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# Results of the 2012-13 Campus Travel Survey

September 2013

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**RESULTS OF THE 2012-13  
CAMPUS TRAVEL SURVEY**

**Institute of Transportation Studies**

*and*

**Transportation and Parking Services**

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# EXECUTIVE SUMMARY

## About the Campus Travel Survey

The UC Davis Campus Travel Survey is a joint effort by the Transportation & Parking Services (TAPS) and the Sustainable Transportation Center, part of the Institute of Transportation Studies at UC Davis. Since 2007 the survey has been administered each fall by a graduate student at the Institute of Transportation Studies. The main purpose of the survey is to collect annual data on how the UC Davis community travels to campus, including mode choice, vehicle occupancy, distances traveled, and carbon emissions. Over the past six years, the travel survey results have been used to assess awareness and utilization of campus transportation services and estimate demand for new services designed to promote sustainable commuting at UC Davis. Data from the campus travel survey have also provided researchers with valuable insights about the effects of attitudes and perceptions of mobility options on commute mode choice. This year's survey is the seventh administration of the campus travel survey.

The 2012-13 survey was administered online in October 2012, distributed by email to a stratified random sample of 28,838 students, faculty, and staff (out of an estimated total population of 41,214). About 15.7 percent (4,514 individuals) of those contacted responded to this year's survey, with 13.8 percent actually completing it. For the statistics presented throughout this report, we weight the responses by role (freshman, sophomore, junior, senior, Master's student, PhD student, faculty, and staff) and gender so that the proportion of respondents in each group reflects their proportion in the campus population.

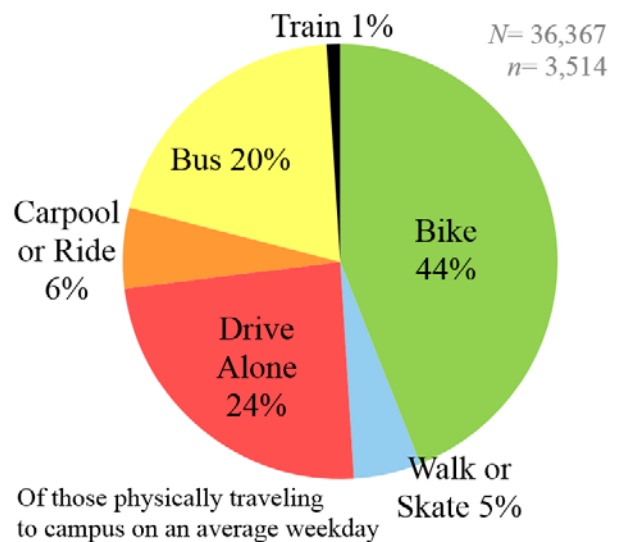
## Main findings

### *Overall mode share*

On an average weekday, about 88 percent of people physically travel to campus (approximately 36,367 people, including those living on campus). Among these, 44 percent bike to get there, 5 percent walk or skate, 24 percent drive alone, 6 percent carpool or get a ride, 20 percent ride the bus, and 1 percent ride the train. These figures represent the percent of people using each means of transportation as their primary mode (that is, for the greatest share of their distance) from wherever they live to their campus destination, on an average weekday.

Because some people use different travel modes on different days, the total number of regular bicyclists or transit-riders, for instance, is substantially larger than the number using each mode on any given day. In particular, about 51 percent reported biking as their primary means at least once during the week. Similarly, about 11

Figure 1. Overall mode share, 2012-13



percent carpooled or got a ride to campus, 28 percent rode the bus, and 1.6 percent rode the train at least once during the week for most of the distance to campus.

*Change in mode share, 2011-12 to 2012-13*

One of the main purposes of the Campus Travel Survey is to collect comparable data each year in order to assess trends over time. The questions and calculations used to estimate mode share in this year’s survey are identical to those used in the 2011-12 survey. In addition, the results of each year are weighted by role and gender to correct for differences in response rates between subsets of the population over time. Notably, the overall share biking to campus decreased by 2.1 percentage points over the last year, while the share riding the bus to campus increased by 2.4 percentage points. Only the change in bus use is statistically significant. Other mode shares experienced small changes; however these are not significant across the population. The share of the university population physically traveling to campus on an average weekday did not change significantly.

*Table 1. One year change in overall mode share, 2011-12 to 2012-13*

Years of comparison	Percentage-point change in share of people doing each on an average weekday							
	Among those physically traveling to campus:							Physically traveling to campus
	Bike	Walk	Personal vehicle			Bus	Train	
			Any	Drive alone	Carpool or ride			
2010-12 to 2011-13	-2.1%	-0.6%	0.4%	0.1%	0.3%	2.4%**	0.0%	-0.8%

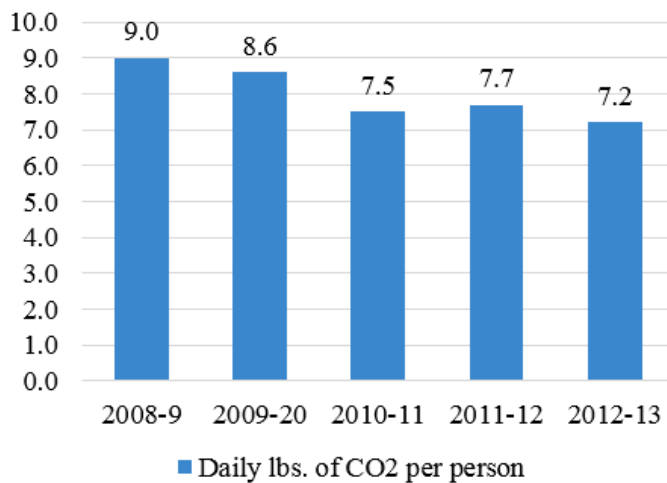
\* Statistically significant difference with  $p < 0.1$  in a two-category  $\chi^2$  test of the frequency of those using this mode versus those using any other mode in one year versus the other.

\*\* Statistically significant at  $p < 0.05$ .

*Carbon dioxide-equivalent emission*

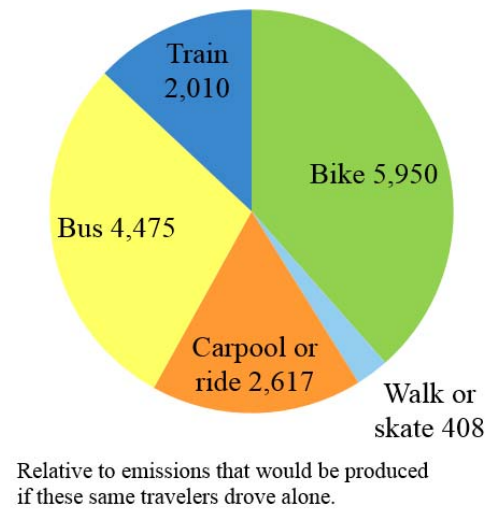
Each year, we use data on mode share, vehicle occupancy, and geocoded travel distance to estimate the amount of carbon dioxide-equivalent (CO<sub>2</sub>e) emitted from commuting to campus. We estimate that travel by UC Davis students and employees to campus generates a total of 295,811 pounds of CO<sub>2</sub>e on an average weekday, or 7.2 pounds of CO<sub>2</sub>e per capita, compared to 7.7 pounds in 2011-12 and 7.5 pounds in 2010-11.

*Figure 2. Daily carbon emissions per capita from commuting, 2008-09 to 2012-13*



As an assessment of the extent that alternative transportation reduces CO<sub>2</sub>e emissions, we might consider that if everyone drove alone to campus but all else were unchanged (e.g. distances and frequency of travel), then there would be an additional 15,460 annual metric tons of CO<sub>2</sub>e generated, compared to 33,544 tons overall. Figure 3 shows the contribution of each alternative to driving alone to the total CO<sub>2</sub>e emissions avoided

Figure 3. Annual CO<sub>2</sub>e emissions avoided



*Average Vehicle Ridership*

Average vehicle ridership (AVR) is a statistic calculated at each UC campus that represents the ratio of the number of people arriving on campus to the number of personal vehicles brought to campus. If everyone drove by themselves to campus, the campus AVR would be equal to one. Values greater than 1.0 indicate more carpooling or the use of alternative modes of transportation. The official 2012-13 AVR for non-student employees living off-campus is 1.70 person-arrivals per vehicle-arrival. The AVR for the entire campus community is 3.82. This means that for every car coming to campus, there are an estimated 3.82 people coming to campus or telecommuting.

Table 2. Average Vehicle Ridership (AVR), 2007-08 through 2012-13

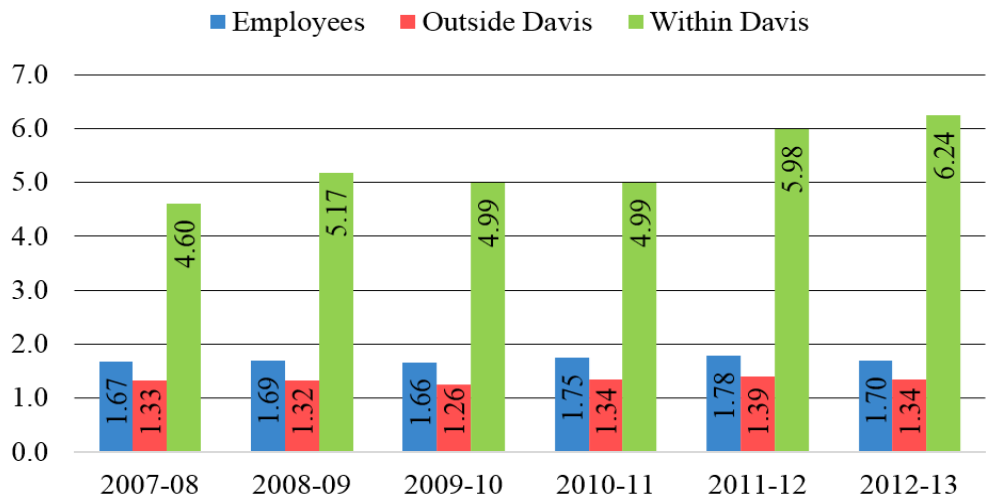
Role group	Off-campus only						All (on and off-campus)					
	2007-8	2008-9	2009-10	2010-11	2011-12	2012-13	2007-8	2008-9	2009-10	2010-11	2011-12	2012-13
Students	1.67	4.76	4.28	4.49	5.29	6.05	5.04	5.91	5.25	5.53	6.41	7.25
Employees	<b>1.67</b>	<b>1.69</b>	<b>1.66</b>	<b>1.75</b>	<b>1.78</b>	<b>1.70</b>	1.67	1.71	1.66	1.75	1.80	1.70
Outside Davis	1.33	1.32	1.26	1.34	1.39	1.34	1.33	1.33	1.26	1.34	1.39	1.34
Within Davis	4.60	5.17	4.99	4.99	5.98	6.24	5.61	6.32	5.99	6.04	7.14	7.36
Overall	2.75	2.99	2.83	3.00	3.26	3.34	3.20	3.51	3.30	3.51	3.78	3.82

**Bold** indicates the official AVR statistic reported by UC campuses. See Appendix D for details on AVR calculations.

Figure 4 shows the differences in AVR between all employees, employees and students living within Davis, and employees and students living outside Davis. As shown, the 2012-13 AVR of those living in Davis is somewhat higher than in previous years, while the AVR of those living outside Davis has remained relatively constant over time. These results suggest that there is still much progress to be made in encouraging those regularly traveling to campus to live within Davis.



Figure 4. Average Vehicle Ridership, 2007-08 to 2012-13

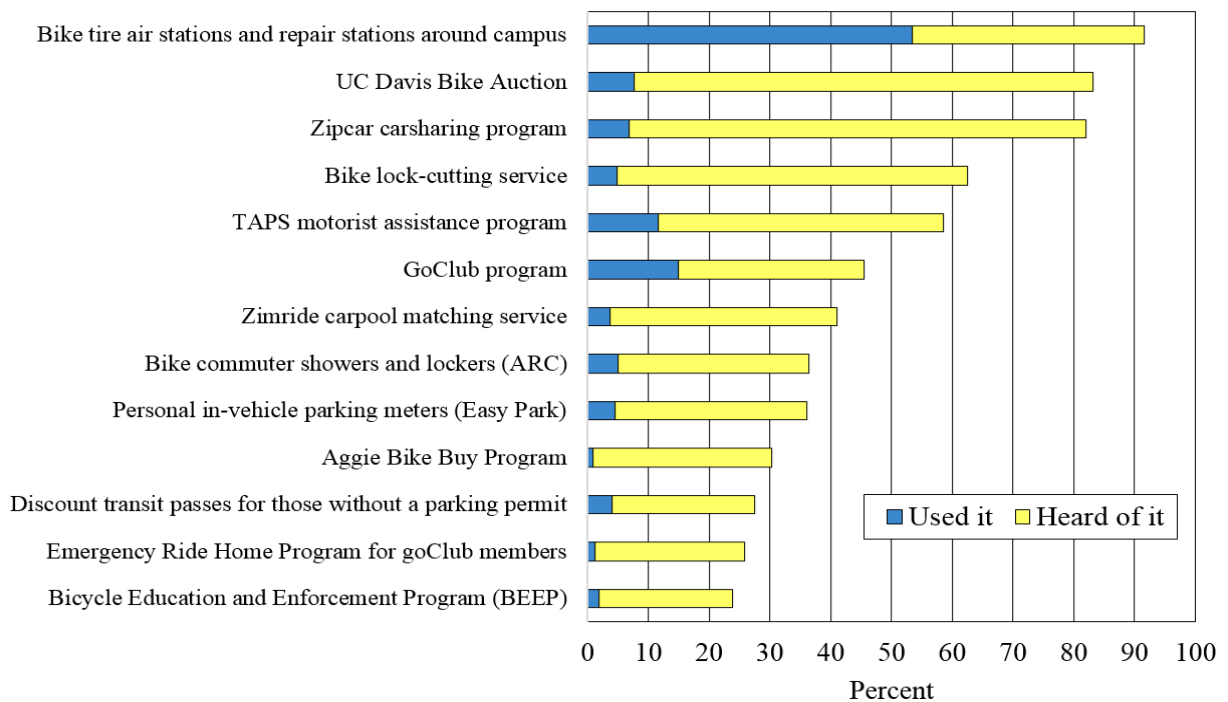


Excludes students and employees who live on-campus. West Village is considered off-campus for this analysis.

*Awareness of TAPS and other transportation services*

Several services that promote bicycling are well-known and highly utilized across the campus population. The bike tire air stations and repair stations on campus are the most highly utilized transportation services, with over 50 percent of respondents having used them (Figure 4).

Figure 4. Awareness of TAPS and other transportation services, 2012-13



# INTRODUCTION

## **Background**

In 2003 the University of California adopted the *UC Policy on Sustainable Practices*, which charges UC campuses with the task of measuring and promoting sustainable commuting. System-wide targets for assessing the sustainability of transportation systems include annual estimation and reporting of Average Vehicle Ridership (AVR) and carbon dioxide equivalent emissions (CO<sub>2</sub>e) for each UC campus. The *UC Policy on Sustainable Practices* also lists mechanisms for reducing commute emissions, including the construction of on-campus housing and expansion of Transportation Demand Management (TDM) programs. In addition to the sustainable transportation goals of the University of California, many universities and colleges around the world face additional reasons to promote alternatives to driving. Some concerns include high costs of expanding parking facilities, air pollution, and traffic congestion. It is essential that campus planners and travel demand managers have current and accurate information about commuting at their institutions so that they may implement targeted transportation policies, evaluate the effectiveness of current services, share best practices with other institutions, and track commuting behavior over time.

## **About the campus travel survey**

The UC Davis campus travel survey is a joint effort by the Transportation & Parking Services (TAPS) on campus and the Sustainable Transportation Center, part of the Institute of Transportation Studies at UC Davis. Since 2007 the survey has been administered each fall by a graduate student at the Institute of Transportation Studies. The main purpose of the survey is to collect annual data on how the UC Davis community travels to campus, including mode choice, vehicle occupancy, distances traveled, and carbon emissions. Over the past six years, the travel survey results have been used to assess awareness and utilization of campus transportation services and estimate demand for new services designed to promote sustainable commuting at UC Davis. Data from the campus travel survey have also provided researchers with valuable insights about the effects of attitudes and perceptions of mobility options on commute mode choice. This year's survey is the seventh administration of the campus travel survey. The survey was first administered in the spring of 2006-07 as a pilot effort, with a second survey conducted in the fall of 2007-08 (Congleton, 2009), and four subsequent surveys conducted in the fall of 2008-09 (Lovejoy, Handy *et al.*, 2009), 2009-10 (Lovejoy, 2010), 2010-11 (Miller, 2011), and 2011-12 (Miller, 2012). The next administration of the survey is planned for October 2013.

The 2012-13 survey was administered online in October 2012, distributed by email to a stratified random sample of 28,838 students, faculty, and staff (out of an estimated total population of 41,214). About 15 percent (4,327 individuals) responded to this year's survey, with about 14 percent actually completing it. For the statistics we present throughout this report, we weight the responses by role (freshman, sophomore, junior, senior, Master's student, PhD student, faculty, and staff) and gender so that the proportion of respondents in each group reflects their proportion in the campus population.

### **Development of the survey instrument**

The content of the survey was based on the previous year's survey, retaining key questions relating to mode choice and residential location, among others. An ongoing attempt to refine question wording has meant that some variables are not directly comparable across years. (See Appendix A for a full copy of the 2012-13 survey instrument. See Appendix B for a summary of changes in the 2012-13 survey compared to the 2011-12 survey.) The online survey was prepared using the Lime Survey software (<http://www.limesurvey.org/>), hosted using the server virtualization service offered by the office of Information Educational Technology (IET), and administered by Ning Wan and Jeremy Dalbeck. Staff at TAPS as well as faculty and students affiliated with the Institute of Transportation Studies provided feedback on survey content and assisted with pre-testing the online survey.

### **Sampling procedure**

As in previous years, the goal of the sampling procedure was to draw a sufficiently large sample for reliable statistical estimates within the following groups: freshmen, sophomores, juniors, seniors, Master's / professional students, PhD students, faculty, and staff. We used standard statistical techniques to determine the minimum sample size needed for estimates with a +/- 5% margin of error, based on the assumed response rate for each of the groups. In past years, we found that response was higher among some role groups (PhD students, faculty, and staff) and lower among others (seniors and Master's/professional students). Since the 2009-10 implementation of the survey, we have varied invitation rates by stratum to account for these differences, assuming that response rates by stratum in previous years would remain relatively consistent. To ensure that we reached minimum sample size targets even with some variation in response rates, we expanded the share of the population sampled to 70 percent (28,838 people), 4,885 more than were invited in 2011-12. (See Appendix G for more information on this year's sampling plan.)

A stratified random sample of 28,838 was drawn from ostensibly complete lists of UC Davis email addresses maintained at two different departments within the university. The sampling of student email addresses was conducted by the Student Affairs Research and Information office (SARI). Student email addresses were screened based on students' class level and departmental affiliation, including all academic and professional students except medical students, who are not based on the Davis campus. In the case of the student sample, we received a spreadsheet from SARI containing only those names and email addresses of individuals selected for inclusion in the sample. A list of employee (faculty and staff) email addresses was drawn by Data Administration staff using the Campus Data Warehouse. Employees were screened to exclude those affiliated with the Medical Center or field stations, those without salary, Emeritus faculty, Extension School faculty, temporary employees, and employees without email addresses. Data Administration staff compiled two separate Excel spreadsheets, one for faculty and one for staff. Since there were more email addresses in each spreadsheet than needed according to the sampling plan, the following procedure was used to draw a random sample from each spreadsheet: since each row contained the email address for one employee, a column was added to each row with a randomly generated number between 1 and 1,000,000. Rows were then sorted by this column of random numbers, and the top 2,487 rows of faculty and 1,922 rows of staff were selected for the respective samples.

### **Survey administration and recruitment of participants**

We invited the randomly selected students, faculty, and staff to participate in the survey via email to their UC Davis addresses. In these emails, faculty and staff recipients were addressed “Dear UC Davis Employee” and students were addressed “Dear UC Davis Student.” Each person in the selected sample received an initial email inviting him or her to take the survey. Those individuals who had not completed the survey one week later were sent a reminder email. See Appendix C for copies of these recruitment emails.

As we did for last year’s survey, we utilized the server virtualization service offered by Information Educational Technology (IET) at UC Davis, which allows extra computing power to be added if loading time problems arise. In addition to hosting the server computing, IET performed load testing prior to the survey launch under various system configurations until the server demonstrated a capacity to handle the anticipated responses without page loading delays. The 2012-13 survey was administered with no technical difficulties. On Monday, October 29<sup>th</sup>, ten hourly batches were sent out to between 739 and 5,000 email addresses until all 28,838 respondents were invited. Reminder invitations were sent out the following Monday, November 5<sup>th</sup>.

Offering a chance to win a desirable prize is thought to increase overall response to a survey. This year, TAPS allocated \$500 for incentives in the form of gift cards to participate in the survey, which is \$200 more than the budget allocated for incentives in the 2011-12 survey. These cards are accepted at more than 200 businesses located in Davis and are expected to appeal to all demographics and roles in the UC Davis community. Entry into this drawing was mentioned in the initial and follow-up recruitment emails, as well as on the first welcome page of the online survey. On the final page of the survey, respondents were asked to indicate whether it would be okay for us to contact them again (1) with questions about their survey or (2) if they win the drawing for a \$50 Downtown Davis gift card, or if instead they preferred not to be contacted. There were 3,116 respondents who indicated they were willing to be contacted if they won the drawing and provided contact information. We assigned each of these respondents a random number and selected the ten with the lowest values as the winners, who were notified via email on December 19<sup>th</sup>, 2012 and issued the prize shortly thereafter.

### **Response rate**

A total of 4,388 respondents at least started the survey (responding to question *Q01*), representing 15.2 percent of those invited. This rate is slightly higher than last year’s survey’s response rate (14.6 percent). Of those who began the survey, 91 percent (3,982 respondents) completed the survey through question *Q28*, which asked respondents about their mode choice on each day of the reference week. Table 3 shows response rates for this year’s survey compared to the previous four surveys. As shown, overall response rates have gradually declined over time. This decline is likely influenced by two factors: there is an increasing proportion of invited respondents who have taken the survey in previous years and who may not feel the need to take the travel survey again; and the estimated time to complete the survey (as described in the email invite) has increased. It is recommended that future invitations to take the campus travel survey explain the importance of taking and completing the survey each year and assure respondents that the survey will take less than ten minutes to complete.

Table 3. Response rates for 2012-13, versus 2011-12, 2010-11, 2009-10, 2008-09 and 2007-08

Role group	2012-13						2011-12	2010-11	2009-10	2008-09	2007-08
	Assumed Population	Number Invited	Number of Responses		Response Rate		Response Rate	Response Rate	Response Rate	Response Rate	Response Rate
			Target	Actual	Target	Actual <sup>a</sup>					
Students	29,431	24,429	2,102	3,171	8.6%	13.0%	12.0%	17.9%	25.0%	22.0%	23.0%
Undergraduate	23,843	20,522	1,432	2,541	7.0%	12.4%	11.3%	16.5%	24.0%	20.0%	22.0%
Freshmen	3,559	3,559	347	541	9.8%	15.2%	13.0%	22.7%	30.0%	22.0%	26.0%
Sophomores	4,179	4,181	352	540	8.4%	12.9%	11.7%	15.5%	26.0%	21.0%	22.0%
Juniors	6,454	4,373	363	624	8.3%	14.3%	13.3%	17.5%	22.0%	22.0%	21.0%
Seniors	9,651	8,409	370	836	4.4%	9.9%	9.4%	12.4%	19.0%	17.0%	20.0%
Graduate	5,588	3,907	670	630	17.1%	16.1%	15.6%	21.5%	28.0%	27.0%	24.0%
Masters	2,021	2,021	323	227	16.0%	11.2%	10.7%	16.0%	19.0%	18.0%	19.0%
PhD	3,567	1,886	347	403	18.4%	21.4%	23.4%	33.6%	40.0%	35.0%	28.0%
Employees	11,783	4,409	702	811	15.9%	18.4%	19.2%	28.7%	34.0%	35.0%	45.0%
Faculty	2,487	2,487	333	394	13.4%	15.8%	16.3%	22.4%	27.0%	30.0%	37.0%
Staff	9,296	1,922	369	417	19.2%	21.7%	24.2%	37.4%	42.0%	39.0%	50.0%
Overall percent	100%	70%					13.0%	20.3%	27.0%	26.0%	28.0%
Overall number	41,214	28,838	2,804	3,982			3,116	3,084	3,569	3,577	3,849

<sup>a</sup> This actual response rate is based on valid responses for primary mode and gender. These cases are weighted by role and gender and used for the bulk of the analysis.

