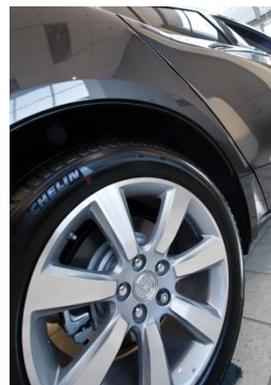


Modal Shift in the Boulder Valley

1990 to 2015

May 2016



Prepared for the
City of Boulder
Transportation
Division

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Executive Summary

Background

The 2015 Travel Diary Study is the ninth replication of the survey since the 1990 baseline survey. This study is a periodic survey of Boulder Valley residents' travel patterns and mode selection, and is designed to provide feedback to City staff and council members on the effectiveness of City programs aimed at reducing single-occupancy vehicle (SOV) travel and information on travel patterns useful for future transportation planning.

The long trend line generated by the multiple implementations of the study is useful in measuring the City's progress in mode shift away from SOV trips, which was one of the original 1989 Transportation Master Plan's (TMP) major objectives. In 1990, the first year of the travel diary study, 44% of all trips were made by driving alone. Later updates of the TMP modified the objective to a target of reducing the SOV modal share to 25% of all trips by the year 2025, and most recently to 20% by 2035 in the 2014 TMP. Achieving an SOV modal share of 20% by the year 2035 would mean a 24% shift in the proportion of SOV trips made from 1990 to 2035, or a 0.53% shift per year.

Participants in the Travel Diary Study are asked to keep a log or "diary" of their travel for one randomly assigned day during the third week of September (or a replacement week if necessary). For every trip made during the 24 hour period, respondents record the origin and destination of the travel, the travel mode used, the time of day, the number of people in the vehicle (if applicable), and the number of miles or blocks traversed during the 24 hour period. A trip is defined for participants as any "one-way travel from one point to another that takes you farther than one city block (about 200 yards) from the original location."

The study members were also asked to complete a survey regarding their household characteristics such as number of vehicles and bicycles present in the household, receipt of deliveries, work location, and other general socioeconomic demographics.

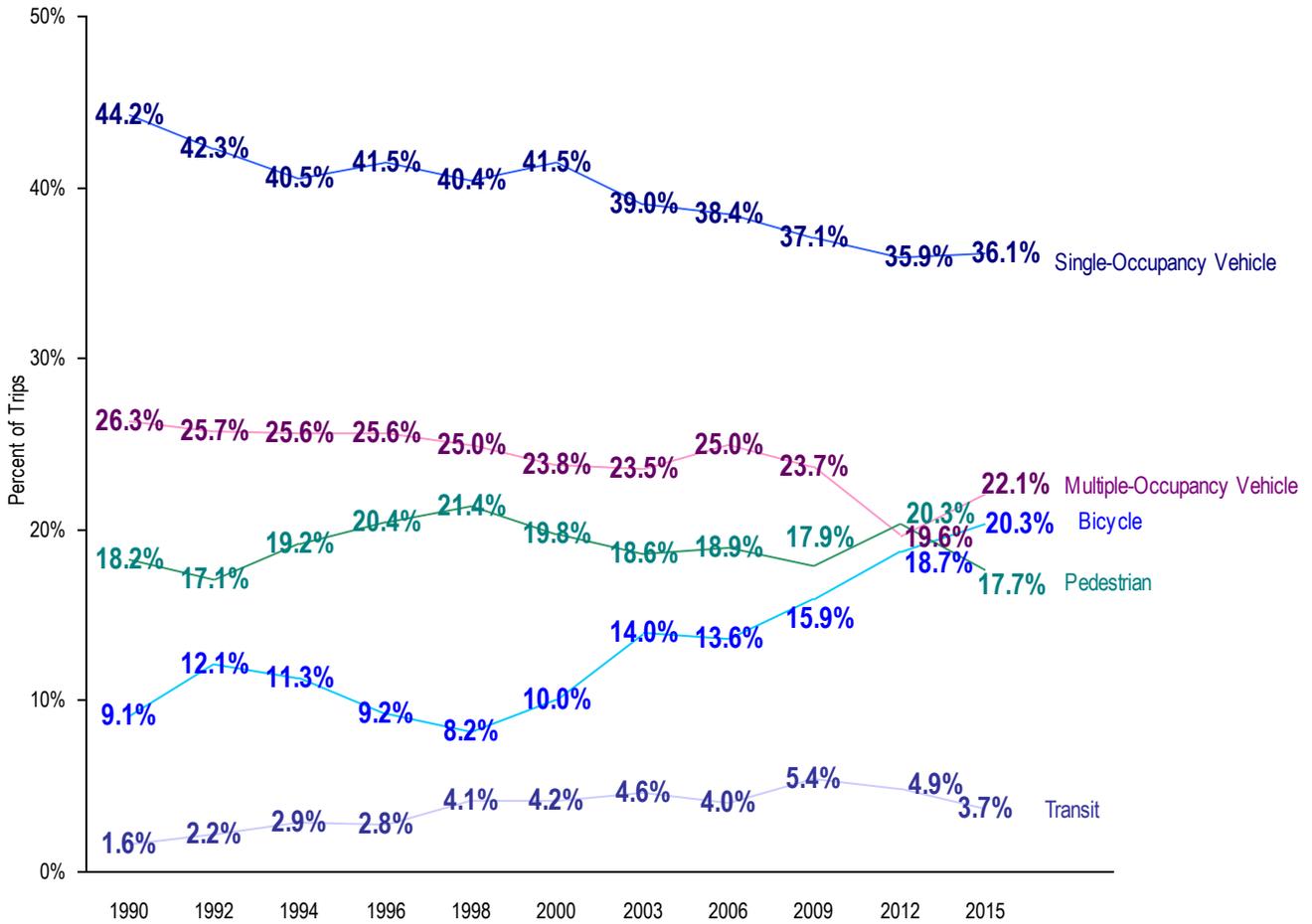
The 2015 Travel Diary Study results are based on approximately 1,200 Boulder Valley residents' records of their travel. With a sample size of 1,000 or more in each study year, the margin of error around the results is $\pm 1.3\%$ per year. Thus, for a difference to be statistically significant between years there must be a shift of at least 2.6% (1.3% around each study year).

Modal Shift of All Trips

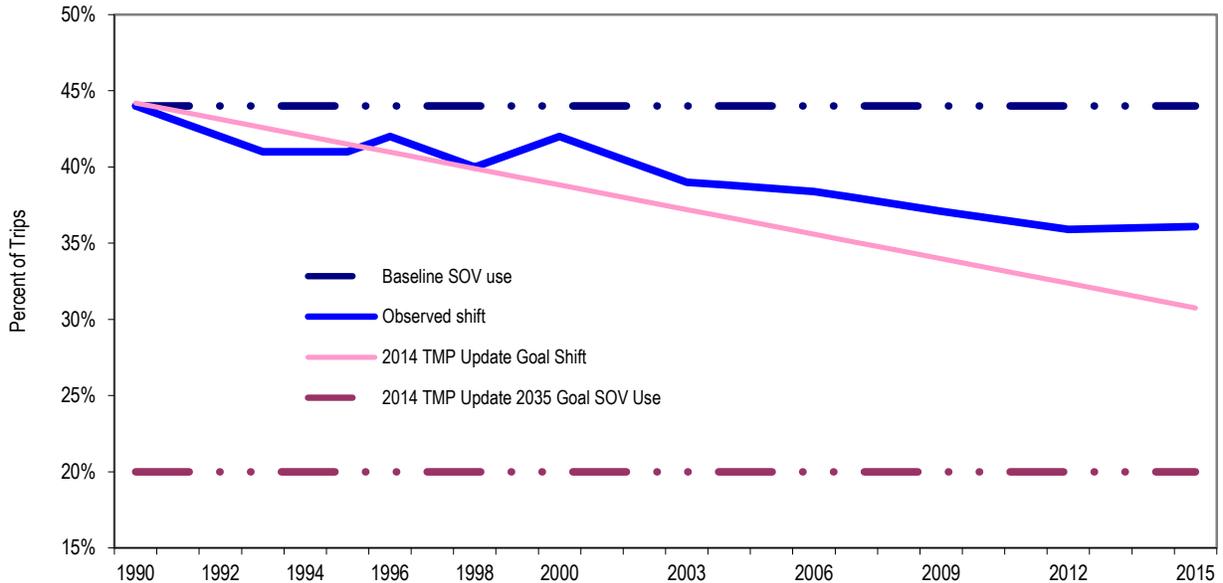
"Modal split" or "modal share," can be defined as a method of dividing travel into all available transportation modes and determining the percent of trips made or miles traveled by each mode. For the Boulder Valley Travel Diary Study the transportation modes are classified as single-occupancy vehicle (SOV), multiple-occupancy vehicle (MOV), transit or high-occupancy vehicle, school bus, foot and bicycle. A comparison of the mode choices from 1990 to 2015 provides information on modal "shift," that is, the shift of trips or miles traveled from one mode to another. This "shift" was measured as the difference in the proportion of trips from 1990 to 2015 (change in percents).

The figure below shows the modal split of all trips made by respondents in every study year. Compared to 1990, significant shift in trips was observed in four categories:

- ◆ Single-Occupancy Vehicle, -7.7%
- ◆ Multiple-Occupancy Vehicle, -4.0%
- ◆ Bicycle, +11.5%



The 2014 TMP includes the objective of achieving an SOV modal share of 20% by the year 2035; this would mean a 24% shift in the proportion of SOV trips made from 1990 to 2035, or an average annual shift of 0.54%, assuming equal progress throughout the forty-five year span. In the figure below, the 2014 TMP target is plotted with the observed shift. As can be seen, the observed modal shift has not quite kept pace with the 2014 TMP objective in recent years, with no change observed from 2012 to 2015.



Changes in Boulder citizens’ travel behavior cannot be solely attributed to the City’s interventions, as regional and national transportation trends also impact travel behavior. The most recent National Household Travel Survey was conducted in 2009 by the Federal Highway Administration, so these data are used for comparison, even though the data are now over 6 years old.

