainly many factors are related to walking travel. The examples given here are intended to be illustrative, and inferring the magnitude of a causal impact from a change in restaurant or food/liquor establishment concentration to walking probabilities goes beyond the capability of this study. Still, the analysis of magnitudes is informative.

Endnotes

Trip Capture, Mode-Split, Number of Shops by Category per 1000 Population and Number of Shops by Category per Square Mile

Place	Trip Capture	Mode-Split	Antiques	Personal Care Services	Apparel	Specialty	Neighborhood Services	Florist & Wedding Shops	Home & Garden	Food & Liquor Shops	Restaurants	
TOTI	0.52		16.1	16.1	2.7	28.2	5.4	2.7	2.7	9.4	18.8	per 1K pop
		0.59	133.3	133.3	22.2	233.3	44.4	22.2	22.2	77.8	155.6	per sq. mi.
TOTO	0.51		0.0	3.4	0.3	3.7	1.3	1.3	0.5	2.1	2.9	per 1K pop
		0.32	0.0	19.4	1.5	20.9	7.5	7.5	3.0	11.9	16.4	per sq. mi.
RIVI	0.42		3.5	50.0	19.3	19.3	9.7	2.6	1.8	13.2	14.9	per 1K pop
		0.71	33.3	475.0	183.3	183.3	91.7	25.0	16.7	125.0	141.7	per sq. mi.
RIVO	0.41		0.3	4.0	0.3	0.8	0.2	0.2	0.3	0.3	2.0	per 1K pop
		0.32	3.6	42.9	3.6	8.9	1.8	1.8	3.6	3.6	21.4	per sq. mi.
PCH	0.39		0.3	7.7	0.5	2.3	0.8	0.2	4.4	1.3	3.5	per 1K pop
		0.24	2.3	62.8	3.9	18.6	6.2	1.6	35.7	10.9	28.7	per sq. mi.
HAWO	0.32		0.0	1.8	0.5	0.8	0.4	0.1	0.4	0.7	1.4	per 1K pop
		0.08	0.0	35.0	9.4	15.4	8.5	1.7	7.7	12.8	27.4	per sq. mi.
HAWI	0.31		0.0	2.8	0.8	2.1	0.7	0.4	1.0	2.2	3.0	per 1K pop
		0.18	0.0	40.3	11.3	30.6	9.7	6.5	14.5	32.3	43.5	per sq. mi.
ESI	0.3		0.4	12.5	1.3	5.8	2.7	0.9	4.5	3.6	14.7	per 1K pop
		0.69	4.8	133.3	14.3	61.9	28.6	9.5	47.6	38.1	157.1	per sq. mi.
INGO	0.28		0.2	1.6	0.4	1.0	0.5	0.6	0.8	1.3	1.2	per 1K pop
		0.27	2.7	22.7	6.4	13.6	7.3	8.2	10.9	19.1	17.3	per sq. mi.
ARTI	0.25		0.2	2.7	0.2	2.5	0.7	0.1	1.0	1.1	2.1	per 1K pop
		0.13	3.7	40.2	3.7	36.6	9.8	1.2	14.6	17.1	31.7	per sq. mi.
ESO	0.25		0.6	0.9	0.3	3.5	0.0	0.6	0.9	0.6	1.5	per 1K pop
		0.33	5.4	8.1	2.7	32.4	0.0	5.4	8.1	5.4	13.5	per sq. mi.
ARTO	0.24		0.1	0.6	0.3	0.9	0.2	0.1	0.7	0.5	0.4	per 1K pop
		0.04	0.8	8.1	3.3	11.4	2.4	0.8	8.9	6.5	5.7	per sq. mi.
GARDO	0.14		0.0	1.9	0.5	2.5	1.0	0.0	2.0	0.6	3.7	per 1K pop
		0.04	0.0	42.9	11.4	57.1	22.9	0.0	45.7	14.3	82.9	per sq. mi.
GARDI	0.12		0.3	2.8	0.9	2.3	0.2	0.7	0.8	2.2	2.5	per 1K pop