Table 4 shows the number of valid responses at three key points in the survey: those who answered the first question about role in the university, those who gave valid responses to questions about primary mode and gender, and those whose addresses were successfully geocoded in addition to meeting the previous criteria. As shown, some role groups did not meet target response rates for a five percent margin of error. Margins of error based on responses by role group are shown later in Table 8. As in previous years, response rates were highest among staff and PhD students, and lowest among sophomores, juniors, seniors, and Master's/professional students.

Table 4. Number of valid responses, by role

Role group	Population	Invited	Target (5% margin of error)	Valid Role (started survey)	Mode and Gender (weighted for bulk of analysis)	Geocoded (weighted for CO <sub>2</sub> emissions, VMT)
Students	29,431	24,429	2,102	3,512	3,171	2,861
Undergraduate	23,843	20,522	1,432	2,782	2,541	2,297
Freshmen	3,559	3,559	347	596	541	534
Sophomores	4,179	4,181	352	594	540	479
Juniors	6,454	4,373	363	668	624	543
Seniors	9,651	8,409	370	915	836	741
Graduate	5,588	3,907	670	730	630	564
Masters	2,021	2,021	323	276	227	198
PhD	3,567	1,886	347	454	403	366
Employees	11,783	4,409	702	876	811	745
Faculty	2,487	2,487	333	422	394	356
Staff	9,296	1,922	369	454	417	389
Overall percent	100%	70%	9.7%	15.2%	13.8%	12.5%
Overall number	41,214	28,838	2,802	4,388	3,982	3,606

### **Screening respondents for eligibility**

While incomplete survey responses were retained in the dataset, cases were excluded based on two criteria: role and office location. In particular, we wanted to include only respondents who are current students or employees affiliated with the campus in Davis (rather than in locations beyond the campus or city of Davis) and whose role at UC Davis is known. Although the sample frame was supposed to only include current students and employees affiliated with the main campus, we have learned that university records are not always accurate, either due to a student or employee's recent change in status or due to ambiguity about the geographic location associated with a nominal departmental affiliation. We have attempted to improve our screening of these exceptions in recent surveys through more explicit questions about roles and office locations.

From the responses to *Q01*, we screened seven respondents who failed to provide a valid role group (who were then skipped to the end of the survey - see Appendix A). Regarding office locations, we intended to include in the sample anyone who usually travels to campus regularly, even if temporarily stationed elsewhere -- such as for sabbatical, teaching abroad, field work, a joint appointment at another campus, or on leave (bereavement, maternity, etc.) -- but exclude those whose main work is elsewhere. We thought this was a potential issue for employees and graduate students, but not undergraduate students. Thus we screened graduate student and employee office locations in question *Q07* ("Where is your office, lab, or department? That is, wherever you usually spend your time when you travel to work or school at UC Davis.") There were 52 respondents who indicated that their offices were located outside of Davis. These most commonly included the Graduate School of Management Center in San Ramon and the UC Davis Medical Center in Sacramento. These 52 respondents were redirected to the end of the survey (see Appendix A: Survey instrument, 2012-13 Campus Travel Survey) and are excluded from the analysis.

In addition to these screening criteria, we excluded four duplicate cases that had identical email addresses. In addition, we excluded 62 cases that indicated traveling to campus but failed to provide answers to questions about primary mode used during the reference week, and 117 cases that did not answer whether they traveled to campus during the reference week. Lastly, five respondents who were away all week indicated in *Q24* that they do not plan to resume travel to campus. Since our survey targets only those who regularly travel to the UC Davis campus, these respondents were also excluded from the analysis.

### **Weighting responses by role and gender**

For the purposes of analysis, we assume that respondents are roughly similar to the rest of the population within their role group (freshmen, sophomores, etc.) with respect to socio-demographics or other attributes that may matter for transportation choices. For this reason, we weight the sample by role group. In particular, as described above, respondents were assigned to one of eight role groups based on their responses to questions *Q01* through *Q03*: freshmen, sophomores, juniors, seniors (and fifth-years and post-baccalaureate), Master's students (and professional students such as law and business and Ed.D. or CANDEL), PhD students, faculty, or staff (including Post-docs). All results presented in this report are weighted to be representative of the campus population by these role groups. That is, we apply a weight factor to each case in a given role group so that the group's proportion in the sample is the same as their proportion in

the overall population. As in previous surveys, the sample is disproportionately comprised of women. In particular, men comprise 27 percent of the sample versus 45 percent of the population of undergraduate students, and 38 percent of respondents versus 50 percent of the population of graduate students.<sup>1</sup> In addition to weighting by role in the university, we correct for these differences in response rates among men and women in each role group so that the share of men and women in the weighted sample is equal to the share of women in each role group in the population.

Although the number of valid responses varies from question to question, we use the same set of weight factors for most variables, based on the distribution of roles among the 3,982 valid responses to question *Q29*, the main question relating to mode choice on each day during the travel week. However, for variables relying on geocoding of respondents' residential location, we generated a separate set of weight factors, based on the 3,606 cases successfully geocoded (by cross-streets and zip code given in questions *Q18* and *Q19*; see Appendix E) and with non-missing mode data from question *Q29*. (See Appendix G for more information on weighting and a list of weight factors by role and gender.)

*Table 5. Unweighted gender distribution of respondents*

Gender (unweighted)	Undergraduate	Graduate	Faculty	Staff
% male	27.0%	37.6%	56.8%	39.9%
% female	71.8%	61.3%	42.4%	58.9%
% prefer not to say/missing	1.2%	1.1%	0.7%	1.2%
Unweighted Sample	2,639	652	403	431
Projected Population	23,843	5,588	2,487	9,296

*Table 6. Weighted gender distribution of respondents*

Gender (weighted)	Undergraduate	Graduate	Faculty	Staff
% male	45.1%	49.6%	65.1%	41.5%
% female	54.9%	50.4%	34.9%	58.5%
% prefer not to say/missing	0.0%	0.0%	0.0%	0.0%
Weighted Sample	2,304	540	240	898
Projected Population	23,843	5,588	2,487	9,296

Table 55 and Table 66 show the difference in gender distribution between the unweighted and weighted results. As described in last year's report, we find that women are less likely to bike and more likely to ride the bus than are men. Without correcting for differences in response rates between men and women, the estimated bike mode share might be lower (and bus mode share higher) than they are in the actual population. Other biases may exist if there are other ways that the sample of respondents differs systematically from the rest of the population, though we have few ways of knowing the extent to which it does.

<sup>1</sup> Figures for the composition of the campus population by gender are drawn from "Student Headcount by Gender, Fall 2011," "Employees by Gender and Ethnicity, Fall 2010," and "Teaching Faculty by Gender, Fall 2010" available on the *UC Davis Facts* website, online at <http://facts.ucdavis.edu/>. These population counts include medical (non-Davis campus) affiliates who are excluded from the survey sample. In addition, the employee count includes employed students, who are not included as employees in the survey sample.

**Reference week**

The main statistics that we report are based on questions that ask respondents about their travel activity during each of the five weekdays prior to receiving the invitation to complete the survey. We schedule the reference week for approximately the same time each year that the survey is administered, and to coincide with the biannual campus traffic counts of vehicles entering campus, usually conducted the last week in October or the first week in November. This year’s first reference week was October 22-29, 2012 (Monday-Friday). We sent initial invitations on Monday, October 29<sup>th</sup> and reminder emails the following Monday, November 5<sup>th</sup>. The overall timeline of the survey launch and reference week is shown in Figure 5.

*Figure 5. Survey launch and reference week schedule*

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
15	16	17	18	19	20	21
22 <i>1st reference week</i>	23	24	25	26	27	28
29 <b>Initial invitations sent</b> <i>2nd reference week</i>	30	31 Halloween	Nov 1	2	3	4
5 <b>Reminder invitations sent</b>	6	7	8	9	10	11

Table 7 displays weather during the two reference weeks. This year, the first reference week was notably cooler and wetter than in past years. The Halloween holiday fell on the Wednesday during which initial invitations were sent, though it is unclear whether this coincidence had an effect on response rates.

*Table 7. Weather during survey reference weeks*

Day	Temperature ranges and precipitation levels			Weather data are for Sacramento, as reported in the <i>Farmer’s Almanac</i> , available online by city and date at <a href="http://www.almanac.com/weatherhistory">http://www.almanac.com/weatherhistory</a> .
	Week 1: October 22-26, 2012		Week 2: October 29 - November 2, 2012	
Monday	52 – 66 °F	0.51 in.	49 – 80 °F	
Tuesday	52 – 63 °F	0.28 in.	48 – 79 °F	
Wednesday	51 – 65 °F	0.06 in.	56 – 75 °F	
Thursday	54 – 68 °F		57 – 70 °F	
Friday	46 – 75 °F		48 – 80 °F	0.18 in.



## FINDINGS

This section summarizes key results from the survey. Data presented in this section are weighted by role and gender, as described above. When “unweighted sample” size is reported it reflects the number of actual respondents in this category; “weighted sample” size reflects the number that would be in each category if the distribution of roles and genders in the sample matched the distribution in the population (so the total number in the weighted sample equals the number in the unweighted sample, but numbers within subgroups may change). “Projected population” size is a projection of the weighted proportions to the full campus population, calculated by multiplying each response by an expansion factor based on role and gender.

Many statistics are presented by role group (freshmen, sophomores, juniors, seniors, Master’s students, PhD students, faculty, or staff). Where applicable, some are broken down by students (including freshmen through PhD students), undergraduates (freshmen through senior students), graduate students (Master’s and PhD students), employees (faculty and staff), within Davis (those living on campus or elsewhere in Davis among all role groups), and outside Davis (those living outside of Davis among all role groups).

### **Confidence intervals**

Table 8 shows the margin of error of findings for each role group, to the extent that the proportions and figures estimated in the report differ by role group. For statistics about the population as a whole, we are 95 percent confident that our estimates are within 1.5 percent of their true value. These expectations are particularly important for mode share estimates, given that some year-to-year changes are significant, while others are not. For example, when we report later that 44 percent of students and employees bike to campus, our margin of error indicates that – to the extent to which the survey results are unbiased – the true share of persons that bike to campus is between 42.5 and 45.5 percent.

*Table 8. Margin of error, by role group*

<b>Role group</b>	<b>Population</b>	<b>Sample Size</b>	<b>Margin of Error</b>
Students	29,431	3,171	1.6%
Undergraduate	23,843	2,541	1.8%
Freshmen	3,559	541	3.9%
Sophomores	4,179	540	3.9%
Juniors	6,454	624	3.7%
Seniors	9,651	836	3.2%
Graduate	5,588	630	3.7%
Masters	2,021	227	6.1%
PhD	3,567	403	4.6%
Employees	11,783	811	3.3%
Faculty	2,487	394	4.5%
Staff	9,296	417	4.7%
Overall	41,214	3,982	1.5%

## **Physical travel to campus**

Table 9 shows the share of each role group who traveled to campus on each day of the reference week. For those living on campus, “travel to campus” on a given day means the respondent indicated traveling to a campus destination for school or work. Overall, about 90 percent of university affiliates physically traveled to campus on each day Monday through Thursday, with a low of 81 percent traveling to campus on Friday. Faculty travel to campus least often, while sophomores travel to campus most often.

*Table 9. Share physically traveling to campus by weekday*

Role	Share Physically Traveling to Campus						Weighted Sample	Projected Population
	Monday	Tuesday	Wed.	Thursday	Friday	No days		
Student	92.1%	93.2%	92.6%	92.3%	82.8%	2.4%	2,843	29,431
Undergrad	93.2%	94.3%	93.8%	94.0%	84.4%	2.3%	2,303	23,843
Freshman	92.0%	90.8%	92.0%	90.0%	89.8%	4.0%	344	3,559
Sophomore	94.7%	94.2%	94.9%	94.9%	93.7%	1.9%	404	4,179
Junior	92.8%	93.4%	93.7%	93.1%	81.5%	2.7%	623	6,454
Senior	93.3%	96.2%	94.0%	95.7%	80.2%	1.6%	932	9,651
Graduate	87.1%	88.6%	87.4%	85.3%	76.3%	3.0%	540	5,588
Masters	87.5%	88.2%	86.8%	85.5%	68.9%	5.0%	195	2,021
PhD	86.9%	88.9%	87.8%	85.2%	80.5%	1.9%	345	3,567
Employee	82.6%	83.7%	84.2%	83.8%	77.3%	6.2%	1,138	11,783
Faculty	76.7%	76.4%	79.0%	78.2%	72.0%	6.2%	240	2,487
Staff	84.2%	85.7%	85.6%	85.3%	78.7%	6.2%	898	9,296
Residential								
Within Davis	91.9%	92.5%	92.6%	91.2%	83.9%	3.1%	3,106	32,147
Outside Davis	80.4%	83.4%	81.8%	85.2%	71.8%	5.2%	876	9,067
Overall	89.4%	90.5%	90.2%	89.9%	81.2%	3.5%	3,982	41,214
Weighted Sample	3,558	3,603	3,591	3,580	3,235	140	3,982	
Projected Population	36,830	37,291	37,169	37,054	33,485	1,450		41,214

Results are based on responses to questions *Q20* and *Q21*. Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

In addition to trends by day of the week, there are substantial differences in the frequency of physical travel to campus among those living in different locations. Overall, those living in Davis travel to campus more often than those living outside Davis (92 percent versus 80 percent on Monday). Approximately 5.2 percent of those living outside Davis did not travel to campus at all during the reference week, compared to 3.1 percent of those living in Davis. Graduate students and faculty living outside of Davis are least likely to travel to campus, with only 71 percent and 66 percent, respectively, traveling to campus on an average weekday day (Table 10). By contrast, 89 percent of graduate students and 81 percent of faculty who live off campus in Davis travel to campus on an average weekday. (See Table 14 for the overall percent of people living in each location, by role group.)

Table 10. Share traveling to campus on an average weekday, by role and residential location

Role	Share Physically Traveling to Campus					Weighted Sample	Projected Population
	Overall	On Campus	West Village	Off Campus in Davis	Outside Davis		
Student	91%	90%	91%	92%	81%	2,843	29,431
Undergrad	92%	90%	92%	93%	87%	2,303	23,843
Freshman	91%	91%	95%	88%	96%	344	3,559
Sophomore	94%	93%	92%	95%	93%	404	4,179
Junior	91%	88%	89%	92%	86%	623	6,454
Senior	92%	89%	94%	93%	86%	932	9,651
Graduate	85%	85%	86%	89%	71%	540	5,588
Masters	83%	75%	83%	87%	76%	195	2,021
PhD	86%	89%	87%	91%	69%	345	3,567
Employee	82%	100%	-	84%	80%	1,138	11,783
Faculty	76%	-	-	81%	66%	240	2,487
Staff	84%	100%	-	86%	82%	898	9,296
Overall	88%	90%	91%	91%	81%	3,982	41,214
Weighted Sample	3,514	461	120	2,227	706	3,982	
Projected Population	36,366	4,774	1,240	23,047	7,305		41,214

Results are based on responses to question *Q21* (days traveling to campus) and *Q16* (residential location). Shares are calculated by taking the average across groups of the percent of the five weekdays that each individual traveled to campus. See Table 14 for the overall percent living in each location by role group. Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3). No employees and very few graduate students indicated living in West Village.

About 3.5 percent of the sample did not physically travel to campus on any day during the reference week. These respondents were asked to give the reason they were away all week (Table 11). Employees were more likely to be away all week than students, with work travel and sickness/personal leave being the most common reasons given for being away.

Table 11. Share away from campus all week and reasons given, by role

Role	Share away all week	Of those away all week, main reason for no travel to campus							Weighted sample away all week	Population away all week
		Study abroad	Vacation	Work or school-related travel	Work from home	Sickness or personal leave	Temporary appointment elsewhere	Sabbatical		
Student	2.4%	29.7%	14.1%	31.4%	2.9%	20.0%	1.9%	0.0%	69	719
Undergrad	2.3%	39.5%	14.9%	13.5%	0.0%	32.0%	0.0%	0.0%	53	552
Freshman	4.0%	17.1%	20.8%	13.9%	0.0%	48.1%	0.0%	0.0%	14	143
Sophomore	1.9%	0.0%	33.6%	16.4%	0.0%	50.0%	0.0%	0.0%	8	79
Junior	2.7%	70.5%	0.0%	9.8%	0.0%	19.6%	0.0%	0.0%	17	176
Senior	1.6%	50.0%	16.7%	16.7%	0.0%	16.7%	0.0%	0.0%	15	154
Graduate	3.0%	13.3%	12.9%	61.0%	7.7%	0.0%	5.2%	0.0%	16	167
Masters	5.0%	0.0%	23.8%	52.4%	14.3%	0.0%	9.5%	0.0%	10	100
PhD	1.9%	28.9%	0.0%	71.1%	0.0%	0.0%	0.0%	0.0%	6	66
Employee	6.2%	0.0%	24.7%	29.6%	5.5%	31.3%	2.5%	6.4%	71	731
Faculty	6.2%	0.0%	7.3%	41.5%	3.7%	16.1%	8.8%	22.6%	15	153
Staff	6.2%	0.0%	31.6%	24.9%	6.2%	37.3%	0.0%	0.0%	56	578
Overall	3.5%	12.9%	20.1%	30.4%	4.3%	26.3%	2.2%	3.6%	95	981
Weighted Sample	95	12	19	29	4	25	2	3	95	
Projected Population	981	127	197	298	43	258	22	35		981

Results are based on responses to question Q22. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Employees (and not students) who were away from campus just some of the days during the week were also asked to give the reason they did not travel to campus for each weekday they were away (Table 12). 6.2 percent of employees were away all week (Table 11). 15.4 percent of employees did not travel to campus on an average weekday (Table 12). The most common reasons for being away from campus are working from home (telecommuting) and work related travel.

Table 12. Share of employees not traveling to campus on an average weekday and reason

Role	Share away from campus on an average weekday	Among those not traveling to campus, reason given:						Weighted Sample	Projected Population
		Work from home	Work or school-related travel	Regularly scheduled day off	Vacation	Sick or personal leave	Other		
Faculty	24.5%	45.9%	30.9%	2.8%	6.3%	6.2%	7.9%	240	2,487
Staff	14.5%	26.9%	18.7%	10.9%	19.8%	23.8%	0.0%	898	9,296
All employees	15.4%	26.2%	24.8%	9.1%	18.1%	19.2%	2.6%	1,138	11,783
Weighted Sample	175	46	43	16	32	34	5	1,138	
Projected Population	1,812	475	449	164	328	348	48		1,811

Results are based on responses to question Q23 for individual days absent and on responses to Q22 for those absent all week; reasons given in Q22 are assumed to apply to all five weekdays. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

## **Destination on campus**

Employees and graduate students were asked the location of their office, lab, or department. This was in part to screen out those whose offices or labs were outside of Davis, who are excluded from the sample for this study. Among the included respondents, 81.3 percent reported locations in the central campus area (an estimated 14,120 people), including 87.6 percent of graduate students, 94.6 percent of faculty, and 73.8 percent of staff (Table 13). 6.8 percent reported locations in west campus, 6.4 percent in south campus, and 5.5 percent off-campus within the city of Davis.

*Table 13. Destination on campus, among employees and graduate students*

<i>Where is your office, lab, or department? (That is, wherever you usually spend your time when you travel to work or school at UC Davis)</i>							
	On the Davis campus, in the Main Campus area	On the Davis campus, in the West Campus area (west of SR 113)	On the Davis campus, in the South Campus area (south of I-80)	Technically off-campus, but within the city of Davis	Weighted Sample	Projected Population	
Graduate	87.6%	4.7%	4.5%	3.1%	540	5,588	
Masters	86.9%	1.8%	8.3%	2.9%	195	2,021	
PhD	88.0%	6.3%	2.4%	3.3%	345	3,567	
Employee	78.2%	7.8%	7.3%	6.7%	1,138	11,783	
Faculty	94.6%	2.0%	2.2%	1.2%	240	2,487	
Staff	73.8%	9.3%	8.6%	8.2%	898	9,296	
Overall	81.3%	6.8%	6.4%	5.5%	1,678	17,371	
Weighted Sample	1,364	114	107	93	1,678		
Projected Population	14,120	1,180	1,108	963		17,371	

Results are based on responses to question *Q07*. Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

## **Residential location**

Since travel behavior varies substantially by residential location, each year respondents are asked about their residential location, defined as the place of residence from which they regularly travel to campus. The four broad categories included the on campus area, the West Village apartments, off-campus elsewhere in Davis, and outside of Davis (*Q16*). The results suggest that 13 percent live on campus (an estimated 5,319 people), 3.3 percent live in the West Village apartments (1,363 people), 62 percent live elsewhere in Davis (25,461 people), and 22 percent live outside of Davis (9,071 people) (Table 14). Individuals who claimed they lived outside of Davis were most likely to live in the nearby cities of Sacramento, Woodland, Vacaville, West Sacramento, Dixon, Elk Grove, and Winters.

Table 14: Residential location by role group

Role	Share living in each location				Weighted Sample	Projected Population
	On Campus	West Village	Off Campus in Davis	Outside Davis		
Student	18.0%	4.5%	67.5%	10.0%	2,844	29,431
Undergrad	19.2%	5.0%	68.2%	7.6%	2,304	23,843
Freshman	88.0%	2.5%	6.1%	3.4%	344	3,559
Sophomore	9.0%	7.7%	80.5%	2.8%	404	4,179
Junior	7.0%	7.5%	75.9%	9.6%	624	6,454
Senior	6.2%	3.2%	80.6%	10.0%	932	9,651
Graduate	13.1%	2.5%	64.5%	20.0%	540	5,588
Masters	9.6%	2.6%	69.1%	18.7%	195	2,021
PhD	15.0%	2.4%	61.8%	20.8%	345	3,567
Employee	0.2%	0.2%	47.5%	52.0%	1,138	11,783
Faculty	0.0%	0.3%	70.2%	29.5%	240	2,487
Staff	0.2%	0.2%	41.5%	58.0%	898	9,296
Overall	12.9%	3.3%	61.8%	22.0%	3,982	41,214
Weighted Sample	514	132	2,460	876	3,982	
Projected Population	5,319	1,363	25,461	9,071		41,214

Results are based on responses to question Q16. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

### **Mode split for primary means of transportation**

For physical trips to campus, mode choice was determined by responses to the statement, “Please select which means of transportation you used on your way to your first campus destination each day. (If you used more than one means, select whatever you did for most of the distance)” (Q29). Thus, modes identified are those used for most of the trip, and only on the way to campus at the beginning of the day. Throughout this report, we refer to answers to this question as a respondent’s “primary” mode, meaning what they did for most of the trip to campus. For each respondent, we calculate the share of days out of the five-day week that a given mode was used as a primary mode. (For instance, if someone biked one day, her bike share for the week would be 20 percent.) The overall mode split represents the average shares across all respondents, which is equivalent to the share of all people using each mode on an average weekday. For the purpose of validating the method we use to calculate mode share, we also asked respondents about the mode they “usually” use to travel to campus. See Table 36 for a comparison of results for “usual” and “primary” modes.

Respondents were asked to report their residential location as the place from which they usually travel to campus. In some cases, respondents may travel to campus from another location (e.g. a family member’s residence), resulting in seemingly dissonant primary mode choices. Similarly, someone may report living on campus but traveling by train to campus. Since there are very few cases in which these dissonant modes appear, results are reported as is, and discretion should be used in interpreting these cases.

Table 15 through 21 show the overall mode split among those physically traveling to campus on a given weekday. Results are shown by role group in Table 15 and by role group for each

category of residential location in the next six tables. On an average weekday, we estimate that of those physically traveling to campus, 44 percent bike (an estimated 18,134 people), 29.6 percent arrive by car (12,200 people), and 21.5 percent ride public transit (8,861 people). The share biking is highest among freshmen, most of whom live on campus.

Table 15. Share using each mode on an average weekday, by role group (all locations)

	Percent physically traveling	Of those physically traveling to campus						Weighted Sample	Projected Population
		Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
Student	90.6%	51.5%	5.7%	11.8%	4.0%	26.3%	0.8%	2,843	29,431
Undergrad	91.9%	50.5%	6.0%	9.7%	3.1%	30.4%	0.4%	2,303	23,843
Freshman	90.9%	78.6%	11.9%	2.3%	1.5%	5.7%	0.1%	344	3,559
Sophomore	94.5%	49.4%	4.7%	3.6%	3.1%	39.2%	0.0%	404	4,179
Junior	90.9%	43.2%	5.1%	10.7%	3.3%	36.8%	0.9%	623	6,454
Senior	91.9%	45.4%	4.9%	14.5%	3.7%	31.2%	0.3%	932	9,651
Graduate	85.0%	56.6%	4.3%	21.3%	7.8%	7.5%	2.6%	540	5,588
Masters	83.4%	51.2%	3.2%	26.4%	7.3%	9.7%	2.2%	195	2,021
PhD	85.8%	59.5%	5.0%	18.5%	8.0%	6.3%	2.8%	345	3,567
Employee	82.3%	23.3%	3.0%	56.4%	11.3%	4.1%	1.9%	1,138	11,783
Faculty	76.5%	45.0%	5.8%	33.5%	8.2%	3.9%	3.6%	240	2,487
Staff	83.9%	18.1%	2.3%	62.0%	12.0%	4.2%	1.4%	898	9,296
Overall	88.2%	44.0%	5.0%	23.7%	5.9%	20.4%	1.1%	3,982	41,214
Weighted Sample	3,512	1,752	199	944	235	812	44	3,982	
Projected Population	36,351	18,134	2,061	9,768	2,432	8,408	453		41,214

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q29 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Table 16 shows the mode share among those who live within Davis. This category includes students and employees who live on campus, off campus in Davis, and in the West Village apartments. Staff are least likely to bike to campus from within Davis (41.5 percent) and among the most likely to ride the bus. Staff are also the most likely to drive alone from within Davis (42.6 percent), while freshmen are least likely to do so (0.5 percent). The train is not a feasible means of traveling to campus from within Davis.