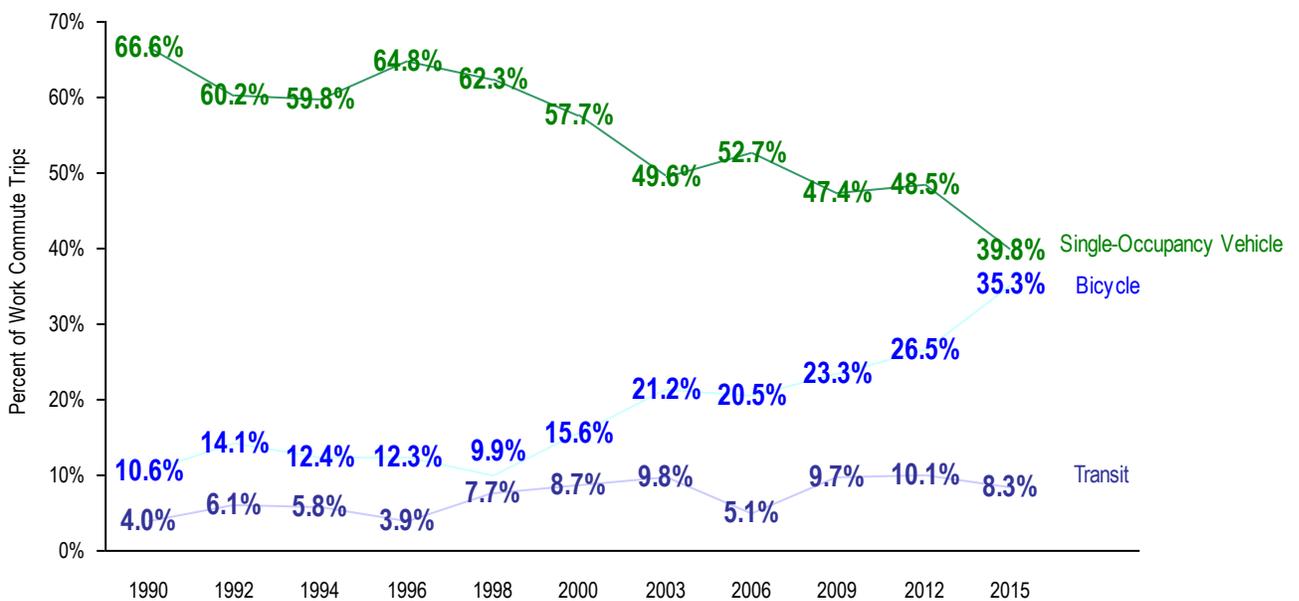
- ◆ Nationwide, there was a 0.22% annual shift away from trips made via private vehicles (87.6% in 1990, 83.4% in 2009) over the last two decades. However, among Boulder Valley residents, there was an annual average decrease of 0.49% from 2000 to 2015.
- ◆ The proportion of trips made on transit remained virtually unchanged nationally, (1.8% in 1990; 1.9% in 2009) while in Boulder there was a 3.8% shift toward public transit in the same period (1.6% in 1990; 5.4% in 2009). However, the estimated proportion of Boulder resident trips made by transit in 2015 was 3.7%, a statistically insignificant decrease.
- ◆ When the modal split of miles traveled is examined, there was virtually no change from 1990 to 2009 nationally in the miles traveled by private vehicle, while in Boulder there was a 4.5% shift *away* from miles traveled via private vehicles (88% in 1990, 81% in 2015).
- ◆ The proportion of miles traveled via transit stayed relatively flat nationwide, 2.1% in 1990 to 1.5% in 2009, while in Boulder the percent of miles traveled via transit increased, from 4.1% in 1990 to 6.9% in 2009. From 2009 to 2015, the proportion of miles traveled by transit in Boulder increased somewhat to 7.8%.

Modal Split of the Work Commute

The figure below shows the percent of work commute trips made by respondents via SOV, bicycle and transit in every study year. Little change was observed over the study period in multiple-occupancy vehicle trips (between 8% and 11%) or pedestrian trips (also between 8% and 11% of work commute trips). Compared to 1990, significant shift was observed in three categories in 2015:

- ◆ Single-Occupancy Vehicle, -26.8%
- ◆ Transit, +4.3%
- ◆ Bicycle, +24.7%

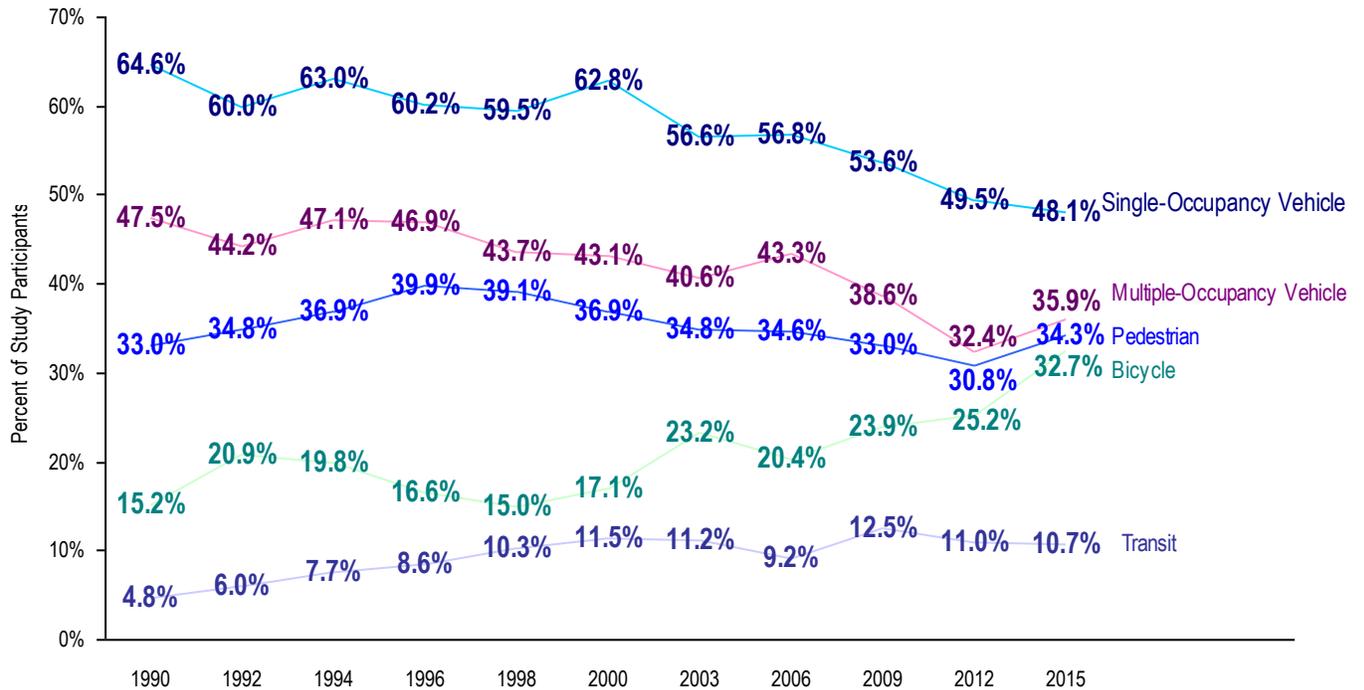
Transit trips, which had been increasing in modal share of work commute trips, have remained relatively flat since 2003. Bicycle trips showed a large increase in modal share from 2012 to 2015, while there was a corresponding decrease in SOV modal share. This is the largest change in modal share since the implementation of the travel diary study. Future travel diary studies, as well as other surveys about work commute travel, will help in understanding whether this was an anomaly, or part of an ongoing trend.



Use of a private vehicle for the work trips has remained constant across the U.S., as measured in trips and miles, while Boulder has experienced a decline in work trips made via private vehicles.

Mode Use

The proportion of people making at least one trip on the assigned travel day by each mode throughout the study period is shown below. Over the study period, the percent of participants making any trips by SOV or MOV has declined, while the proportion making any trips via transit or by bicycle has increased. In the case of bicycle, the proportion of respondents making at least one trip by bicycle showed a large increase from 2012.



Trip Characteristics

The information recorded on the travel diary can be used to characterize the trip-making behavior of Boulder residents. In 2015:

- ◆ The average number of trips per day per person was 5.4.
- ◆ The average number of miles traveled per day per person was 22.7 miles.
- ◆ The percent of people who did not leave the house on assigned travel day was 5.7%
- ◆ The average estimated trip distance was 4.4 miles.
- ◆ The average estimated trip duration in was 19.6 minutes.

These trip characteristics have remained fairly stable over the study period.

Compared to national data, Boulder residents make shorter trips (5.4 miles for Boulder residents in 2012 compared to 9.8 miles in 2009 for U.S. residents).

The average work commute trip for Boulder residents in 2015 was 5.1 miles in distance and 22 minutes in duration. The average work commute for U.S. residents in 2009 was 11.8 miles and 24 minutes.

Study Results

Background

The Travel Diary Study is a periodic survey of Boulder Valley residents' travel patterns and mode selection. The baseline study was conducted in 1990 and has been re-implemented every two to three years since then. The study is designed to provide feedback to City staff and Council members on the effectiveness of City programs aimed at reducing single-occupancy vehicle (SOV) travel, and to provide information on travel patterns useful for future transportation planning.

The 2015 Travel Diary Study is the eleventh replication of the survey since the baseline study. This long trend line is useful in measuring the City's progress in mode shift away from SOV trips, as one of the original Transportation Master Plan's (TMP) major objectives was to shift "15% of all trips currently made by single-occupant autos to other forms of transportation, including ridesharing, transit, walking, and bicycling" by the year 2010. In 1990, the first year of the travel diary study, 44% of all trips were made by driving alone. The 1996 TMP modified the objective to a target of reducing the SOV modal share to only 25% of all trips by the year 2020 and the 2003 and 2008 update extended the target year to 2025. Reflecting the city's Sustainability Framework and Climate Commitment, the 2014 TMP established a more aggressive target of a 20% SOV mode share by 2035. This target is now the standard against which these study results are measured. Achieving an SOV modal share of 20% by the year 2035 would mean a 24% shift in the proportion of SOV trips made from 1990 to 2035, or a 0.54% shift per year.

Participants in the study were asked to keep a log or "diary" of their travel for one randomly assigned day during the third week of September (or a replacement week if necessary). For every trip made during the 24 hour period, they recorded the origin and destination of the travel, the travel mode used, the time of day, the number of people in the vehicle (if applicable), and the number of miles or blocks traversed during each trip. A trip was defined as any "one-way travel from one point to another that takes you farther than one city block (about 200 yards) from the original location."

The participants were also asked to complete a survey regarding their adult household members' typical primary modes of travel, locations of work/school, number of vehicles, and general socioeconomic information about the household and the study participant (see *Appendix F. Data Collection Materials* for copies of the survey materials).