		0.15	3.9	40.3	13.0	33.8	2.6	10.4	11.7	32.5	36.4	per sq. mi.
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	Neighborhood Businesses Per Square Mile	Neighborhood Businesses/ 1K Population	Grocery/ Neighborhood Businesses	Apparel & Specialty/ Neighborhood Businesses	Density Apparel & Specialty	Restaurant/ Neighborhood Businesses	Density Personal Care Services	Density Medical- Dental	Medical- Dental/ 1K Population
TOTI	1133.3	136.7	0.069	0.2255	255.6	0.1373	133.3	244.4	29.5
TOTO	128.4	22.6	0.093	0.1744	22.4	0.1279	19.4	41.8	7.4
RIVI	1325.0	139.6	0.094	0.2767	366.7	0.1069	475.0	608.3	64.1
RIVO	137.5	12.9	0.039	0.0909	12.5	0.1558	42.9	17.9	1.7
PCH	188.4	23.1	0.058	0.1193	22.5	0.1523	62.8	46.5	5.7
HAWO	132.5	6.9	0.097	0.1871	24.8	0.2065	35.0	32.5	1.7
HAWI	222.6	15.3	0.145	0.1884	41.9	0.1957	40.3	109.7	7.5
ESI	661.9	62.1	0.058	0.1151	76.2	0.2374	133.3	76.2	7.1
INGO	127.3	9.0	0.150	0.1571	20.0	0.1357	22.7	128.2	9.0
ARTI	189.0	12.7	0.090	0.2129	40.2	0.1677	40.2	32.9	2.2
ESO	127.0	13.7	0.043	0.2766	35.1	0.1064	8.1	51.4	5.5
ARTO	67.5	5.3	0.096	0.2169	14.6	0.0843	8.1	10.6	0.8
GARDO	374.3	16.6	0.038	0.1832	68.6	0.2214	42.9	57.1	2.5
GARDI	207.8	14.3	0.156	0.2250	46.8	0.1750	40.3	48.1	3.3
Median	188.7	14.8	0.092	0.1878	37.7	0.1541	40.3	49.7	5.6

Trip Capture and Mode-Split: What Seems to Matter

As indicated in the Performance Report dated March 30, 2007, several measures used in this study are correlated to the trip capture and mode-split measures. Several are strongly correlated. The correlation between mode-split and total retail density is .78, as is the one between mode-split and shops and restaurant density. The correlation between mode-split and population density is -.62. The correlation figure for trip capture and jobs per population is .69, while that between trip capture and population density is -.71. As noted in the Performance Report, the correlations indicate a relationship, but they do not imply causality.

Regression techniques can be used to determine whether a causal relationship exists, however given the small number of observations in this portion of the study (14), it is hard to invest too much in the results. But that said, simple Ordinary Least Squares regressions suggest that two measures may have statistically significant explanatory power with respect to trip capture and mode-split. Population density and job density considered separately and on their own have some impact on each of these measures. The other variables available are almost certainly spatially autocorrelated, which renders inferences about the significance levels unreliable. The data set available for this analysis did not include sufficient information to allow correction for the spatial autocorrelation.

The results of the simple (one variable) OLS regressions are shown in table form below. For this limited sample (14 observations), population density explained about 48 percent of the variation in trip capture rates. Jobs per resident population explained about 43 percent of the variation in trip capture rates. Job density explained much less of the variation in trip capture, only about 14 percent (Adjusted R-squares are cited in all instances). For mode-split, job density does the best job of explaining the variation—about 42 percent. Population density only explains about 34 percent, while jobs per resident population explained about 39 percent.

reg tripcap popdens

Source	SS	df	MS	Number of obs = 14	
-----+				F(1, 12) =	12.62
Model	.097269534	1	.097269534	Prob > F =	0.0040
Residual	.092501879	12	.00770849	R-squared =	0.5126
-----+				Adj R-squared =	0.4719
Total	.189771413	13	.014597801	Root MSE =	.0878
-----+					
tripcap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
-----+					
popdens	-.0000189	5.32e-06	-3.55	0.004	-.0000305 -7.30e-06

