Parking Innovations in the City of Berkeley: Evaluation of the goBerkeley Program

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Abstract

This report presents an overview and evaluation of the goBerkeley pilot parking management program. The program set out to use parking pricing to increase parking availability and at the same time to increase travel by transit, biking, walking, and carpooling. Incentives were offered to encourage transit use and carsharing. The program was implemented in three commercial districts: Downtown Berkeley, Telegraph/Southside, and Elmwood. In the first two districts, parking prices were raised by about 50% in areas with heavy demand (“premium” parking) and kept low in areas with low demand (“value” parking). Time limits were extended to two hours in the high demand areas and extended to eight hours in areas with low demand. In the Elmwood district variable pricing by duration was instituted, with up to three hours of parking allowed, subject to increased prices with each additional hour. Parking rates were also coordinated with prices in off-street facilities.

The results showed that the price increases, applied to about two-thirds of the publicly-provided on-street parking supply in the three areas, had different effects in the three districts. Downtown, premium pricing opened up spaces for parkers overall but not on every block and in particular not on the block faces where demand had been (and remained) heaviest. Value pricing and longer time limits led to increased use of previously underutilized metered spaces. In the Telegraph/Southside district, premium pricing had little effect on demand but value pricing and longer time limits led to much greater use of spaces that had previously sat empty. In Elmwood, the combined prices coupled with longer time limit changes did not reduce demand; higher, not lower, utilization rates (less availability) was observed at on-street meters.

Bus pass programs, targeted to a limited number of apartment dwellers and employees, did not change travel choices significantly, although pass holders reported higher levels of bus use than they otherwise would have made. Carsharing was of relatively little interest to the targeted businesses and employees, who did not see a good match to their business or personal needs, and also had little impact on travel.

The available data indicate that price elasticities for metered parking are low. This is consistent with focus group findings that parkers were more concerned about having enough time to complete their activities without getting a ticket than they were about price, at least at the current levels, and with City survey findings that parkers are more concerned about convenience than price. The City surveys also found that parkers are generally satisfied with the current parking situation. This suggests that the crowding at some times of day may not be as problematic as some have thought (since key locations remain parked up in all three districts.)

More detailed information on duration of parking would be useful in understanding changes in travel behavior and in estimating revenue impacts. New data collection methods using automated technologies may facilitate management of the parking supply. In addition, better survey designs and methods allowing time series analyses would be helpful to future efforts, as would monitoring private parking facilities open to the public and tracking land use changes that are likely to affect localized demand for parking.
1.0 Purpose of this Report

In 2008 the City of Berkeley, California applied for a grant from the Federal Highway Administration to test innovations in parking management. The initial concept was to increase parking prices in areas where parking was in high demand, and to adjust time limits to more realistically reflect localized patterns of demand, in particular by allowing longer parking durations in areas with low demand for short-term parking. Simultaneously, the City hoped to encourage transit, biking, and walking as everyday travel modes in Berkeley, and to encourage carsharing rather than ownership; it was hoped that higher parking prices would incentivize mode shifts and that revenues from parking could help support programs to promote these travel alternatives.

The program was funded after several rounds of review and negotiation and also received funding from other state and local sources. In total, the City received three grants: a $900,000 grant from the Federal Highway Administration, a $2 million grant for climate action initiatives from the Metropolitan Transportation Commission, and a $100,000 transportation – clean air grant from the Bay Area Air Quality Management District. In addition, FHWA funded a $900,000 parking experiment at the University of California, Berkeley, under which new pay-by-day parking options were to be coupled with incentives to increase use of other modes of campus access. The UC Berkeley project was funded as an additional part of the City of Berkeley’s federal grant and funds were passed through to the campus.

The City program was implemented in 2012-2014. The University program experienced delays due to technology and IT problems and will continue into 2015.

UC Berkeley worked with the mayor and staff on the initial conception of the project and subsequently was engaged by the City of Berkeley to provide policy advice and technical support on particular issues, and to conduct an independent evaluation of the City project. The UC team worked with city staff to prepare an initial GIS map of the study areas as well as an initial inventory of spaces and signage, and a preliminary documentation of parking occupancy by time of day by block face. UC team members also helped design an intercept survey to be administered to users of the three project areas, and advised on interview questions for merchants.

Earlier studies by UC team members and graduate students had documented parking issues in Downtown Berkeley (Deakin et al., 2004). A graduate transportation studio offered through the Department of City and Regional Planning was formed in spring 2013 to examine parking issues in the campus and South Berkeley areas and contributed to the project. Through this studio, team members conducted occupancy surveys and carried out a survey of parkers in RPP areas, estimated a joint mode choice and parking model using UC employee travel data, and contributed to a study of TDM marketing for UC downtown employees. These papers have been published and presented separately (Moylan et al., 2014; Proulx et al., 2014; Shirgaokar and
Deakin, 2014; Riggs, 2015; Riggs and Kuo, 2014; Riggs and Kuo 2015). Undergraduate students also contributed to the work as interns in spring and fall 2014, conducting field surveys and assisting with intercept surveys and focus groups. The graduate student classwork and the undergraduate internships were unpaid, but survey reproduction and focus group costs were covered by the project.

The initial proposal called for the UC Berkeley team to participate in city-organized meetings with stakeholders. However, because of time commitments and scheduling issues, the City revised its approach to stakeholder participation and for the most part met with stakeholders in separate meetings rather than convening project meetings to which stakeholders were invited. Consequently most of these meetings occurred without UC team members’ involvement and city staff advised that they preferred that the UC team focus on an independent evaluation. The UC team therefore redirected its efforts on this task, utilizing data forwarded by the staff and augmenting it with UC-collected parker intercept surveys and interviews in the pilot program areas, and conducting several focus groups with people who park in and around the program areas.

The City hired consultants to conduct several rounds of data collection and to promote the use of alternative modes. Staff conducted surveys and interviewed stakeholders and provided the study team with oral reports on the findings. In fall 2014, the City provided the UC team with the data on parking utilization and revenues for use in the UC Berkeley team’s evaluation.

City staff also prepared their own assessment of the GoBerkeley Program, which was presented to the City Council in December 2014 (Daniels, 2014). This report was forwarded to the UC team by a member of the City Council and contained additional data on performance and revenues.

The UC team used the data provided by city staff, presented to the City Council, and collected on its own along with findings from previous studies and the studio papers to form its assessment of the program. This report documents the UC Berkeley team’s independent evaluation.

2.0 Background on Berkeley Transportation and Parking

The City of Berkeley is a major regional educational and employment center with about 30% more jobs than employed residents. The University of California, Berkeley campus and the main commercial areas of the city, including Downtown Berkeley, are served by buses, and there are three Bay Area Rapid Transit (BART) rail stations within the city, including the heavily utilized Downtown Berkeley station. In addition, while hill areas on the Eastern side of the city present impediments, much of the city and all of its commercial districts are laid out on flat to gently sloping terrain with street designs that facilitate walking and cycling. In 2010, for Berkeley residents the drive alone share for work trips was 43%, with 6% in 2-person carpools. About 15% walked to work, 11% took BART, 7% took the bus, and 6% biked. About 4% were in 3+ person carpools and 7% worked at home. Berkeley employees had a somewhat higher share of
driving, with 53% of the workers driving alone and 9% in 2-person carpools. 12% got to Berkeley jobs by transit (7% by bus and 5% by BART), 11% walked, 5% worked at home, and 5% bicycled. Only 3% commuted to Berkeley by 3+ person carpools (Bay Area Census, 2010 data).

The heavy use of transit, walking and biking reflects City and University policies implemented over at least five decades. The City has invested in a network of bike lanes and bike boulevards, has reduced parking requirements, and has incentivized carsharing. Both the City and the University (the City’s largest employer, accounting for about 14,000 of the City’s 70,000 employees in 2010) have implemented policies and programs designed to encourage and subsidize transit use, and ridesharing, including the provision of discount bus passes and carpool parking to employees. In addition, both have provided a limited supply of parking and have priced it. Consequently, campus affiliates and other employees working in Berkeley have a relatively low rate of drive-alone commuting compared to the Bay Area as a whole.

The 53% of employees in Berkeley who drive to work is a figure that has been relatively stable for some time (Bay Area Census, 2010; Deakin et al., 2004). One of the challenges is how to reduce this further. Of the Berkeley workers who drive alone, nearly 70% come from just seven cities: Berkeley itself plus Oakland, Richmond, San Francisco, El Cerrito, Albany, and San Leandro, all of which are well connected to Berkeley by transit. (See Table A-1 in the appendix.) About 20% of the workers who drive alone to their jobs in Berkeley live in Oakland, and nearly as many at 19% live in Berkeley—even though only 29% of Berkeley residents who also work in the city drive to work (Bay Area Census, 2010 data). Although most trips within Berkeley are only a mile or two in length, and many of the trips from Oakland to Berkeley jobs centers are also relatively short, mostly under five or six miles, they are beyond plausible walk distances and many are not easily made by bicycles due to topography, traffic, and freeway barriers. Transit service is available to most neighborhoods in the cities from which most drivers come, but is not always competitive with the automobile. For example, for much of Berkeley and Oakland, even during the peak periods when service is best, it takes 3-4 times as long to commute to central Berkeley by bus or BART (when this option is available) as by driving. For commuters in this situation, driving is likely to remain the preferred mode unless the other means of transportation can be improved or the incentives to use other modes are well matched and substantial. Thus, despite the comparatively modest levels of automobile use that already have been achieved and the availability of transit options, many employees do drive to their jobs in Berkeley.