The 2015 Travel Diary Study results are based on 1,227 Boulder Valley residents' records of their travel. Study results were statistically weighted so that demographics of respondents matched population demographics. Details about the methodology used to select individuals to participate in the study and how they recorded their travel can be found in *Appendix E. Study Methodology*.

With a sample size of 1,000 or more in each study year, the margin of error around the results is $\pm 1.3\%$ per year. Thus, for a difference to be statistically significant between years there must be a shift of at least 2.6% (1.3% around each study year).

Modal Shift of All Trips

Transportation mode choice, referred to as “modal split” or “modal share,” can be defined as a method of classifying travel into all available transportation modes and can refer to the number of modes, number of trips or number of miles traveled. This study uses the number of trips and number of miles when calculating modal split, and classifies the modes as single-occupancy vehicle (SOV), multiple-occupancy vehicle (MOV)¹, transit or high-occupancy vehicle, school bus, foot and bicycle. A comparison of the mode choices from 1990 to 2015 provides information on modal “shift,” that is, the shift of trips or miles traveled from one mode to another. This “shift” was measured as the difference in the proportion of trips from 1990 to 2015 (change in percents). The modal split of trips as observed in the 2015 Travel Diary is shown in Figure 2 on the next page, while the modal shift of trips from 1990 to 2015 by Boulder Valley residents is presented in Figure 1.

Over the entire study period, the proportion of all trips made by driving alone has shifted 8%, about half of which occurred in the early 1990s. In 2015, SOV trips accounted for about 36% of all trips made by Boulder residents, down from about 44% in 1990 and similar to what had been observed in 2012. Transit trips have more than doubled over that same period, increasing from less than 2% in 1990 to about 4% in 2015. However, transit share decreased somewhat in 2015 compared to 2012, from 4.9% of trips to 3.7% of trips, a loss that was not statistically significant. Large gains were observed in the proportion of trips made by bicycle over the previous 2 decades, from 9% in 1990 to 20% in 2015. Much of this gain has happened since 2000.

The proportion of trips made via MOV has remained fairly constant since 1990 until 2006. However, beginning in 2009 and continuing in 2012, a decrease in MOV trips was seen. In 2015, 22% of all trips were made in personal vehicles with more than one person, down from 26% in 1990. Nearly a third of those MOV trips included at least one child in the vehicle, while just over two-thirds included only adults (see Figure 2 on the next page).

Figure 1: Modal Split of Trips for Boulder Valley, 1990-2015

Travel Mode	Percent of Trips*											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	36.1%	35.9%	37.1%	38.4%	39.0%	41.5%	40.4%	41.5%	40.5%	42.3%	44.2%	-7.7%
Multiple-Occupancy Vehicle	22.1%	19.6%	23.7%	25.0%	23.5%	23.8%	25.0%	25.6%	25.6%	25.7%	26.3%	-4.0%
Transit	3.7%	4.9%	5.4%	4.0%	4.6%	4.2%	4.1%	2.8%	2.9%	2.2%	1.6%	+2.0%
School Bus	0.0%	0.6%	0.1%	0.1%	0.3%	0.7%	0.7%	0.5%	0.5%	0.7%	0.6%	-0.6%
Bicycle	20.3%	18.7%	15.9%	13.6%	14.0%	10.0%	8.2%	9.2%	11.3%	12.1%	9.1%	+11.5%
Foot	17.7%	20.3%	17.9%	18.9%	18.6%	19.8%	21.4%	20.4%	19.2%	17.1%	18.2%	-1.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Trips	5,767	4,835	5,505	6,081	6,380	6,791	5,987	6,454	6,723	6,681	7,355	

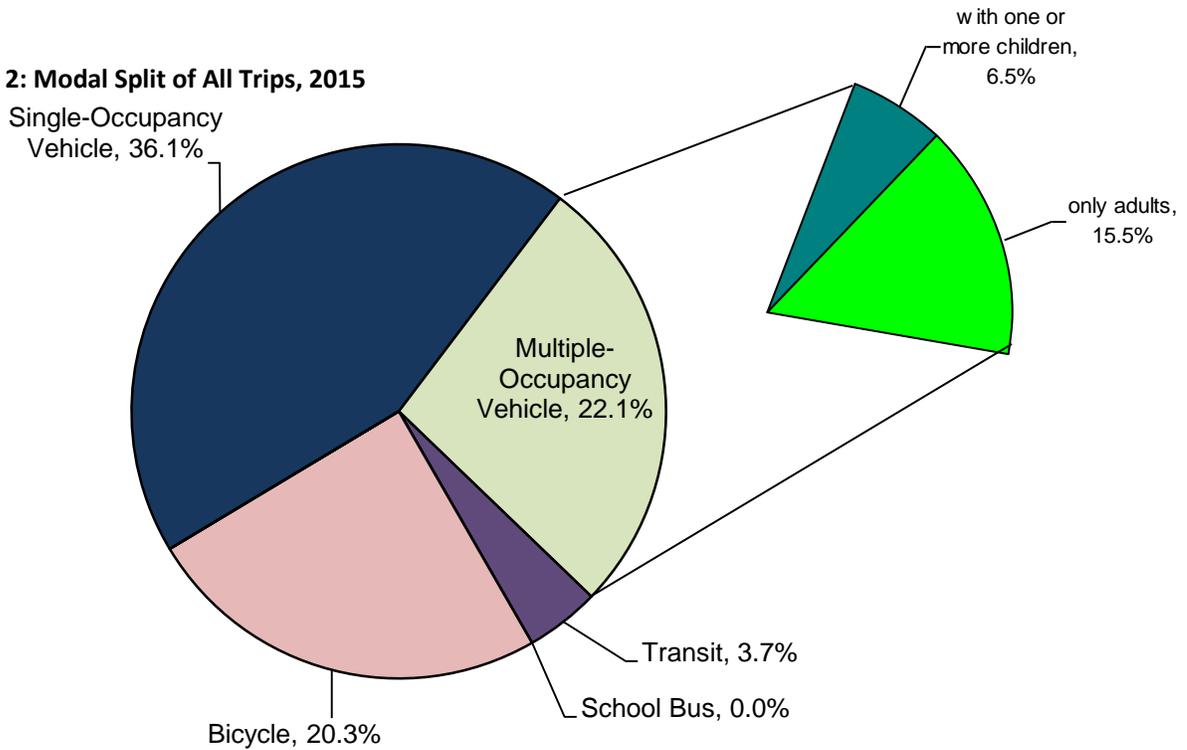
Modes with shifts that are statistically significantly different between 1990 and 2015 are shaded.

Modes with shifts that are statistically significant different between 2012 and 2015 are bolded.

** These estimates have a margin of error of $\pm 1.3\%$ using a 95% confidence interval.*

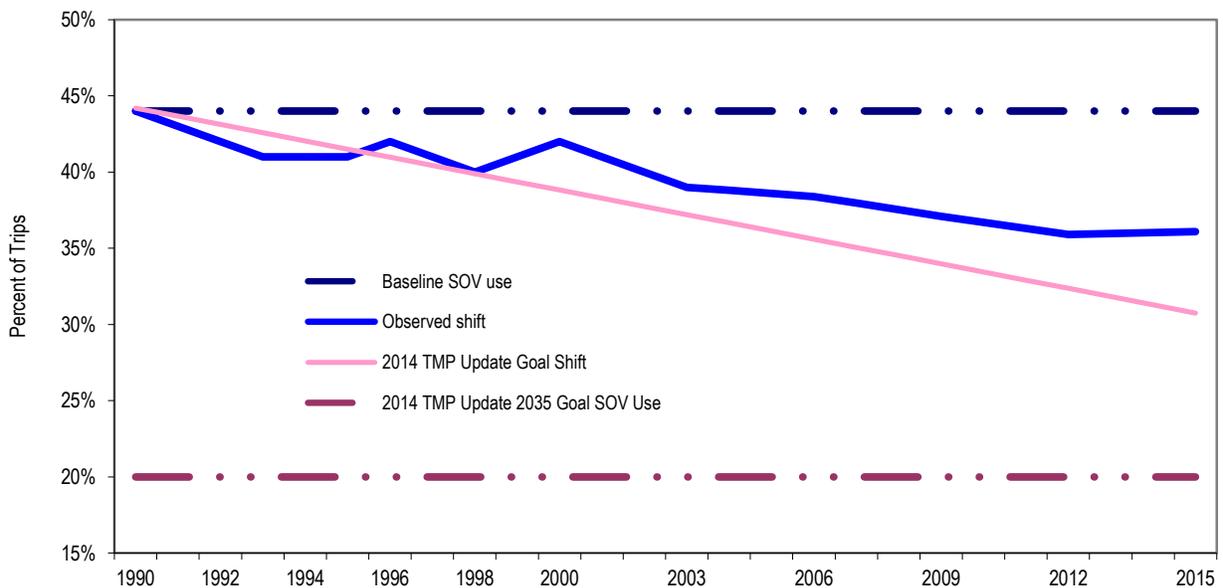
¹ A single-occupancy vehicle refers to an automobile, van, truck or motorcycle which has only one occupant; a multiple-occupancy vehicle is an automobile, truck or motorcycle with more than one occupant. (Truck and motorcycle trips make up a very small proportion of the trips made.)

Figure 2: Modal Split of All Trips, 2015



The 2014 TMP update includes an objective of achieving an SOV modal share of 20% by the year 2035; this would mean a 24% shift in the proportion of SOV trips made from 1990 to 2035, or an average annual shift of 0.53%, assuming equal progress throughout the forty-five year span. In Figure 3, the 2014 TMP target is plotted with the observed shift. As can be seen, the observed modal shift has not quite kept pace with the 2014 TMP objective in recent years, with no change observed from 2012 to 2015.