Table 16. Share using each mode on an average weekday, from within Davis

	Percent physically traveling	Of those physically traveling to campus						Weighted Sample	Projected Population
		Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
Student	91.7%	56.3%	6.1%	6.6%	3.1%	27.8%	0.1%	2,559	26,489
Undergrad	92.3%	54.1%	6.2%	5.1%	2.6%	31.8%	0.1%	2,128	22,020
Freshman	90.7%	81.0%	12.1%	0.5%	1.1%	5.3%	0.1%	332	3,438
Sophomore	94.5%	50.8%	4.6%	2.3%	2.3%	40.0%	0.0%	393	4,063
Junior	91.4%	47.5%	5.3%	5.1%	2.9%	39.1%	0.0%	564	5,836
Senior	92.6%	49.7%	5.4%	8.3%	3.2%	33.3%	0.1%	839	8,683
Graduate	88.3%	67.1%	5.2%	14.4%	5.7%	7.3%	0.3%	432	4,469
Masters	85.2%	60.3%	3.8%	18.5%	6.1%	10.5%	0.8%	159	1,642
PhD	90.2%	70.9%	5.9%	12.1%	5.5%	5.5%	0.0%	273	2,827
Employee	84.6%	46.6%	4.0%	37.2%	7.7%	4.4%	0.0%	546	5,654
Faculty	81.0%	58.8%	7.5%	24.4%	5.3%	3.9%	0.0%	169	1,753
Staff	86.1%	41.5%	2.5%	42.6%	8.7%	4.7%	0.0%	377	3,901
Overall	90.4%	54.7%	5.7%	11.7%	3.9%	24.0%	0.1%	3,106	32,143
Weighted Sample	2,808	1,698	178	362	121	744	2	3,106	
Projected Population	29,061	17,572	1,843	3,748	1,254	7,700	25		32,143

Results are based on responses to question *Q21* (whether they traveled to campus each day) and question *Q29* (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

Table 17 shows the mode share among those who live on campus, defined as the area south of Russell Blvd., west of A St., north of I-80, and east of highway 113.



Table 17. Share using each mode on an average weekday, from on-campus

	Of those physically traveling to campus							Weighted Sample	Projected Population
	Percent physically traveling	Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
Student	89.7%	79.6%	14.8%	0.6%	1.1%	3.9%	0.0%	512	5,296
Undergrad	90.5%	78.8%	15.3%	0.5%	0.9%	4.5%	0.0%	441	4,566
Freshman	90.8%	83.1%	13.1%	0.2%	0.9%	2.7%	0.1%	303	3,133
Sophomore	92.6%	71.7%	18.5%	1.0%	0.7%	8.0%	0.0%	37	378
Junior	88.0%	59.6%	22.4%	2.4%	0.4%	15.3%	0.0%	44	455
Senior	89.2%	74.9%	19.9%	0.6%	1.0%	3.6%	0.0%	58	601
Graduate	85.0%	84.6%	11.5%	1.3%	2.6%	0.0%	0.0%	71	730
Masters	75.0%	69.7%	24.6%	2.6%	3.1%	0.0%	0.0%	19	193
PhD	88.5%	89.1%	7.5%	0.9%	2.5%	0.0%	0.0%	52	537
Employee	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2	23
Faculty	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-
Staff	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2	23
Overall	89.8%	79.7%	14.7%	0.6%	1.1%	3.9%	0.0%	514	5,319
Weighted Sample	461	409	76	3	6	20	0	514	
Projected Population	4,774	4,237	784	33	58	205	2		5,319

Results are based on responses to question *Q21* (whether they traveled to campus each day) and question *Q29* (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3). Very few employees indicated living within the area considered “on-campus,” therefore these mode splits may not be characteristic of all employees living within this area.

Table 18 shows the specific mode share among those living in the West Village apartments. Because the sample sizes in most role groups are very low, role-specific mode shares should be interpreted with some degree of caution; however, the overall mode share estimates for West Village are consistent with expectations for travel distances greater than “on campus” locations but generally less than “off campus in Davis” locations.

Table 18. Share using each mode on an average weekday, from West Village

	Of those physically traveling to campus							Weighted Sample	Projected Population
	Percent physically traveling	Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
Student	91.1%	58.6%	3.9%	4.0%	3.2%	30.2%	0.1%	129	1,334
Undergrad	91.7%	58.9%	4.3%	3.0%	1.6%	32.1%	0.1%	116	1,197
Freshman	95.0%	88.2%	0.0%	0.0%	0.0%	10.6%	1.2%	8	87
Sophomore	92.5%	58.1%	5.3%	3.2%	3.7%	29.7%	0.0%	31	323
Junior	89.3%	49.3%	6.4%	2.6%	1.1%	40.6%	0.0%	47	482
Senior	93.7%	65.7%	1.2%	4.3%	0.6%	28.2%	0.0%	29	304
Graduate	85.6%	56.3%	0.0%	13.5%	18.4%	11.8%	0.0%	13	137
Masters	82.8%	43.1%	0.0%	22.4%	24.1%	10.4%	0.0%	5	52
PhD	87.3%	64.0%	0.0%	8.4%	15.0%	12.6%	0.0%	8	85
Employee	84.9%	53.3%	0.0%	46.7%	0.0%	0.0%	0.0%	3	29
Faculty	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	1	7
Staff	80.0%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	2	22
Overall	90.9%	58.5%	3.8%	4.9%	3.2%	29.6%	0.1%	132	1,363
Weighted Sample	120	77	5	6	4	39	0	132	
Projected Population	1,240	798	52	66	43	403	1		1,363

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q29 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Table 19 shows the mode share results for those living off-campus in Davis, but excluding the West Village apartments. Among those living elsewhere in Davis, undergraduate students and staff are less likely to bike than graduate students and faculty. Undergraduate students have high bus ridership rates (39.2 percent), whereas graduate students and employees in Davis who do not bike are more likely to commute by car.

Table 19. Share using each mode on an average weekday, from off-campus in Davis

	Percent physically traveling	Of those physically traveling to campus						Weighted Sample	Projected Population
		Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
Student	92.2%	50.0%	4.0%	8.4%	3.7%	33.8%	0.1%	1,919	19,859
Undergrad	92.9%	47.0%	3.9%	6.5%	3.2%	39.2%	0.1%	1,571	16,257
Freshman	88.0%	46.2%	2.5%	5.6%	3.8%	41.9%	0.0%	21	218
Sophomore	95.0%	47.8%	3.0%	2.4%	2.4%	44.4%	0.0%	325	3,363
Junior	91.9%	46.3%	3.6%	5.6%	3.3%	41.1%	0.0%	473	4,899
Senior	92.8%	47.2%	4.5%	9.0%	3.5%	35.7%	0.1%	751	7,777
Graduate	89.1%	64.2%	4.2%	16.9%	5.9%	8.5%	0.3%	348	3,602
Masters	86.6%	59.8%	1.5%	20.3%	5.8%	11.7%	0.9%	135	1,397
PhD	90.7%	66.8%	5.8%	14.9%	5.9%	6.6%	0.0%	213	2,205
Employee	84.5%	46.3%	4.0%	37.3%	7.8%	4.5%	0.0%	541	5,603
Faculty	81.0%	59.1%	7.6%	24.1%	5.4%	4.0%	0.0%	169	1,746
Staff	86.1%	40.9%	2.5%	43.0%	8.8%	4.7%	0.0%	373	3,857
Overall	90.5%	49.3%	4.0%	14.3%	4.5%	27.8%	0.1%	2,460	25,461
Weighted Sample	2,227	1,212	98	352	111	684	2	2,460	
Projected Population	23,047	12,549	1,012	3,644	1,152	7,083	22		25,461

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q29 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

This year, we asked respondents who lived off-campus in Davis to identify which part of Davis they lived in by using a series of maps as references (see Appendix A). Table 20 shows the mode share for those living off-campus in Davis (excluding West Village apartments) by their location in Davis. The results suggest that mode splits vary substantially by neighborhood. Bicycling to campus is especially prevalent among individuals living in Central and Downtown Davis. Those living in Downtown Davis are much more likely to walk to campus than individuals living elsewhere. Driving to campus is more common from the neighborhoods of East and South Davis, and taking the bus to campus is more common from North and South Davis.

Table 20. Share using each mode on an average weekday, from within Davis, by neighborhood

	Percent physically traveling	Of those physically traveling to campus						Weighted Sample	Projected Population
		Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
West Davis	91.8%	49.8%	1.9%	18.9%	4.7%	24.6%	0.0%	496	5,225
North Davis	92.4%	42.4%	1.2%	9.3%	4.2%	42.7%	0.2%	490	5,162
South Davis	92.1%	33.7%	1.3%	19.3%	6.1%	39.4%	0.2%	428	4,509
East Davis	88.7%	53.1%	2.5%	22.1%	5.2%	17.2%	0.0%	396	4,172
Central Davis	90.1%	62.4%	6.9%	5.8%	3.8%	21.0%	0.0%	390	4,108
Downtown Davis	87.1%	66.3%	18.7%	5.5%	0.8%	8.7%	0.1%	217	2,286
Overall	90.5%	49.3%	4.0%	14.3%	4.5%	27.8%	0.1%	2,417	25,461
Weighted Sample	2,187	1,192	97	346	109	672	2	2,417	
Projected Population	23,047	12,549	1,012	3,644	1,152	7,083	22		25,461

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q29 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Table 21 shows the mode share for students and employees who live outside Davis (an estimated 9,071 people). Among those traveling from outside Davis, 85.4 percent commute by car, 6.2 percent ride the bus, and 4.9 percent ride the train.

Table 21. Share using each mode on an average weekday, from outside Davis

	Percent physically traveling	Of those physically traveling to campus						Weighted Sample	Projected Population
		Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train		
Student	81.1%	3.6%	1.6%	64.1%	12.3%	11.0%	7.5%	284	2,942
Undergrad	87.0%	3.3%	2.4%	68.4%	9.5%	12.2%	4.2%	176	1,823
Freshman	96.0%	13.7%	6.7%	49.0%	12.6%	17.9%	0.0%	12	121
Sophomore	92.7%	0.0%	9.2%	49.8%	30.8%	10.2%	0.0%	11	116
Junior	86.1%	0.0%	3.8%	66.2%	7.0%	13.4%	9.6%	60	618
Senior	85.8%	4.4%	0.0%	74.9%	7.9%	10.9%	1.9%	94	968
Graduate	71.4%	4.2%	0.0%	55.5%	17.8%	8.5%	14.0%	108	1,119
Masters	75.7%	6.7%	0.0%	64.8%	13.2%	6.0%	9.3%	37	379
PhD	69.2%	2.9%	0.0%	50.3%	20.4%	9.9%	16.6%	72	740
Employee	80.3%	0.7%	2.0%	75.1%	14.7%	3.8%	3.7%	592	6,129
Faculty	65.6%	4.3%	0.9%	60.3%	16.5%	3.7%	14.2%	71	734
Staff	82.3%	0.3%	2.1%	76.7%	14.5%	3.8%	2.5%	521	5,395
Overall	80.5%	1.7%	1.9%	71.5%	13.9%	6.2%	4.9%	876	9,071
Weighted Sample	706	14	16	626	122	54	43	876	
Projected Population	7,305	150	170	6,483	1,263	559	446		9,071

Results are based on responses to question Q21 (whether they traveled to campus each day) and question Q29 (primary means of transportation each day). All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Table 22 shows the mode share by role if we include telecommuting as a travel mode, since it is sometimes considered an alternative to physical travel. The denominator for these estimates is the number of people who physically traveled to campus plus those who worked from home on a given weekday, but excluding those who did not travel for another other reason. If working from home was indicated as a reason for not traveling to campus the entire week, we assumed that the individual did so on all five weekdays.<sup>2</sup>

*Table 22. Share using each mode on an average weekday, including telecommuting*

	Share physically traveling or working from home	Of those physically traveling to campus or working from home						Work from home	Weighted Sample	Projected Population
		Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train			
Student	90.6%	51.5%	5.7%	11.8%	4.0%	26.3%	0.8%	0.0%	2,843	29,431
Undergrad	91.9%	50.5%	6.0%	9.7%	3.1%	30.4%	0.4%	0.0%	2,303	23,843
Freshman	90.9%	78.6%	11.9%	2.3%	1.5%	5.7%	0.1%	0.0%	344	3,559
Sophomore	94.5%	49.4%	4.7%	3.6%	3.1%	39.2%	0.0%	0.0%	404	4,179
Junior	90.9%	43.2%	5.1%	10.7%	3.3%	36.8%	0.9%	0.0%	623	6,454
Senior	91.9%	45.4%	4.9%	14.5%	3.7%	31.2%	0.3%	0.0%	932	9,651
Graduate	85.2%	56.4%	4.3%	21.2%	7.8%	7.5%	2.6%	0.2%	540	5,588
Masters	83.9%	50.9%	3.2%	26.2%	7.3%	9.6%	2.2%	0.7%	195	2,021
PhD	85.8%	59.5%	5.0%	18.5%	8.0%	6.3%	2.8%	0.0%	345	3,567
Employee	86.0%	22.3%	2.9%	54.0%	10.8%	4.0%	1.8%	4.3%	1,138	11,783
Faculty	85.1%	40.4%	5.2%	30.1%	7.3%	3.5%	3.2%	10.2%	240	2,487
Staff	86.2%	17.6%	2.2%	60.3%	11.7%	4.1%	1.4%	2.7%	898	9,296
Overall	89.3%	43.5%	4.9%	23.4%	5.8%	20.1%	1.0%	1.2%	3,982	41,214
Weighted Sample	3,557	1,732	195	931	233	802	41	48	3,982	
Projected Population	36,811	17,923	2,019	9,639	2,408	8,298	428	499		41,214

Results are based on responses to question Q21 (whether they traveled to campus each day), question Q29 (primary means of transportation each day). See footnote regarding student telecommuting. All mode split percentages are calculated as follows: we first calculate the percent of five weekdays that an individual used a particular mode and then take the average over all respondents. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

While Table 15 through 22 present estimates for the share using various modes on an average weekday. Table 23 shows the share using each mode as a primary mode at least once during the five-day week. Although 44 percent of individuals bike to campus as their primary means of transportation on an average weekday (Table 15), 51 percent bike to campus as their primary means of transportation at least once during the week (Table 23). So while about 18,134 people bike as their primary means of travel on an average day, about 21,042 people are regular

<sup>2</sup> Only employees were asked question Q23 (reasons for not traveling to campus on particular days of the week), and so only employees could indicate telecommuting on these days. Both employees and students were asked question Q22 (reason for not traveling to campus the entire week), and could indicate working from home as the reason for being away all week. Thus student telecommuting is only measured if it was done the entire week, and therefore the percent of students working from home is a lower bound estimate.

bicyclists (at least once per week). The number of regular carpoolers and train-riders is also substantially greater than the average number of people traveling by these modes on a given day, projected to be 4,710 (versus 2,432) and 657 (versus 453) for carpooling and train-riding, respectively. In addition to those physically traveling to campus, Table 23 shows that the number of graduate students and employees who work from home at least once during the seven-day week is about twice the number working from home on an average weekday (1,097 compared to 499). These findings indicate that a substantial number of graduate students and employees work from home at least one day week, while a much smaller number work from home more than a few days a week.

*Table 23. Percent using each as a primary mode at least once during the five-day week*

Of those physically traveling to campus at least once										
	Percent physically traveling at least once	Bike	Walk or Skate	Drive Alone	Carpool or Ride	Bus	Train	Work from home	Weighted Sample	Projected Population
Student	97.6%	60.4%	10.6%	18.2%	9.5%	36.0%	1.2%	0.0%	2,843	29,431
Undergrad	97.7%	59.8%	11.4%	15.3%	8.1%	41.4%	0.5%	0.0%	2,303	23,843
Freshman	95.9%	85.1%	22.7%	3.3%	4.3%	9.1%	0.4%	0.0%	344	3,559
Sophomore	98.0%	63.1%	9.2%	7.4%	8.4%	52.7%	0.1%	0.0%	404	4,179
Junior	97.4%	52.1%	10.7%	15.2%	8.3%	50.3%	0.9%	0.0%	623	6,454
Senior	98.5%	54.3%	8.6%	23.1%	9.2%	42.2%	0.4%	0.0%	932	9,651
Graduate	97.0%	63.1%	7.6%	30.9%	15.6%	12.8%	4.3%	0.2%	540	5,588
Masters	95.2%	60.9%	6.2%	39.3%	16.2%	15.9%	3.1%	0.6%	195	2,021
PhD	98.0%	64.3%	8.4%	26.3%	15.2%	11.1%	5.0%	0.0%	345	3,567
Employee	93.8%	26.7%	4.3%	64.4%	16.4%	6.2%	2.6%	9.5%	1,138	11,783
Faculty	94.0%	46.9%	8.1%	46.0%	13.0%	6.2%	5.6%	23.9%	240	2,487
Staff	93.8%	21.3%	3.3%	69.3%	17.3%	6.2%	1.8%	5.6%	898	9,296
Lives within Davis	96.9%	64.4%	10.8%	18.2%	9.5%	33.4%	0.2%	1.3%	3,106	32,143
Lives outside Davis	94.9%	2.8%	2.0%	77.5%	18.6%	7.1%	6.8%	7.8%	876	9,071
Overall	96.5%	51.1%	8.9%	31.1%	11.4%	27.7%	1.6%	2.7%	3,982	41,214
Weighted Sample	3,842	2,033	354	1,236	455	1,103	63	106	3,982	
Projected Population	39,764	21,042	3,665	12,798	4,710	11,411	657	1,097		41,214

Results are based on responses to questions Q21 (whether traveled to campus) and Q29 (primary means of transportation each day). Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

### **Comparison of 2012-13 mode share with 2011-12**

One of the main purposes of the Campus Travel Survey is to collect comparable data each year in order to assess trends over time. The questions and calculations used to estimate mode share in this year's survey are identical to those used in last year's survey. In addition, the results of each year shown in this analysis are weighted by role and gender to correct for differences in response rates between subsets of the population over time. Table 24 shows mode share estimates for 2011-12 and 2012-13, which are very similar across the two years. Data for both years are

weighted by role and gender.

Table 25 shows percentage-point changes in the overall mode share and the results of tests for statistically significant changes over this one-year period. In this section, “private vehicle” includes those driving alone, carpooling, or getting a ride to campus.

Table 24. Comparison of mode shares, 2011-12 to 2012-13

2012-13	Share physically traveling	Of those physically traveling, share using each mode on an average weekday							Weighted sample	Projected population
		Bike	Walk	Drive alone	Carpool or ride	Private vehicle	Bus	Train		
Students	91%	51.5%	5.7%	11.8%	4.0%	15.8%	26.3%	0.8%	2,844	29,431
Undergrad	92%	50.5%	6.0%	9.7%	3.1%	12.8%	30.4%	0.4%	2,304	23,843
Graduate	85%	56.6%	4.3%	21.3%	7.8%	29.1%	7.5%	2.6%	540	5,588
Employees	82%	23.3%	3.0%	56.4%	11.3%	67.7%	4.1%	1.9%	1,138	11,783
Outside Davis	81%	1.7%	1.9%	71.5%	13.9%	85.4%	6.2%	4.9%	876	9,071
Within Davis	90%	54.7%	5.7%	11.7%	3.9%	15.6%	24.0%	0.1%	3,106	32,143
Overall	88%	44.0%	5.0%	23.7%	5.9%	29.6%	20.4%	1.1%	3,982	41,214

2011-12	Share physically traveling	Of those physically traveling, share using each mode on an average weekday							Weighted sample	Projected population
		Bike	Walk	Drive alone	Carpool or ride	Private vehicle	Bus	Train		
Students	91%	52.7%	6.6%	13.2%	3.3%	16.5%	23.1%	0.0%	2,248	29,387
Undergrad	92%	52.2%	6.5%	10.9%	3.3%	14.1%	26.1%	0.0%	1,810	23,659
Graduate	87%	55.2%	6.9%	26.4%	6.9%	33.3%	4.6%	1.1%	438	5,728
Employees	85%	27.1%	3.5%	52.9%	11.8%	64.7%	4.7%	1.2%	868	11,341
Outside Davis	81%	3.7%	1.2%	67.9%	16.0%	84.0%	7.4%	3.7%	714	9,338
Within Davis	92%	56.5%	6.5%	12.0%	3.3%	15.2%	20.7%	0.0%	2,402	31,390
Overall	89%	46.1%	5.6%	23.6%	5.6%	29.2%	18.0%	1.1%	3,116	40,728

Data for both years are weighted by role and gender.

Table 25. One year change in overall mode share, 2011-12 to 2012-13

Years of comparison	Percentage-point change in share of people doing each on an average weekday								Physically traveling to campus
	Among those physically traveling to campus:								
	Personal vehicle				Carpool				
2011-12 to 2012-13	Bike	Walk	Any	Drive alone	or ride	Bus	Train	0.0%	-0.8%
	-2.1%	-0.6%	0.4%	0.1%	0.3%	2.4% **	0.0%		

\*\* Statistically significant difference with  $p < 0.05$  in a two-category  $\chi^2$  test of the frequency of those using this mode versus those using any other mode in one year versus the other.

Data for both years are weighted by role and gender.

Most notably, the overall bus share increased by 2.4 percentage points over the last year, which is significant at the five percent level. The share biking to campus declined by 2.1 percentage points, but this change was not statistically significant. Other modes experienced small changes, however these were not significant across the population. The share physically traveling to campus on an average weekday did not change significantly for any subset of the population included in this analysis.

Table 26 shows percentage-point changes in mode share and the results of tests for statistically

significant changes by role and residential location between 2011-12 and 2012-13.

Table 26. One year change in mode share, by role and residential location

	Percentage point change from 2010-11 to 2011-12								
	Bike	Walk	Personal vehicle	Drive alone	Carpool or ride	Bus	Train		
Students	-1.2%	-0.9%	-0.7%	-1.4%	0.7%	3.2%	**	0.8%	**
Undergraduate	-1.7%	-0.5%	-1.3%	-1.2%	-0.2%	4.3%	**	0.4%	**
Graduate	1.4%	-2.6% *	-4.2%	-5.1% *	0.9%	2.9%	*	1.5%	
Employees	-3.8%	* -0.5%	3.0%	3.5%	-0.5%	-0.6%		0.7%	
Outside Davis	-2.1%	** 0.6%	1.4%	3.6%	-2.1%	-1.2%		1.2%	
Within Davis	-1.9%	-0.8%	0.3%	-0.3%	0.6%	3.3%	**	0.1%	
Overall	-2.1%	-0.6%	0.4%	0.1%	0.3%	2.4%	**	0.0%	

\* Statistically significant difference with  $p < 0.1$  in a two-category  $\chi^2$  test of the frequency of those using this mode versus those using any other mode in one year versus the other.

\*\* Statistically significant at  $p < 0.05$ .

Data are weighted for both years by role and gender.

### **Carpooling and ridesharing**

Each year we ask those who indicate carpooling (multiple people in a vehicle arriving on campus together) or getting a ride to campus (where the driver continues on to another destination after the drop-off) how many other people were in the vehicle. This data enables us to accurately account for carpooling and ridesharing in our estimation of vehicle-miles traveled from person-miles traveled. The average vehicle occupancies for carpools and rides are shown in Table 27. Among those who carpooled at any point during the reference week, the average number of passengers was 2.5 (including the driver). Most people dropped off on campus were the sole passenger, with an average of 1.4 passengers dropped off per ride to campus (excluding the driver).

Table 27. Average carpool size

Role group	Average occupancy among those that carpooled /rode at least once		Weighted sample	
	Carpool occupants (including driver)	Ride passengers (excluding driver)	Carpoolers	Riders
Undergraduate	2.4	1.5	89	72
Graduate	2.5	1.1	56	19
Faculty	3.1	1.3	22	6
Staff	2.5	1.3	112	24
Outside Davis	2.6	2.1	127	15
Within Davis	2.4	1.3	152	106
Overall	2.5	1.4	279	120

Vehicle occupancy is based on responses to question Q30 for those carpooling and to question Q31 for those who got a ride. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).