Effective parking management has been an ongoing challenge for both the City and University. Relatively few employers have off-street parking for their workforce and those who do often have fewer spaces than drivers. Employee parking in residential neighborhoods has reached problematic levels in a number of areas and at residents’ request the City has implemented Residential Permit Parking (RPP) programs. Municipal and privately owned garages and lots available for public use operate in several locations and large supermarkets, and a few other retailers provide customer parking, but the facilities often full or nearly so. Residents and visitors
traveling for services, shopping, medical care, entertainment, and education often depend on metered spaces to meet a large part of their parking needs.

For the City, high parking occupancies have been a persistent condition on a number of blocks in the center of downtown and in the Center Street garage, though a few blocks away parking has usually been available. Parking has also been crowded along some streets in the Telegraph Avenue / Southside commercial district, while a few blocks away parking has gone empty. The Elmwood district has experienced oversubscribed parking along College Avenue, its primary shopping street, while its off-street lot has had available spaces.¹

Likewise the University has experienced oversubscribed parking in some lots and garages (even with stacked parking services expanding the effective supply) while other facilities a few blocks away have been relatively underutilized. In addition, UC employee and student travel surveys indicate that several thousand UC affiliates park during the academic year in Resident Permit Parking (RPP) Areas, some of which are within walking distance of UC (and the three city commercial districts that are the subject of this study.) Because Berkeley’s form of RPP allows those without a permit to park free of charge for two hours, it effectively makes the residential streets a supply of free parking for short term visitors as well as those willing to move their cars to avoid a ticket.²

That University and City parking supplies overlap and interact should come as no surprise, since the University central campus is bounded on two sides by Downtown and the Telegraph/Southside commercial district and numerous UC facilities are scattered through both districts. Even the more distant Elmwood district is only half a mile from the central campus and only a few blocks from some Southside UC facilities. Thus, University affiliates and visitors make use of parking on-street and in City lots and garages in Downtown and Telegraph/Southside, and to a lesser extent in the Elmwood district. In turn, some of the

¹ Figure A-1 in the Appendix shows metered parking locations in Berkeley. In addition to metered parking and municipal lots and garages, several privately held garages and lots are available for public use in Downtown and also in Telegraph/Southside area. Other than the large supermarkets and pharmacies that dot the city, relatively few businesses in Berkeley have off-street parking for customers and employees; the areas are mostly developed with shared walls and are built out to the sidewalks. West Berkeley retail is an exception, having a combination of shared off street parking and metered on-street parking. All three pilot project areas have a mix of uses but Elmwood is considerably smaller than the other two, with a higher share of retail shops and restaurants. See Table A-4 in the appendix showing business and employment characteristics of the three pilot project areas.

² Berkeley allows on-street parking in residential areas, and in the neighborhoods around the downtown and the university. The City has implemented Resident Permit Parking (RPP) to deter excessive use of the on-street spaces by employees, students, and visitors. Berkeley’s RPP ordinance requires that a car lacking a permit for the RPP area move from the area after the two-hour limit, just as its meter ordinance requires that a car must be moved after the maximum parking time allowed has been reached. In practice, RPP time limits have proved difficult and costly to enforce, and some of the non-resident parkers routinely wipe off chalk marks on tires (the most common enforcement method in the RPP areas) or move cars a short distance to evade enforcement efforts.
university’s parking facilities are available for use by non-UC drivers during the late afternoon and weekends.

The uneven utilization of parking availability indicates that the parking “problem” at both the City and the University is a matter of location and utilization rather than a problem of overall supply, at least at this time. However, absent corrective action, localized parking shortages could worsen or spread as both the university and the city continue to develop, especially since some of the areas where new development is proposed are the same areas where the local parking supply has been thetightest. For example, the campus has removed several hundred parking spaces to create a site for a new art museum at the Oxford St. edge of the downtown, and plans to remove additional parking on Fulton St. to build an aquatics center, and on Shattuck Ave. to make way for new facilities for the School of Public Health. Adding new parking might be one solution, but it is a highly costly one (Tudela, Shirgaokar, Deakin and Riggs, 2015) and it could exacerbate problems of traffic congestion, vehicle emissions, and neighborhood disruption that are already points of contention in the city and between the city and university. Thus, both the City and University are seeking ways to better manage the existing parking supply so as to minimize parking-related search traffic and reduce the need for additional parking construction.

The City’s parking pilot project, which it dubbed the “goBerkeley Program”, was designed to both alleviate parking woes and encourage the use of other modes of travel. The goBerkeley program set out to reduce cruising for parking by using prices to open up parking spots in high-demand areas, a strategy famously advocated by Shoup (2011). The goBerkeley program also aimed to improve the efficacy of parking enforcement by using license plate readers that make it easier to catch day-long meter feeders and other violators, and aimed to reduce driving by funding incentives for carsharing and transit.

The parallel University parking pilot project initially proposed to use information from planned gated entries to major parking garages and surface lots to provide real-time parking availability information to drivers, hoping to thereby reduce cruising for parking. This was to be coupled with a change in parking options offered, to include a program aimed at travelers who need to drive 2-3 days a week but could take transit, walk, bike, or work at home other days, which would be monitored using gate and cellphone app data. However, because the gate technology proved problematic from a security perspective, it has not been installed. The pilot project therefore was redesigned and a more limited experiment has been developed, using cellphone apps to record and incentivize part-time parking use (Deakin and Sengupta, 2013).

The schedule for completion of the campus pilot project has been extended into 2015 and will be the subject of a separate report. However, data and analyses from the first half of that study, including analyses of campus travel patterns, parking demand, and use of and employee perspectives on alternative modes, inform this study, both because the UC campus is the city’s largest employer and because it employs a wide range of employees (faculty, research staff, management staff, office support staff, accounting, IT, medical personnel, custodians and
groundskeepers, dining service personnel, etc.), providing insights about travel among different income groups.

### 3.0 The goBerkeley Program: Overview

#### 3.1 Objectives and Schedule

The goBerkeley program was funded as a “three-year pilot program … designed to improve the ease of traveling within key areas of the city. The pilot study… [was intended to] explore and test methods of reducing local traffic congestion, improving parking options, and promoting alternatives to driving one’s car in three of Berkeley’s commercial areas [Downtown, Telegraph Ave., and Elmwood]” (goBerkeley, Information page, 2014).

Specific goals of the goBerkeley program were defined as follows:

- “Encourage workers and residents to take transit, carshare, bike and walk.
- Improve parking conditions to reduce double-parking and circling for a space.
- Improve parking customer experience.
- Test a parking management technique for long-term program” (goBerkeley, 2013)

#### Figure 1. Initial goBerkeley Program Schedule

According to the initial plan, the goBerkeley program was to follow the timeline shown in Figure 1. Mayor Tom Bates launched the program on June 27, 2013 (goBerkeley, Launching Press Release, 2013). The first rounds of changes were implemented slightly later than originally planned, in October 2013. A second round of changes (adjustments to time limits and prices) was implemented in June 2014. Assessments of the program were carried out in fall 2014 and city staff issued a report to the City Council on the program’s accomplishments in December 2014 (Daniels, 2014). Decisions on next steps for the program (which could be continued, extended, expanded, or dropped) are anticipated to be made by the City Council in 2015.
3.2 Changes Implemented in Parking Charges and Time Limits

The goBerkeley program implemented changes in both parking charges and in time limits in the pilot project areas. Changes in parking charges were designed to reflect demand for the spaces in different subareas of the three districts included in the goBerkeley program; some areas were oversubscribed, with virtually no vacancies for much of the day, while along other blocks meters sat empty much of the time. Changes in time limits also responded to complaints that had been made for many years, to the effect that the time limits at many of the meters were too short to allow parkers to complete their business in the commercial districts they were visiting without risking a ticket, or required (illegal) meter feeding to avoid being ticketed.

The parking price and time limits changes were made after a review of data on parking occupancy by time of day in the various project areas. Initial data collection efforts were carried out by UC team members to establish a baseline space count by time limit (presented to the City in GIS format) and to provide a windshield survey of occupancy levels at various times of day – morning, midday, and evening peak periods. These data were analyzed by City staff to determine where to focus change efforts.

The initial parking changes, implemented in October 2013, included higher rates and extended time limits for much of the parking in all three commercial areas included in the goBerkeley program. Initially, three different zones were established: Premium, Value 1 and Value 2. The Premium zone, located in areas of high demand, increased the time limit uniformly to two hours—many spaces previously had been subject to time limits of an hour or less. The price was increased from $1.50/hr. (a citywide rate adopted by the City Council in 2009) to $2.25/hour, a 50% increase. The Value 1 zone, at the periphery of the Premium areas, was changed to a 4-hour time limit and a price was dropped by 25 cents to $1.25/hour. The Value 2 zone, implemented in areas of low parking demand, was changed to an 8-hour time limit and the price was lowered to $1.00/hour. Garage rates also were changed as part of the goBerkeley program (goBerkeley, Changes for garages December 2013, 2013). Figure 2 shows the location of these new pricing zones in the Downtown and Telegraph areas. Elmwood, which had a more complex parking experiment, with a price that increased each hour up to a three hour limit, is not shown in the figure but lies along College Ave. south of the Dwight Way and the Southside neighborhood.
In June 2014, a second round of changes was made to adjust parking rates and time limits in the Downtown Berkeley and Telegraph/Southside areas, including the Center Street Garage. The revisions reduced the number of price categories from three to two: Premium and Value zones. In the Premium zones, the two hour parking limit was retained but the parking rate was increased by $0.50 per hour, to $2.75/hour. The Value zones were all changed to an 8-hour parking time limit and the price was increased by $0.25/hr., to $1.50/hour. The Center Street Garage short-term rates were set at $2.00/hr. for up to four hours and a daily maximum of $20, with a half-price “early bird” rate for cars arriving before 9 a.m. The Berkeley Way Parking Lot adopted the Value pricing scheme. No changes were made to the rates and time limits in the Elmwood District, as the initial assessment was that the variable pricing and longer time limits were working reasonably well. Figure 3 shows the resulting prices in the Downtown Berkeley and Telegraph/Southside areas (see Table A-2 in appendix for details of price/time changes.)
3.3 Transportation Demand Management Strategies

In addition to the parking price increases shown in Figures 2 and 3, the goBerkeley program pursued several strategies to reduce driving in Berkeley by promoting other modes of transportation (as well as telecommuting), with efforts targeted for both employees and residents.