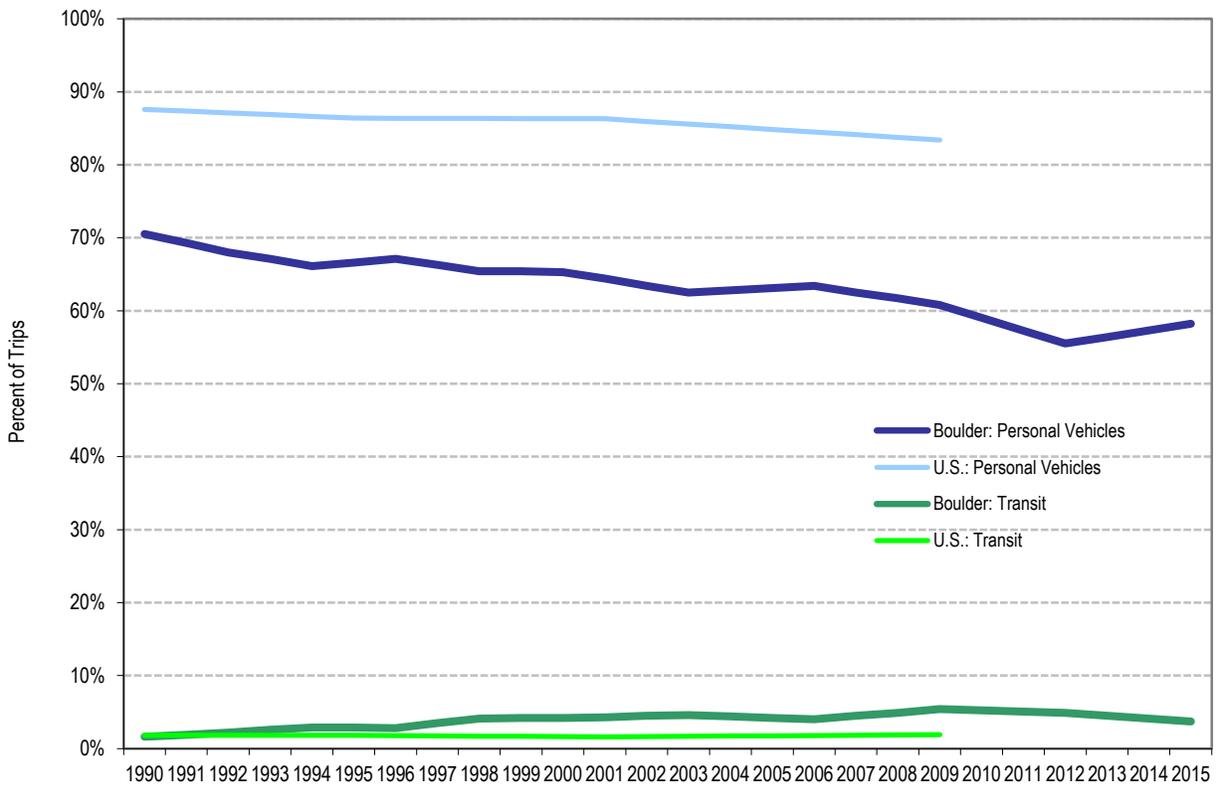
Figure 3: Percent of SOV Trips from 1990-2015: Observed Versus Desired Shift



Changes in Boulder citizens’ travel behavior cannot be solely attributed to the City’s interventions, as regional and national transportation trends also impact travel behavior. However, the national trends observed demonstrated only a slight reduction in “privately owned vehicle” (POV) use, which includes both SOVs and MOVs, between 1990 and 2009.² Figure 4 below compares the change observed in Boulder from 1990 to 2015 to that observed in the nation from 1990 to 2009. Nationwide, there was a 4.2% shift away from trips made via private vehicles (87.6% in 1990, 83.4% in 2009) over a 19 year period, which translates to an average annual decrease of 0.22%. However, among Boulder Valley residents, there was a 12.3% shift observed (70.5% in 1990, 58.2% in 2015) in POV use over a 25 year period, an average annual decrease of 0.49%.

The proportion of trips made on transit remained virtually unchanged nationally, (1.8% in 1990; 1.9% in 2009) while in Boulder there was a 2.1% shift toward public transit (1.6% in 1990; 3.7% in 2012), representing an average annual increase of 0.084%.

Figure 4: Percent of All Trips from 1990 to 2009/2015: Boulder Compared to the U.S.



² Appendix A. National Travel Data contains additional detail on the comparisons made in Figure 4. These data come from the 1990 and 1995 Nationwide Personal Transportation Study and the 2001 and 2009 National Household Travel Study (NHTS).

Modal share estimates using miles traveled show larger shares for the motorized vehicles because these vehicles are used to traverse greater distances. From 1990 to 2012, there had been no significant change observed in the SOV share of miles traveled, with some mild variation from year to year. However, in 2015 there was a decrease in the number of miles traveled by SOV, with a nearly corresponding increase in the number MOV miles traveled. However, this was similar to what had been observed in the years from 1990 to 2009. There has been a shift of about 4% in the proportion of miles traveled by bicycles in the study period, increasing from 4.9% of miles in 1990 to 8.5% of miles in 2015. Likewise, the number of miles traveled by transit has also increased about 4% over the study period, from 4.1% in 1990 to 7.8% in 2015.

Figure 5: Modal Split of Miles for Boulder Valley, 1990-2015

Travel Mode	Percent of Miles*											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	41.9%	49.6%	46.1%	46.9%	44.0%	49.1%	48.1%	45.2%	46.2%	48.0%	50.0%	-8.1%
Multiple-Occupancy Vehicle	38.7%	30.5%	35.9%	36.3%	39.5%	35.9%	35.6%	41.3%	38.6%	37.3%	37.7%	+1.0%
Transit	7.8%	6.6%	6.9%	5.7%	5.5%	6.5%	7.0%	5.7%	6.4%	6.2%	4.1%	+3.7%
School Bus	0.0%	0.5%	0.5%	0.1%	0.2%	0.4%	0.6%	0.2%	0.2%	0.5%	0.2%	-0.2%
Bicycle	8.5%	9.3%	8.1%	7.2%	7.7%	4.7%	4.6%	4.3%	5.6%	5.4%	4.9%	+3.6%
Foot	3.1%	3.4%	2.5%	3.7%	3.0%	3.5%	4.1%	3.2%	2.9%	2.5%	3.0%	+0.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Miles	25,358	18,269	27,016	25,756	31,248	28,689	25,562	30,042	30,300	29,761	29,634	

Modes with shifts that are statistically significantly different between 1990 and 2015 are shaded.

Modes with shifts that are statistically significant different between 2009 and 2015 are bolded.

** These estimates have a margin of error of ±1.3% using a 95% confidence interval.*

As with the modal split of trips, the reduction in SOV miles can be compared to the 2014 TMP objective (Figure 6), assuming that the objective of a 24% shift in the proportion of trips made by SOV can also be translated as an objective of a 24% shift in the proportion of miles traveled by SOV. When miles are used as the unit of analysis, it can again be observed that the modal shift of miles has not yet met the TMP objective. There tends to be more variability in the proportion of miles traveled by different modes than there is in the proportion of trips.

Figure 6: Percent SOV Miles 1990-2015: Observed Versus Expected Shift

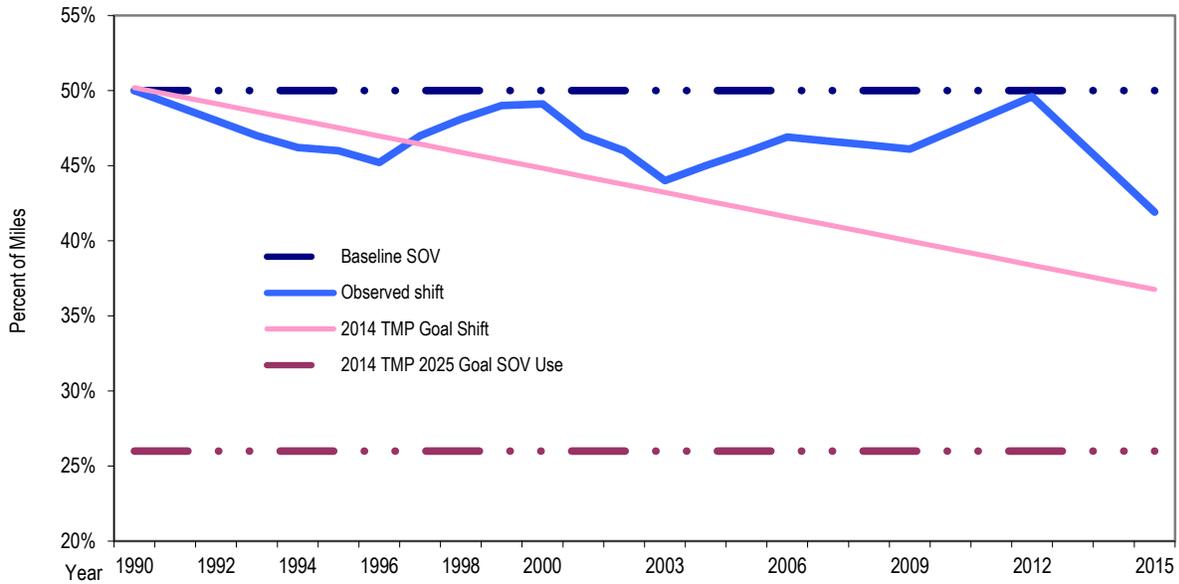
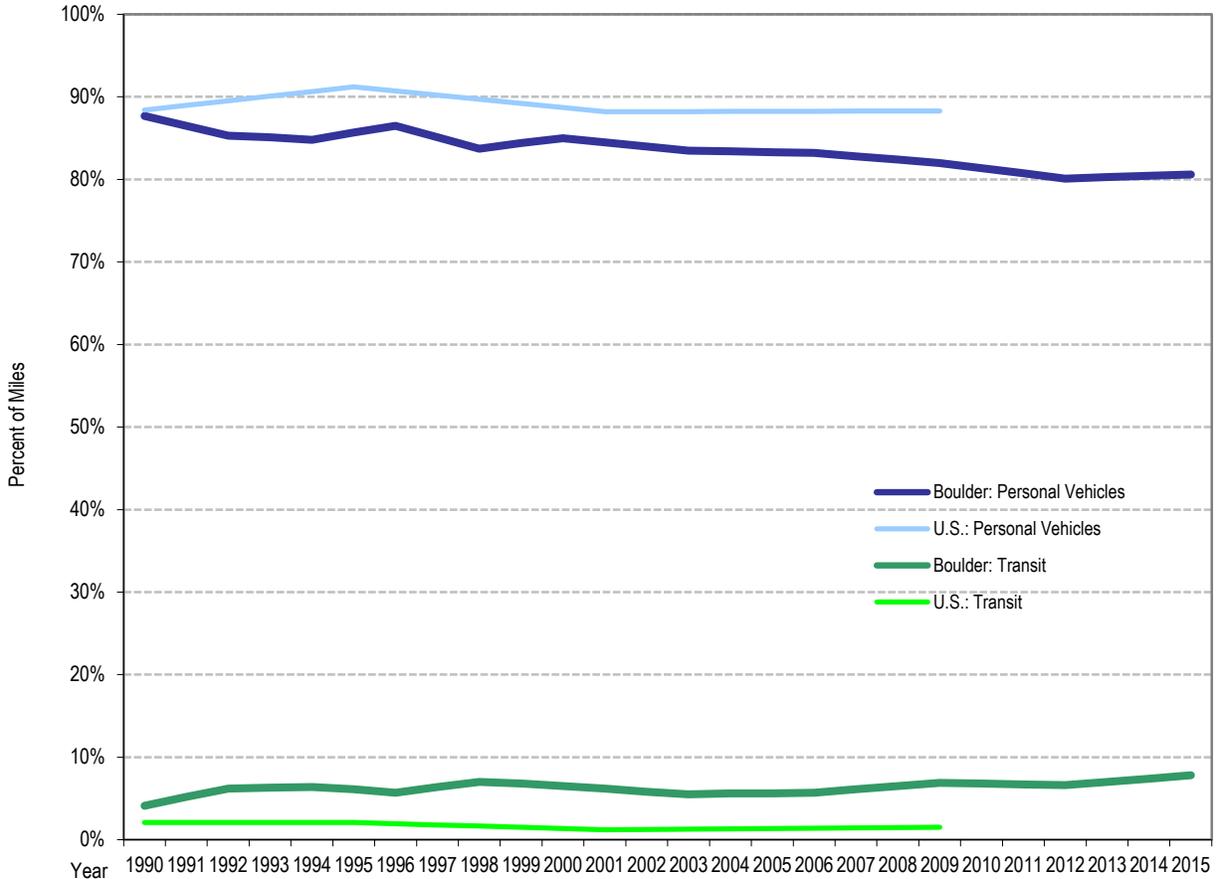