## **Number of vehicles on campus**

Estimates of the number of people driving alone, carpooling, and getting a ride can be combined with average vehicle occupancy findings to estimate the total number of vehicles arriving on campus. In particular, we estimate the total number of vehicles as the number of people driving alone, plus fractional vehicles counted in proportion to vehicle occupancy. That is, if a respondent reports arriving in a four-person carpool, we count this as 0.25 vehicles arriving on campus on behalf of that respondent. We weight and expand the sample to project the total number of vehicles for the entire campus population, using the expansion factors shown in Table A-3. We estimate that 9,780 vehicles come to campus on an average weekday (Table 28). About 687 of these contain carpools and 411 are vehicles just dropping passengers off.

*Table 28. Projected vehicles arriving on an average weekday, by occupancy and role*

Role group	Projected number of vehicles on an average weekday				Projected Population
	Drive alone	Carpool	Ride	Total	
Students	3,138	273	292	3,704	29,431
Undergraduate	2,128	154	233	2,515	23,843
Freshmen	73	10	14	96	3,559
Sophomores	142	35	32	209	4,179
Juniors	627	38	52	717	6,454
Seniors	1,287	71	135	1,493	9,651
Graduate	1,010	119	60	1,189	5,588
Masters	444	34	16	494	2,021
PhD	566	85	44	695	3,567
Employees	5,471	414	118	6,004	11,783
Faculty	638	53	18	709	2,487
Staff	4,834	361	100	5,295	9,296
Within Davis	3,389	289	331	4,008	32,143
Outside Davis	5,221	399	80	5,700	9,071
Overall	8,610	687	411	9,708	41,214

Results are based on responses to questions *Q21* (days physically traveling to campus), *Q29* (mode of transportation used each day), *Q30* (carpool size), and *Q31* (number given a ride). “Drive alone” includes driving alone in a vehicle as well as driving a motorcycle or scooter. The distinction between carpools and rides is whether the driver’s destination is campus: Carpool is defined as “Carpool or vanpool with others also going to campus (either as driver or passenger)” and ride is defined as “Get a ride (someone drops you off and continues on elsewhere).” Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

## **Average Vehicle Ridership**

Average vehicle ridership (AVR) is a statistic calculated at each UC campus that represents the ratio of the number of people arriving on campus to the number of personal vehicles brought to campus. In particular, we use a formula developed by the South Coast Air Quality Management District, intended to count weekday arrivals of employees from off-campus (only) and making adjustments for employees who telecommute, who adopt a compressed work week schedule, or who use a zero-emission vehicle to commute to campus (see Appendix D for details on the calculation of AVR). If everyone drove by themselves to campus, the campus AVR would be equal to one. Values greater than 1.0 indicate more carpooling or the use of alternative modes of transportation. Among those traveling from off-campus, AVR is estimated to be 3.34 campus-wide, and 1.70 among non-student employees only (Table 29). This means that for every car coming to campus, there are an estimated 3.34 off-campus people coming to campus or

telecommuting. This ratio is the highest it has been in six years of Campus Travel Survey data; however gender weights have only been applied starting in 2010-11. Table 29 shows the AVR estimates over the last six years.

Table 29. Average Vehicle Ridership (AVR), 2007-08 through 2012-13

Role group	Off-campus only						All (on and off-campus)					
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Students	1.67	4.76	4.28	4.49	5.29	6.05	5.04	5.91	5.25	5.53	6.41	7.25
Undergraduate	4.24	5.80	5.11	5.38	6.42	7.23	5.04	7.37	6.36	6.72	8.01	8.77
Freshmen	5.32	5.35	4.69	3.26	3.66	5.06	26.39	33.40	21.84	32.75	34.61	33.67
Sophomores	6.46	10.24	9.38	8.37	15.93	17.51	6.78	10.67	9.53	9.11	16.54	18.88
Juniors	4.05	6.26	5.48	5.59	6.24	7.85	4.46	6.56	6.04	6.23	6.88	8.30
Seniors	3.55	4.39	3.88	4.57	5.26	5.62	3.77	4.67	4.09	4.79	5.68	5.96
Graduate	3.43	2.81	2.57	2.79	3.14	3.55	3.94	3.21	2.95	3.18	3.45	4.03
Masters	3.22	2.71	2.6	2.73	3.34	3.15	3.49	2.94	2.84	2.94	3.57	3.43
PhD	3.55	2.86	2.56	2.82	3.03	3.84	4.2	3.36	3.01	3.33	3.39	4.47
Employees	<b>1.67</b>	<b>1.69</b>	<b>1.66</b>	<b>1.75</b>	<b>1.78</b>	<b>1.70</b>	1.67	1.71	1.66	1.75	1.80	1.70
Faculty	2.23	2.34	2.37	2.24	2.76	3.06	2.23	2.35	2.38	2.24	2.78	3.06
Staff	1.58	1.60	1.56	1.66	1.65	1.52	1.58	1.62	1.55	1.67	1.67	1.52
Non-student and student employees	n/a	n/a	2.20	n/a	2.45	2.51	n/a	n/a	2.31	n/a	2.59	2.64
Outside Davis	1.33	1.32	1.26	1.34	1.39	1.34	1.33	1.33	1.26	1.34	1.39	1.34
Within Davis	4.60	5.17	4.99	4.99	5.98	6.24	5.61	6.32	5.99	6.04	7.14	7.36
Overall	2.75	2.99	2.83	3.00	3.26	3.34	3.20	3.51	3.30	3.51	3.78	3.82

**Bold** indicates the official AVR statistic reported by UC campuses.

AVR estimates from 2010-11 and 2011-12 are weighted by role and gender.

See Appendix D for details on AVR calculations.

Table 30 shows AVR statistics for 2012-13 at UC Davis with those at other UC campuses for which AVR statistics are available. At the time of this report, the most recent AVR for most UC campuses is the one documented in the *Systemwide Transportation Survey Matrix 10-11*. Dashes indicate no new AVR was available for that year. To the extent that the most recently reported AVR statistics at other UC campuses reflect travel patterns in 2012-13, the comparison suggests that UC Davis has the highest (best) AVR of the UC campuses for which statistics are available.

Table 30. AVR at UC Davis versus other UC campuses

UC Campus	2009-10	2010-11	2011-12	2012-13	Notes on reported AVR	Comparable AVR at UCD 2012-13
Irvine	1.90	1.87	-	-	Includes grad student employees	2.51
Los Angeles	1.64	-	-	-	Official (off campus employees only)	1.70
Riverside	1.55	1.53	-	-	Official (off campus employees only)	1.70
Santa Barbara	1.35	-	-	-	Averaged for faculty (1.4) and staff (1.3)	1.70
San Diego	1.60	1.60	-	-	Official (off campus employees only)	1.70
San Francisco	2.30	-	-	-	Off campus students and employees	3.34
Santa Cruz	2.29	1.94	-	-	Off campus students and employees	3.34

See Appendix D for details on the calculation of the Davis AVR. Other campus figures are from the Systemwide Transportation Survey Matrix 08-09, 09-10, and 10-11, available online at [http://www.universityofcalifornia.edu/sustainability/trans\\_pres.html](http://www.universityofcalifornia.edu/sustainability/trans_pres.html).

### **Zero-emission vehicles**

For the purposes of calculating AVR statistics, we asked anyone who reported driving, carpooling, or getting a ride at any point on their way to campus during the reference week whether they used an all-electric or hydrogen fuel cell vehicle (Q34). Seventeen (weighted) respondents reported using a zero-emission vehicle to travel to campus during the reference week: eleven drove all-electric vehicles and six drove hydrogen vehicles.

### **Parking permits**

Whether or not they reported having a car, all respondents were asked whether they currently have a UC Davis parking permit, and if so which type (question Q15). About 19 percent of respondents reported having an annual parking permit and 6 percent reported having a monthly or quarterly permit: a projected 7,681 and 2,444 people, respectively (Table 31). This year, we also asked respondents whether they had an in-vehicle parking meter, such as the EasyPark Personal Parking Meter. One percent of respondents, or a projected 369 people, claimed to own an in-vehicle parking meter.

Table 31. Share of people with a parking permit, by role

	Has either an annual/multi-year or monthly/quarterly permit		Annual (or multi-year) permit		Monthly or quarter permit		Personal in-vehicle parking meter		Total population
	Share of weighted sample	Projected population	Share of weighted sample	Projected population	Share of weighted sample	Projected population	Share of weighted sample	Projected population	
Student	12.0%	3,537	5.6%	1,657	6.4%	1,880	0.8%	239	29,431
Undergrad	9.8%	2,329	3.9%	934	5.8%	1,394	0.6%	142	23,843
Freshman	2.3%	82	1.6%	58	0.7%	24	0.0%	0	3,559
Sophomore	6.0%	250	3.2%	134	2.8%	116	0.3%	12	4,179
Junior	10.4%	672	4.0%	257	6.4%	415	0.5%	31	6,454
Senior	13.7%	1,325	5.0%	486	8.7%	839	1.0%	99	9,651
Graduate	21.6%	1,208	12.9%	723	8.7%	486	1.7%	96	5,588
Masters	24.3%	490	15.3%	308	9.0%	182	1.8%	37	2,021
PhD	20.1%	718	11.6%	414	8.5%	304	1.7%	59	3,567
Employee	55.9%	6,588	51.1%	6,024	4.8%	564	1.1%	130	11,783
Faculty	44.6%	1,110	41.7%	1,037	2.9%	73	0.8%	19	2,487
Staff	58.9%	5,478	53.7%	4,987	5.3%	491	1.2%	111	9,296
Within Davis	13.2%	4,242	9.9%	3,181	3.3%	1,062	1.0%	313	32,143
Outside Davis	64.9%	5,883	49.6%	4,501	15.2%	1,382	0.6%	56	9,071
Overall	24.6%	10,125	18.6%	7,681	5.9%	2,444	0.9%	369	41,214

Results are based on responses to question Q15. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

**Ridership by transit provider**

If respondents indicated that they rode a bus or a train at any point on their way to campus any day during the prior week, they were asked to indicate which transit service(s) they used (“Check all that apply”). Table 32 and Table 33 show the share of bus and train users who used each service at least once during the reference week. Of the 1,064 respondents who indicated riding the bus in the past week, most reported using Unitrans at least once.

Table 32. Share riding specific bus services at least once during the week

Role group	Unitrans	Yolobus	UC			Weighted sample	Projected population
			UCD / UCDMC Shuttle	Sacramento Regional Transit	Berkeley / UC Davis shuttle		
Undergraduate	93.4%	6.1%	2.9%	0.3%	0.4%	931	9,633
Graduate	81.4%	7.0%	10.8%	0.0%	0.0%	67	693
Faculty	72.3%	9.9%	7.1%	0.0%	3.6%	14	145
Staff	58.3%	12.5%	25.1%	4.2%	0.0%	52	539
Overall	90.7%	6.6%	4.6%	0.4%	0.4%	1,064	11,009

Results are based on responses to questions Q28 (whether a bus was ever used) and Q33 (which bus services). Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Of the 61 respondents who indicated riding the train in the past week, nearly all rode the Amtrak Capitol Corridor. Given the relatively small sample size, the estimates for train service ridership are imprecise.

*Table 33. Share riding specific train services at least once during the week*

Role group	Among those who rode the train, share who used each service at least once			Weighted sample
	Amtrak Capitol Corridor	BART	Sacramento Regional Transit	
Undergraduate	90%	0%	0%	11
Graduate	94%	5%	6%	23
Faculty	100%	5%	0%	13
Staff	100%	14%	15%	15
Overall	96%	7%	6%	61

Results are based on responses to questions *Q28* (whether a train was ever used) and *Q34* (which train services). Data are weighted by role group based on the 3,982 valid responses to question *Q29* (see Table A-3).

### **Distance from campus**

For the purpose of estimating vehicle-miles traveled and carbon dioxide emissions from travel to campus, respondents were asked more detailed information about where they live, including the set of cross-streets nearest where they live and their zip code, if outside of Davis, in questions *Q18* through *Q19*. This information was geocoded in ArcGIS, enabling a variety of spatial analyses (see Appendix E for details on the methodology).

We used the geocoded addresses to estimate the distance respondents travel (along a shortest-time route) to get to campus (in particular, to the Silo) on a daily basis (see Appendix E). Note that in this analysis, we used the street network, which was not augmented to include additional bike- and pedestrian-only links, which are especially prevalent in Davis. Since some pedestrians and bicyclists may choose routes based on shortest distance, the estimated distances might be interpreted as upper bounds. Table 34 and 35 summarize distances traveled by role group, showing that employees tend to travel from farther away. The median distance traveled among students is about 1.8 miles, versus 2.9 among faculty and 10.7 among staff (Table 34).

Table 34. Average distance from campus, based on geocoded addresses, by role

Role	Percent geocoded	Among those successfully geocoded, distance from campus (in miles):				Weighted Sample	Projected Population
		Mean	Median	Minimum	Maximum		
Student	90%	4.3	1.8	0.4	306.6	2,575	29,431
Undergrad	90%	3.4	1.7	0.4	80.1	2,086	23,843
Freshman	99%	1.5	0.8	0.7	48.9	311	3,559
Sophomore	89%	2.3	1.8	0.5	44.4	366	4,179
Junior	87%	4.5	1.8	0.5	67.9	565	6,454
Senior	89%	3.8	1.8	0.4	80.1	844	9,651
Graduate	90%	8.4	2.1	0.5	306.6	489	5,588
Masters	87%	8.1	2.0	0.6	306.6	177	2,021
PhD	91%	8.6	2.1	0.5	132.4	312	3,567
Employee	92%	11.9	7.4	0.5	133.1	1,031	11,783
Faculty	90%	12.3	2.9	0.5	133.1	218	2,487
Staff	93%	11.8	10.7	0.8	74.2	813	9,296
Outside Davis	86%	23.9	17.5	0.7	306.6		8,622
Off Campus in Davis	89%	2.1	1.9	0.4	5.6		25,416
Overall	91%	6.5	2.0	0.4	306.6	3,982	41,214
Weighted Sample	3,606						

Distances are calculated as the shortest-time network distance between respondents' geocoded cross-streets (given in questions *Q18* and *Q19*) and a centroid on campus near the Silo (see Appendix E). Data are weighted by role and gender group for the 3,606 cases successfully geocoded and with non-missing mode choice data in question *Q29*.

While 88 percent of undergraduates live within 3 miles of campus, only 54 percent of faculty and 30 percent of staff do (Table 35). About 15 percent of the campus population lives more than 10 miles away, and 7 percent more than 20 miles away. Note that the threshold for living within Davis is about 5 miles, and that very few people live 5 to 10 miles from campus, given the agricultural belt that surrounds Davis. That is, once they live outside of Davis, it is likely that they live more than 10 miles away.

Table 35. Cumulative percent of people living within each distance of campus, by role

Distance from campus	Overall	Students		Employees	
		Undergraduate	Graduate	Faculty	Staff
0.5 miles or less	0.3%	0.4%	0.2%	0.0%	0.0%
1 mile	24.8%	34.0%	16.7%	3.9%	1.3%
1.5 miles	36.1%	46.7%	28.4%	14.0%	5.1%
2 miles	55.2%	70.3%	43.8%	23.9%	10.8%
2.5 miles	63.8%	76.5%	59.4%	36.5%	19.5%
3 miles	75.4%	88.2%	68.4%	53.7%	29.8%
4 miles	83.4%	93.9%	80.1%	66.9%	40.9%
6 miles	84.3%	94.1%	80.5%	72.5%	43.2%
8 miles	84.5%	94.1%	80.7%	73.0%	44.0%
10 miles	85.2%	94.3%	81.4%	73.9%	47.8%
12 miles	86.9%	94.4%	82.4%	76.1%	58.6%
14 miles	88.1%	94.9%	83.9%	77.5%	64.0%
16 miles	89.7%	95.4%	86.3%	79.5%	70.2%
18 miles	91.5%	95.9%	88.7%	82.9%	77.9%
20 miles	93.1%	96.6%	90.6%	84.3%	84.3%
25 miles	94.5%	97.3%	92.0%	86.5%	88.7%
30 miles	95.8%	98.2%	92.7%	86.8%	94.6%
40 miles	96.6%	98.7%	93.3%	87.4%	97.2%
50 miles	97.2%	99.1%	93.8%	88.8%	98.5%
60 miles	97.8%	99.7%	94.5%	89.9%	99.2%
70 miles	99.3%	99.9%	98.6%	96.3%	99.5%
100 miles	99.9%	100.0%	99.6%	99.2%	100.0%
More than 100 miles	100.0%	100.0%	100.0%	100.0%	100.0%
Weighted sample	3,606	2,297	564	356	389
Projected population	41,214	23,843	5,588	2,487	9,296
Group's percent of the overall population	100.0%	57.9%	13.6%	6.0%	22.6%

Distances are calculated as the shortest-time network distance between geocoded cross-streets (given in questions *Q18* and *Q19*) and a centroid on campus near the Silo (see Appendix E). Data are unweighted. See “Appendix E: Geocoding and network distances” for more details.

For the purpose of validating the method we use to calculate mode share, we asked respondents about the mode they “usually” use to travel to campus (*Q26*). This variable captures what respondents consider to be their “usual” mode, even if they traveled to campus using a different primary mode during the reference week. In addition, this variable captures the mode usually used by respondents who did not travel to campus during the reference week. For each distance category, Table 36 shows the share “usually” using each mode among those physically travelling to campus. The resulting mode share estimates derived from the “usual” mode question are very close to the estimates derived from the standard “reference week” primary mode questions. This consistency is important, since it indicates the mode share estimates of the Campus Travel Survey adequately capture what respondents consider to be their “usual” travel mode.

Table 36. Usual mode, by distance from campus

Distance group	Percent physically traveling	Usual mode of those physically traveling to campus						Weighted sample	Projected population
		Bike	Walk or skate	Drive alone	Carpool or ride	Bus	Train		
Within 1 mile	89%	80%	13%	1%	0%	5%	0%	664	7,761
1 to 2.9 miles	92%	57%	3%	10%	2%	28%	0%	1,821	20,961
3 to 4.9 miles	89%	44%	1%	28%	6%	20%	0%	349	3,997
5 to 9.9 miles	87%	2%	0%	78%	19%	0%	0%	48	552
10 to 19.9 miles	85%	1%	0%	78%	13%	7%	1%	412	4,730
20 miles or more	75%	1%	1%	63%	15%	6%	14%	281	3,213
Overall	89%	48%	4%	23%	5%	19%	1%	3,575	41,214
Weighted sample	3,178	1,725	136	829	168	670	46	3,575	
Projected population	36,640	17,677	1,396	8,499	1,724	6,870	473		41,214

Mode data are based on responses to question Q26, and distance data are calculated network distances between the geocoded cross-streets (given in Q18 and Q19) and a centroid on campus near the Silo (see Appendix E). Data are weighted by role group and gender for the 3,606 cases successfully geocoded and with non-missing mode choice data in question Q29 (see Table A-3).

### **Aggregate person-miles and vehicle-miles traveled to campus**

For estimates of the number of miles traveled to and from campus, we rely on the calculated distances between respondents' geocoded home locations and a centroid on campus. We assume respondents take the fastest path to and from campus on the days they report having traveled to campus. This method likely underestimates the true number of miles traveled to and from campus because it does not take into account side trips that respondents might make on the way to or from campus (e.g. stopping at the store, picking up children, or visiting friends), diversions from the shortest time path for a more pleasant or less congested route, or trips away from campus during the middle of the day (e.g. going to lunch or to an off-site meeting).

We estimate the number of miles traveled to and from campus each day as the doubled network distance between respondents' geocoded home locations and the Silo on campus (as described in Appendix E), multiplied times the percent of weekdays a respondent traveled to campus. Thus, if a person lives 10 miles from campus and traveled to campus all five days, her average daily person-miles would be 20 miles; by contrast, if she traveled to campus only one day, her average daily person-miles would be 4 miles. We then attribute person-miles to each mode based on the share of weekdays a respondent used each mode. Thus, if a respondent biked one day and drove four, we count 20 percent of her miles as bike miles and 80 percent as driving miles. Summed across all respondents, this figure represents the number of person-miles traveled by each mode on an average weekday.

To estimate the number of person-miles traveled annually, we first assume that respondents travel the same number of days per week and using the same modes as in the reference week for the entire 36 weeks of the academic year. To estimate summer travel, we rely on responses to questions Q64 and Q65 about the number of weeks and average number of days per week traveled to campus during the summer, assuming respondents used the same modes as during the survey reference week throughout the summer. For example, annual miles biked = (distance from campus × 2) × (share of days biked during reference week) × [(36 weeks × 5 days/week) + (weeks traveled to campus during the summer × days/week traveled during summer)]. In order to estimate the daily person-miles traveled by each person on an average day we calculate a



weighted average of summer and academic-year travel.

Vehicle-miles traveled (VMT) accounts for vehicle use and occupancy per mile. To estimate VMT for any travel in a personal vehicle or public transit vehicle (including driving alone, carpooling, getting a ride, riding a bus, and riding a train), we assume that each person-mile contributes a fractional vehicle-mile equivalent to one divided by vehicle occupancy. We assume that travel by walking, biking, or skating contributes no VMT. Vehicle occupancy for carpooling and getting a ride varies for each respondent, as reported in questions *Q30* and *Q31* for those carpooling/vanpooling or getting a ride, respectively. If a respondent lives 10 miles from campus and traveled in a 3-person carpool all five weekdays, her average daily VMT would be  $(10 \text{ miles} \times 2) / 3 = 6.67$  miles. Vehicle occupancy for those driving alone and for those who got a ride and were the only person dropped off on campus by the person giving them a ride is assumed to be one.

In addition to VMT for personal vehicles, we estimate VMT for buses and trains for the purpose of calculating the carbon dioxide equivalent emissions generated from commuting to campus (see next section). For bus and train occupancy, we assume average occupancy for all trips on those modes. In particular, we estimated average bus occupancy based on annual ridership data from Unitrans, since the majority of bus riders use Unitrans. According to 2011 figures from the National Transit Database, Unitrans provided 7,920,873 annual passenger miles and 790,901 vehicle revenue miles, suggesting an average of about 10.02 passengers per mile.<sup>3</sup> Thus, for someone who lives 10 miles from campus and traveled by bus all five weekdays, average bus VMT per day is  $(10 \text{ miles} \times 2) / 10.02 = 2.00$  vehicle-miles. In general, each mile someone travels by bus contributes  $1 / 10.02 \approx 0.100$  vehicle-miles per passenger-mile.

We estimate train occupancy based on annual ridership data from Amtrak's Capitol Corridor, since they provide the majority of train rides to campus. According to figures in the Capitol Corridor Business Plan Update, the Capitol Corridor had an average of 95.4 passengers per mile in FY 2011-12.<sup>4</sup> If a respondent lives 100 miles from campus and traveled by train all five days, her average train VMT per day is estimated to be  $(100 \text{ miles} \times 2) / 95.4 = 2.10$  vehicle-miles. In general, each mile someone travels by train contributes  $1 / 95.4 \approx 0.010$  vehicle-miles per passenger-mile.

Our estimates for vehicle-miles traveled, by mode and role, are shown in Table 37 and Table 38.

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<sup>3</sup> U.S. Department of Transportation, Federal Transit Administration, 2011 National Transit Database, Annual Transit Profile, Unitrans - City of Davis/ASUCD (NTD ID 9142) ([http://www.ntdprogram.gov/ntdprogram/pubs/profiles/2011/agency\\_profiles/9142.pdf](http://www.ntdprogram.gov/ntdprogram/pubs/profiles/2011/agency_profiles/9142.pdf)).

<sup>4</sup> *Capitol Corridor Intercity Passenger Rail Service Business Plan Update FY 2013-14 – FY 2014-15*, Appendix C ([http://www.capitolcorridor.org/included/docs/business\\_plans/13\\_15\\_Business\\_Plan\\_DRAFT.pdf](http://www.capitolcorridor.org/included/docs/business_plans/13_15_Business_Plan_DRAFT.pdf)).

Table 37. Vehicle-miles traveled, by mode, daily and annually

Mode	Daily		Annually		Percent of total VMT	Percent of total people	Population projection
	Total VMT	VMT per person	Total VMT	VMT per person			
No vehicle (bike, walk or skate)	0	0.0	0	0.0	0.0%	49.0%	20,195
Personal vehicles	225,341	18.5	56,335,292	4,617.6	98.2%	29.6%	12,200
Drive alone	205,622	21.1	51,405,578	5,262.7	89.6%	23.7%	9,768
Carpool or ride	19,719	8.1	4,929,714	2,027.0	8.6%	5.9%	2,432
Bus	3,903	0.5	975,716	116.0	1.7%	20.4%	8,408
Train	290	0.6	72,575	160.2	0.1%	1.1%	453
Total	229,534	5.6	57,383,583	1,392.3	100.0%	100.0%	41,214

Mode groups are the estimated number using each means of transportation on a typical weekday during the reference week, based on responses to questions Q21 and Q29. Vehicle-miles are calculated as described in the text, drawing on data from questions Q21, Q29, Q18, Q19, and the average number of passengers per mile on Unitrans and Amtrak's Capitol Corridor. All data are weighted (and expanded) by role and gender group for the 3,606 cases successfully geocoded (based on Q18) and with non-missing mode choice data in question Q29 (see Table A-3).