Measures undertaken included marketing travel options to residents, distribution of free transit passes to residents and employees, and substantial discounts for carsharing targeted at employers and employees in the program areas. The City also continued its efforts at promoting walking, biking, carpooling and telework on its website and in its public works investments.

Specific actions included the following:

- 1,000 free AC Transit Easy Passes were made available to residents of apartment buildings in the pilot program area for a six-month period, and 456 were distributed, after a consultant team contacted 5,460 households, talked with 1,800 people, and provided customized travel information to nearly 900 individuals. The consultants estimate that the effort resulted in a 3.1% reduction in vehicle travel.
• 1,000 free AC Transit Easy Passes were made available for employers to distribute to employees in the pilot project areas for one year. 38 employers signed up in the first month, exhausting the supply of passes. 48% of the pass holders used the pass at least twice a week.

• Carsharing: City Car Share offered a sign-up discount to employers in the program areas. In addition, a $50 credit was given to employees who signed up for carsharing.

• Walk, bike, carpool and telework: Information on these forms of transportation was provided in the marketing done by the City’s consultants and on the City’s website. Walking was promoted by discussing the vibrancy of Berkeley neighborhoods and the ability to reach the Downtown, the University, and the Telegraph/Southside commercial districts within 15 minutes from many residential areas. Bicycling was promoted by explaining the health benefits from biking and providing links to bike stations and travel maps of bike routes. For carpooling and telecommuting, the website emphasizes that travelers could save money by using these options.

The resident program promoting TDM was carried out by TransForm, a local NGO, and was completed in 2012. A brief evaluation was conducted by a consulting firm and is reported in an appendix to the staff’s December 2014 report to the City Council. The goBerkeley TDM Program elements aimed at businesses ended June 30, 2014 and are also discussed in the December 2014 report to the City Council.

Overall, the programs had a small but positive impact on travel to and within Berkeley. Of the 1,000 transit passes offered to residents of apartment buildings, only 494 were used, in part because the apartments and areas of the city targeted by the outreach program include numerous UC students who already have bus passes as part of their student registration. Of the residents who were registered for passes, only 65% used their passes each month. A survey of pass holders obtained 102 responses. While 82% said they used transit more than they would have without the pass, only 48 percent reported that they used the pass at least twice a week. 83 percent reported that they would not have bought a pass on their own.

Ten businesses joined the carsharing program but many others found that it did not match their business needs. Additional carshare vehicles and locations were provided and were utilized at about the same rate as other carshare vehicles, indicating that the installments did increase carshare use. Resident memberships citywide increased during the period but it is not clear what share of the increase can be attributed to the increases in carshare vehicles and marketing.

3.4 Tests of Automated Data Collection Technologies

Because data collection is a costly and tedious task done manually, but individual sensors for each space (as implemented in San Francisco) are (at least currently) beyond the budget capacity of most cities, the goBerkeley project included tests of parking data collection and enforcement using license plate reader technologies.
The staff report to City Council (Daniels, 2014) stated that vehicle-mounted camera technologies were successful in collecting occupancy data at a level of accuracy sufficient for parking management operations, and would reduce costs of collecting parking data and identifying parking violations. Additional details are pending.

4.0 Parking Management Evaluation Data

Three main categories of data were collected by the City and its consultants to evaluate the goBerkeley program’s parking management element: parking data, survey data, and revenue data. In addition, the City obtained input on program design and on community reactions to the program through workshops and individual meetings with stakeholders and discussed program elements with the City Transportation Commission, whose minutes and packets record key points of the discussions.

The UC team assisted in the data collection effort by creating an initial set of GIS maps and database on parking inventory and occupancy. To validate and supplement the City data, UC researchers also collected license plate and turnover data on a small sample of blocks, focusing on areas of heavy demand. Finally, the UC team also conducted intercept surveys in two of the areas and used these to identify participants for focus groups which were subsequently held with parkers from all three areas.

4.1 Parking Occupancy and Turnover Data

Occupancy data are a key element of the project since pricing is set based on occupancy levels. Turnover data are useful both in assessing whether time limits match patterns of demand and in assessing enforcement needs.

On- and off-street parking spaces were inventoried and the City’s consultants recorded occupancy at various times of day by block face. These data were first collected in June 2013 and again in January 2014, June 2014, and October 2014. The January 2014 data were collected Monday through Saturday and the later rounds were collected Wednesday, Thursday and Saturday. Since City of Berkeley meter enforcement begins at 9 a.m. and ends at 6 p.m., the first observation period began at 9 a.m. Additional data were collected beginning at noon, 3 p.m., and 6 p.m. Data collection routes were designed to allow each route to be collected in an hour or less. The final 6 p.m. round represents conditions in the early evening period after enforcement has stopped. This is known to be a period of continued high demand. The resulting parking occupancy data bases provide the principal “before” and “after” data for each of the two price and time limit changes.

Supplementary data collected by the City’s consultants included license plate information, which was obtained for one hour periods on most of the block faces observed in the occupancy studies. The license plate data were intended to support an analysis of parking duration and turnover. In
addition, a limited number of block faces in Residential Permit Parking (RPP) areas were sampled to see if pricing changes had affected nonresident use of the RPP areas (see Table A-3.)

Figure 4 shows the block faces for which occupancies were recorded by the City’s consultants. With a few exceptions such as red zones and construction zones downtown and around campus that were omitted, the consultants’ license plate recording also occurred on these blocks (Figure 5). In Downtown, 109 block faces were studied; in Telegraph/ Southside, 52; in Elmwood, 8. Data were collected by the consultants on the RPP blocks shown in Figure 6.

Figure 4. Block Faces where Occupancy data were Collected by the City’s Consultants
Figure 5. Block Faces where License Plate Data were Recorded by the City’s Consultants
In addition to the data collected by the City’s consultants, the UC Berkeley team collected a smaller sample of parking data focusing on areas and periods of heavy demand and on residential areas within walking distance of the commercial districts. The UC team’s data included license plate recording. Data were collected on sample blocks at 8 a.m., 10 a.m., 12 p.m., 2 p.m., 4 p.m., and 6 p.m. for Tuesday through Thursday one week in each area in October 2013; and at 12 p.m., 2 p.m., for the same hours in March 2014; and for 12 p.m. and 4 p.m. only in early November 2014. Downtown data were collected on Bancroft Way (North side) between Oxford St. and Shattuck Ave., Shattuck Ave. (East side) between Bancroft Way and Allston Way, Center St.
(South side) between Oxford St. and Shattuck Ave., and University Ave. (both sides) between Oxford St. and Milvia St., and Milvia St. between University Ave. (both sides) and Allston Way. In the Telegraph/Southside district, data were collected on Bancroft Way between Piedmont Ave. and Telegraph Ave., on College between Bancroft Way and Dwight Way, and on Durant Ave. between Piedmont Ave. and Telegraph Ave. (both sides of the street in all cases.) In Elmwood, data were collected for College Avenue from Russell St. to Webster St., on Russell St. from the Russell St./Benvenue Ave. diverter to the Russell St./Piedmont Ave. diverter, and on Cherry St. and Piedmont Ave. between Stuart St. and Russell St. (both sides of the street in all cases.) The latter include RPP frontages. Additional RPP data collected by UC researchers included routes through the Telegraph/Southside, Elmwood, and LeConte districts, shown in Moylan et al., 2014.

The consultant data were presented in the December report to City Council (Daniels, 2014) categorized as changes in the number of blocks exhibiting “Low Demand (<65%), Target Demand (65-85%), and High Demand (>85%).” The changes observed between the before and after data can be summarized as follows:

- Downtown on-street spaces: In the Premium area, the percentage of “full” block faces dropped from 37% to 25%. However, 37 block faces still had parking occupancy above 85%.
- Downtown garages: Spaces were made available in Downtown municipal parking garages for short-term as well as long-term users. Occupancy in the 70-80% range was reported.
- Telegraph/Southside on-street spaces: The number of blocks that are over 85% occupied in the Premium Areas remained about the same. Previously under-utilized Value Areas saw greatly increased utilization.
- Telegraph/Southside garages: The Channing/Telegraph city-owned garage saw increased use, with occupancy increasing to about 75%.
- Elmwood on-street spaces: Parking occupancy increased on weekdays. Half of all of blocks were within the target 65%-85% occupancy, with the other half over 85% occupied.
- The Elmwood Lot had spaces available during weekday afternoons.

The UC replicate occupancy data was consistent with these findings. The UC license plate data were used to review turnover, which was not reported by the City and its consultants in the materials available to the UC team. The City treated license plate data as confidential and has pledged to destroy it after its own analyses are completed.