Figure 7 shows a comparison of the percent of miles traveled in the nation between 1990 and 2009, and in Boulder Valley between 1990 and 2015, by mode. The proportion of miles traveled by private vehicles stayed the same in the U.S., from 88% of miles in 1990 to 88% again in 2009. However, in Boulder the trend was a declining one, from 88% of miles in 1990 to 81% in 2015. The proportion of miles traveled via transit actually decreased nationwide, from 2.1% in 1990 to 1.5% in 2009, while in Boulder the percent of miles traveled via transit increased, from 4.1% in 1990 to 7.8% in 2015.

Figure 7: Percent of All Miles from 1990 to 2009/2015: Boulder Compared to the U.S.



Modal Split of the Work Commute

Trips made as part of the work commute were identified for special analysis, including trips directly between home and work and trips linked during the work commute.³ As not all respondents had a work commute, the data in the following tables are based on a smaller number of respondents and trips, are less stable from year to year and have a higher margin of error (about $\pm 4\%$).

The SOV modal share of work commute trips decreased from 1990 to 2015 by 27 percentage points over the study period (see Figure 8), with a large decrease from 2012 to 2015 of about 9%. The transit share, which had been increasing from 1990 to 2003, declined in 2006 to levels not statistically significantly higher than 1990 levels, but increased again in 2009 and has stayed relatively stable since. The proportion of work commute trips made by bicycling, which has increased over the study period, increased again from 2012 to 2015. Over the study period, the increase has been about 25% of trips, with 9% of the shift occurring between 2012 and 2015. Some of this increase in recent years is likely due to the fact that a greater proportion of employed respondents report working in Boulder rather than outside of Boulder, and those who work in Boulder are more likely to bicycle than employed residents who work outside of Boulder (see Figure 22 on page 19 and figures on page 12 for more information). However, this is the largest change in modal share since the implementation of the travel diary study. Future travel diary studies, as well as other surveys about work commute travel, will help in understanding whether this was an anomaly, or part of an ongoing trend.

Figure 8: Modal Split of Trips for the Work Commute, 1990-2015

Travel Mode	Percent of Trips*											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	39.8%	48.5%	47.4%	52.7%	49.6%	57.7%	62.3%	64.8%	59.8%	60.2%	66.6%	-26.8%
Multiple-Occupancy Vehicle	6.7%	5.7%	8.5%	10.7%	9.2%	7.6%	8.2%	10.8%	10.1%	9.8%	9.9%	-3.2%
Transit	8.3%	10.1%	9.7%	5.1%	9.8%	8.7%	7.7%	3.9%	5.8%	6.1%	4.0%	+4.3%
School Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.1%	0.2%	0.0%	0.0%
Bicycle	35.3%	26.5%	23.3%	20.5%	21.2%	15.6%	9.9%	12.3%	12.4%	14.1%	10.6%	+24.7%
Foot	10.0%	9.2%	11.1%	11.0%	10.3%	10.4%	11.8%	8.2%	11.8%	9.6%	8.9%	+1.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Trips	910	754	1,021	1,101	951	1,161	947	1,192	1,146	1,111	1,302	

Modes with shifts that are statistically significantly different between 1990 and 2015 are shaded.

Modes with shifts that are statistically significant different between 2012 and 2015 are bolded.

³ See page 32 for a description of how trips were categorized. Using the trip classification scheme displayed in Figure 47: Types of Trips, the “home-based work” commute trips could be determined. Still, a small percentage of the work commute would not be accounted for when a work trip was “linked,” that is, a trip where the person makes a stop on the way to or from work. For example, if the participant stopped at the post office on the way to work, the first trip would be classified as “home-based other” and the second trip would be categorized as “non-home based”. Neither of these legs of the trip would be counted as the work commute. Similarly, if a participant drove to the Park-n-Ride, and then took a bus to work, neither trip would be classified as “home-based work;” the first would be coded as “home-based other” the second as “non-home based.” To be sure trips were identified as part of the work commute, another code was created which allowed the trips to be distinguished as “linked”. All the linked trips are included in the analysis of “work commute” trips.

Since 1990, a decrease was observed in the proportion of miles traveled by driving alone for the work commute. However, this decrease was mostly observed from 2012 to 2015, although the proportion of miles traveled for the work commute was similar in 2009 as what was observed in 2015.

Since 1990, the proportion of miles traveled by bicycle and by transit for the work commute have increased. For bicycle, these increases mostly occurred between 1998 and 2000, then 2000 and 2003, with another jump in this study period from 2012 to 2015. The proportion of miles traveled by transit for the work commute were similar in 2015 as what had been observed in 2009.

The initial decreases observed in the proportion of work commute miles traveled via SOV, and the initial increases in transit miles may reflect the emphasis of GO Boulder’s programs. At the time of GO Boulder’s inception, a great deal of emphasis was placed on the work commute. The Eco-Pass program provided RTD bus passes to many employees in the Boulder Valley. Over time, though, additional emphases and programs were implemented, which may have led to other changes in trip-making behavior. For example, the modal shift of miles traveled by bicycle for the work commutes has increased about 10% since 1990, with much of the change occurring between 2000 and 2003; and again from 2012 to 2015. This shift in bicycle travel (trip and miles) may be due to the addition of bike/pedestrian underpasses and the continued progress in completing the facilities of the Bicycle System Plan. There were also more employed respondents who worked in Boulder rather than outside the Valley in 2015 than in previous years, which may account for some of the increase in bicycle trips and miles traveled for the work commute in 2015.

Figure 9: Modal Split of Miles for the Work Commute, 1990-2015

Travel Mode	Percent of Work Commute Miles											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	56.9%	69.7%	59.7%	66.6%	63.6%	68.8%	66.7%	71.5%	66.6%	64.5%	71.9%	-15.0%
Multiple-Occupancy Vehicle	6.7%	10.9%	9.1%	10.3%	12.8%	6.3%	11.2%	11.9%	14.9%	10.1%	10.9%	-4.2%
Transit	20.6%	8.7%	19.5%	11.8%	12.6%	17.4%	16.2%	11.2%	12.7%	16.5%	11.2%	+9.4%
School Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.6%	0.0%	0.0%
Bicycle	14.6%	9.6%	10.6%	10.2%	10.0%	6.0%	4.4%	4.3%	4.6%	6.9%	4.7%	+9.9%
Foot	1.3%	1.1%	1.1%	1.2%	1.0%	1.5%	1.3%	1.0%	1.2%	1.4%	1.3%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Work Commute Miles	4,508	4,411	6,215	5,980	5,607	6,637	5,846	6,326	7,111	6,412	6,818	

Modes with shifts that are statistically significantly different between 1990 and 2015 are shaded.

Modes with shifts that are statistically significant different between 2009 and 2015 are bolded.

Figure 10 compares the change in Boulder’s modal split of the work commute to the national trends. Use of a private vehicle for the work trips has remained constant across the U.S., as measured in trips and miles, while Boulder has experienced a decline in work trips and miles traveled for the work commute made via private vehicles, although the proportion of miles traveled has shown some volatility. The trend line for the proportion of work trips and miles made via transit has been volatile in Boulder, but the overall trend for is an increasing one. Nationally, no change has been observed in transit use for work trips or miles.

Figure 10: Percent of Work Commute Trips and Miles from 1990 to 2009/2015: Boulder Compared to the U.S.