Table 38. Vehicle-miles traveled, by role, daily and annually

Role	Daily		Annually		Percent of total VMT	Percent of total people	Population projection
	Total VMT	VMT per person	Total VMT	VMT per person			
Students	73,725	2.51	18,431,231	626	32.12%	71.41%	29,431
Undergraduate	49,412	2.07	12,352,908	518	21.53%	57.85%	23,843
Freshmen	2,662	0.75	665,575	187	1.16%	8.64%	3,559
Sophomores	2,808	0.67	702,059	168	1.22%	10.14%	4,179
Juniors	17,645	2.73	4,411,307	683	7.69%	15.66%	6,454
Seniors	26,296	2.72	6,573,967	681	11.46%	23.42%	9,651
Graduate	24,313	4.35	6,078,323	1,088	10.59%	13.56%	5,588
Masters	8,164	4.04	2,041,104	1,010	3.56%	4.90%	2,021
PhD	16,149	4.53	4,037,219	1,132	7.04%	8.65%	3,567
Employees	155,809	13.22	38,952,352	3,306	67.88%	28.59%	11,783
Faculty	15,914	6.40	3,978,478	1,600	6.93%	6.03%	2,487
Staff	139,895	15.05	34,973,874	3,762	60.95%	22.56%	9,296
Outside Davis	209,068	24.25	52,267,062	6,062	91.08%	20.92%	8,622
Within Davis	20,466	0.63	5,116,521	157	8.92%	79.08%	32,592
On campus	98	0.02	24,440	4	0.04%	13.67%	5,634
West Village	267	0.17	66,787	43	0.12%	3.74%	1,541
Off campus	20,101	0.79	5,025,295	198	8.76%	61.67%	25,416
Total	229,534	5.57	57,383,583	1,392	100.00%	100.00%	41,214

Vehicle-miles are calculated as described in the text, drawing on data from questions Q21, Q29, Q18, Q19, and the average number of passengers per mile on Unitrans and Amtrak's Capitol Corridor. All data are weighted (and expanded) by role and gender group for the 3,606 cases successfully geocoded (based on Q18) and with non-missing mode choice data in question Q29 (see Table A-3).

### **Carbon dioxide-equivalent emissions**

We estimate the amount of greenhouse gases produced by campus travelers by assuming that each travel mode generates a certain quantity of carbon dioxide-equivalent (CO<sub>2e</sub>) emissions per person-mile traveled, and multiplying this quantity by our estimate of miles traveled by each mode on an average weekday. In particular, we assume driving alone generates 1.1 pounds-equivalent of CO<sub>2e</sub> per vehicle-mile (regardless of vehicle type), and that carpooling/getting a ride, riding a bus, and riding a train produce some fractional amount of the emissions produced for the entire vehicle, adjusted for the total number of passengers in the vehicle. For carpooling and getting rides, we adjust vehicle occupancies based on those reported by the respondents themselves. For transit, we assume average occupancies apply for all respondents. We estimate emissions based on national travel emissions averages (provided by TravelMatters.org) as well as on an alternative (lower) emissions estimate specific to Unitrans buses (Table 39).

*Table 39. Formula for calculating average weekday pounds of CO<sub>2e</sub>, by mode*

Mode		
Driving alone	1.1 lbs / mile	× aggregated average weekday person-miles traveled (or equivalently, vehicle-miles traveled) by driving alone
Carpool / ride	1.1 lbs / mile	× aggregated average weekday carpool/ride vehicle-miles traveled (this is the equivalent of adjusting person-miles by the reported carpool size)
Bus (high)	0.90 lbs / mile	× aggregated average weekday person-miles traveled by bus
Bus (low)	0.091 lbs / mile	× aggregated average weekday person-miles traveled by bus
Train	0.46 lbs / mile	× aggregated average weekday person-miles by train

The “low” estimate for bus emissions is based on annual fuel use and passenger-miles of service at Unitrans, as described in Lovejoy, *et al.* (2009). All other estimates are drawn from the *TravelMatters* website, Individual Emissions Calculator Methodology, available online at <http://www.travelmatters.org/calculator/individual/methodology>, which is meant to capture national averages. Annual estimates of CO<sub>2e</sub> generated are based on comparable figures of miles traveled annually

Table 40. Daily pounds of CO<sub>2</sub>e emitted, by mode and role

Role	Pounds-equivalent of CO <sub>2</sub> e generated on an average weekday					Total CO <sub>2</sub> e	Average lbs. / person	Percent of total CO <sub>2</sub> e	Percent of total people	Projected Population
	Drive alone	Carpool or ride	Bus (high)	Bus (low)	Train					
Students	69,753	7,725	28,398	2,871	6,190	112,066	3.81	37.88%	71.41%	29,431
Undergraduate	46,695	4,487	25,541	2,582	2,215	78,938	3.31	26.69%	57.85%	23,843
Freshmen	2,507	337	691	70	2	3,537	0.99	1.20%	8.64%	3,559
Sophomores	2,217	293	4,748	480	1	7,259	1.74	2.45%	10.14%	4,179
Juniors	17,375	953	8,555	865	1,525	28,408	4.40	9.60%	15.66%	6,454
Seniors	24,596	2,903	11,546	1,167	687	39,733	4.12	13.43%	23.42%	9,651
Graduate	23,058	3,238	2,857	289	3,975	33,128	5.93	11.20%	13.56%	5,588
Masters	7,760	1,076	982	99	1,026	10,843	5.37	3.67%	4.90%	2,021
PhD	15,298	2,163	1,874	190	2,949	22,285	6.25	7.53%	8.65%	3,567
Employees	156,432	13,965	6,798	687	6,549	183,745	15.59	62.12%	28.59%	11,783
Faculty	15,954	1,394	678	69	3,002	21,027	8.45	7.11%	6.03%	2,487
Staff	140,478	12,572	6,121	619	3,547	162,717	17.50	55.01%	22.56%	9,296
Outside Davis	209,103	18,869	13,809	1,396	12,723	254,503	29.52	86.04%	20.92%	8,622
Within Davis	17,081	2,822	21,387	2,162	17	41,308	1.27	13.96%	79.08%	32,592
On campus	44	38	209	21	1	292	0.05	0.10%	13.67%	5,634
West Village	154	46	764	77	1	966	0.63	0.33%	3.74%	1,541
Off campus	16,883	2,738	20,414	2,064	15	40,050	1.58	13.54%	61.67%	25,416
Overall	226,185	21,691	35,196	3,559	12,740	295,811	7.18	100.00%	100.00%	41,214

High estimates assume 0.90 pounds/passenger-mile (as estimated by TravelMatters.org). Low estimates assume 0.091 pounds/passenger-mile, as estimated using Unitrans data on annual fuel use and passenger-miles of service provided as described in Lovejoy, *et al.* (2009). Total and average are based on the “high” estimate of bus emissions.

Table 41. Annual tons of CO<sub>2</sub>e emitted, by mode and role

Role	Annual tons of CO <sub>2</sub> e					Total CO <sub>2</sub> e	Average tons / person	Percent of total CO <sub>2</sub> e	Percent of total people	Projected Population
	Drive alone	Carpool or ride	Bus (high)	Bus (low)	Train					
Students	7,910	876	3,220	326	702	12,708	0.43	37.88%	71.41%	29,431
Undergraduate	5,295	509	2,896	293	251	8,951	0.38	26.69%	57.85%	23,843
Freshmen	284	38	78	8	0	401	0.11	1.20%	8.64%	3,559
Sophomores	251	33	538	54	0	823	0.20	2.45%	10.14%	4,179
Juniors	1,970	108	970	98	173	3,221	0.50	9.60%	15.66%	6,454
Seniors	2,789	329	1,309	132	78	4,506	0.47	13.43%	23.42%	9,651
Graduate	2,615	367	324	33	451	3,757	0.67	11.20%	13.56%	5,588
Masters	880	122	111	11	116	1,230	0.61	3.67%	4.90%	2,021
PhD	1,735	245	213	21	334	2,527	0.71	7.53%	8.65%	3,567
Employees	17,739	1,584	771	78	743	20,836	1.77	62.12%	28.59%	11,783
Faculty	1,809	158	77	8	340	2,384	0.96	7.11%	6.03%	2,487
Staff	15,930	1,426	694	70	402	18,452	1.98	55.01%	22.56%	9,296
Outside Davis	23,712	2,140	1,566	158	1,443	28,860	3.35	86.04%	20.92%	8,622
Within Davis	1,937	320	2,425	245	2	4,684	0.14	13.96%	79.08%	32,592
On campus	5	4	24	2	0	33	0.01	0.10%	13.67%	5,634
West Village	17	5	87	9	0	110	0.07	0.33%	3.74%	1,541
Off campus	1,915	310	2,315	234	2	4,542	0.18	13.54%	61.67%	25,416
Overall	25,649	2,460	3,991	404	1,445	33,544	0.81	100.00%	100.00%	41,214

High estimates assume 0.90 pounds/passenger-mile (as estimated by TravelMatters.org). Low estimates assume 0.091 pounds/passenger-mile, as estimated using Unitrans data on annual fuel use and passenger-miles of service provided as described in Lovejoy, *et al.* (2009). Total and average are based on the “high” estimate of bus emissions for a conservative (upper-bound) emissions estimate.

We do not take into account emissions associated with the manufacture of bicycles or vehicles, or of home energy use for those working from home, assuming that biking, walking, skating, working from home, or otherwise not traveling contributes no emissions. As with our estimates of total miles traveled on which these estimates are based, side trips made on the way to or from campus, and any trips made in the middle of the day are not taken into account.

Using these assumptions, we estimate that travel to campus generates a total of 295,811 pounds of CO<sub>2</sub>e on an average weekday, or 7.18 pounds per person (Table 40), and about 33,544 metric tons of CO<sub>2</sub>e annually, or 0.81 metric tons per person (Table 41). Undergraduate students, particularly freshmen and sophomores, contribute much less to campus-wide CO<sub>2</sub>e emissions than their share of the population. Employees, and especially staff, contribute the most CO<sub>2</sub>e relative to their share of the campus population, comprising 29 percent of the population and contributing 62 percent of CO<sub>2</sub>e on an average day.

As an assessment of the extent that alternative transportation reduces CO<sub>2</sub>e emissions, we might consider that if everyone drove alone to campus but all else were unchanged (e.g. the distances traveled and frequency that people travelled to campus), then there would be an additional 15,460 metric tons (annually) of CO<sub>2</sub>e generated (Table 42). Figure 6 shows the share of CO<sub>2</sub>e emissions avoided from each alternative to driving alone.

Table 42. Annual tons of CO<sub>2</sub>e emissions avoided compared to driving alone

Role	Annual tons of CO <sub>2</sub> e saved					Total CO <sub>2</sub> e saved	Average savings / person	Projected Population
	Bike	Walk or skate	Carpool or ride	Bus	Train			
Students	4,595	319	738	3,610	977	10,239	0.35	29,431
Undergraduate	3,481	266	285	3,247	350	7,628	0.32	23,843
Freshmen	373	55	23	88	-	539	0.15	3,559
Sophomores	660	42	63	604	-	1,369	0.33	4,179
Juniors	928	63	85	1,088	241	2,404	0.37	6,454
Seniors	1,520	106	113	1,468	108	3,315	0.34	9,651
Graduate	1,114	53	454	363	627	2,611	0.47	5,588
Masters	390	11	178	125	162	866	0.43	2,021
PhD	724	42	276	238	465	1,745	0.49	3,567
Employees	1,355	89	1,879	864	1,033	5,221	0.44	11,783
Faculty	522	37	322	86	474	1,441	0.58	2,487
Staff	833	53	1,556	778	560	3,780	0.41	9,296
Outside Davis	188	-	2,396	1,756	2,007	6,347	0.74	8,622
Within Davis	5,762	408	222	2,719	3	9,114	0.28	32,592
On campus	596	110	4	27	-	736	0.13	5,634
West Village	211	13	6	97	-	327	0.21	1,541
Off campus	4,955	285	212	2,595	2	8,050	0.32	25,416
Overall	5,950	408	2,617	4,475	2,010	15,460	0.38	41,214

Bike savings = 1.1 lbs./mile\*annual person-miles biked

Walk or skate savings = 1.1 lbs./mile\*annual person-miles walked or skated

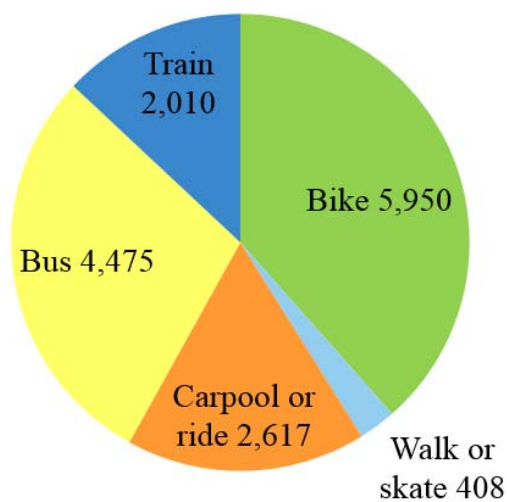
Carpool or ride savings = 1.1 lbs./mile\*(carpool or ride PMT - carpool or ride VMT)

Bus savings = (1.1 lbs./mile - 0.091 lbs./mile)\*annual bus PMT

“Low” estimates are used to conservatively estimate savings.

Train savings = (1.1 lbs./mile - 0.46 lbs./mile)\*annual train PMT

Figure 6. Annual tons of CO<sub>2</sub>e emissions avoided by using alternative transportation modes



Relative to emissions that would be produced if these same travelers drove alone.

### **Driver’s license, car and bicycle access**

All respondents were asked whether they have a driver’s license, have access to a car for driving to campus, and have access to a bicycle for riding to campus. About 90 percent of those living within Davis have a driver’s license, compared to 98 percent of those living outside Davis. Car access varies substantially by residential location: less than 70 percent of those in Davis have access to a car, compared to 97 percent of those living outside Davis. About 84 percent of university affiliates have access to a bike, and those who live in Davis have substantially higher rates of bike access (87.8 percent compared to 68.6 percent for those outside of Davis). Overall, more people have access to a bicycle (34,429) than to a car (31,014), though these rates are substantially different among only those living outside Davis (Table 43).

*Table 43. Driver’s license, car and bicycle access*

		Have a driver's license	Have access to a car	Have access to a bike	Weighted Sample	Projected Population
Student		88.8%	65.6%	85.0%	2,844	29,431
Undergrad		87.7%	60.5%	84.7%	2,304	23,843
Freshman		74.2%	20.1%	94.0%	344	3,559
Sophomore		83.6%	44.1%	93.4%	404	4,179
Junior		90.5%	62.9%	77.0%	624	6,454
Senior		92.5%	77.0%	82.6%	932	9,651
Graduate		93.6%	85.9%	86.2%	540	5,588
Masters		91.3%	85.5%	82.2%	195	2,021
PhD		94.9%	86.2%	88.5%	345	3,567
Employee		98.9%	96.8%	80.0%	1,138	11,783
Faculty		99.3%	97.8%	89.9%	240	2,487
Staff		98.8%	96.5%	77.4%	898	9,296
Residential location	Within Davis	89.9%	68.6%	87.8%	3,106	32,143
	Outside Davis	97.8%	96.7%	68.6%	876	9,071
Overall		91.7%	75.3%	83.5%	3,982	41,214
Weighted Sample		3,651	2,996	3,326	3,982	
Projected Population		37,785	31,014	34,429		41,214

Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

### **Injuries resulting from bike falls or crashes on and off campus**

All respondents who indicated biking on campus at some point in the last year were asked if they experienced “a fall or crash that resulted in personal injury to you” while “biking on campus” or biking “between home and campus.” Of the 70 percent of respondents who indicated biking on campus within the last year, 18.1 percent (an estimated 5,241) said they had experienced a bike crash on campus that resulted in personal injury, and 11.5 percent (an estimated 3,344) experienced a crash between home and campus (Table 44). Sophomores and freshmen who ride a bike on campus are most likely to experience on campus bike crashes that result in injury.

Table 44. Injuries resulting from bike falls or crashes

Of those riding a bike on campus in the last year, share who experienced a fall or crash that resulted in personal injury									
	Share who rode a bike on campus in the last year	Biking on campus		Biking off campus, between home and campus		Role group share of population	Role group share of injuries	Population who biked in the last year	Campus population
		Share	Projected number of persons	Share	Projected number of persons				
Student	78.7%	21.7%	5,034	13.6%	3,145	71.4%	95.3%	23,169	29,431
Undergrad	79.0%	24.0%	4,512	14.1%	2,663	57.9%	83.6%	18,831	23,843
Freshman	74.0%	23.3%	615	9.0%	236	8.6%	9.9%	2,635	3,559
Sophomore	94.2%	36.8%	1,450	15.5%	609	10.1%	24.0%	3,938	4,179
Junior	70.4%	17.3%	785	10.7%	487	15.7%	14.8%	4,541	6,454
Senior	79.6%	21.5%	1,649	17.0%	1,303	23.4%	34.4%	7,682	9,651
Graduate	77.6%	12.1%	523	11.2%	486	13.6%	11.8%	4,337	5,588
Masters	72.8%	10.9%	160	7.5%	111	4.9%	3.1%	1,472	2,021
PhD	80.2%	12.7%	362	13.0%	372	8.7%	8.6%	2,861	3,567
Employee	49.9%	4.2%	245	3.9%	230	28.6%	5.5%	5,878	11,783
Faculty	68.0%	7.1%	120	3.5%	59	6.0%	2.1%	1,692	2,487
Staff	45.0%	2.9%	122	4.1%	171	22.6%	3.4%	4,183	9,296
Residential location									
Within Davis	82.0%	19.1%	5,020	12.3%	3,243	78.0%	96.3%	26,342	32,143
Outside Davis	30.3%	9.1%	251	4.3%	119	22.0%	4.3%	2,750	9,071
Overall	70.3%	18.1%	5,241	11.5%	3,344	100.0%	100.0%	28,964	41,214

Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

All respondents who indicated experiencing a bike fall or crash that resulted in injury were asked about the extent to which this incident reduced their current biking frequency (Table 45). Of those who experienced such an incident, 85 percent indicated that they do not bike any less as a result; however, 11.7 percent indicated biking “somewhat less often,” 2.4 percent indicated biking “much less often,” and 0.8 percent indicated that they “don’t bike anymore” as a result of the fall or crash.



Table 45. Effects of bike falls or crashes on biking frequency

		<i>Has this fall or crash caused you to bike less frequently now?</i>							
		No, it has not caused me to bike any less		Yes, it has caused me to bike somewhat less often		Yes, it has caused me to bike much less often		Yes, and it is why I don't bike anymore	
		Of those who had a bike crash	Population	Of those who had a bike crash	Population	Of those who had a bike crash	Population	Of those who had a bike crash	Population
Student		84.2%	4,630	12.5%	686	2.5%	136	0.9%	48
Undergrad		83.6%	4,072	12.9%	626	2.6%	129	0.9%	41
	Freshman	91.2%	529	5.4%	32	3.4%	20	0.0%	-
	Sophomore	85.0%	1,194	12.5%	175	2.1%	30	0.4%	6
	Junior	88.0%	756	10.2%	87	0.9%	8	0.9%	8
	Senior	78.7%	1,593	16.4%	332	3.5%	71	1.4%	28
Graduate		88.3%	558	9.4%	60	1.1%	7	1.1%	7
	Masters	94.9%	137	5.1%	7	0.0%	-	0.0%	-
	PhD	86.4%	420	10.7%	52	1.4%	7	1.4%	7
Employee		98.1%	375	0.0%	-	1.9%	7	0.0%	-
	Faculty	94.7%	127	0.0%	-	5.3%	7	0.0%	-
	Staff	100.0%	248	0.0%	-	0.0%	-	0.0%	-
Residential location	Within Davis	84.5%	4,723	12.1%	678	2.6%	143	0.9%	48
	Outside Davis	97.3%	282	2.7%	8	0.0%	-	0.0%	-
Overall		85.1%	5,005	11.7%	686	2.4%	143	0.8%	48

Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

### **Self-reported bicycling aptitude**

Question *Q73* asked all respondents to rate their ability to ride a bike, specifying that we were interested in “whether you know how to ride a bike, regardless of whether it is practical or desirable for you to do so as a means of transportation to campus.” Approximately 1.7 percent indicated that they cannot ride a bike, and 6.5 percent of respondents indicated that they could but were “not very confident” doing so. Overall, over 91 percent of respondents indicated that they were “somewhat” or “very confident” riding. Among all groups, freshmen, juniors, and Master’s students are least likely to report being “very confident,” and women are significantly less likely to report being “very confident” than men (Table 46).

Table 46. Self-reported bicycling aptitude

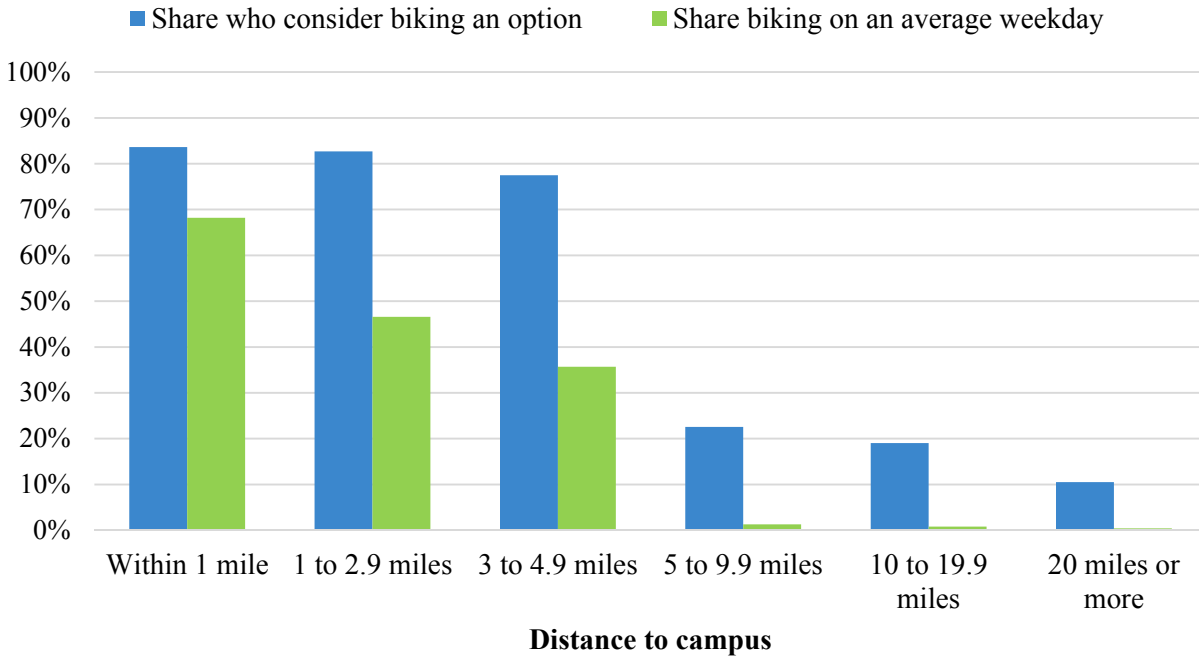
		<i>How would you rate your ability to ride a bike? In particular, we are interested whether you know how to ride a bike, regardless of whether it is practical or desirable for you to do so as a means of transportation to campus.</i>							
		I cannot ride a bike at all because I do not know how		I can ride a bike, but I am not very confident doing so		I am somewhat confident riding a bike		I am very confident riding a bike	
		Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample
Student		2.3%	57	6.2%	157	18.8%	478	72.8%	1,852
Undergrad		2.4%	49	6.3%	130	18.7%	386	72.6%	1,496
Freshman		1.7%	5	6.0%	18	29.8%	89	62.5%	187
Sophomore		0.8%	3	3.9%	14	21.1%	76	74.2%	268
Junior		3.7%	20	9.7%	54	18.9%	105	67.7%	374
Senior		2.5%	21	5.2%	44	13.7%	116	78.7%	668
Graduate		1.7%	8	5.6%	27	19.1%	92	73.6%	356
Masters		0.8%	1	7.1%	12	23.5%	41	68.5%	118
PhD		2.2%	7	4.7%	15	16.6%	52	76.5%	238
Employee		0.3%	3	7.4%	75	13.7%	140	78.6%	804
Faculty		0.5%	1	4.2%	9	12.4%	27	82.9%	182
Staff		0.3%	2	8.2%	66	14.1%	113	77.4%	622
Residential location	Within Davis	2.0%	56	5.8%	162	16.7%	465	75.5%	2,106
	Outside Davis	0.6%	4	9.0%	70	19.8%	154	70.7%	550
Gender	Male	1.8%	29	2.2%	35	10.2%	165	85.9%	1,396
	Female	1.6%	32	10.1%	196	23.3%	453	64.9%	1,260
Overall		1.7%	61	6.5%	232	17.3%	619	74.5%	2,656

Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

### **Bicycling potential**

We include a question to assess the potential mode share of biking. In *Q76*, respondents were asked, “What options are available to you for getting to campus?” Answers to this question might be used as a proxy for the highest potential share of each mode, since those who do not consider a particular mode as viable will be very unlikely to choose it. Figure 7 shows the differences between the share of respondents who consider biking to campus an option and the share that actually bikes to campus on an average weekday.