While we can make no comparison between turnover rates observed by the consultants and those observed by the UC team, the UC license plate data from the limited number of locations listed previously indicated that a fairly high share of cars were still overstaying the two hour posted time limits in Downtown and Telegraph/Southside. In both locations, about 15% of cars were observed staying longer than the posted time limits on the metered blocks that the UC team
studied. In addition, at certain block faces two or three of the parked cars were observed to be staying in the same parking space for more than two observation periods (i.e., parking for at least four hours in the same Premium spot.)

The UC team observed parking continuously for the full afternoon at two block faces downtown where overstaying the time limits was observed. In both cases the team members observed meter feeding and in both cases the meters were allowed to expire for a portion of the time that the car was parked, illustrating an enforcement difficulty.

4.2 Data Regarding Extended Hours of Parking Meter Enforcement

Berkeley is well-known for its restaurants, theaters, and other entertainment spots, and its commercial districts are bustling in the dinner hours and on into the evening – especially the Downtown, Telegraph/Southside, and Elmwood areas, all of which offer evening entertainment. For a number of years there has been discussion of extending parking meter enforcement to 8 or 9 p.m. both for revenue generation and to deter employees and residents from parking at the metered spaces all evening, which uses up spaces that visitors also are seeking. Pushback from residents and employees has cited safety issues after dark, and visitors and some merchants have expressed concern that time limits for evening parking would make it difficult to have a lengthy dinner party or to attend a play or concert as well as have dinner. Local news media have also been negative about evening parking rates, which were implemented and then rescinded in Oakland after a public outcry.

Data on evening parking collected by the City’s consultants in the three pilot areas indicated that parking is in fact scarce in the early evenings and that a substantial share of the parking is used by employees and residents —17% in Elmwood, 26% in the Telegraph/Southside district, and 29% in the Downtown. The UC Team does not have data showing which blocks are experiencing employee and resident parking, and so cannot assess whether this is affecting the most valuable parking or the peripheral parking that otherwise would be in low demand.

The December 2014 staff report to the City Council describes expenditures for cars parked by residents and employees versus cars parked by visitors, indicating that the latter spend several times as much per car parked. The data are not adjusted for frequency of parking, however, which could change their import. For example, if a visitor comes to an area once a month and spends $100 and an employee comes five days a week and spends $5 each time, the monthly expenditures are identical.

A short four-month test of extending enforcement hours from a 6 p.m. end time to an end time of 8 p.m. was proposed (goBerkeley, Evening Pilot Information, 2014) but at the time this report was prepared, extended meter hours had not been implemented. The City was collecting opinions from users of the areas through an online survey but results were not yet available.
4.3 Data from Meetings, Surveys, and Focus Groups

A series of meetings and surveys were conducted by the City in order to gather information on stakeholder perspectives about parking and transportation in the pilot project areas. In addition, supplementary surveys and focus groups were carried out by the UC team.

4.3.1 Merchant / Business Meetings and Survey

In March 2013, before the first round of parking changes had been implemented but after a round of informational meetings on the program had been held with merchants and other business leaders, city staff emailed businesses in the study areas and requested their participation in an online opinion survey. The survey, which consisted mostly of open ended questions, garnered 196 responses, with over half from Downtown Berkeley and most of the rest from Elmwood. This is a low response rate (20%) inasmuch as the City reports a business census of 958 businesses in the study areas. As of the time of this writing an “after” survey of business owners was planned but had not been carried out.

The comments received on the “before” survey were positive to neutral, and offered some insights into merchant perspectives.

4.3.2 Before-After User Surveys

Before and after implementation of the parking changes, a survey was conducted to obtain information on the travel and parking choices and trip purposes of users of the various study areas. The survey was initially co-designed by UC Berkeley researchers and the City of Berkeley staff, and was originally intended to be an intercept survey collected in each of the areas by city staff. However, the staff was unable to implement the survey through on-the-spot interviews as planned, and instead handed out postage-paid mail-back surveys to passersby for the “before” survey. That survey, distributed in April 2013, obtained a total of 273 responses by the cutoff date, for an overall response rate below 30%. The “after” survey, which was revised somewhat by staff, was distributed in September 2014, and obtained 166 responses.

The questions in the “after” survey were not identical to those in the “before” survey. Questions asked during the “before” survey were:

1. Where were you given this survey? (Downtown, Elmwood, Telegraph)
2. How often do you visit this area? (I live here, I work here, 3 or more times a week, once or twice a week, once or twice a month, I’m just passing by)
3. What's the total amount of time you will be in this area today? (open)
4. What days of the week do you usually visit this area? (just weekdays, just weekends, both)
5. What time of the day do you usually visit this area? (daytime, evening, both)
6. How did you get to this area? (drive alone, carpool, bus, bike, BART, walk)
7. If you drove, where did you park? (metered space, in the neighborhood, in a lot garage, in merchant or store lot, in a street nearby)
8. Do you ever travel to this area by a different mode? (drive alone, carpool, bus, bike, BART, walk)
9. Which activities will you do in this area? (work here, live here, shopping, eating at a restaurant, going to the theatre, professional services, taking or connecting to bus or BART, business related meeting, Berkeley City College related, Berkeley High School related, UC Berkeley related, other)
10. Which activities have you done in the past in this area? (first time, shopping, eating at a restaurant, going to the theatre, professional services, taking or connecting to bus or BART, business related meeting, Berkeley City College related, Berkeley High School related, UC Berkeley related, other)
11. Do you agree or disagree with the following: (strongly agree, agree, neutral, disagree, strongly disagree, no opinion)
   a. I can usually find metered parking quickly
   b. Parking garages or lots usually have spaces available
   c. Parking time limits in this area allow me enough time
   d. All of my shopping/business/entertainment needs can be met in this area
   e. Transit options in this area meet my needs
   f. Bus stops are conveniently located in this area
   g. This area is a pleasant place to walk around in
   h. This area is a pleasant place to bicycle in

The “after” survey included the following questions:

1. I was given this survey in (Downtown, Elmwood, Telegraph)
2. Which activities will you do/are you doing in this area today? (work here, live here, passing through, shopping, eating at a restaurant, going to the theatre, professional services, school, other)
3. What’s the total amount of time you’ll be in this area? (open)
4. How did you get to this area? (bike, bus, drive alone, carpool, walk)
5. Where did you park? (in a city lot garage, in a private lot garage, merchant or store lot, on-street metered space, on-street unmetered space)
6. How long did it take you to find parking? (0-5 minutes, 5-10 minutes, 10-20 minutes, over 20 minutes)
7. How much did you pay for parking at the location (I don’t know, free, $1-2, $3-5, $5+)
8. Please rate your experience finding your parking space. (from 1=very difficult to 5=very easy)
9. What factors motivated you today in selecting your parking space? (safety or security, proximity to destinations, parking rate, parking time limit, first space to become available, I expected to be parking here, this wasn’t my first choice, other)
10. During which time period is it most difficult to find parking? (9 a.m. to 12 p.m., 12 p.m. to 3 p.m., 3 p.m. to 6 p.m., 6 p.m. to 9 p.m.)

11. Please state whether you agree, disagree, are neutral or have no opinion about this list of statements: (agree, neutral, disagree, no opinion):
   a. When I look for an on-street parking space I can usually find one quickly
   b. Parking garages or lots in this area usually have spaces available
   c. I find that the parking time limits at the meters allow me enough time for my typical visit
   d. My residential parking permit allows me to find parking when I need it

12. Do you ever drive to and park in this area? (yes, no)

13. How important were the following factors in your decision not to drive to the area today?
   Please rank in terms of importance (1 = most important to 5 = least)
   a. Access to a car
   b. Parking rate
   c. There's never available parking
   d. Parking time limit
   e. I have an EasyPass
   f. Open-Ended Response

14. Please rank the following factors from the least to the most important when selecting a parking spot: (1 = most important to 5 = least important)
   a. Safety
   b. Location, proximity to destination
   c. Parking rate
   d. Parking time limit
   e. I expect there to be parking here

15. Have you noticed any of the following changes to parking recently? (Check all that apply)
   a. More parking spaces are available
   b. Longer time limits
   c. Lower parking rates
   d. Higher parking rates
   e. Premium, value rate and progressive rate zones
   f. New parking signs

While some of the changes to the survey questions were minor, question 4 in the revised “after” survey omitted BART, a heavily used mode in Berkeley, and questions 7-13 focus on parking, even though only a fraction of the users of any of the study areas reach the area by car. While directing survey questions to parkers may have been useful for the project, and the results can still provide insights, the revised survey questions introduced a substantial bias that most likely affected response rates and makes comparison of the two surveys problematic.
To evaluate employees’ reactions to the goBerkeley Program, before and after surveys were conducted. The before survey was conducted in April 2013, obtaining 373 responses. It asked the following questions:

1. In which business district do you work? (Downtown, Elmwood, Telegraph)
2. How many days a week do you work at this location? (once or twice per week, three or four times a week, more than four times per week, just weekends, just weekdays, both weekdays and weekends)
3. What are your usual work hours? (usual start time and end time, open)
4. How do you get to work? (drive alone, carpool, bus, BART, bike, walk)
5. Do you ever take a different mode of transportation? (drive alone, carpool, bus, BART, bike, walk)
6. When you drive to work, where do you park? (at metered space, on residential streets, in a lot or garage, merchant or store lot, I don’t drive to work, other)
7. The following is a list of statements about parking in your business district. Can you mark whether you strongly agree, agree, disagree, strongly disagree or are neutral?
   a. I find parking on street at meters is usually available
   b. Parking in residential streets is usually available
   c. The parking garages or lots in the area usually have spaces available
   d. I find that the parking time limits in the area are long enough
   e. Comments
8. The following is a list of statements about transit in your business district. Can you say whether you strongly agree, agree, disagree, strongly disagree, or are neutral?
   a. There are enough transit options in the area
   b. I would take the bus more often if the buses came more often
   c. I would take the bus more often if hours of services were earlier or later
   d. I would take the bus more often if bus stops were more conveniently located
   e. I would take the bus more often if the fare was less expensive
   f. While on the bus, the ride is enjoyable
   g. Comments
9. The following is a list of statements about biking and walking in your business district. Can you say whether you strongly agree, agree, disagree, strongly disagree, or are neutral?
   a. Bicycle routes to the area are convenient
   b. There's available bike parking at my work (work provided or otherwise)
   c. If I parked my bike at work it would be secure
   d. I feel safe bicycling on the street to get to work
   e. I feel safe walking to and from work
   f. I find that walking in the ___ area is enjoyable
g. Walking to and from work is enjoyable

h. Comments

10. Finally, for statistical purposes only, can you provide the nearest intersection to your home and a zip code?

The after survey was targeted to employees that participated on the EZ Transit or CityCarShare program. Therefore, the results obtained are not directly comparable to the “before” survey.