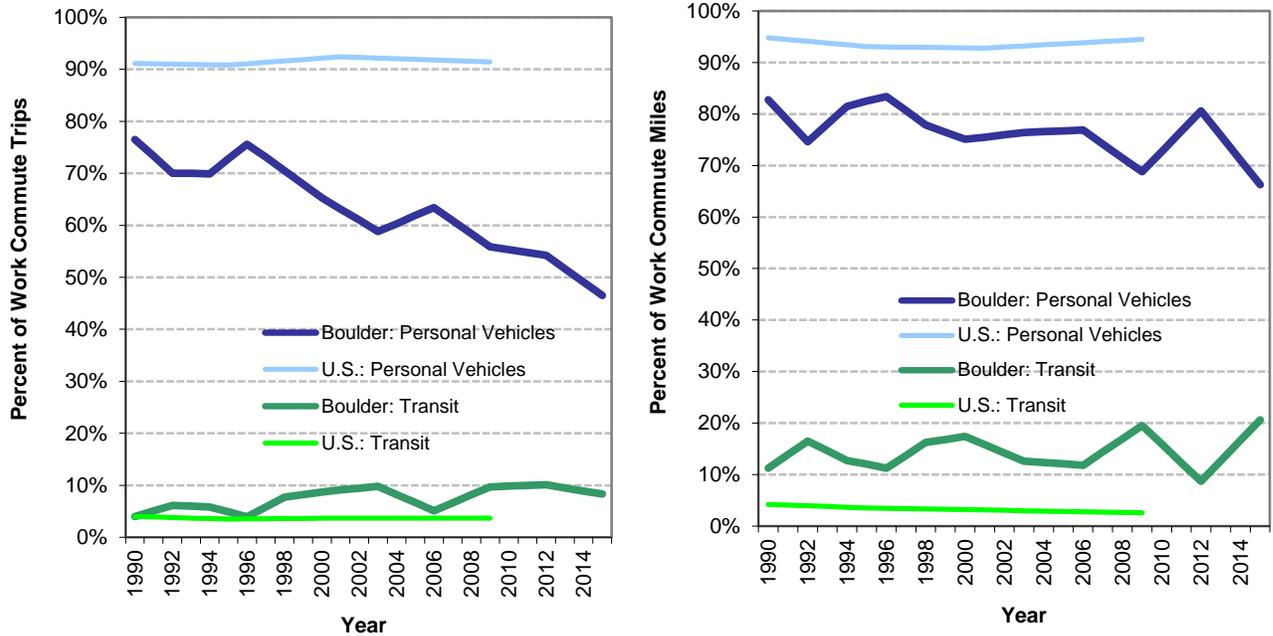


Figure 11 displays the work commute trip made on the assigned travel study day by study participants' workplace location. Those who worked in Boulder were least likely to have used an SOV for any part of their work commute compared to those who worked in other cities. A greater proportion of the work commute trips made by Boulder Valley residents who worked in Boulder or in Denver were made via transit, indicating the high availability of service within Boulder and between Boulder and Denver, while transit use for the work commute for those who worked in other locations was much lower. Among travel diary study participants who worked in Boulder, about 6% of the trips made for the work commute were made using transit. This represents an increase transit use for the work commute since the study inception in 1990 among employed study participants who worked in Boulder, but a decrease from 2012 (see Figure 12). Bicycle use for the work commute was very high among Boulder residents who worked in Boulder, with nearly 4 in 10 work commute trips reported as being made by bicycling. This represented about a 10% gain since 2012.

Figure 11: Modal Split of Work Commute Trips by Location of Workplace, 2015

Travel Mode	Location of Workplace		
	Boulder	Denver	Other
Single-Occupancy Vehicle	32.5%	56.9%	68.5%
Multiple-Occupancy Vehicle	6.0%	5.9%	13.0%
Transit	6.0%	27.5%	14.8%
Bicycle	43.7%	3.9%	2.8%
Foot	11.9%	5.9%	0.9%
Total	100.0%	100.0%	100.0%
Number of Work Commute Trips	705	51	108

Figure 12: Modal Split of Work Commute Trips for Boulder Valley Residents Who Work in Boulder, 1990-2015

Travel Mode	Percent of Work Commute Trips for BV Residents Who Work in Boulder											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	32.5%	40.2%	41.5%	48.9%	44.0%	55.0%	59.7%	61.8%	58.3%	59.5%	65.9%	-33.4%
Multiple-Occupancy Vehicle	6.0%	3.5%	5.7%	8.6%	7.1%	7.6%	8.3%	10.0%	11.1%	9.6%	9.7%	-3.7%
Transit	6.0%	11.5%	7.6%	3.5%	7.7%	5.4%	6.3%	2.8%	3.6%	3.7%	2.4%	+3.6%
School Bus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.2%	0.0%	0.0%	0.0%
Bicycle	43.7%	33.3%	30.4%	26.6%	27.8%	21.6%	13.4%	16.0%	16.1%	16.0%	12.5%	+31.2%
Foot	11.9%	11.5%	14.8%	12.4%	13.4%	10.4%	11.9%	9.4%	10.7%	11.3%	9.6%	2.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Work Commute Trips	705	574	648	758	646	786	647	874	856	810	1,048	

Modes with shifts that are statistically significantly different between 1990 and 2015 ($\pm 4\%$) are shaded.

Modes with shifts that are statistically significant different between 2012 and 2015 ($\pm 4\%$) are bolded.

Telecommuting

Telecommuting was defined as follows: “Employees telecommute when they fulfill their job responsibilities at home by substituting telecommunications (computer, Internet/Web and/or telephone) for work-related travel.” Respondents were asked whether they had telecommuted on the day assigned to them to record their travel. Since this question was first asked in 1996, about 10% of the respondents in every study year have reported that they telecommuted on their assigned travel day (see Figure 14). Of those who telecommuted, only about 40% indicated that telecommuting reduced the number of SOV trips they made on the day they completed the travel diary (see Figure 15).

Figure 13: Teleworking Status 2009-2015

Employees telecommute when they fulfill their job responsibilities at home by substituting telecommunications (computer, Internet/Web and/or phone) for work-related travel. How often, if ever, do you telecommute for work? (Note: do not include times you take work home to do in the evenings, only times you work from home instead of traveling to a workplace.)	Percent of Respondents		
	2015	2012	2009
Every work day (I always work from my home)	12.0%	12.7%	7.9%
3 to 4 times per week	2.6%	3.1%	3.9%
2 to 3 times per week	7.3%	5.1%	5.6%
Once or twice a month	15.1%	8.9%	9.8%
Occasionally	15.7%	21.1%	17.2%
Never	47.3%	49.1%	55.7%
Total	100.0%	100.0%	100.0%
<i>Number of Respondents</i>	934	749	839

Figure 14: Telecommuting on Assigned Travel Day, 1996-2015

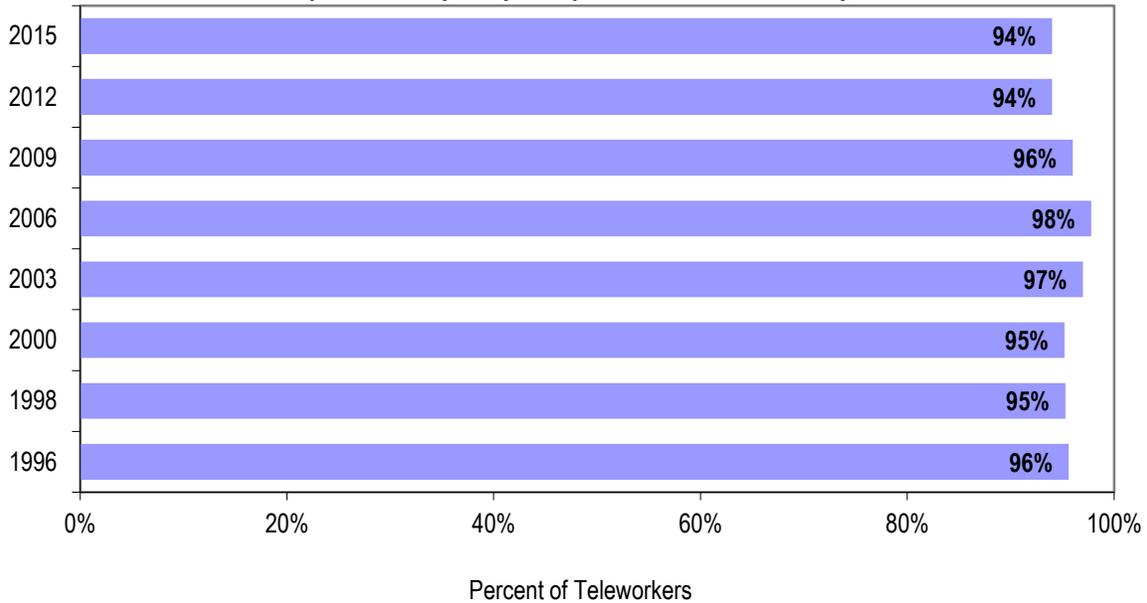
Did you telecommute on the day you completed the travel diary?	Percent of Respondents							
	2015	2012	2009	2006	2003	2000	1998	1996
Yes	11.4%	10.8%	8.1%	12.0%	12.2%	10.4%	11.0%	13.6%
No	88.6%	89.2%	91.9%	88.0%	87.8%	89.6%	89.0%	86.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<i>Number of Respondents</i>	930	742	829	882	890	1,160	1,010	1,056

Figure 15: Did Telecommuting Replace Drive Alone Trips, 2000-2015

Did working at home reduce the number of single-occupancy vehicle (drive alone) trips you made on the day you completed the travel diary compared to days you do not telecommute? (2009 wording)	Did telecommuting reduce the number of single-occupancy vehicle trips you made on the day you completed the travel diary? (2000-2006 wording)	Percent of Respondents Who Telecommuted								
		2015		2012		2009		2006	2003	2000
Yes, reduced about 2 drive-alone trips	Yes	20.6%	37.1%	21.9%	39.4%	17.8%	38.0%	44.8%	44.0%	36.9%
Yes, reduced more than 2 drive-alone trips		16.6%		17.5%		10.2%				
No, I made the same number of drive alone trips	No	62.9%		60.6%		72.0%		55.2%	56.0%	63.1%
Total		100.0%		100.0%		100.0%		100.0%	100.0%	100.0%
<i>Number of Respondents</i>		175		137		156		106	106	144

Almost all respondents who reported teleworking on their assigned travel day and who made any trips on their assigned travel day made at least one work-related trip (Figure 16). Given that only about four in ten thought telecommuting replaced SOV trips, teleworking may not yet be a big replacement of work day trips.

Figure 16: Percent of Teleworkers Who Made Any Trip Who Made a Work-Related Trip on the Day They Completed Their Travel Diary, 1996-2015



Modal Split of University of Colorado Students

In fall 2009 (the latest year for which data are available), 30,196 on-campus degree-seeking students were enrolled at CU-Boulder. Students accounted for just under 21,000 or about 20% of Boulder Valley residents during the school year. The other 9,000 lived outside of Boulder Valley. About 6,000 students, primarily freshmen, lived in 22 campus residence halls, while another approximately 1,500 live in a sorority or fraternity, and the remainder lived in residential units within the Valley. The transportation choices made by the students for all trips are displayed in Figure 17 and for the school commute in Figure 18 on the next page.⁴

The modal split for this group is traditionally quite different than the rest of Boulder’s population due to the students’ high use of alternate modes. In all years, SOVs were used for about 20% to 25% of all CU students’ trips, and for 5% to 10% of the trips made to school. This low use may be attributed to the lower vehicle availability of students (in 2015, 0.78 vehicles per driver for CU students versus 0.92 vehicles per driver for non-students) and the scarcity and cost of parking on campus. It may also be due to the fact that some students must park more than a block from school, and thus recorded the purpose of the automobile portion of their trip as “change travel mode,” and the walk from the car to school as “school” (see footnote 4 below).

In 1998, there was a large increase in the proportion of trips made by students via transit. This may be due to the introduction of the SKIP service, which directly serves the campus along Broadway. However, in 2015 the proportion of all trips made via transit dropped to 1990 levels, and a marked decrease was observed in the proportion of trips made via transit for school trips. These changes were accompanied by a drop in the proportion of all trips and school trips made by walking, and a large increase in the proportion of trips made by bicycling.