_cons	.5545069	.0704417	7.87	0.000	.4010276	.7079861
-----+-----						

reg trip_cap jobpop

Source	SS	df	MS	Number of obs =	14
Model	.090617373	1	.090617373	F(1, 12) =	10.97
Residual	.09915404	12	.008262837	Prob > F =	0.0062
Total	.189771413	13	.014597801	R-squared =	0.4775
				Adj R-squared =	0.4340
				Root MSE =	.0909

trip_cap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
jobpop	.1624508	.0490547	3.31	0.006	.0555698 .2693318
_cons	.2315442	.0357883	6.47	0.000	.1535681 .3095203

reg trip_cap jobdens

Source	SS	df	MS	Number of obs =	14
Model	.038820592	1	.038820592	F(1, 12) =	3.09
Residual	.150950821	12	.012579235	Prob > F =	0.1044
Total	.189771413	13	.014597801	R-squared =	0.2046
				Adj R-squared =	0.1383
				Root MSE =	.11216

trip_cap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
jobdens	.000015	8.53e-06	1.76	0.104	-3.60e-06 .0000336
_cons	.237948	.054816	4.34	0.001	.1185143 .3573817

reg mode_split jobdens

Source	SS	df	MS	Number of obs =	14
Model	.30876592	1	.30876592	F(1, 12) =	10.58
Residual	.350269759	12	.029189147	Prob > F =	0.0069
Total	.659035679	13	.050695052	R-squared =	0.4685
				Adj R-squared =	0.4242
				Root MSE =	.17085

mode_split	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
jobdens	.0000422	.000013	3.25	0.007	.0000139 .0000705
_cons	.0647667	.0835008	0.78	0.453	-.1171659 .2

ⁱ Summarizing the regression results from the Quantitative Travel Behavior report, there was little evidence that centers (Torrance, Inglewood, Riviera Village, El Segundo) reduced driving trip generation. There was some evidence that persons walk more, on a daily basis (based on the one-day travel diary) in Riviera Village, El Segundo, Pacific Coast Highway, Hawthorne, and Artesia inner ring. (When we do not specify inner or outer ring, the result pertains to both the inner and outer ring of the study area.) Persons were more likely to report that they usually traveled to their center by walking in Riviera Village, El Segundo, Torrance Old Town outer ring, Inglewood outer ring, and Pacific Coast Highway. Looking at trip types, the most pronounced effects were for meal and grocery trips, and those two trip types will be analyzed further later in this section. Persons were more likely to report that they usually walked for meal trips in Riviera Village, El Segundo, Torrance outer ring, and Inglewood outer ring. Persons were more likely to report that they usually walked for grocery trips in Riviera Village, El Segundo, Inglewood outer ring, Artesia inner ring, and Gardena inner ring. All these results are from regressions that controlled for individual sociodemographic and attitudinal variables.

ⁱⁱ The Performance Report also gives hints about the importance of retail functions and concentration as opposed to population density. As indicated in the Performance Report dated March 30, 2007, measures of retail density are correlated with the trip capture and mode-split measures, while population density, by itself, is not associated with better performance. The correlation between mode-split and total retail density is .78, as is the one between mode-split and shops and restaurant density. The correlation between mode-split and population density is -.62. The correlation figure for trip capture and jobs per population is .69, while that between trip capture and population density is -.71. As noted in the Performance Report, the correlations indicate a relationship, but they do not imply causality.

ⁱⁱⁱ The quantitative travel behavior analysis showed that meal and grocery trips were among the most likely sources of travel behavior change, including mode shifting from driving to walking. Hence it is sensible to more closely examine those two trip types and the link from meal and grocery travel to restaurants and food/liquor establishments in the study areas.

^{iv} We also tested regressions with only the income variables, excluding the variables for age, number of children in the household, and cars per licensed driver. The sign and significance on the variables for restaurants per 1,000 persons and food and liquor stores per 1,000 persons did not change. When only the income variables were excluded, several income dummy variables were significant in the trip generation (number of trips) regression, and the results showed that higher income persons took more trips to eat meals and to buy groceries. But including age and the number of children in the household shows that age and whether there are children are the key determinants of the number of meal and grocery trips, and fewer income dummy variables were significant in the regressions with age and number of children included. Lastly, one might be concerned about whether cars per licensed driver is endogenous. We believe the presence of vehicles in the household is likely not endogenous to the specific travel behaviors – to eat meals and buy groceries – studied in this instance, but regardless the results on the variables for restaurants per 1,000 persons and food and liquor stores per 1,000 persons were not sensitive to the inclusion or exclusion of the cars per licensed drivers variable.