4.3.4 Additional City-Sponsored Surveys (Not Complete as of December 2014)

The staff report to the City Council in December 2014 indicates that two additional surveys are not complete at this time: A Daytime Driver Survey and Evening Survey, for which two waves each were reported to have been conducted in 2014. No information was provided about number of responses received from either survey or wave thereof, the distribution of respondents across study areas, or other basic sample statistics, although some results are presented in the December report. Without more information on sampling approach, number of surveys distributed, and response rate, the significance of the changes reported between the two waves cannot be assumed to be statistically meaningful.

4.3.5 UC Berkeley Focus Groups

UC Berkeley researchers conducted focus groups with three sets of drivers to Berkeley: drivers who parked in Southside residential neighborhoods (15 participants, recruited midafternoons weekdays from parkers in the area who did not have a Resident Permit Parking sticker, using flyers placed on cars), drivers who parked at meters in Elmwood (12 participants, recruited weekdays in the late afternoon from sidewalk passersby, using a screening question to ascertain that they had parked at an on-street meter), and drivers who parked at meters or in garages Downtown (17 participants, also recruited late afternoon weekdays on-street with a screening question to ascertain that they had parked a car). Response rates were 12% for RPP recruiting and about 18% for parker recruiting. Only adults over 18 were eligible to participate. The focus groups were each an hour long and allowed the researchers to explore the group members’ perspectives and reasoning processes concerning parking and transportation options. Additional focus groups for employees at UC were carried out and are reported in Ng (2014).

The focus group participants who parked in Southside residential neighborhoods included workers and students in the area. Most parked for three to eight or nine hours at a stretch. They either did not have a parking option at or near their place of employment or school, or found the options available to them too expensive. They saw themselves as saving money and getting some exercise by being willing to park a few blocks away in free parking spots and moving their cars around several times a day. Most knew they were violating the RPP rules by staying in the same district or wiping chalk marks off tires, although four of the 15 participants thought that the RPP rules only required them to move their car, not to remove it from the district.
For these who parked at meters in Elmwood, all were repeat visitors who reported that they come to the area occasionally to go to a café or restaurant, do some shopping, or enjoy an entertainment event. The majority (8) lived in various parts of Berkeley and all but one lived more than a half mile from College Ave. and Russell St., the intersection used to measure distances to participants’ residences. Two others lived in Oakland and traveled down College Ave. on the way home from work in Berkeley, and two lived in Contra Costa County and came to Berkeley occasionally to shop or have dinner. The participants commented that parking was difficult on College Ave. not only because of the limited number of spaces but also because traffic was often heavy and backed up from the Ashby Ave. intersection. One participant commented that it is difficult to circle the block in Elmwood because of traffic diverters on side streets, and so she generally went directly to the lot or a residential street if she did not find a parking space on the first pass. Others agreed, elaborating that if they were coming from the South they looked for parking on College Ave. and if they did not find it, went to the parking lot. If they were coming from the North, they often went to the lot first. All agreed that if a space was not found on the street or in the lot on the first pass, they went directly to a residential street to park rather than cruise around looking for parking. They found it easy to find a space a block or two away on one of the residential streets just north of Russell. They were uncertain what the hourly rates at the meters were but also were not concerned about them – the time limits and the risk of getting a ticket were the more worrisome aspects of parking at meters.

For those who parked in Downtown Berkeley, all used meters and some used garages at times. Among meter users, there was a split between those who were making a quick trip to, e.g., going to the bank, picking up office supplies, getting lunch, or running an errand at an office, and those who were staying a longer time for a luncheon meeting, a business event, a medical appointment, etc. The participants with one exception were regular visitors who came to Downtown Berkeley several times a month (one visited only a few times a year) and none was employed there. The participants had noted that allowable parking durations had been extended. There was general agreement that previously, with one-hour meters, the risk of a ticket had been very high. One respondent commented that enforcement seemed to be “relentless and very unforgiving”, and everyone agreed, and they agreed as well that that being able to avoid a ticket was much more important to them than paying a little more for parking. Interestingly, they did not know what the parking rates were at the meters. All members of the focus groups preferred to use meters for short trips of an hour or two in duration, but would go to a garage (public or private) if they planned to stay more than two hours, e.g., for a conference or meeting.

Focus groups are intended to provide insights into the perspectives of participants rather than statistical data and should be interpreted as such.

4.3.6 UC Berkeley Intercept Surveys

To follow up on the focus group findings that indicated that parkers might not be very aware of the parking pricing in effect, UC Berkeley student researchers conducted an intercept survey in
which persons were approached on the sidewalk, asked a screening question about whether they had parked at a meter in the area that day, and if they said yes, asked to respond to a short set of oral questions if they also were adults over 18. The questions asked how much the respondents had paid for parking, how often they parked in the area, whether they ever used other modes to come to the area, and what their trip purpose and expected trip duration was. The respondents were also asked what they understood Premium and Value parking options to entail.

62 surveys were completed in the Downtown, 49 in the Telegraph/Southside district, and 40 in Elmwood. All surveys were carried out on a Tuesday, Wednesday or Thursday afternoon in October and November 2014 in Premium parking areas. Response rates for those who met the two screening criteria were 35 percent Downtown and 30 percent in the other two districts. The samples are small and should therefore be interpreted with caution.

The results were consistent across the three areas: most parkers knew approximately much parking time they had purchased, e.g. they had paid for 40 minutes or the maximum, and most knew how much they had paid if they paid cash (“I dropped six quarters into the meter”) but not if they paid by credit card (“I just put my card in and pushed for the maximum time”). The majority did not know what the hourly rate was, ranging from 61% in Telegraph/Southside and 60% in Elmwood to 55% Downtown. Three-quarters understood that premium parking was higher priced than value parking but over half had not paid attention to the signs where they parked and did not know how to find value parking locations.

4.4 Revenue Data

In addition to the field data, surveys, and focus group data, revenue information was provided by the City of Berkeley to allow the impact of the new regulatory regimes on meter revenue to be assessed. The City also had to analyze revenue data to meet requirements imposed by the Federal Highway Administration regarding use of revenues. The agreement with FHWA required that through the end of the federally funded pilot program, any additional revenues must be spent on agreed-upon items as follows:

- Offsetting impacts and optimizing operations of the goBerkeley program (60%)
- Expanding the program (25%)
- Improving customer service (5%)
- Supporting TDM efforts (10%).

The Solano Avenue and Euclid/Hearst commercial districts were used as rough “controls” for overall economic trends.

According to the City data, for the three pilot areas including the off-street municipal lots and garages, revenues from parking totaled almost $8.5 million for FY 2013, with 61% from
Downtown and 32% from Telegraph/Southside. (The City uses a July to June fiscal year.) Fiscal year 2014 data were not available to the UC team at the time this report was being prepared.

The December 2014 report to City Council states that $1.37 million in revenues qualify as restricted revenue for the period from the second quarter 2014 through the first quarter 2015 (i.e., through Sept. 2014.) These revenues are reported to be from meters; the total is net of a decline of about $264 thousand from garages.

The Berkeley team was provided parking revenue data for FY 11, FY 12, FY 13, and the first quarter of FY 14 only. According to these data, in the two control areas, parking revenues went up by 3% in FY 12 compared to FY 11 and by 4% in FY 13 compared to FY 12. Parking revenues in the pilot areas went up considerably more in FY 12, by 10% overall. Most of the revenue increases in this period were due to substantially increased returns from the Center St. and Telegraph/Shattuck garages. In FY 13, however, revenues went up only 4% in the pilot areas.

Since the changes in parking pricing were implemented in FY 14 (in October 2013 and June 2014), these data do not provide any indication of the effects of the pricing project, but they do indicate that other factors can cause substantial changes in parking revenues and need to be investigated.

Sales tax data by quarter from the Downtown and Telegraph districts were provided for FY 2011 through FY 2013-Q3 as an indicator of economic activity. The data show considerable fluctuation in tax revenues, with a 25-26% difference between the quarterly low and the quarterly high in each district over the period reviewed. Fluctuations also occurred quarter to quarter in both Downtown and the Telegraph district, with quarterly changes ranging from less than one percent in some cases to as high as 18% (Downtown FY12-Q3) and 26% (Telegraph, FY11-Q3). Quarterly fluctuations are not consistent in size or direction of change across districts and likely reflect highly localized market factors. For example, the closure of the UC Berkeley Lower Sproul Plaza area for a multi-year construction project may have affected sales tax earnings starting in FY 2013-Q2 in the Telegraph Area, just as the closure of the MLK Garage (public parking) on the same area of the campus may have affected use of the nearby Telegraph Channing city garage. Overall, sales tax revenues in FY2013-Q3 were about the same as in FY 2011-Q1 in the Telegraph district but had increased by 24% in Downtown over the same period.