Figure 17: Modal Split of All Trips Made by CU Students, 1990-2015

Travel Mode	Percent of Trips Made by CU Students											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	21.1%	19.6%	22.9%	19.1%	26.0%	22.3%	21.0%	17.0%	19.8%	20.6%	24.8%	-3.7%
Multiple-Occupancy Vehicle	12.1%	9.6%	16.3%	17.0%	17.5%	13.3%	17.0%	19.2%	17.3%	19.3%	19.7%	-7.6%
Transit	6.6%	10.3%	10.2%	10.8%	9.7%	10.1%	12.2%	6.2%	5.9%	4.7%	5.7%	+0.9%
Bicycle	34.5%	26.5%	22.9%	25.1%	15.5%	17.0%	11.3%	18.2%	19.2%	23.1%	17.6%	+16.9%
Foot	25.7%	33.9%	27.7%	27.8%	31.4%	37.3%	38.5%	39.3%	37.8%	32.4%	34.2%	-8.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of Trips	1,230	1,168	1,140	1,072	1,747	1,696	1,400	1,379	1,572	1,734	1,901	

Modes with shifts that are statistically significantly different between 1990 and 2015 are shaded.

Modes with shifts that are statistically significant different between 2009 and 2015 are bolded.

⁴ Included in this table are trips for which the recorded purpose was “school”. School trips were not linked as work commute trips were, so parts of the trip that were linked would not be included. For example, if a student walked 2 blocks to the bus, rode the bus for 1 mile, and then walked 3 blocks to school, only the last leg of that trip would be recorded as “school”. The other two legs would be recorded as “change travel mode.”

Figure 18: Modal Split of School Commute Trips Made by CU Students, 1990-2015

Travel Mode	Percent of School Commute Trips Made by CU Students											Change 1990 to 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Single-Occupancy Vehicle	6.8%	4.5%	11.0%	5.2%	13.0%	8.7%	12.6%	5.7%	7.9%	8.8%	10.1%	-3.3%
Multiple-Occupancy Vehicle	0.0%	1.9%	7.3%	1.2%	1.2%	3.6%	5.1%	3.0%	3.0%	1.7%	3.2%	-3.2%
Transit	4.6%	16.8%	12.8%	19.9%	18.9%	10.4%	20.3%	8.0%	7.5%	8.5%	8.9%	-4.3%
Bicycle	52.5%	33.0%	35.3%	42.9%	22.8%	22.7%	15.4%	30.9%	25.9%	31.5%	24.2%	+28.3%
Foot	36.1%	43.8%	33.5%	30.8%	44.0%	54.6%	46.7%	52.4%	55.7%	49.5%	53.6%	-17.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Number of School Commute Trips	219	267	218	181	259	341	296	241	299	364	334	

Modes with shifts that are statistically significantly different between 1990 and 2015 are shaded.

Modes with shifts that are statistically significant different between 2009 and 2015 are bolded.

Trip Characteristics

Summary Characteristics of All Trips

This section of the report explores the characteristics of the trips made by Boulder Valley residents. Figure 19, below, displays summary trip characteristics for all trips, regardless of mode of travel. These trip characteristics have remained fairly steady over the study period, although the average number of miles traveled per day decreased from 2009 to 2012, but then increased again in 2015 to levels a bit higher than what had been observed in 2009.

On average, respondents traveled about 23 miles per day and made about 5½ trips during the 24-hour period assigned to them in 2012, with an average trip length of about 4½ miles. While the average trip distance has not changed much since 1990, the average trip duration has increased about 5 minutes, from 14.4 minutes in 1990 to 19.6 minutes in 2015, possibly due to the changes in the proportion of trips being taken by various modes (e.g., traveling by bicycle usually takes longer than traveling the same distance by car). About 6% of respondents made no trips on their assigned travel day, an increase from the 4% who did so in 1990, but similar to what has been observed in recent years.

Figure 19: Summary Trip Characteristics, All Trips, 1990-2015

Summary Travel Characteristics	Year											Change 1990- 2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Average number of trips per day per person	5.4	4.9	5.1	5.7	5.5	6.1	5.9	6.2	6.1	6.0	5.9	-0.5
Average number of miles per day per person	22.7	18.8	24.7	24.1	27.0	25.2	26.0	27.8	26.9	25.4	24.3	+1.6
Percent of people who did not leave the house on assigned travel day	5.7%	5.7%	5.8%	5.4%	5.2%	4.7%	4.9%	5.2%	4.1%	4.6%	4.1%	+1.6
Average estimated trip length in miles ⁵	4.4	3.8	5.0	4.3	5.1	4.3	4.3	4.7	4.5	4.6	4.0	+0.4
Average estimated trip time in minutes	19.6	15.8	17.0	16.0	15.4	13.5	11.4	13.3	11.8	14.9	14.4	+5.1
Average miles per hour	13.8	13.8	15.7	15.7	16.0	15.4	15.5	15.2	15.9	15.7	15.1	-1.3

Characteristics with changes that are statistically significantly different between 1990 and 2015 are shaded.

Characteristics with changes that are statistically significant different between 2009 and 2015 are bolded.

⁵ Travel Diary Study participants are asked to record the estimated distance in miles or blocks of every trip they make. Thus, trip distance is not measured objectively, but is determined by the respondents' self report. See Appendix E. Study Methodology for a note on the adjustments made to these figures.

Trip Characteristics of the Work Commute

The travel characteristics of work commute trips are displayed in Figure 20. Figure 21 makes comparisons to the national commute. The average work commute of Boulder residents was 5.1 miles in 2015, while the average work commute duration was about 22 minutes. As with all trips, the work trips made by Boulder residents were shorter in length than observed nationally, but the duration has increased enough to be similar to the national average. However, while the distance of the work commute has remained about the same for Boulder residents while increasing for the nation as a whole, the duration of the commute has increased at a faster rate for Boulder residents than nationally, possibly due to the changes in the proportion of trips being taken by various modes (e.g., traveling by bicycle usually takes longer than traveling the same distance by car).

Figure 20: Summary Work Commute Trip Characteristics, All Travel Modes, 1990-2015

Summary Travel Characteristics	Year											Change 1990-2015
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990	
Average estimated trip length in miles	5.1	6.0	6.1	5.5	6.2	5.7	6.2	5.3	6.2	5.9	5.2	-0.1
Average estimated trip time in minutes	22.3	17.7	17.1	17.1	16.7	16.3	12.1	13.7	20.4	16.7	15.1	+7.2
Average miles per hour	14.4	17.1	18.3	17.8	18.6	17.9	18.6	18.1	18.9	19.6	18.4	-4.0

Characteristics with changes that are statistically significantly different between 1990 and 2015 are shaded.
Characteristics with changes that are statistically significant different between 2009 and 2015 are bolded.

Figure 21: Summary Work Commute Trip Characteristics, Boulder Compared to the U.S., 1990-2009/2015

Summary Travel Characteristics	Boulder			U.S.		
	2015	1990	Annual Percent Change	2009	1990	Annual Percent Change
Average estimated trip length in miles	5.1	5.2	-0.14%	11.79	10.65	0.56%
Average estimated trip time in minutes	22.3	15.1	2.31%	23.85	19.60	1.14%

A household travel survey that accompanied the diary asked respondents to identify where they worked if they were employed. In all years, about eight in ten employed respondents work in Boulder.

Figure 22: Location of Respondent’s Workplace, 1990-2015

Location of Workplace	Percent of Respondents										
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Boulder	83.5%	80.6%	76.7%	73.2%	77.4%	62.9%	78.7%	81.7%	80.4%	81.5%	83.1%
Denver	6.0%	6.3%	6.2%	6.3%	6.2%	5.4%	8.7%	8.3%	8.3%	1.0%	8.3%
Longmont	2.0%	2.3%	3.4%	4.8%	3.8%	1.8%	2.5%	1.9%	1.8%	2.2%	1.2%
Broomfield	1.9%	4.1%	2.5%	3.9%	2.4%	2.2%	1.3%	2.5%	2.3%	3.3%	1.3%
Louisville	0.9%	0.8%	2.5%	3.0%	2.3%	2.0%	3.3%	2.2%	2.2%	0.5%	1.8%
Lafayette	0.8%	0.8%	1.8%	1.6%	1.0%	1.0%	0.6%	0.6%	1.7%	2.1%	0.7%
Other location	5.0%	5.1%	6.7%	7.1%	6.8%	24.6%	4.8%	2.9%	3.2%	9.5%	3.6%
Total	100%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Employed Respondents	799	710	787	897	911	1,182	839	895	942	973	1,109

Automobile Trip Characteristics

Figure 23 and Figure 24 summarize the trip characteristics for automobile trips. The proportion of respondents making at least one SOV trip on their assigned travel day has decreased from 65% in 1990 to 48% in 2015; the proportion making at least one MOV trip decreased from 48% in 1990 to 36% in 2015. On average, participants in the 2015 study made 1.7 SOV trips per day; those who made at least one SOV trip made 3.6 trips on average. The average number of carpool trips per respondent in 2015 was about 1. The average trip distance was about 5 miles for SOV trips and about 8 miles for MOV trips. The average trip duration in minutes was about 17 minutes for SOV trips, and about 20 minutes for MOV trips.

Figure 23: Summary Trip Characteristics, SOV Trips, 1990-2015

Summary Travel Characteristics	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of SOV trips per day per person	1.75	1.65	1.80	2.03	2.00	2.36	2.28	2.41	2.37	2.34	2.49
Percent of people making at least one SOV trip	48.1%	49.5%	53.6%	56.8%	56.6%	62.8%	59.5%	60.2%	63.0%	60.0%	64.6%
Average number of SOV trips per day per person who made at least one SOV trip	3.64	3.34	3.36	3.57	3.52	3.76	3.83	4.00	3.77	3.90	3.85
Average estimated trip length in miles	5.2	5.3	6.1	5.2	5.7	5.0	5.1	5.1	5.2	5.2	4.6
Average estimated trip time in minutes	17.2	15.8	16.3	14.6	13.3	11.5	9.6	12.6	11.4	13.7	12.9
Average miles per hour of SOV trips	18.2	19.5	21.1	20.3	21.0	19.7	20.0	19.4	20.5	20.2	19.3

Characteristics with changes that are statistically significantly different between 1990 and 2015 are shaded.