Figure 7. Share who consider biking to campus an option vs. share that actually bikes, by distance



**Perceptions of bicycle enforcement and safety biking on campus**

In addition to bicycling aptitude, we ask respondents questions about their perceptions of bicycle traffic law enforcement and safety on campus. These questions were presented in the form of statements with Likert-scale responses, and respondents were asked to rate their level of agreement or disagreement with each statement. To the extent that the weighted sample is representative of the university population, the counts shown in the “Weighted Sample” columns can be multiplied by a factor of 10 to estimate the number of persons in each role group and residential location who agree or disagree with these statements (Table 47).

About 39 percent of the sample agreed or strongly agreed that “bicycle traffic laws are adequately enforced on campus.” About 30 percent indicated they were neutral or unsure, 21 percent disagreed, and over 9 percent strongly disagreed. Employees and seniors are most likely to disagree, while freshmen are most likely to agree that there is adequate enforcement.

Table 47. Perceptions of bicycle traffic law enforcement on campus

		<i>Bicycle traffic laws are adequately enforced on campus.</i>									
		Strongly disagree		Disagree		Neutral or don't know		Agree		Strongly agree	
		Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample
Student		7.0%	177	17.8%	447	31.6%	792	32.6%	818	11.0%	276
Undergrad		6.6%	133	17.4%	353	31.4%	637	33.9%	688	10.8%	219
	Freshman	3.0%	9	11.4%	34	38.2%	112	37.5%	110	9.9%	29
	Sophomore	4.2%	15	19.7%	71	27.4%	99	37.2%	135	11.4%	41
	Junior	6.1%	33	16.7%	90	33.5%	180	33.5%	180	10.1%	54
	Senior	9.1%	76	18.9%	159	29.3%	246	31.3%	263	11.3%	95
Graduate		9.2%	44	19.5%	93	32.3%	155	27.3%	131	11.8%	56
	Masters	7.7%	13	17.2%	30	37.6%	65	25.3%	44	12.2%	21
	PhD	10.0%	31	20.7%	64	29.4%	90	28.4%	87	11.5%	35
Employee		16.5%	166	28.1%	284	26.5%	268	23.4%	236	5.5%	55
	Faculty	14.9%	32	27.7%	60	23.4%	51	29.3%	63	4.7%	10
	Staff	16.9%	134	28.2%	224	27.4%	217	21.8%	173	5.7%	45
Residential location	Within Davis	7.6%	211	19.7%	546	29.8%	824	32.7%	905	10.1%	279
	Outside Davis	17.6%	132	24.5%	185	31.3%	236	19.8%	149	6.9%	52
Overall		9.7%	343	20.8%	730	30.1%	1,060	30.0%	1,054	9.4%	331

Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Table 48 summarizes the levels of agreement and disagreement about the safety of biking on campus.

Table 48. Perceptions of safety biking on campus

		<i>I feel safe biking on campus.</i>									
		Strongly disagree		Disagree		Neutral or don't know		Agree		Strongly agree	
		Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample	Share of Responses	Weighted Sample
Student		3.2%	80	11.8%	294	19.9%	496	42.6%	1,065	22.5%	563
Undergrad		3.1%	63	11.5%	232	20.3%	411	43.0%	868	22.1%	446
	Freshman	3.0%	8	6.8%	19	16.8%	48	50.9%	145	22.6%	64
	Sophomore	2.0%	7	11.9%	43	15.8%	57	46.5%	167	23.8%	85
	Junior	2.7%	15	13.7%	73	23.8%	127	39.8%	212	20.0%	107
	Senior	4.0%	33	11.5%	97	21.3%	180	40.8%	344	22.4%	189
Graduate		3.6%	17	12.9%	62	17.8%	85	41.1%	196	24.6%	117
	Masters	4.6%	8	17.6%	30	21.9%	37	34.9%	60	21.0%	36
	PhD	3.0%	9	10.3%	32	15.5%	48	44.7%	137	26.5%	81
Employee		5.7%	57	12.8%	127	22.6%	224	39.2%	387	19.7%	194
	Faculty	4.5%	9	10.2%	21	16.5%	35	43.3%	91	25.5%	54
	Staff	6.1%	47	13.5%	105	24.3%	189	38.1%	296	18.1%	141
Residential location	Within Davis	3.1%	86	12.0%	330	17.6%	484	43.7%	1,204	23.6%	650
	Outside Davis	7.0%	51	12.4%	91	32.2%	236	33.9%	248	14.6%	107
Overall		3.9%	137	12.1%	420	20.6%	720	41.6%	1,452	21.7%	758

Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

While most respondents indicated feeling safe biking on campus, 16 percent of respondents strongly disagreed or disagreed with the statement, “I feel safe biking on campus.” An additional 21 percent indicated they were neutral or unsure about the statement.

### **Bicycle theft**

Table shows the incidence of bicycle theft and vandalism on the UC Davis campus between October 26, 2011 and October 26, 2012, the year before the first reference week. Among the 70.3 percent of the weighted sample who rode a bike on campus during this period, 10.1 percent reported their entire bike was stolen, 9.6 percent reported parts of their bike were stolen, and 2.6 percent reported their bike was vandalized. Since these categories were not mutually exclusive, the same respondent could indicate an entire bike theft, a partial bike theft, and a vandalism—therefore these percentages should not be added to reflect the total incidence of bike theft and vandalism. Overall, we estimate that 2,939 people had an entire bike stolen from campus during this period.

*Table 49: Incidence of bike theft, by role*

		Have you been the victim of bicycle theft or vandalism on the UC Davis campus in the past year (Oct. 26, 2011 - Oct. 26, 2012)?					Weighted Sample	Projected Population
		Rode bike on campus in last year	Of those who rode a bike on campus in the last year			My bike was vandalized		
			Yes, my entire bike was stolen	Yes, but only parts of my bike were stolen				
Student		78.7%	10.9%	10.7%	3.1%	2,844	29,431	
Undergrad		79.0%	11.0%	11.1%	3.3%	2,304	23,843	
	Freshman	74.0%	1.9%	5.7%	3.7%	344	3,559	
	Sophomore	94.2%	11.6%	16.0%	4.3%	404	4,179	
	Junior	70.4%	9.6%	10.0%	2.6%	624	6,454	
	Senior	79.6%	14.8%	11.2%	3.0%	932	9,651	
Graduate		77.6%	10.3%	8.6%	2.1%	540	5,588	
	Masters	72.8%	7.1%	6.6%	0.5%	195	2,021	
	PhD	80.2%	12.0%	9.7%	2.9%	345	3,567	
Employee		49.9%	7.0%	5.1%	0.5%	1,138	11,783	
	Faculty	68.0%	6.1%	5.8%	0.4%	240	2,487	
	Staff	45.0%	7.4%	4.8%	0.5%	898	9,296	
Residential location	Within Davis	82.0%	9.8%	9.7%	2.7%	3,106	32,143	
	Outside Davis	30.3%	12.8%	7.4%	1.5%	876	9,071	
Overall		70.3%	10.1%	9.6%	2.6%	3,982	41,214	
Weighted Sample		2,798	284	267	72	3,982		
Projected Population		28,964	2,939	2,766	741		41,214	

Results are based on responses to questions *Q69* (theft in the last year). Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

Based on the survey results, seniors are most likely to have experienced a bike theft in the last year, while freshmen have the lowest incidence of bike theft, since most freshmen have only been on campus a month or two at the time the survey is administered each year.

### **Awareness of TAPS and other transportation programs**

Respondents were presented a list of services and asked to indicate, “It’s new to me,” “I’ve heard of it, but never used it,” or “I’ve used it.” Table 50 summarizes the responses for each service, and Table 51 compares responses for the past six years, for those items that appeared on each of the surveys.

*Table 50. Awareness of transportation services*

Service	Have used it	Have only heard of it	Never heard of it
Bike tire air stations and repair stations around campus	53.4%	38.2%	8.3%
GoClub program	14.9%	30.6%	54.6%
TAPS motorist assistance program	11.6%	47.0%	41.4%
UC Davis Bike Auction	7.7%	75.5%	16.8%
Zipcar carsharing program	6.8%	75.2%	18.1%
Bike commuter showers and lockers (ARC)	5.1%	31.3%	63.7%
Bike lock-cutting service	4.9%	57.6%	37.5%
Personal in-vehicle parking meters (Easy Park)	4.6%	31.5%	63.9%
Discount transit passes for those without a parking permit	4.1%	23.3%	72.6%
Zimride carpool matching service	3.7%	37.3%	59.0%
Bicycle Education and Enforcement Program (BEEP)	1.9%	22.0%	76.1%
Emergency Ride Home Program for goClub members	1.3%	24.6%	74.1%
Aggie Bike Buy Program	0.8%	29.4%	69.8%

Results are based on responses to question *Q70*. Data are weighted by role and gender based on the 3,982 valid responses to questions *Q01*, *Q09*, and *Q20-9* (see Table A-3).

*Table 51. Awareness of transportation services, 2007-08 through 2011-12*

Service	Percent who have heard of it				
	2012-13	2011-12	2010-11	2009-10	2008-09
UC Davis Bike Auction	83.2%	83.9%	86.3%	81.5%	84.3%
Zipcar carsharing program	81.9%	75.9%	75.1%	57.3%	n/a
Bike lock-cutting service	62.5%	57.3%	42.7%	40.9%	49.0%
TAPS motorist assistance program	58.6%	51.7%	60.3%	51.3%	49.0%
GoClub program	45.4%	42.8%	32.8%	17.5%	n/a
Zimride carpool matching service	41.0%	31.2%	24.2%	15.4%	n/a
Personal in-vehicle parking meters (Easy Park)	36.1%	34.7%	26.5%	24.3%	34.2%
Discount transit passes for those without a parking permit	27.4%	34.8%	32.3%	30.2%	n/a
Emergency Ride Home Program for goClub members	25.9%	24.5%	23.6%	16.3%	n/a

Data for 2012-13 are based on responses to question *Q70*. See Miller (2012) for results from 2011-12, Miller (2011) for results from 2010-11, Lovejoy (2010) for results from 2009-10, Lovejoy, *et al.* (2009) for results from 2008-09, and Congleton (2009) for results from 2007-08.

### **Barriers to using alternative transportation**

This year, we included two questions to better understand why some individuals do not utilize the alternative transportation options available to them. Respondents who lived in Davis (excluding on-campus) but had not biked to campus in the past week were asked why they chose not to bike. The weighted number of agreements with each given statement is shown in Table 52. While a large number of individuals likely avoid biking due to preference (“I prefer to use a different mode of transportation”), many individuals did not bike due to structural barriers, such as not owning a bike.

*Table 52. Barriers to biking, by role and gender*

		<i>Why did you choose not to bike to campus last week? (select all that apply)</i>									
		I prefer to use a different mode of transportation	I do not have a bike	It is inconvenient for me to bike	Last week's weather was unsuitable for biking	The distance from my house to campus is too far for me to bike	My bike does not work very well	Biking takes too long	I feel unsafe biking to campus	I live close to campus so it makes more sense to walk	Biking to my school or work would look unprofessional
Students		276	229	150	160	159	162	136	118	25	24
Undergraduate		248	199	128	147	140	148	116	100	22	18
Freshman		3	2	0	2	4	0	4	2	0	0
Sophomores		61	19	30	34	36	27	32	15	1	2
Juniors		76	78	39	39	37	41	35	38	9	5
Seniors		107	100	58	72	63	80	46	46	11	11
Graduate		28	30	22	13	19	14	19	17	3	6
Masters		11	15	13	4	10	3	8	8	0	3
PhD		17	15	9	9	9	11	12	9	3	3
Employees		54	26	53	36	30	13	37	16	11	10
Faculty		9	3	14	4	6	3	7	5	8	1
Staff		45	24	39	32	24	11	30	11	2	9
Gender	Male	218	156	133	141	130	122	114	105	16	20
	Female	112	100	70	55	60	54	59	28	20	14
Overall		330	256	203	196	189	175	173	133	35	34
Projected Population		3,412	2,645	2,098	2,033	1,960	1,814	1,791	1,378	363	347

Results are based on responses to question Q43. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).

Respondents who lived outside of Davis but had not used transit to travel to campus in the past week were asked about why they had not used transit. The weighted number of agreements with each statement is shown in Table 53. A weighted sample of 204 individuals (corresponding to an estimated population of 2,116) agreed with the statement “There are no transit options available to me,” suggesting that there is a significant potential transit market that could be reached either through transit promotion measures, or through increased transit availability in areas that currently lack service. In both Table 52 and Table 53, trends held relatively constant across role and gender.

Table 53. Barriers to using transit, by role and gender

		<i>Why did you choose not to use transit (bus or rail) for your commute to campus last week? (select all that apply)</i>							
		It is inconvenient for me to take transit	Traveling by transit takes too long	There are no transit options available to me	I prefer to use a different mode of transportation	The transit options available to me are too expensive	I dislike using transit	I feel unsafe commuting by transit	Arriving to my work or school by transit would look unprofessional
Students		128	88	63	31	29	31	19	1
Undergraduate		92	61	42	23	14	24	16	0
Freshman		6	3	1	3	2	2		0
Sophomores		5	5	2	1	2	1	2	0
Juniors		25	17	13	6	5	9	6	0
Seniors		56	36	26	13	5	12	8	0
Graduate		36	28	21	7	15	7	3	1
Masters		13	12	10	3	4	3	1	1
PhD		24	16	11	5	11	4	2	0
Employees		281	199	141	78	50	36	11	0
Faculty		30	23	18	7	6	2	0	0
Staff		252	177	123	71	43	35	11	0
Gender	Male	244	157	106	62	43	38	25	1
	Female	165	131	99	47	35	29	4	0
Overall		410	288	204	109	79	67	29	1
Projected Population		4,239	2,979	2,116	1,125	813	695	302	7

Results are based on responses to question Q44. Data are weighted by role and gender based on the 3,982 valid responses to questions Q01, Q09, and Q20-9 (see Table A-3).



## **ACKNOWLEDGEMENTS**

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## APPENDICES

### **Appendix A: Survey instrument, 2012-13 Campus Travel Survey**

Below is the full text of the survey instrument, shown without the formatting as it would have appeared to online survey-takers. Notes about the conditional display of questions based on respondents' prior answers are shown in brackets. Answer options that were offered as checkboxes in the online survey (allowing respondents to select more than one response) are denoted here with a . Answer options that were implemented either as radio buttons or as part of a dropdown list in the online survey (allowing respondents to select only one response) are denoted here with a . Questions that were required for respondents to proceed are denoted here with an asterisk. As in past surveys, the dates of the reference week changed after one week.

## **Welcome to the 2012-13 Campus Travel Survey!**

This annual survey is intended for everyone who regularly travels to UC Davis for school or work. This research effort provides campus planners with valuable feedback on how people get to campus and their experiences with various transportation programs. Your feedback is important to us! The survey takes 10-15 minutes to complete. Doing so is voluntary, and we assure you that all responses are confidential and the results will only be published in the aggregate, without connection to any individual. You must be at least 18 years old to complete this survey.

In appreciation for your time, we're offering anyone who completes the survey entry into a drawing to win one of **ten \$50 Downtown Davis gift cards!**

Thanks for participating!

*Role, screening, and gender*

First, we have a few questions about your role at UC Davis.

### **Q01. What is your primary role at UC Davis?\***

- Undergraduate student (including Post-baccalaureate)
- Graduate student
- Faculty
- Staff
- Visiting scholar
- Post doc
- Recent graduate
- Retiree

[If faculty]

### **Q02. What is your current faculty status?**

- Ladder rank (senate)
- Non-ladder rank (non-senate)

[If undergraduate student]

### **Q03. What year are you?\***

- Freshman
- Sophomore
- Junior
- Senior
- Fifth-year senior
- Post-baccalaureate
- Visiting / exchange student
- Other: \_\_\_\_\_

[If sophomore, junior, senior, fifth-year, post-bac]

**Q04. Did you transfer to UC Davis from a college, university, or community college?**

- Yes
- No

[If graduate student]

**Q05. What type of graduate program are you in?\***

- Master's
- PhD
- Law
- MBA
- Veterinary
- Ed.D. or CANDEL
- Other

[For graduate and undergraduate students only]

**Q06. As a student, are you also a paid employee of UC Davis?**

- Yes
- No

[If employee or grad student]

**Q07. Where is your office, lab, or department?** (That is, wherever you usually spend your time when you travel to work or school at UC Davis)\*

- On the Davis campus, in the Main Campus area -- this is most people
- On the Davis campus, in the West Campus area (west of SR 113)
- On the Davis campus, in the South Campus area (south of I-80)
- Technically off-campus, but within the city of Davis
- Outside of Davis

[If located outside of Davis, ask this question, then skip to end, to "Optional" page]

**Q08. Where outside of Davis is your office, lab, or department?**

[write-in]

*General information*

Next, we have a few questions about you.

**Q09. What is your gender?**

- Female
- Male
- Prefer not to say

**Q10. Do you have any temporary or permanent physical conditions that limit your ability to walk, bike, drive, or use public transit?**

- Yes
- No

[If yes]

**Q11. Please rate the degree to which these conditions limit your ability to walk, bike, drive, or use public transit:**

	Temporarily <i>limits</i>	Temporarily <i>prevents</i>	Generally <i>limits</i> (long term)	Generally <i>prevents</i> (long term)	No limitation
Walk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bike	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public transit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q12. Do you currently have a driver's license?**

- Yes  
 No

[If yes]

**Q13. Do you have access to a car (for driving to campus, if you wanted to use it)?**

- Yes  
 No

**Q14. Do you own or have access to a functioning bike (for bicycling to campus destinations, if you wanted to use it, regardless of whether it is practical for you to do so)?**

- Yes  
 No

[If has access to a car]

**Q15. Do you currently have a UC Davis parking permit?**

No, I don't have one

Yes, I have (select type):

- Annual (or multi-year) permit  
 Monthly or quarter permit  
 Daily permits (such as complimentary GoClub parking permit)  
 Personal in-vehicle parking meter

*Residential location*

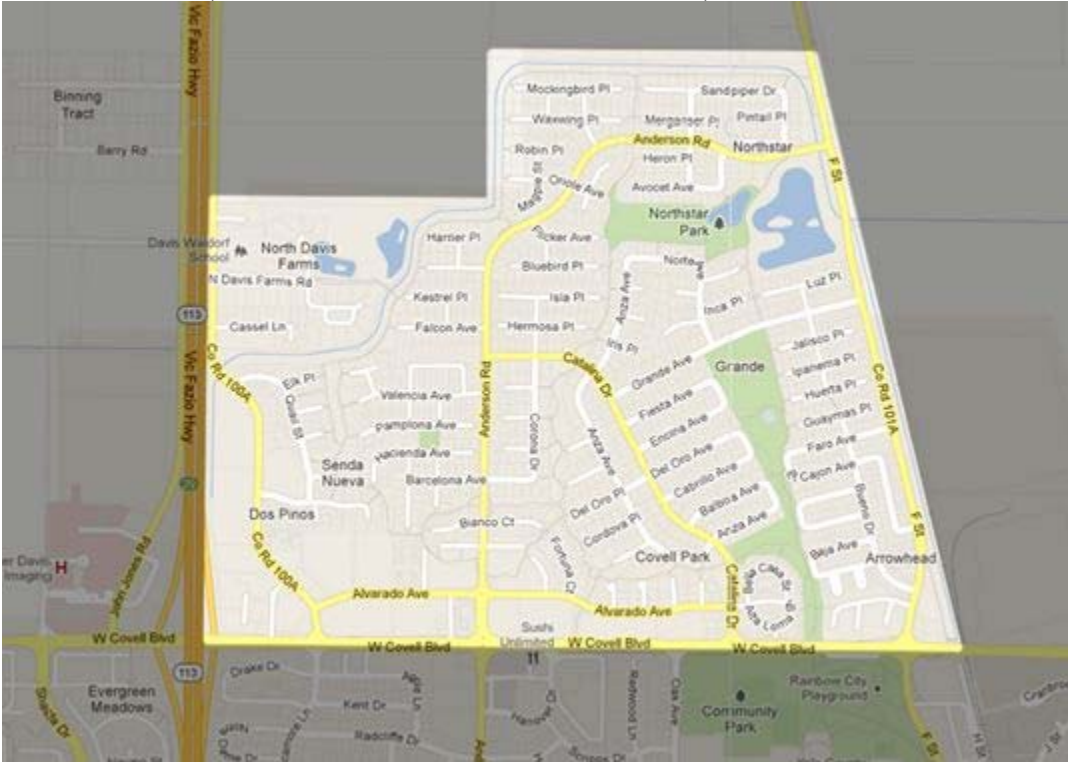
**Q16. Where do you live now? \***

- On the UC Davis campus (includes Cuarto and the area east of SR 113, south of Russell Blvd, west of A St, and north of I-80)  
 Off-campus, in the West Village apartments  
 Off-campus elsewhere, in the city of Davis  
 Outside of Davis

[If resides off-campus in the city of Davis]

**Q17. Which part of Davis do you live in? (scroll down to see all options)**

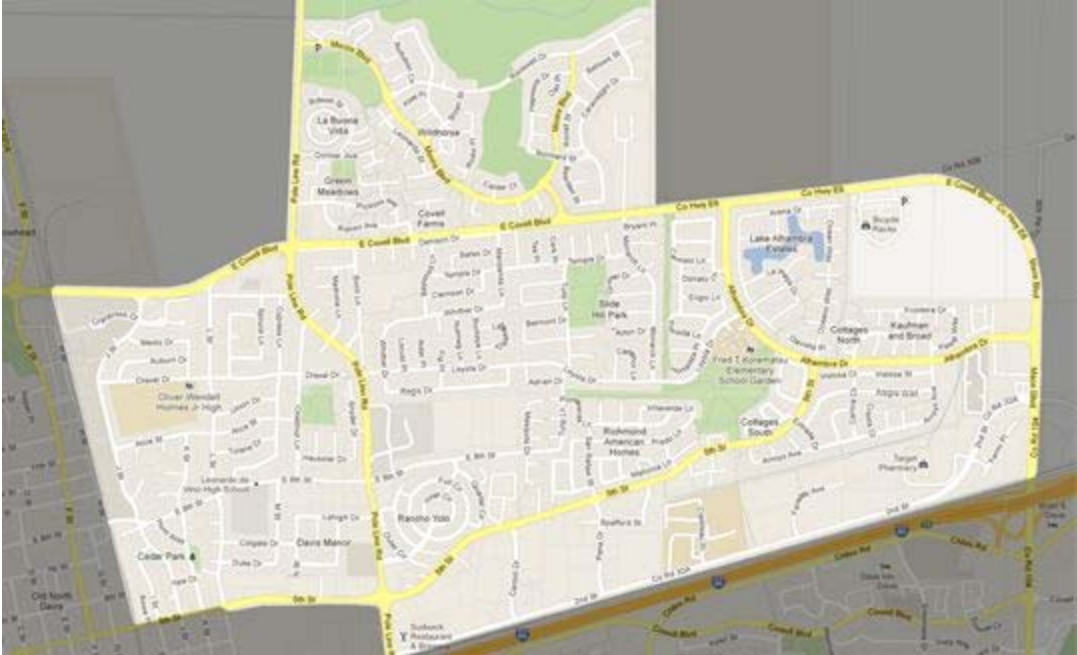
- North Davis (north of West Covell and west of F St.)