Since retail sales are one driver of demand for metered parking, changes in sales activity could be accompanied by changes in parking demand, but many other factors, including the mix of retail establishments, also would have to be accounted for. For example, shifts to sales of higher priced goods (e.g., cellphones rather than T-shirts) would increase sales tax without necessarily increasing travel demand; shifts to services not subject to sales tax could decrease sales tax.
without necessarily lowering demand for travel and parking. A look at quarter to quarter changes
in the three pilot districts do not show any clear relationship between sales tax and parking
revenues, with neither the direction of change nor the magnitude of change showing a consistent
pattern.

5.0 Assessment

It is worth noting that the assessment can only be as robust as the data that inform it, and some of
the data available for this assessment were partial or limited. Survey samples in particular were
not well documented so sampling methods and sampling rates remain obscured. Questions
changed between waves, and response rates were low. Going forward, more robust survey
methods are strongly advised. It may be appropriate to create rotating panels with incentive
payments to help assure representativeness, adequate sample size, and continued reporting.

Omitted data include data on parking supply and rates at lots and garages that are privately
owned. These form a substantial portion of the parking supply downtown and in the
Telegraph/Southside district and could influence parking behavior observed at meters and in
municipal garages and lots. Likewise data on enforcement policies, ticket revenues, etc. was not
available but could be important in understanding traveler behavior, costs and revenues.

Data on parking duration should be available from license plate studies but were not provided for
this analysis. Duration data would help explain revenue changes and also would be important to
understand whether prices and time limits are affecting the duration and number of activities
parkers undertake.

Simple before-after studies may give misleading pictures of parking utilization because of
seasonal, daily, and hourly variations in demand as well as external events such as construction
projects, which closed two university garages and temporarily blocked meters on some blocks in
the study area. There is a risk that certain changes attributed to pricing are in fact explained by
such factors.

These data limitations are reasons for caution, but the data are nonetheless sufficient to draw
some conclusions about the program.

The data presented show that the goBerkeley parking management program has increased the
efficiency of on-street parking utilization in the three districts it included, though efficacy varied
among the districts and the specifics differ. The TDM program was not particularly successful,
resulting in very limited change in travel behavior or car ownership. In part, this is due to the
already high level of use of transit, biking, and walking in Berkeley, and in part it was due to the
limited focus of the TDM programs funded. These findings raise several issues that deserve
further attention.
5.1 Parking Availability and Occupancy

In Downtown Berkeley, parking availability increased in the premium area and staff report that the percentage of full block faces dropped from 37% to 25%, which translates into 10-12 fewer block faces that are over the 85% full criterion that the pilot program adopted. A modest increase in the use of the Berkeley Way lot was achieved, and vacancy declined in the two Downtown municipal parking garages to 70-80% (mostly because of changes in monthly parking policies.) In Telegraph/Southside, parking occupancy in the premium areas did not change. Prime parking spaces remained fully occupied during much of the day but value parking was more heavily used after time limits were extended. In the much smaller Elmwood district, parking occupancy increased overall and key blocks were over the 85% criterion some times of day. The Elmwood lot also remained quite full.

The findings raise questions about what the city intends to accomplish with its 85% criterion. The criterion is a rule of thumb used in many industries as an indicator of effective capacity and accounts for the realities of operation which may prevent full capacity utilization or lead to backups at times when demand spikes. For parking, use of 85% as the effective capacity will account for the occasional blockage of a parking space or two due to, say a double parked delivery vehicle or a car parked over the line. As an example, in an 8-space stretch of parking, if one car is over the line, only 7 cars may be able to park, resulting in effective capacity being reduced to about 88% of physical capacity. Also, operating at less than full capacity leaves room for growth without having to invest in new capital facilities and provides some allowance for fluctuations in demand, as can happen seasonally (e.g., Christmas shopping season), due to special events (e.g., football game days, graduation), or in a highly localized way, by time of day as a function of land uses (high school drop off and pick up, movie start times, etc.)

It should be noted, however, that average weekday capacity is only one of many ways that effective capacity has been measured. A different result will be obtained if 90 percent occupancy is targeted rather than 70-85 percent occupancy, or if occupancy is calculated for the average day versus say the peak weekday hour between 9 a.m. and 6 p.m., the peak weekday hour, or the 100th highest hour of the year. 85% is based on a judgment call about the effective utilization rate and can be set higher or lower depending on the characteristics of the activities in the area and the willingness to accept occasional shortfalls (Millard-Ball et al., 2014).

5.2 Parking Search and Access

Parking behavior reflects parker’s travel and activity patterns and personal characteristics as well as price. It matters whether the parkers are regular users who are familiar with the parking supply and know where to look for parking, in which case a higher level of occupancy is usually acceptable. Alternatively, if they are new or infrequent visitors, who do not know their way around the district, more empty spaces might be needed to avoid prolonged searches. Regular users who plan to drive to an area will often choose times of travel in which parking is likely to
be available, such as by avoiding going shopping in certain areas mid-day Saturdays, knowing suburbanites will have flooded the area, or to go Downtown mid-morning or mid-afternoon rather than at the busier noon or late afternoon periods. They also will often know where to look for a parking space and will take the first place they see that is within reasonable walking distance for them, which may be a few blocks from their destination. Infrequent visitors of the area, lacking the same level of knowledge about parking supply, locations where parking might be available, and times of day when parking is likely to be occupied, are more likely to find themselves having to hunt for a space.

Acceptable walking distances also should be considered in determining how much parking should be left open. If the policy is that a parker should be able to find a space or two on any block face, far more parking would remain vacant than if the policy is that a parker should be able to find a space within a four or five minute walk of the intended destination. Thus, parking policy should reflect consideration of how much walking is acceptable for various trip purposes and from a public policy perspective.

As a point of reference, the maximum walking distances within the various premium areas are all under 20 minutes. It is an 18-minute walk (0.8 mi.) from Fulton St. and Oxford St. to College Ave. and Channing Way across the entire length of the Telegraph/Southside district, a 13-minute walk from Shattuck Ave. and Hearst Ave. to Fulton St. and Durant Ave. at the opposite ends of the Downtown, and a mere 5-minute walk from Stuart St. to Webster St. along College Ave., the length of the Elmwood district. Most walks from parking in the Downtown or Southside to most destinations will be 5 minutes or less, as will be virtually all such trips in Elmwood. Thus, a reasonable question is whether Berkeleyans think that having to walk a few minutes from parking is too much to ask of the average driver to Berkeley’s commercial districts.

A 5-minute walk might be difficult for a person with disabilities, though many in this category will have access to conveniently located handicapped parking. Such a walk may also be challenging for those carrying heavy or bulky packages or with small children in tow. For others, trip purpose and duration is likely to affect willingness to walk. A driver planning to drop off dry cleaning or buy groceries may not want to walk very far to do so, whereas a couple going out for dinner and a concert or a shopper wanting to see what area stores have to offer may be quite willing to walk several blocks to and from their parking spaces. In addition, travelers are willing to walk farther when there are sidewalks, short blocks with comfortable street crossings, traffic calming, and plenty to look at along the way than in areas missing such features (Adkins et al., 2012; Ameli et al., 2015). Travel behavior studies confirm that there is no single distance for willingness to walk nor is there any evidence that in urban districts it is critical for everyone to be able to park on the same block as one’s destination.

The fact that in surveys the majority of respondents said that it was easy to find a parking space indicates that full compliance with an 85% occupancy rule of thumb is not necessary in the Berkeley context. Thus, the City Council may wish to consider whether a more relaxed approach
would be appropriate. For example, it may be acceptable for on street parking to be full in the late afternoon or after 6 p.m., and further adjustments to reduce use may not be needed. Alternatively, the city might want to consider time of day pricing for parking spaces that are in high demand.

5.3 Providing Parking versus Reducing Auto Use

How much parking should be kept available is especially important in light of the city’s desire to reduce auto use. If the city pursues a policy whereby parking is always available to those who want it, there will be less incentive for those who say drive to work on the UC campus but walk down the hill rather than drive when they go downtown to connect with friends at 5:30 p.m. for a drink. There will be less incentive for employees going to a meeting on the Southside to take the bus or share a ride if they can drive there and easily find a parking space on the same block as their destination. There will be less incentive for a worker or student to take the bus rather than drive and park in a value zone. Keeping the parking supply open means that only price and not search time is a potential constraint. Keeping parking on the tight side is likely to provide an incentive to use alternative modes of travel—modes that will be comparatively less attractive if parking is always available.

A concern raised about a tight parking supply is that it can lead to cruising (prolonged searching) for parking, adding to VMT and emissions. While there is evidence that cruising for parking does occur, in the compact districts and small blocks that characterize Berkeley, cruising is likely to be on the order of a few hundred to a thousand feet rather than in miles. Also, those with knowledge of the area are likely to park before they arrive at their actual destination, knowing that parking can be tight. In this way it is important to know not just about occupancy but about the characteristics of the users visiting the area.

Drivers to Berkeley destinations include workers, students, and those who regularly come for shopping, social and recreational visits, and personal business, as well as tourists and occasional visitors. Each group has a different demand for parking, price sensitivity, and access time sensitivity. The groups also have different levels of knowledge of the streets and parking in the area, and a different willingness to consider alternative modes for their trip. Level of service for transit also changes drastically for off-peak trips, especially by bus. It is far harder to change travel behavior for non-work trips, especially those that are not tied to a work or school trip to the area. Also, it is likely harder to influence the behavior of infrequent visitors than it is to affect regular users’ choices. However, non-work travel behavior also varies widely with specific trip purpose, the availability and quality of alternative modes of travel, alternative parking locations, and the feasibility of choosing alternative destinations for accomplishing the trip purpose.

For such complex decision making situations, sophisticated TDM programs could make a difference. For example, in response to higher parking prices, shoppers and travelers making social-recreational trips may choose to simply pay the higher price, reduce the duration of their
stay to reduce costs, search for a lower cost parking spot, choose a different mode of access, choose a different destination, or travel less frequently. Which choices they make are a function of their personal and household socio-economic characteristics, their trip purposes, their household locations, personal and household scheduling constraints, the travel options available to them, plus personal habits and preferences. Most people can change where they shop more easily than they change where they go to the doctor, and far more easily than they can change their housing location or work / school setting. Website information, cellphone apps, and real time information signs are more likely to be useful to novices or occasional users than to residents, employees, and season ticket holders.

In general, however, parking pricing is relatively inelastic across most trip purposes and market segments, with price elasticities in the -1.0 to -0.6 range the most common (see Litman, 2014 for a review of the literature.) Studies at UC Berkeley offer evidence that is likely to apply to many workers elsewhere in the City of Berkeley, given that the large UC workforce is highly diverse in income, job, and socio-economic characteristics and includes most of the employment categories found elsewhere in the city. Parking price elasticities estimated for UC Berkeley employees are in the -0.1 to -0.5 range, varying with income (Ng, 2014). This suggests that a similar range might be applicable for City workers in general (see Table A-4 in the appendices for data on the Berkeley workforce in the study areas.) The elasticities at the higher end of this spectrum observed in the literature are more likely to apply to trips for shopping, personal business, dining out, etc., which are a frequent trip purpose for drivers traveling mid-morning or later in Berkeley.

In the short term especially, few travelers for work and education can change their trip destination or even their trip frequency or time of day. However, shoppers and other casual travelers often do have these options, and can go elsewhere if parking is too difficult. If the concern is high prices for parking, there is some evidence that parkers will shorten their trip duration (Litman, 2014).

The City finds in its December 2014 report to the City Council that only 5% fewer cars are parking in the premium zones, which suggests that overall price elasticity may be at the lower -0.1 level. But this is a fairly low elasticity level for shoppers and other midday travelers, so an alternate explanation is worth considering, that there may have been pent-up (suppressed) demand for parking caused by previous constraints on parking that has now been released into the system.

5.4 Price Elasticities and Revenues

Price elasticities also inform how revenues will change with price changes. Low price elasticity would suggest that substantial increases in parking price can be implemented without reducing revenues significantly. Indeed, if price elasticities of demand are very low, the price increases implemented should have generated substantial new revenues. The UC team did not have access to FY 14 revenue data so we are not certain whether or not this occurred. As parking
management moves forward, it is worth double-checking the number of cars in the system and their duration to assess whether revenues are as expected, and to calculate price elasticities.

It should be kept in mind that parking price elasticities are likely to be nonlinear, and future price increases might not generate the same responses as those observed in the recent round of changes in the three study areas. It also is important to account for other degrees of freedom in the system, especially the possibility that in response to higher prices parkers have reduced durations. This could mean that there are as many cars and VMT as before but fewer hours of parking, and therefore lower revenues than otherwise would be projected. Duration data either from license plate studies or possibly from smart meters and kiosks could provide the information needed to assess this issue properly, but were not available to the UC Berkeley study team.

5.5 Managing Parking in Residential Areas

An option that is available to those who are willing to walk a few blocks is parking in residential neighborhoods. Although most blocks near the pilot area have adopted resident permit parking programs (RPP), it has been widely observed and reported that some non-permit holders use RPP parking and move their cars if they stay longer than two hours (Shirgaokar and Deakin, 2014). UC data have long indicated that this has happened as a result of campus parking restrictions and price increases, and a recent Southside study (Moylan et al., 2014) has reported that there are hundreds of such vehicles in the RPP areas. Improved parking enforcement capabilities such as those potentially offered by automated data collection equipment could greatly reduce non-resident parking for more than the two hour time limits. If this occurs, it could cause spillback effects on demand for city and campus parking. Plugging this leak in the parking regulations also could increase demand for commute alternatives.

5.6 Managing Value Pricing

The demand for parking in previously underutilized value pricing locations appears to have increased, and an interesting issue is who is using this parking and for what trip purposes. With the adjusted prices, the value pricing locations now charge the same rate as established elsewhere in the city, but value parking has longer time limits. Currently a value priced parking space at $1.50/hr. costs $12.00 for all-day parking, making it competitive with other daily parking rates. Parking at UC Berkeley for those who buy a monthly pass comes out to only $5.00-$8.00 / day, but for those who do not use parking enough to justify a monthly permit, daily permits are considerably more expensive, running $12.00-$16.00. Early-bird parking costs about $10.00/day at most Berkeley garages, but parking for those who arrive after 9 a.m. is $15.00/day and up. Thus, value pricing is a good deal for those who want to come in around 9 a.m. or a little later, especially if they want to park for a number of hours. In other words, the value pricing spaces may be an on-street equivalent of a parking garage in terms of cost and convenience.
One question is why there is an 8-hour limit imposed, instead of a flat dollar per hour fee for each hour that meters are enforced—currently for nine hours a day Monday through Saturday. If the city is willing to allow this parking to supplement other day-long parking, the UC Berkeley team sees no reason to cut the parking short at 8 hours.

5.7 Mode Choice and TDM Efforts

Census data (2010) indicate that 53% of Berkeley employees drive to work and that many of these workers are from Berkeley, Oakland or other nearby cities and towns that have transit service to Berkeley (see Table A-1 in the appendix.) While a few Berkeley workers do live a considerable distance away, the vast majority reside within a few miles of their work destination in Berkeley. Thus, it is misleading to concentrate on distance as a reason for driving; the more important reason is that travel times by bus are not competitive. Many Berkeley workers live too far away to comfortably walk or bike; bus transit is available but takes several times as long as driving. For those who can afford to pay for parking—and many Berkeley workers can—it is far more cost-effective to drive and park than to spend upwards of 45 minutes each way on the bus for a trip that could be made in 15 minutes by car. The extra hour a day travel time has a higher value for most workers than the $10.00-$15.00 (or less) that daily parking costs. If value of time is half the wage rate, as is typical, anyone earning $40,000-$50,000 or more would be likely to value the time savings of driving more than the lower cost but longer travel time of transit. Convincing these individuals to use existing transit would typically require finding a link to other community and environmental values that the individual may hold.

Off-peak, cutbacks in bus service have led to sparse schedules, and in some cases, no service at all. This is a further impediment to transit use for workers who are not on a regular 8 a.m. to 5 p.m. schedule, and for most non-work trips. Simply offering free or deep discount transit passes does not overcome the time barrier or make up for the sparse midday and evening transit service.

When the pilot project was first discussed, one idea was to raise parking prices and use the revenues to purchase free bus passes for all Berkeley residents; perhaps as a partnership with major employers such as UC Berkeley, and/or to pay for improved bus and paratransit services within Berkeley. The justification for this was that on-street and municipal parking spaces are owned by the city as a whole, not by the districts in which they are held, and transit incentives and improvements would help mitigate auto use and parking demand, benefitting drivers and parkers. While this idea was not pursued as part of the goBerkeley project, and current budgetary realities may necessitate devoting parking revenues to the general fund rather than directing them to transportation improvements, the concept might be worth considering more seriously in the future and examined with a cost-benefit analysis. Based on current evidence, transit improvements, or in the alternative, new mobility services in areas that currently do not have adequate bus service, such as on-demand or Uber for night service, would be needed to attract substantial ridership.
A transit subsidy that worked on multiple transit operators including BART also would be of considerable interest to Berkeley residents, who use BART for their commutes to a greater extent than they use AC Transit. A flexible multi-operator transit pass is seen as an important need throughout the region and is the subject of considerable work at MTC, so may become feasible in the future.

The role of carsharing in a Berkeley TDM program deserves more discussion. For residents, carsharing can be an opportunity to reduce car ownership, often by getting rid of second and third cars, and for some it may even remove the need for any car ownership. For large employers, carsharing can reduce the need for company fleet vehicles used for occasional trips. For businesses in Berkeley, most of which are small, it is less obvious that carsharing matches business use of vehicles and fulfills needs, and this was reflected in the low subscription rate achieved despite the best efforts of consultants. Hence, focusing on a broader residential market may be the best overall strategy for encouraging car sharing and reduced ownership and use. Furthermore, exploring peer-to-peer solutions as being experimented by Ford in Partnership with Getaround may provide future opportunity (Hirsch, 2015).

If a more traditional TDM program is promoted, it would be important to develop a better understanding of the share of shopping and personal business trips in Berkeley that are made by people who are already in town for work or school. Some programs have had success marketing transit use and bikesharing to these groups for trips during the day. In addition, while there is some evidence to support the idea that some travelers can be persuaded to gradually shift modes. As reported in the staff report to City Council, there is substantial evidence that the best chance of getting a driver to try other modes of travel is when he or she has experienced a major life change such as a new job, a new housing location, becoming an empty nester, etc. If TDM programs are continued in the future the UC team recommends that attention be given working with employers and employer associations to target persons for which life changes open up opportunities for making new choices.