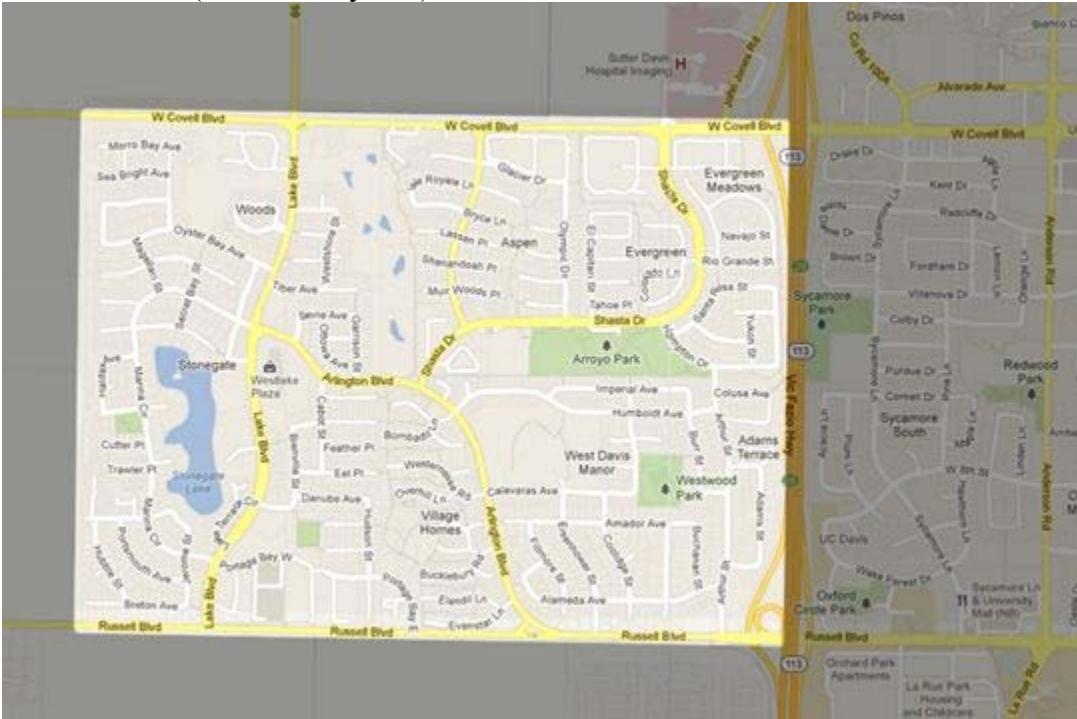
- South Davis (south of I-80)



- East Davis (east of H St., except for Old North Davis)

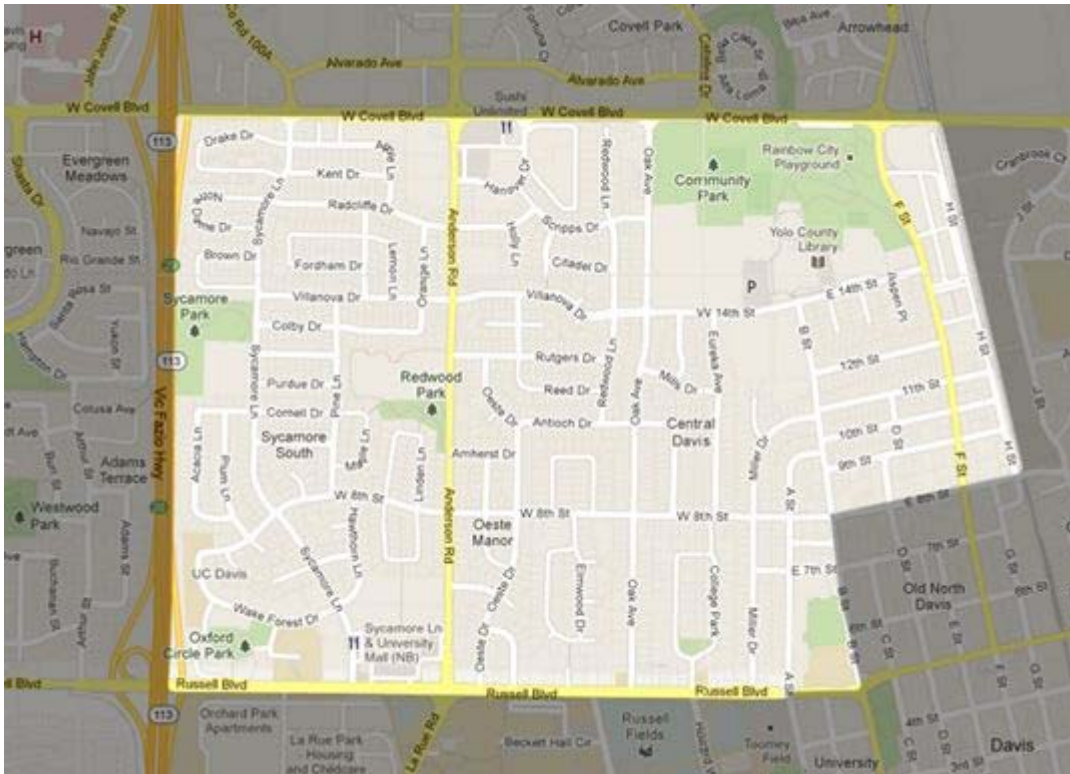


○ West Davis (west of Hwy 113)



○ Central Davis (see map)





○ Downtown Davis (see map)



○ Not sure

- Other (none of these labels describes my location in Davis)

[If resides off campus (in Davis or outside of Davis)]

**Q18. What is an intersection near your home?** (Please answer for where you live locally, when you are traveling to campus on a regular basis. This information will only be used to calculate the approximate distance you travel to campus. It will be kept confidential and will not be used in any other way.)

Your street: \_\_\_\_\_

Nearest cross-street: \_\_\_\_\_

[If resides outside of Davis]

**Q19. What is your zip code?**

Zip Code: \_\_\_\_\_

*Days traveled last week*

Consider your activities during the five weekdays last week, from Monday (Oct. 29) through Friday (Nov. 2). If you have a day planner, it might be useful to look at the last week's activities as you complete this section.

**Q20. Did you go somewhere on campus any of the weekdays last week (Oct. 29 - Nov. 2) for school or work?** (If you went to a UC Davis office or lab that is technically off-campus, but within the city of Davis, please count that as well.)\*

- Yes, I traveled to campus destinations for school or work last week  
 No, I was away all week, Oct. 29 - Nov. 2

**Q21. On which days last week did you go somewhere on campus for school or work? (If you went to a UC Davis office or lab that is technically off-campus, but within the city of Davis, please count that as well.)\***

- Monday  
 Tuesday  
 Wednesday  
 Thursday  
 Friday

*Days not traveled last week*

[If no travel to campus all week]

**Q22. What was the main reason you did not go to campus destinations last week for school or work?**

- Study abroad  
 Vacation  
 Work or school-related travel or field work  
 Telecommuting (working from home or another remote location)  
 Sickness or personal leave  
 Temporary appointment elsewhere (internship, visiting scholar, teaching appointment, exchange program, etc.)

- Sabbatical
- PELP (Planned Educational Leave Program)
- Other: \_\_\_\_\_

[For faculty, visiting scholar, staff, post-doc]

**Q23. What was the main reason you did not travel to work? Please answer for each day individually.**

- Telecommuting (working from home or another remote location)
- Work or school-related activities elsewhere (field work, meetings, teaching appointment, etc.)
- Regularly scheduled day off
- Vacation
- Sick or personal leave
- START or furlough day
- Day off as part of a compressed work week (i.e. 4/40, 9/80, or 3/36 schedule)

[If no travel to campus all week]

**Q24. About when do you expect to resume regular travel to campus for school or work?**

- Within a week
- A week to a month
- A month to a quarter
- A quarter to a year
- More than a year
- Never

*Usual travel to campus*

**Q25. When you are regularly traveling to campus, about how many days per week do you typically travel to campus for school or work?**

- Less than once a week
- 1 day per week
- 2 days per week
- 3 days per week
- 4 days per week
- 5 days per week or more

**Q26. What mode of transportation do you usually use to travel to campus for school or work? (If you usually use more than one mode of transportation, please select the one you usually use for most of the distance).**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to campus (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)

- Bus
- Train or light rail

*Arrival time*

[For any days that traveled]

**Q27. On each of the days that you traveled to campus, what time did you arrive at your first destination?**

	Between 6am and 10am	Either before 6am or after 10am
Monday	<input type="radio"/>	<input type="radio"/>
Tuesday	<input type="radio"/>	<input type="radio"/>
Wednesday	<input type="radio"/>	<input type="radio"/>
Thursday	<input type="radio"/>	<input type="radio"/>
Friday	<input type="radio"/>	<input type="radio"/>

*Modes used last week*

Consider how you traveled to campus last week.

[If traveled at least one day last week]

**Q28. First think back to the entire week (Monday, Oct. 29 - Friday, Nov. 2).** Please tell us *all* the different means of transportation you used at some point on your way to school or work, from the moment you left home to when you arrived at your first destination on campus -- even if it was just for part of the way -- on any day that week.\*

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others going to campus (either as driver or passenger)
- Get a ride (the driver continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[For any days that traveled]

**Q29. Next, consider each day specifically.** Please select which means of transportation you used on your way to your first campus destination each day. (If you used more than one means, select whatever you did for **most of the distance.**)\*

	Bike	Walk	Skate or skateboard	Motorcycle or scooter	Drive alone in a car (or other vehicle)	Carpool or vanpool with others also going to campus (either as driver or passenger)	Get a ride (someone drops you off and continues on elsewhere)	Bus	Train or light rail

	Bike	Walk	Skate or skateboard	Motorcycle or scooter	Drive alone in a car (or other vehicle)	Carpool or vanpool with others also going to campus (either as driver or passenger)	Get a ride (someone drops you off and continues on elsewhere)	Bus	Train or light rail
Monday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tuesday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wednesday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thursday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friday	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[If carpooled last week]

**Q30. During the times when you carpooled with others last week, how many people on average were in your carpool or vanpool (including yourself)?**

- 2 (you plus one other person)
- 3 people
- 4 people
- 5 people
- 6 people
- 7 people
- 8 people
- 9 people
- 10 people
- 11 people
- 12 or more people

[If got a ride last week]

**Q31. During the times when you got a ride on your way to campus last week, how many people on average did your driver drop off?**

- 1 (just you)
- 2 people
- 3 people
- 4 people
- 5 people
- 6 people
- 7 people
- 8 people
- 9 people
- 10 people
- 11 or more people

[If motorcycled, drove alone, carpooled, or got a ride last week]

**Q32. Did you use a zero emission vehicle to get to campus last week?**

- No [default]

- Yes, it is an all-electric vehicle
- Yes, it is a hydrogen fuel cell vehicle

[If rode the bus last week]

**Q33. Which bus service(s) did you use on your way to campus last week?**

- Unitrans
- Yolobus
- UCD / UCDCMC Shuttle
- Sacramento Regional Transit
- Amtrak motorcoach (bus)
- UC Berkeley / UC Davis shuttle
- Muni
- Fairfield Suisun Transit
- Davis Community Transit
- AC Transit
- Other: \_\_\_\_\_

[If rode the train last week]

**Q34. Which train service(s) did you use on your way to campus last week?**

- Amtrak Capitol Corridor
- BART
- Sacramento Regional Transit
- Muni
- Caltrain
- Other: \_\_\_\_\_

[If lives in North Davis and biked to school or work at least once in the past week]

**Q35. What route do you typically use to bike to campus? (please select the street or path that you use for the most distance)**

- Anderson Rd
- Sycamore Ln
- Oak Ave
- B St
- F St
- Not sure
- Other: \_\_\_\_\_

[If lives in South Davis and biked to school or work at least once in the past week]

**Q36. What route do you typically use to bike to campus? (please select the street or path that you use for the most distance)**

- Richards/Cowell Blvd
- Arboretum path/tunnel
- Pole Line bridge/2nd St
- Pole Line bridge/5th St
- Dave Pelz bridge/2nd St
- Dave Pelz bridge/5th St

- Not sure
- Other: \_\_\_\_\_

[If lives in East Davis and biked to school or work at least once in the past week]

**Q37. What route do you typically use to bike to campus? (please select the street or path that you use for the most distance)**

- 2nd St
- 3rd St
- 4th St
- 5th St
- E. 8th St
- J St
- Covell Blvd
- Not sure
- Other: \_\_\_\_\_

[If lives in West Davis and biked to school or work at least once in the past week]

**Q38. What route do you typically use to bike to campus? (please select the street or path that you use for the most distance)**

- Russell Blvd bike path
- West Village bike path/Orchard Rd
- Sycamore Ln
- Not sure
- Other: \_\_\_\_\_

[If lives in Central Davis and biked to school or work at least once in the past week]

**Q39. What route do you typically use to bike to campus? (please select the street or path that you use for the most distance)**

- 5th St
- E. 8th St
- A St
- Oak Ave
- Eureka Ave/College Park
- Anderson Rd
- Sycamore Ln
- Not sure
- Other: \_\_\_\_\_

[If lives in Downtown Davis and biked to school or work at least once in the past week]

**Q40. What route do you typically use to bike to campus? (please select the street or path that you use for the most distance)**

- 1st St
- 2nd St
- 3rd St
- 4th St
- 5th St

- E. 8th St
- B St
- C St
- D St
- E St
- F St
- G St
- Olive Dr
- Arboretum bike path
- Not sure
- Other: \_\_\_\_\_

[If lives in West Village or off-campus in Davis, traveled in the past week, but did not travel by bike]

**Q41. Have you thought about biking to campus for school or work?**

- Yes
- No
- Not applicable (I bike to campus regularly)

[If lives in West Village or off-campus in Davis, traveled in the past week, but did not travel by bike]

**Q42. How likely are you to bike to campus at least once in the next six months?**

- Very likely
- Somewhat likely
- Not likely

[If lives in West Village or off-campus in Davis, traveled in the past week, but did not travel by bike]

**Q43. Why did you choose not to bike to campus last week? (select all that apply)**

- Last week was a fluke; I usually bike to campus.
- The distance from my house to campus is too far for me to bike.
- My bike does not work very well.
- I do not have a bike.
- I prefer to use a different mode of transportation.
- I live close to campus so it makes more sense to walk.
- Biking takes too long.
- Last week's weather was unsuitable for biking.
- I feel unsafe biking to campus.
- It is inconvenient for me to bike.
- Biking to my school or work would look unprofessional.
- Other: \_\_\_\_\_

[If lives outside of Davis, traveled in the past week, but did not travel by transit]

**Q44. Why did you choose not to use transit (bus or rail) for your commute to campus last week? (select all that apply)**

- Last week was a fluke; I usually use transit to commute to campus.



- There are no transit options available to me.
- I prefer to use a different mode of transportation.
- It is inconvenient for me to take transit.
- I feel unsafe commuting by transit.
- The transit options available to me are too expensive.
- I dislike using transit.
- Traveling by transit takes too long.
- Arriving to my work or school by transit would look unprofessional.
- Other: \_\_\_\_\_

[If skateboarded in the past week]

**Q45. How much experience do you have skateboarding (including longboarding)?**

- No experience (I in-line skate/roller skate, I don't skateboard)
- Less than one year
- 1-2 years
- 2-4 years
- More than 4 years

[If skateboarded in the past week]

**Q46. Outside of skateboarding to or around campus, in what other situations have you skateboarded? (select all that apply)**

- Before coming to Davis - for recreation
- Before coming to Davis - to get to school/work
- Before coming to Davis - to get to other places
- Since coming to Davis - for recreation
- Since coming to Davis - to get to work off-campus
- Since coming to Davis - to get to other places within Davis
- Since coming to Davis - for travel while outside of Davis

[If skateboarded in the past week]

**Q47. On a scale of 1-4, how important, if at all, are the following reasons for your choice to skateboard for travel?**

	Not at all important 1	2	3	Very important 4
Speed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fun	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coolness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[If skateboarded in the past week]

**Q48. On what types of streets would you feel comfortable riding your skateboard in daylight and good weather? (select all that apply)**

- Sidewalks
- Bike paths
- A two-lane local street with a bike lane
- A two-lane local street without a bike lane
- A four-lane street with a bike lane
- A four-lane street without a bike lane

[If skateboarded in the past week and lives in North Davis]

**Q49. What route do you typically use to skateboard to campus? (please select the street or path that you use for the most distance)**

- Anderson Rd
- Sycamore Ln
- Oak Ave
- B St
- F St
- Not sure
- Other: \_\_\_\_\_

[If skateboarded in the past week and lives in South Davis]

**Q50. What route do you typically use to skateboard to campus? (please select the street or path that you use for the most distance)**

- Richards/Cowell Blvd
- Arboretum path/tunnel
- Pole Line bridge/2nd St
- Pole Line bridge/5th St
- Dave Pelz bridge/2nd St
- Dave Pelz bridge/5th St
- Not sure
- Other: \_\_\_\_\_

[If skateboarded in the past week and lives in East Davis]

**Q51. What route do you typically use to skateboard to campus? (please select the street or path that you use for the most distance)**

- 2nd St
- 3rd St
- 4th St
- 5th St
- E. 8th St
- J St
- Covell Blvd
- Not sure
- Other: \_\_\_\_\_

[If skateboarded in the past week and lives in West Davis]

**Q52. What route do you typically use to skateboard to campus? (please select the street or path that you use for the most distance)**

- Russell Blvd bike path
- West Village bike path/Orchard Rd
- Sycamore Ln
- Not sure
- Other: \_\_\_\_\_

[If skateboarded in the past week and lives in Central Davis]

**Q53. What route do you typically use to skateboard to campus? (please select the street or path that you use for the most distance)**

- 5th St
- E. 8th St
- A St
- Oak Ave
- Eureka Ave/College Park
- Anderson Rd
- Sycamore Ln
- Not sure
- Other: \_\_\_\_\_

[If skateboarded in the past week and lives in Downtown Davis]

**Q54. What route do you typically use to skateboard to campus? (please select the street or path that you use for the most distance)**

- 1st St
- 2nd St
- 3rd St
- 4th St
- 5th St
- E. 8th St
- B St
- C St
- D St
- E St
- F St
- G St
- Olive Dr
- Arboretum bike path
- Not sure
- Other: \_\_\_\_\_

*Non-campus travel*

**Q55. We'd like to ask about trips you frequently make to off-campus destinations. Please indicate up to THREE kinds of trips that you make frequently off-campus in an ordinary week.**

- Visit a friend's house
- Dine out / Coffee shop / Bar

- Go grocery shopping
- Do other shopping (not grocery)
- Go to work / internship
- Participate in sports event / other recreational activity
- Go to movie / other recreational activity
- Other: \_\_\_\_\_
- None (I rarely or never travel to off-campus destinations)

[If selected “Visit a friend’s house”]

**Q56. For your trips to visit a friend's house, please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[If selected “Dine out / Coffee shop / Bar”]

**Q57. For your trips to dine out or visit a coffee shop or bar, please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[If selected “Go grocery shopping”]

**Q58. For your trips to go grocery shopping, please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail

Other: \_\_\_\_\_

[If selected “Do other shopping (not grocery)”]

**Q59. For your trips to do other shopping (not grocery), please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[If selected “Go to work / internship”]

**Q60. For your trips to off-campus work or an internship, please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[If selected “Participate in sports event / other recreational activity”]

**Q61. For your trips to participate in a sports event or other recreational activity, please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[If selected “Go to movie / other recreational activity”]

**Q62. For your trips to go to a movie or other recreational activity, please indicate how you**

**usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

[If selected "Other"]

**Q63. If you indicated "Other" for the trips you make most frequently to off-campus destinations, please indicate how you usually get there:**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to the same place (either as driver or passenger)
- Get a ride (someone drops you off and continues on elsewhere)
- Bus
- Train or light rail
- Other: \_\_\_\_\_

*Summer activities*

Now consider this past summer, from June 18 - September 21, 2012.

**Q64. How much time did you spend at UC Davis over the summer?** We're interested in the number of weeks you spent last summer traveling to and from campus destinations on a regular basis. Please estimate how many weeks you were on campus at least once a week during this period. If you went to a UC Davis office or lab that is technically off-campus, but within the city of Davis, please count that as well. (Note: There were a total of 14 weeks in the academic summer.)

- All summer / 14 weeks (June 18 – September 21)
- 13 weeks
- 12 weeks
- 11 weeks
- 10 weeks
- 9 weeks
- 8 weeks
- 7 weeks
- 6 weeks (equivalent to just ONE summer session, I or II)
- 5 weeks

- 4 weeks
- 3 weeks
- 2 weeks
- 1 week
- None

[For any answer other than “None”]

**Q65. During this period, how many days per week were you typically on campus?**

- 1 day per week
- 2 days per week
- 3 days per week
- 4 days per week
- 5 days per week or more

*Incidents*

Now think back to ALL of last year (from November 2, 2011 through November 2, 2012).

**Q66. Did you ride a bicycle on campus at least once during the past year (that is, anytime from November 2, 2011 to November 2, 2012)?**

- Yes
- No

[If answered “yes” to previous question]

**Q67. During this period, did you experience a fall or crash that resulted in personal injury to you while doing any of the following?**

	Yes	No
Biking on campus	<input type="radio"/>	<input type="radio"/>
Biking off campus, on my way between home and campus	<input type="radio"/>	<input type="radio"/>

[If answered “yes” to previous question]

**Q68. Has falling or crashing in the past year caused you to bike less frequently now?**

- No, it has not caused me to bike any less
- Yes, it has caused me to bike somewhat less often
- Yes, it has caused me to bike much less often
- Yes, and it is why I don't bike anymore

*Bicycle theft*

[If biked on campus in past year]

**Q69. Have you been the victim of bicycle theft or vandalism on the UC Davis campus in the past year (November 2, 2011 through November 2, 2012)? If you experienced multiple incidents of bike theft or vandalism on campus in the past year, please check all that apply.**

- Yes, my entire bike was stolen
- Yes, but only parts of my bike were stolen (seat, wheel, accessories)

- My bike was vandalized (damaged but not stolen)
- No, I had a bike on campus in the past year but did not experience a theft or vandalism
- Not applicable: I haven't had a bike on campus in the last year

*Campus transportation programs*

**Q70. Are you familiar with any of these programs?**

	It's new to me	I've heard of it, but never used it	I've used it
GoClub program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aggie Bike Buy Program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bike tire air stations and repair stations around campus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bike commuter showers and lockers (ARC)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency Ride Home Program for goClub members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycle Education and Enforcement Program (BEEP)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zipcar carsharing program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zimride carpool matching service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discount transit passes for those without a parking permit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personal in-vehicle parking meters (Easy Park)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TAPS motorist assistance program	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bike lock-cutting service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UC Davis Bike Auction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*More information*

**Q71. You indicated that you have not used the following programs. If you would like to learn more about these programs, check any of the boxes below. (For each box checked we will send you a one-time informational email about the program selected.)**

- GoClub program
- Bike tire air stations and repair stations around campus
- Aggie Bike Buy Program
- Bike commuter showers and lockers (ARC)
- Emergency Ride Home Program for goClub members
- Bicycle Education and Enforcement Program (BEEP)
- Zipcar carsharing program
- Zimride carpool matching service



- Discount transit passes for those without a parking permit
- Personal in-vehicle parking meters (Easy Park)
- TAPS motorist assistance program
- Bike lock-cutting service
- UC Davis Bike Auction

*Ranking improvements*

Your input helps us prioritize transportation projects to best serve the UCD community.

**Q72. Which campus transportation improvement would you most like to see implemented?**

- Increased bicycle police enforcement
- Increased bicycle education for new students
- New bicycle roundabouts on campus
- Increased bus service (more frequent buses)
- Expanded bus service (more bus routes)
- Additional vanpools
- None of the above
- Other: \_\_\_\_\_

*Comfort*

Not too much further!

**Q73. How would you rate your ability to ride a bike?** In particular, we are interested in whether you know how to ride a bike, regardless of whether it is practical or desirable for you to do so as a means of transportation to campus.

- I cannot ride a bike at all because I do not know how
- I can ride a bike, but I am not very confident doing so
- I am somewhat confident riding a bike
- I am very confident riding a bike

*Travel preferences*

**Q74. We'd like to ask about your preferences with respect to travel and the environment. There are no right or wrong answers; we want only your true opinions. To what extent do you agree or disagree with the following statements?**

	Strongly disagree	Disagree	Neutral or don't know	Agree	Strongly agree
Travel time is generally wasted time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like riding a bike.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bicycle traffic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neutral or don't know	Agree	Strongly agree
laws are adequately enforced on campus.					
I need a car to do many of the things I like to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like driving.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q75. To what extent do you agree or disagree with the following statements? (continued)**

	Strongly disagree	Disagree	Neutral or don't know	Agree	Strongly agree
I feel safe biking on campus.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like using public transit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often need to use my own vehicle to travel to different sites during the day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I already bicycle for transportation as often as I can.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to limit my driving to reduce air pollution	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q76. What options are available to you for getting to campus?**

- Bike
- Walk
- Skate or skateboard
- Motorcycle or scooter
- Drive alone in a car (or other vehicle)
- Carpool or vanpool with others also going to campus (either as driver or passenger)
- Get a ride (the driver continues on elsewhere)
- Bus
- Train or light rail

*About you*

This section asks a few more questions about you. We use this information to help understand travel choices and how the people taking the survey might represent the UC Davis community as a whole. Your answers are confidential and will not be used for any other purposes.