6.0 Conclusions and Recommendations

The results to date from the goBerkeley program indicate that the price increases were moderately effective. Downtown, premium pricing opened up spaces for parkers overall but not on every block and in particular not on the block faces where demand had been heaviest. Value pricing and longer time limits led to increased use of previously underutilized metered spaces. In the Telegraph/Southside district, the increased prices for premium parking spots had little effect on demand, but value pricing and accompanying longer time limits led to much greater use of spaces that had previously sat empty. In Elmwood, the combined prices coupled with the longer time limits led to higher, not lower, utilization rates (less availability) at on-street meters.

Bus pass programs, targeted to a limited number of apartment dwellers and employees, did not change travel choices significantly, although pass holders reported higher levels of bus use than
they otherwise would have made. This could be related to limited coverage during off-peak hours or limitations in terms of coverage – both areas for future research and policy. Carsharing was also of relatively little interest to the targeted businesses and employees, who did not see a good match to their business or personal needs, and also had little impact on travel, but some did sign up for it. Both programs were hard sells for the sub-markets they targeted, however may hold future promise as the number dynamic ridesharing and networked transportation services like Uber and Uberpool increase.

It appears that price elasticities for metered parking are low. This is consistent with focus group findings that parkers were more concerned about having enough time to complete their activities without getting a ticket than they were about price, at least at the current pricing levels. City survey respondents similarly reported that they were more concerned about convenience than price, and that they were generally satisfied with the current parking situation. This suggests that the crowding at some times of day may not be as problematic as some have thought, since key locations remain parked up in all three districts.

More detailed information on duration of parking would be useful in understanding changes in travel behavior and in estimating revenue impacts. New data collection methods using automated technologies may facilitate data collection. In addition, better survey designs and methods allowing time-series analyses would be helpful to future parking management efforts.
References


5. Berkeley, City of (December 2014) Christine Daniels, City Manager (work submitted by Andrew Clough, Director of Public Works). goBerkeley Program Results and Next Steps. City Council Packet Information Item, Berkeley, CA.


Appendix: Additional Tables and Figures

Figure A-1: Parking Meters in the City of Berkeley, CA
Table A-1: Commuters Driving Alone (DA) to Work in Berkeley

<table>
<thead>
<tr>
<th>City of Residence</th>
<th>Total Commuters to Berkeley</th>
<th>DA #</th>
<th>% of Berkeley DA Workers</th>
<th>% Residents Working in Berkeley who DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakland</td>
<td>12,515</td>
<td>7,375</td>
<td>19.8%</td>
<td>59%</td>
</tr>
<tr>
<td>Berkeley</td>
<td>23,590</td>
<td>6,950</td>
<td>18.6%</td>
<td>29%</td>
</tr>
<tr>
<td>San Francisco</td>
<td>3,175</td>
<td>1,760</td>
<td>4.7%</td>
<td>55%</td>
</tr>
<tr>
<td>El Cerrito</td>
<td>2,485</td>
<td>1,515</td>
<td>4.1%</td>
<td>61%</td>
</tr>
<tr>
<td>Richmond</td>
<td>3,630</td>
<td>2,425</td>
<td>6.5%</td>
<td>67%</td>
</tr>
<tr>
<td>Albany</td>
<td>2,215</td>
<td>1,135</td>
<td>3.0%</td>
<td>51%</td>
</tr>
<tr>
<td>San Leandro</td>
<td>1,025</td>
<td>685</td>
<td>1.8%</td>
<td>67%</td>
</tr>
<tr>
<td>Total</td>
<td>48,635</td>
<td>21,845</td>
<td>58.6%</td>
<td>45%</td>
</tr>
</tbody>
</table>

Share of Berkeley employees from these cities: 69.4%

Source: Extracted from Bay Area Census 2010
Table A-2: Summary of goBerkeley Parking Rate and Time Limit Changes

<table>
<thead>
<tr>
<th>METERS</th>
<th>Baseline</th>
<th>Launch (Fall 2013)</th>
<th>Adjustment (Spring 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elmwood</td>
<td>Parking Rates</td>
<td>$1.50/hr</td>
<td>1 hr - $1.50 2 hrs - $3.50 3 hrs - $6.00</td>
</tr>
<tr>
<td></td>
<td>Time Limits</td>
<td>1 hr</td>
<td>3 hrs</td>
</tr>
<tr>
<td>Southside</td>
<td>Parking Rates</td>
<td>$1.50/hr</td>
<td>Premium - $2.25/hr Value - $1.00/hr</td>
</tr>
<tr>
<td></td>
<td>Time Limits</td>
<td>30 min – 2 hr</td>
<td>Premium – 2 hr Value – 8 hr</td>
</tr>
<tr>
<td>Downtown</td>
<td>Parking Rates</td>
<td>$1.50/hr ($1.75/hr Premium)</td>
<td>Premium - $2.25/hr Value - $1.25/hr</td>
</tr>
<tr>
<td></td>
<td>Time Limits</td>
<td>30 min – 2 hr</td>
<td>Premium – 2 hr Value – 4 hr</td>
</tr>
<tr>
<td>LOTS AND GARAGES</td>
<td>Parking Rates</td>
<td>$1.50/hr (non- validated)</td>
<td>Hourly - $3/hr (avg) 4+ hrs - $18 Early bird - $8 Monthly - $150</td>
</tr>
<tr>
<td>Elmwood (Elmwood Lot)</td>
<td>Time Limits</td>
<td>2 hr</td>
<td>3 hrs</td>
</tr>
<tr>
<td>Southside (Telegraph Channing Garage)</td>
<td>Parking Rates</td>
<td>Hourly - $2.50/hr (avg) 4+ hrs - $15 Early bird - $8 Monthly - $150</td>
<td>Hourly - $2/hr 4+ hrs - $17 Early bird - $9 Monthly - $170</td>
</tr>
<tr>
<td>Downtown (Center Street Garage)</td>
<td>Parking Rates</td>
<td>Hourly - $2.50/hr 4+ hrs - $15 Monthly - $150</td>
<td>Hourly - $2/hr 4+ hrs - $17 Monthly - $170</td>
</tr>
<tr>
<td>Downtown (Oxford Garage)</td>
<td>Parking Rates</td>
<td>First 2 hrs - $1.50/hr Next 4 hrs - $2.50/hr</td>
<td>No change</td>
</tr>
<tr>
<td>Downtown (Berkeley Way Lot)</td>
<td>Time Limits</td>
<td>6 hr</td>
<td>No change</td>
</tr>
</tbody>
</table>

Source: December 2014 Staff Report to City Council
Table A-3: Block Faces and Spaces for which Occupancy Data Were Provided

Source: extracted from data sheet provided by the City of Berkeley

<table>
<thead>
<tr>
<th></th>
<th>Premium</th>
<th>Value</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block faces</td>
<td>Spaces</td>
<td>Block faces</td>
</tr>
<tr>
<td>Downtown</td>
<td>79</td>
<td>815</td>
<td>37</td>
</tr>
<tr>
<td>Telegraph/Southside</td>
<td>39</td>
<td>620</td>
<td>18</td>
</tr>
<tr>
<td>Elmwood</td>
<td>6</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>1513</td>
<td>55</td>
</tr>
</tbody>
</table>

Note: Dec. 2104 staff report to City Council lists slightly different block face counts as follows:

<table>
<thead>
<tr>
<th></th>
<th>Premium</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown</td>
<td>89</td>
<td>29</td>
</tr>
<tr>
<td>Telegraph/Southside</td>
<td>31</td>
<td>21</td>
</tr>
<tr>
<td>Elmwood</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>128</td>
<td>50</td>
</tr>
</tbody>
</table>
### Table A-4: Businesses in the Study Area – 2013 Data

<table>
<thead>
<tr>
<th>Type of business</th>
<th>Downtown Berkeley</th>
<th>Elmwood</th>
<th>Telegraph / Southside *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of businesses</td>
<td># of employees</td>
<td>Percent</td>
</tr>
<tr>
<td>Restaurant</td>
<td>67</td>
<td>604</td>
<td>12%</td>
</tr>
<tr>
<td>Retail</td>
<td>26</td>
<td>351</td>
<td>7%</td>
</tr>
<tr>
<td>gym/community ctr.</td>
<td>5</td>
<td>308</td>
<td>6%</td>
</tr>
<tr>
<td>non-profit</td>
<td>16</td>
<td>227</td>
<td>4%</td>
</tr>
<tr>
<td>Service</td>
<td>209</td>
<td>1,896</td>
<td>36%</td>
</tr>
<tr>
<td>Medical</td>
<td>26</td>
<td>272</td>
<td>5%</td>
</tr>
<tr>
<td>Automotive</td>
<td>8</td>
<td>213</td>
<td>4%</td>
</tr>
<tr>
<td>School</td>
<td>6</td>
<td>203</td>
<td>4%</td>
</tr>
<tr>
<td>Govt./institutional</td>
<td>23</td>
<td>747</td>
<td>14%</td>
</tr>
<tr>
<td>Parking</td>
<td>3</td>
<td>9</td>
<td>0%</td>
</tr>
<tr>
<td>Entertainment</td>
<td>7</td>
<td>313</td>
<td>6%</td>
</tr>
<tr>
<td>Hotel</td>
<td>3</td>
<td>5</td>
<td>0%</td>
</tr>
<tr>
<td>Misc.</td>
<td>91</td>
<td>79</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>490</strong></td>
<td><strong>5,228</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

* includes employment along Telegraph Avenue including Alta Bates Hospital and other medical offices south of the Telegraph/Southside area.

Source: Data provided by City of Berkeley