[If grad, faculty, staff]

**Q77. How many years have you been at UC Davis (in any role)?**

- 0 (this is my first year)
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years or more

**Q78. In what year were you born?**

[Numerical write-in]

Help text: e.g. 1980

[Employees]

**Q79. What is your highest level of education?**

- No formal education
- Some grade school or high school
- High school diploma or equivalent
- Some college or technical school
- Associates degree or technical school certificates
- Four-year bachelor's degree
- Some graduate school
- Graduate degree(s)

[Undergraduate student]

**Q80. What is the highest level of education completed by whichever parent/guardian has the most education?**

- No formal education
- Some grade school or high school
- High school diploma or equivalent
- Some college or technical school
- Associates degree or technical school certificates
- Four-year bachelor's degree
- Some graduate school
- Graduate degree(s)

**Q81. Do you live alone or with other people? Please choose *all* that apply.**

- I live alone
- I live with roommate(s), housemate(s), or in a dorm
- I live with family, a partner, or others with whom I share some income -- *we'll call them*

*your household*

**Q82. If you live with family, a partner, or others with whom you share some income, please indicate how many OTHER members of your household are in each age category.**

age under 6: \_\_\_\_\_  
age 6-15: \_\_\_\_\_  
age 16-17: \_\_\_\_\_  
age 18-64: \_\_\_\_\_  
age 65 or older: \_\_\_\_\_

**Q83. If you live with family, a partner, or others with whom you share some income, please check the category that contains your approximate annual household income before taxes. If you live alone or with only roommate(s) or housemate(s), please check the category that contains your own approximate annual income before taxes.**

- Less than \$10,000
- \$10,000 - \$19,999
- \$20,000 - \$29,999
- \$30,000 - \$39,999
- \$40,000 - \$49,999
- \$50,000 - \$59,999
- \$60,000 - \$79,999
- \$80,000 - \$99,999
- \$100,000 - \$119,999
- \$120,000 - \$139,999
- \$140,000 - \$159,999
- \$160,000 - \$199,999
- \$200,000 or more

[To undergraduate and graduate students that have access to a car]

**Q84. You indicated that you have access to a car. How much financial support do you receive from your parent(s)/guardian(s) for driving related expenses such as gas, insurance, and vehicle maintenance?**

- None at all
- For some things
- For most things
- For everything

Optional

[If indicated that work/school location is outside Davis (in Q07)]

**Q85. Since your office or department is outside of Davis, we do not need any further information from you at this time.** But thanks for volunteering to participate! You are still eligible to enter the drawing for a \$50 Downtown Davis gift card, if you wish.

[If indicated that recently graduated (in Q01)]

**Q86. Since you are no longer a student at UC Davis, we do not need any further**

**information from you at this time.** But thanks for volunteering to participate! You are still eligible to enter the drawing for a \$50 Downtown Davis gift card, if you wish.

[If indicated “retiree” in (Q1)]

**Q87. Since you are no longer an employee of UC Davis, we do not need any further information from you at this time.** But thanks for volunteering to participate! You are still eligible to enter the drawing for a \$50 Downtown Davis gift card, if you wish.

**Q88. Is it okay for us to contact you again in the future?** Please check all that apply:

- No, I prefer not to be contacted again.
- Yes, with questions about my survey.
- Yes, with the information I requested regarding transportation programs.
- Yes, if I win the drawing for a [\\$50 Downtown Davis gift card](#).

[If yes, okay to contact]

**Q89. Please provide the following contact information.** This information will ONLY be used for the purposes you specified.

Name: \_\_\_\_\_

Daytime phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

**Q90. Optional: Is there anything else you would like to tell us about transportation at UC Davis?** We welcome any additional comments in the space below.

[Undergraduate and graduate students]

**Q91. This winter, the Center for Environmental Policy and Behavior at UCD will be sending out a Social Network Survey related to the survey you have just completed. The Social Network Survey will only ask you a few more questions and will take about five to ten minutes for you to complete. Respondents will be entered into drawings to win American Express gift cards, up to \$100 in value! Please indicate if you would like to receive information about this survey:**

- Yes, I would like to receive more information about the Social Network Survey
- No, thanks

[Would like information about survey but did not provide contact information above]

**Q92. Please provide the following contact information.**

Name: \_\_\_\_\_

Email address: \_\_\_\_\_

**Thanks for completing this survey!**

## **Appendix B: Changes in the 2011-12 survey instrument**

1. There were several short one-time research sections that are excluded from the report (see below).
2. A few questions were added to cover issues that have not been addressed in previous surveys:
  1. Residential location within the City of Davis (1 q)
  2. Barriers to using alternative modes of transportation (2 q), asked to a subset of respondents
  3. Preferences for campus transportation improvements (1 q)
3. Clarifying language was added to a question assessing whether an individual had ridden a bike on campus in the past year.
4. A new section was added in which individuals could request more information on specific transportation programs.
5. A question assessing students' financial support from parents for transportation expenditures replaced a question assessing students' degree of overall financial dependence on parents.
6. The following sections have been eliminated:
  1. Other people in carpools, vanpools, and ridepools
  2. Circulator modes
  3. Interest in TAPS bike drop-off site
7. The following sections have been reduced:
  1. Type of parking permit
  2. Bike theft
  3. Travel preferences
8. The first reference week was moved back to October 22-26, with the second reference week taking place during Oct. 29- Nov. 2.

### *One-time research sections*

#### **Bicycle Route to Campus**

Individuals who lived off-campus in Davis and had biked at least once in the past week were asked one question about their bicycle route to campus.

#### **Bicycle Readiness for Change**

Individuals who lived off-campus in Davis but had not biked in the past week were asked an additional two questions to gauge their intent to bicycle in the future.

#### **Section on Skateboarding**

Individuals who had used a skateboard at least once in the past week were asked five questions about skateboarding.

#### **Travel to Off-Campus Destinations**

All survey respondents were asked four questions to assess how they traveled outside of commuting to campus.

## **Appendix C: Text of the recruitment emails**

*Initial recruitment email:*

**From:** Campus Travel Survey <travelsurvey@ucdavis.edu>

**To:** <...@ucdavis.edu>

**Subject:** 2012-13 Campus Travel Survey

Dear UC Davis Student [Employee],

You are invited to participate in the 2012-2013 UC Davis Campus Travel Survey. This research effort provides campus planners with valuable feedback on how people get to campus and their experiences with various transportation programs. This annual survey is intended for everyone who regularly travels to UC Davis for school or work. Your feedback is important to us! The survey takes 10-15 minutes to complete. Doing so is voluntary, and we assure you that all responses are confidential and the results will only be published in the aggregate, without connection to any individual. You must be at least 18 years old to complete this survey.

In appreciation for your time, we're offering anyone who completes the survey entry into a drawing to win one of ten \$50 Downtown Davis gift cards!

To start the survey, click on the link below:

<http://travel.its.ucdavis.edu>

Thanks for your participation in this year's survey!

Best regards,

Brigitte Driller, Graduate student, Institute of Transportation Studies

Susan Handy, Professor, Institute of Transportation Studies

Cliff Contreras, Director, Transportation and Parking Services

*Reminder recruitment email*

**From:** Campus Travel Survey <travelsurvey@ucdavis.edu>

**To:** <...@ucdavis.edu>

**Subject:** 2012-13 Campus Travel Survey

Dear UC Davis Student [Employee],

Last week we invited you to take the 2012-13 Campus Travel Survey. If you finished the survey last week, thank you! Your responses have been recorded, and you can disregard the rest of this message. If not, we encourage you to complete the survey today. Data from this research effort provides valuable feedback about the travel preferences of the entire UC Davis community, and your response matters to us. The survey takes 10-15 minutes to complete. Doing so is voluntary, and we assure you that all responses are confidential and the results will only be published in the aggregate, without connection to any individual. You must be at least 18 years old to complete this survey.

In appreciation for your time, we're offering anyone who completes the survey entry into a drawing to win one of ten \$50 Downtown Davis gift cards!

To start the survey, click on the link below:

<http://travel.its.ucdavis.edu>

Thanks for your participation in this year's survey!

Best regards,

Brigitte Driller, Graduate student, Institute of Transportation Studies

Susan Handy, Professor, Institute of Transportation Studies

Cliff Contreras, Director, Transportation and Parking Services



## **Appendix D: Calculation of Average Vehicle Ridership (AVR)**

AVR (average vehicle ridership) is a ratio of the number of person-arrivals to private-vehicle-arrivals. If everyone drove by themselves to campus, the campus AVR would be 1.0. Higher AVR values (greater than 1.0) indicate more carpooling and/or use of alternative modes of transportation.

To compare AVR statistics on the Davis campus with other UC campuses, we calculate AVR using a standard formula developed by the South Coast Air Quality Management District (AQMD) in “Rule 2202 – On Road Motor Vehicle Mitigation Options.”<sup>5</sup> We attempt to adhere to the AQMD formula, although our overall survey methodology deviates to some extent from that prescribed by the AQMD.<sup>6</sup> The AQMD formula excludes weekend travel (considering Monday through Friday only) and excludes on-campus residents (considering travel among off-campus residents only). It includes adjustments for vehicle occupancy and the use of zero-emission vehicles (ZEV).

In particular, we use the following formula:

$$AVR = \frac{\text{Total weekly arrivals}}{\text{Weekly vehicle arrivals}} = \frac{(\text{Arrivals by all modes}) + (\text{Employee telecommuting days}) + (\text{CWW days})}{(\text{Drive alone arrivals}) + (\text{Fractional carpool arrivals})}$$

with:

*Arrivals by all modes* = a count of all respondents arriving by bus, driving, carpooling, getting a ride, walking, biking, skating, and riding transit on Monday, plus the same for Tuesday, Wednesday, etc. through Friday (using question Q29 in the 2012-13 survey).

*Employee telecommuting days* = a count of respondents telecommuting on Monday, plus those doing so on Tuesday, etc. through Friday. These are based on responses to questions Q21 and Q23 for any respondents who traveled some days and telecommuted other days. But for respondents who indicated no travel during any of the five days of the reference week (in Q21) and then indicated the reason for no travel was telecommuting (in Q22), we assume the respondent telecommuted all five days of the reference week.

*Employee CWW days* = a count of respondents reporting that they did not travel on Monday because they had a CWW (compressed work week) day off, plus those who did so for Tuesday, Wednesday, etc. through Friday (using responses to questions Q21 and Q22).

*Drive-alone arrivals* = a count of respondents arriving by driving alone on Monday, plus those doing so on Tuesday, Wednesday, etc. through Friday (using responses to Q29).

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<sup>5</sup> As of May 1, 2010, this rule is available online (at [http://www.aqmd.gov/trans/doc/regform/all\\_registration.pdf](http://www.aqmd.gov/trans/doc/regform/all_registration.pdf)).

<sup>6</sup> For instance, the AQMD specifies that response to the survey must be 90 percent response rate, whereas we rely on surveying only a sample and weighting the responses.

As an adjustment for the use of ZEV vehicles, we exclude from the count any arrivals by a respondent who has indicated using an all electric or fuel cell vehicle for their travel during the reference week (in question *Q32*).

*Fractional carpool arrivals* = A count of the fractions of vehicle-arrivals accounted for those arriving in carpools (or getting rides) for each day Monday through Friday. In particular, for each day a respondent carpools (or gets a ride, using *Q29*) we add to the arrival count a fraction equal to one divided by the total number of people in the carpool (using *Q30*) or the number of passengers dropped off by the driver (using *Q31*). We exclude from the count any arrivals by a respondent who has indicated using an all-electric or hydrogen vehicle (in question *Q32*).

In all cases, the estimated number of arrivals for the entire campus community is a projection. In particular, we weight (and expand) the sample responses by role and gender based on the 3,982 valid responses to question *Q29* (see Table A-3).

We calculate AVR both excluding and including on-campus residents, and by each role group. The AQMD and most other UC campuses exclude on-campus residents and most only calculate AVR for employees rather than for students. The inclusion of student employees can greatly change AVR statistics, though to a different extent at different campuses. We include a question about whether student respondents are also paid employees of UC Davis (question *Q06*) to allow us to estimate AVR including student employees.

## **Appendix E: Geocoding and network distances**

We used the ESRI Streetmap USA dataset to do all of the geocoding and network route assignments. It is based on the TIGER/Line 2000 streets dataset produced by the U.S. Census Bureau, and has been enhanced by ESRI and Tele Atlas. If the exact street was not available, then we geocoded the point to the nearest pre-existing road. In all cases, the differences were minor and expected to be negligible.

### *Geocoding residential locations*

We used address information to geocode points to the ESRI Streetmap USA dataset. First, we used SPSS to filter out empty records. Then we used Microsoft Excel to divide the data into separate tables for each subcategory (On Campus, West Village, Off Campus in Davis, and Outside Davis), and concatenate the street names into a single field. This allowed us to input the data into an appropriate address locator that would be able to automatically geocode as many addresses as possible.

Inputting the data directly into an address locator resulted in successful matching of most addresses. Because there was the potential for a small percentage of addresses to be matched incorrectly by the address locator, we also manually verified that the match address was the same as the input address. We geocoded unmatched addresses by manually placing points in the correct locations, or by modifying the input addresses so that they matched correctly using an automatic address locator.

### *Network distance*

The network route assignments were created using the ArcGIS Network Analyst extension and the ESRI Streetmap USA dataset (the same dataset used to geocode the residential locations). For those living off campus in Davis (excluding West Village) and outside Davis, distances were calculated from the geocoded residential location points to a point located on the UC Davis campus at the corner of Hutchison Drive and California Avenue, near the Silo. The network route assignments were calculated by optimizing for the fastest travel times (based on assumptions about the expected speed of travel on each facility type), which was deemed to produce more realistic routes than optimizing for distance, because it produces routes that favor major roads and highways where possible. While this is especially appropriate for those traveling by car, manual inspection of alternative routes indicated that the shortest-time routes also seemed to be more realistic for bike and walk trips, where differences existed. Note that in this analysis, we used the street network, which was *not* augmented to include additional bike- and pedestrian-only links, which are especially prevalent in Davis.

We assign an average distance from campus destinations for all on-campus respondents equal to the mean calculated network distance for on-campus respondents. This distance is equal to 0.77 miles and reflects our best estimate of the average distance from residential locations within the “on campus” area to campus destinations.

For the respondents living in the West Village apartments, we assumed that distance from campus is equal to the calculated network distance from the center of the West Village complex to the Silo (traveling along Hutchison Drive). This distance is equal to 1.3 miles and reflects our best estimate of the average distance from residential locations in West Village to campus

destinations.

*Comparability with results from previous surveys*

We used the same procedures to geocode and calculate network distances as were used in the 2011-12, 2010-11, 2009-10 and 2008-09 Campus Travel Surveys, so results from the 2012-13 survey should be comparable with these surveys. Because the 07-08 survey employed a different method both to collect data on the respondents' residential locations (allowing respondents to click on a map versus typing cross streets into a text field); to geocode points; and to calculate network distances, the estimated distances and calculations based on them (miles traveled and emissions) are not comparable to later survey years.

## **Appendix F: Imputation and valid responses**

To make the most out of the available data, the following process was used to impute missing data to question *Q29*, the primary mode used to get to campus for each day of the reference week:

1. Missing answers were only coded for days on which the respondent indicated traveling to campus (*Q21*) but did not indicate a primary mode.
2. In cases where all answers were missing for *Q28* and *Q29*, the answer to *Q26* about “usual mode” was imputed for each day traveled in *Q29*.
3. In cases where only one answer was given for *Q28* (all modes used to get to campus), missing answers to *Q29* were recoded as this answer.
4. In one case where usual mode was listed and only some answers to *Q29* were missing, the missing modes were imputed so that the “usual” mode made up the majority and the “secondary” mode made up the minority of days traveled.
5. Finally, in any cases with a valid answer to *Q26*, this answer (“usual mode”) was imputed for *Q29*.

Table A-1 shows the number of valid cases for each major step in the data validation process. Starting with 4,327 initial responses, cases were excluded due to missing or invalid data, resulting in 3,982 responses which had valid answers for role, gender, *Q20*, and general residential location. These 3,982 cases were selected for the bulk of the weighted analysis in this report.

*Table A-1. Valid responses*

<b>Variable Name (Description)</b>	<b>Valid Cases (N = 4,327)</b>
<i>Role</i> (8 categories)	4,316
<i>valid_gender</i> (if known male or female)	4,078
<i>valid_Q20</i> (whether traveled to campus)	4,210
<i>valid_physical</i> (physically traveled)	4,070
<i>valid_res</i> (general residential location)	4,241
<i>validMG</i> (post imputation, use for weighted analysis)	3,982

## Appendix G: Sampling Plan

Table A-2 shows the expected response rates based on stratum sizes and response rates in previous years. This year, expected response rates varied from just 4 percent among seniors to 19 percent among staff.

Table A-2. Sampling plan for 2012-13, versus 2011-12, 2010-11, 2009-10, 2008-09, and 2007-08

Role group	2012-13				2011-12 <sup>b</sup>		2010-11 <sup>c</sup>		2009-10 <sup>d</sup>		2008-09 <sup>e</sup>		2007-08 <sup>f</sup>	
	Assumed population <sup>a</sup>	Number invited	Percent Invited	Target response <sup>7</sup>	Inv.	Res.	Inv.	Res.	Inv.	Res.	Inv.	Res.	Inv.	Res.
Students	29,431	24,429	83%	9%	70%	12%	45%	18%	37%	25%	38%	22%	36%	23%
Undergraduate	23,843	20,522	86%	7%	73%	11%	40%	17%	32%	24%	32%	20%	31%	22%
Freshmen	3,559	3,559	100%	10	71%	13%	55%	23%	41%	30%	39%	22%	40%	26%
Sophomores	4,179	4,181	100%	8%	100%	12%	51%	16%	40%	26%	39%	21%	36%	22%
Juniors	6,454	4,373	68%	8%	57%	13%	35%	18%	29%	22%	31%	22%	32%	21%
Seniors	9,651	8,409	87%	4%	74%	9%	33%	12%	26%	19%	24%	17%	21%	20%
Graduate	5,588	3,907	70%	17%	59%	16%	64%	22%	60%	28%	61%	27%	60%	24%
Masters	2,021	2,021	100%	16%	100%	11%	100%	16%	98%	19%	86%	18%	84%	19%
PhD	3,567	1,886	53%	18%	36%	23%	31%	34%	39%	40%	48%	35%	48%	28%
Employees	11,783	4,409	37%	16%	29%	19%	23%	29%	22%	34%	31%	35%	28%	45%
Faculty	2,487	2,487	100%	13%	100%	16%	71%	22%	63%	27%	78%	30%	65%	37%
Staff	9,296	1,922	21%	19%	13%	24%	12%	37%	13%	42%	20%	39%	20%	50%
Overall percent	100%		70%	10%	59%	13%	39%	20%	33%	27%	36%	26%	34%	28%
Overall number	41,214	28,838			23,953	3,116	15,704	3,084	13,322	3,569	14,031	3,577	13,770	3,849

<sup>a</sup> Population figures are based on those provided by the Budget and Institutional Analysis department. For employees, this consisted of a tabulation they prepared at our request that included a breakdown of the total number of on-campus faculty (ladder faculty plus other faculty) and on-campus staff (including academic support, senior management, MSP, and SSP). For students, figures are based on the 2011-2012 student population summary three-quarter average (available online at [http://budget.ucdavis.edu/data-reports/documents/enrollment-reports/eenrsum\\_a1112.pdf](http://budget.ucdavis.edu/data-reports/documents/enrollment-reports/eenrsum_a1112.pdf)).

“Seniors” includes post-baccalaureate (teaching credential) students; “Masters” includes all academic-program masters students, plus professional-program students in Master of Law, JD, MBA (full time and working professional program), Forensic Science, Master of Advanced Study, and Master of Preventative Vet Med, and excluding all School of Medicine students; “PhD” includes all academic-program doctoral (D1 and D2) students, plus professional-program students in Veterinary Medicine (DVM), excluding all School of Medicine students.

<sup>b</sup> As reported in (Miller, 2012)

<sup>c</sup> As reported in (Miller, 2011).

<sup>d</sup> As reported in (Lovejoy, 2010).

<sup>e</sup> As reported in (Lovejoy, Handy, and Contreras, 2009).

<sup>f</sup> As reported in (Congleton, 2009).

<sup>7</sup> For each stratum, the minimum sample size,  $n$ , was calculated as 
$$n = \frac{z_{\alpha/2}^2 S^2}{e^2 + \frac{z_{\alpha/2}^2 S^2}{N}}$$
, where  $N$  is the total

population,  $S^2$  is the population variance,  $z_{\alpha/2}$  is the  $(1-\alpha/2)^{\text{th}}$  percentile of the standard normal distribution for degree of certainty  $1-\alpha$ , and  $e$  is the acceptable margin of error of the estimate Lohr, S. L. (1999). "Sampling: Design and Analysis." This formula assumes a two-sided test and includes a finite population correction. We assumed  $S^2=0.25$  (since a binary variable assuming a given value with probability  $p$  has maximum  $S^2 \approx p(1-p)$  when  $p= 0.5$ ); we assumed acceptable margin of error of  $\pm 5\%$  ( $e = 0.05$ ); and we aimed for 95% confidence level ( $\alpha=0.05$  or  $z_{\alpha/2} \approx 1.96$ ). Values of  $N$  used were those shown in Table A-2.

## Appendix H: Weighting by role and gender

The appropriate weight factor is a ratio of the population share to the sample share for each role group. That is, with  $N$  total population,  $n$  in the sample, and  $N_i$  in role and gender group  $i$  in the population (for instance, female freshmen), and  $n_i$  of that group  $i$  in the sample, we apply the weight factor  $W_i = (N_i/N) / (n_i/n)$  to all cases in group  $i$ . Applying the weight factors alters the apparent distribution of respondents by role and gender, but the overall sample size is unchanged. In instances where we would like to expand the sample to a projection of the full population, we weight each case by an *expansion* factor  $E_i$ , equal to  $(N_i / n_i)$ . Applying the expansion factors alters both the distribution of respondents by role, and inflates the sample to the size of the population, or 41,214.

Although the number of valid responses varies from question to question (that is,  $n$  and  $n_i$ ), we use the same set of weight factors for most variables, based on the distribution of roles among the  $n = 3,982$  valid responses to question  $Q29$ , the main question relating to mode choice on each day during the travel week. For variables relying on geocoding of respondents' residential location, we generated a separate set of weight factors, based on the 3,606 cases successfully geocoded (by cross streets and zip code given in questions  $Q18$  and  $Q19$ ; see Appendix E). Both sets of weights are shown in Table A-3.

Table A-3. Weight factors, applied by role and gender

Role group ( $i$ )	Gender	Population ( $N$ )	Role and Gender <sup>a</sup>				Role, Gender, and Geocoded <sup>b</sup>			
			Valid responses ( $n$ )	Weight factor ( $N_i/N$ )/( $n_i/n$ )	Expansion factor ( $N_i / n_i$ )	Weighted sample size	Valid responses ( $n$ )	Weight factor ( $N_i/N$ )/( $n_i/n$ )	Expansion factor ( $N_i / n_i$ )	Weighted sample size
<b>Freshmen</b>	Female	2,018	413	0.4720820	4.89	195	408	0.4327448	4.95	177
	Male	1,541	128	1.1632215	12.04	149	126	1.0701048	12.23	135
<b>Sophomores</b>	Female	2,369	393	0.5825314	6.03	229	351	0.5906487	6.75	207
	Male	1,810	147	1.1893219	12.31	175	128	1.2368905	14.14	158
<b>Juniors</b>	Female	3,492	444	0.7598008	7.86	337	390	0.7833261	8.95	305
	Male	2,962	180	1.5901044	16.46	286	153	1.6940693	19.36	259
<b>Seniors</b>	Female	5,221	602	0.8379721	8.67	504	535	0.8538798	9.76	457
	Male	4,430	234	1.8290502	18.93	428	206	1.8814762	21.50	388
<b>Masters</b>	Female	1,019	137	0.7183445	7.43	98	119	0.7489121	8.56	89
	Male	1,002	90	1.0761231	11.14	97	79	1.1102016	12.69	88
<b>PhD</b>	Female	1,798	257	0.6758604	7.00	174	229	0.6868772	7.85	157
	Male	1,769	146	1.1708154	12.12	171	137	1.1299134	12.91	155
<b>Faculty</b>	Female	868	168	0.4991699	5.17	84	157	0.4837072	5.53	76
	Male	1,619	226	0.6921573	7.16	156	199	0.7118437	8.14	142
<b>Staff</b>	Female	5,438	248	2.1186382	21.93	525	232	2.0509022	23.44	476
	Male	3,858	169	2.2055352	22.83	373	157	2.1499359	24.57	338
<i>Overall</i>		41,214	3,982	n/a	10.3500753	3,982	3,606	n/a	11.4292845	3,606

<sup>a</sup> Based on valid responses to  $Q09$  and  $Q29$ .

<sup>b</sup> Based on valid responses to  $Q09$ ,  $Q29$  and successful geocoding of home location (from questions  $Q18$ - $Q19$ )