Characteristics with changes that are statistically significant different between 2009 and 2015 are bolded.

Figure 24: Summary Trip Characteristics, MOV Trips, 1990-2015

Summary Travel Characteristics	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of MOV trips per day per person	1.11	0.94	1.14	1.40	1.26	1.38	1.44	1.52	1.49	1.44	1.52
Percent of people making at least one MOV trip	35.9%	32.4%	38.6%	43.3%	40.6%	43.1%	43.7%	46.9%	47.1%	44.2%	47.5%
Average number of MOV trips per day per person who made at least one MOV trip	3.09	2.90	2.95	3.23	3.10	3.20	3.30	3.23	3.16	3.26	3.19
Average estimated trip length in miles	7.8	6.0	7.5	6.2	8.6	6.4	6.1	7.5	6.8	6.6	5.8
Average estimated trip time in minutes	19.9	18.1	17.6	16.4	18.4	14.5	9.8	13.4	12.3	17.1	16.0
Average miles per hour of MOV trips	20.2	19.6	21.0	20.9	21.4	20.1	19.9	19.9	20.3	19.2	18.5

Characteristics with changes that are statistically significantly different between 1990 and 2015 are shaded.

Characteristics with changes that are statistically significant different between 2009 and 2015 are bolded.

Vehicle Miles Traveled per Capita

An estimate was created of per capita vehicle miles traveled (VMT) per adult Boulder Valley resident. This estimate includes miles traveled in a single-occupancy vehicle and in a multiple occupancy vehicle. (This means that some of the MOV miles are “double-counted” because the miles traveled are being assigned to all those in the vehicle.) There is some volatility in these estimates, because there is a certain amount of error around each of the estimates that goes into the calculation. However, the estimated number of vehicle miles traveled per capita has ranged from about 5,000 to 8,000 over the study period.

Figure 25: Vehicle Miles Traveled per Capita, 1990-2015

Calculating per capita VMT	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of SOV trips per day per person	1.75	1.65	1.80	2.03	2.00	2.36	2.28	2.41	2.37	2.34	2.49
Average estimated SOV trip length in miles	5.2	5.3	6.1	5.2	5.7	5.0	5.1	5.1	5.2	5.2	4.6
Estimated SOV VMT per capita per day (average number of trips x average trip length)	9.10	8.75	10.98	10.56	11.40	11.80	11.63	12.29	12.32	12.17	11.45
Average number of MOV trips per day per person	1.11	0.94	1.14	1.40	1.26	1.38	1.44	1.52	1.49	1.44	1.52
Average estimated MOV trip length in miles	7.8	6.0	7.5	6.2	8.6	6.4	6.1	7.5	6.8	6.6	5.8
Estimated MOV VMT per capita per day (average number of trips x average trip length)	8.66	5.64	8.55	8.68	10.84	8.83	8.78	11.40	10.13	9.50	8.82
TOTAL VMT per capita per day (SOV VMT + MOV VMT)	17.76	14.39	19.53	19.24	22.24	20.63	20.41	23.69	22.46	21.67	20.27
TOTAL annual VMT per capita per day (assumes 48 weeks a year)	5,967	4,833	6,562	6,463	7,471	6,932	6,858	7,960	7,545	7,282	6,811

Vehicle Occupancy

The average number of people in an automobile has not changed significantly from 1990 to 2015 (see Figure 26). The average vehicle occupancy for all automobile trips was about 1.4 persons; for MOV trips the average vehicle occupancy was about 2.3 persons. Just over 60% of all automobile trips were made with only one person in the vehicle.

Figure 26: Vehicle Occupancy, 1990-2015

Number of Occupants	Percent of Total Auto Trips										
	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
1	62.1%	64.1%	60.6%	58.9%	61.3%	62.8%	60.9%	60.9%	60.8%	61.3%	61.5%
2	29.2%	27.4%	26.8%	29.3%	28.4%	26.5%	27.3%	27.9%	28.0%	27.2%	26.6%
3	6.1%	5.7%	7.5%	6.8%	6.7%	6.5%	6.7%	7.0%	7.3%	6.5%	7.7%
4	2.0%	2.1%	4.1%	3.6%	2.2%	3.1%	3.8%	3.5%	2.9%	3.6%	2.9%
5 or more	0.6%	0.7%	1.0%	1.3%	1.4%	1.1%	1.3%	0.7%	1.0%	1.4%	1.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average Vehicle Occupancy for all Automobiles	1.50	1.48	1.58	1.60	1.55	1.55	1.58	1.56	1.56	1.57	1.56
Average Vehicle Occupancy for Autos with at Least Two Passengers	2.32	2.34	2.48	2.46	2.41	2.47	2.47	2.42	2.43	2.47	2.46
Number of Trips	3,355	2,640	3,573	4,212	4,722	4,589	4,067	4,375	4,524	4,564	5,310

Vehicle Ownership and Availability

Households can be classified according to their ratio of number of vehicles to eligible drivers. If the ratio is 1:1 or greater, this household can be considered to have “high vehicle availability”.⁶ Persons in households with high vehicle availability tend to drive alone more often.

Vehicle availability and ownership for all study years are shown in Figure 27. The average number of bicycles per household is also displayed in the table. Vehicle availability has declined slightly since 1990, when the average was 1.0 vehicles for every household member aged 16 and over to 0.9 vehicles per household member aged 16 and older. The average number of motorized vehicles per household has also declined somewhat, from 1.83 vehicles per household in 1990 to 1.77 vehicles per household in 2015. Bicycles per household has increased somewhat over the study period, from 1.98 bicycles per household in 1992 (the 1990 household survey did not ask about bicycles) to 2.78 bicycles per household in 2015.

Figure 27: Vehicle Availability, Vehicles per Household and Bicycles per Household, 1990-2015

Vehicle and Bicycle Availability	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average vehicle availability (per person in household 16 or older)	0.89	0.89	0.93	0.90	0.89	0.96	0.92	0.89	0.99	0.98	1.00
Average number of motorized vehicles per household	1.77	1.59	1.66	1.60	1.69	1.79	1.73	1.63	1.78	1.83	1.83
Average number of bicycles per household	2.78	2.48	2.26	2.19	2.21	2.09	2.04	2.00	2.00	1.98	<i>not asked</i>

⁶ Puget Sound Council of Governments: “Household Travel Surveys, 1985-1988 Puget Sound Region”; June 1990.

Transit Trip Characteristics

The characteristics of trips made on the assigned travel day via transit are shown in Figure 28. The proportion of people who made at least one trip on the bus increased from about 5% in 1990 to about 11% in 2015. The average bus trip was about 10 miles, a jump compared to the trend in more recent years. The estimated trip duration was 29 minutes.

Figure 28: Summary Trip Characteristics, Transit Trips, 1990-2015

Summary Travel Characteristics	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of bus trips per day per person	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.1
Percent of people making at least one bus trip	10.7%	11.0%	12.5%	9.2%	11.2%	11.5%	10.3%	8.6%	7.7%	6.0%	4.8%
Average number of bus trips per day per person who made at least one bus trip	1.8	2.0	2.1	2.3	2.1	2.2	2.4	2.0	2.2	2.1	1.9
Average estimated trip length in miles	9.5	5.5	7.9	6.2	6.3	6.6	7.2	9.7	10.1	13.2	10.4
Average estimated trip time in minutes	29.0	22.1	23.8	21.1	20.9	16.6	18.1	18.4	28.3	29.7	29.7
Average miles per hour of transit trips	15.3	13.5	17.0	15.6	15.3	14.9	17.1	17.9	18.1	24.5	18.9

Eco-Pass Status

In previous implementations of the travel diary, study participants were asked whether they had an Eco-Pass, and what kind they held. Starting in 2009, participants were first asked if they were eligible to have an Eco-Pass. Over half of respondents in the last three travel diary implementations said they were eligible for an Eco-Pass (see Figure 29). However, 12% of those eligible for a pass in 2015 and nearly 20% in 2012 and 2009 had not picked up their pass (see Figure 30).

Figure 29: Eco-Pass Eligibility, 2009-2015

Are you eligible to have an Eco-Pass, an annual pass that allows you unlimited bus rides? (Please check all that apply.)*	2015	2012	2009
yes, through my employer	21.8%	20.2%	17.6%
yes, through my neighborhood	10.2%	11.4%	12.0%
yes, a CU Boulder student Buff One pass	20.3%	20.2%	18.0%
yes, CU Boulder faculty/staff Buff One pass	5.4%	5.2%	7.1%
yes, other pass	0.9%	1.6%	1.7%
no, I am not eligible for an Eco-Pass	45.2%	46.1%	47.6%
Number of Respondents	1,117	1,036	1,112

* Percents may add to more than 100% as respondents could give more than one answer.

Figure 30: Eco-Pass Pick-up Status, 2009-2015

Did you pick up a pass (or passes)?**	2015	2012	2009
Yes	88.2%	79.7%	82.8%
No	11.8%	20.3%	17.2%
Total	100.0%	100.0%	100.0%
Number of Respondents	620	561	588

** Only asked of those eligible for an Eco-Pass.

To compare Eco-Pass possession over time, those who were eligible for an Eco-Pass and reported that they had picked one up were considered to have an Eco-Pass. As shown in Figure 31, about 49% of study participants in 2015 held some kind of an Eco-Pass, a proportion that has been increasing over the years. In 2015, about 21% of respondents had an Eco-Pass through their employer (including the University of Colorado faculty/staff BuffOne pass). About 7% held an Eco-Pass through their neighborhood.

Figure 31: Eco-Pass Status, 1998-2015

Do you have an Eco-Pass?	2015 [†]	2012 [†]	2009 [†]	2006	2003	2000	1998
no	51.4%	56.9%	56.4%	61.9%	53.9%	60.7%	61.0%
yes, through employer	15.9%	13.1%	12.4%	12.3%	12.6%	11.2%	10.2%
yes, through neighborhood	7.0%	6.9%	8.1%	4.7%	2.6%	3.9%	3.5%
yes, a CU Boulder student BuffOne Pass	19.8%	17.2%	15.4%	15.9%	23.2%	20.4%	21.2%
yes, a CU Boulder faculty/staff BuffOne pass	5.3%	4.7%	6.5%	3.7%	4.6%	2.9%	4.2%
yes, other pass	0.6%	1.2%	1.2%	1.4%	3.1%	0.9%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	1122	1040	1118	1,154	1,278	1,191	1,035

[†]This percent is an estimate, based on respondent's Eco-Pass eligibility and pick-up status. Since the question asked in 1998 through 2006 was changed in 2009, results may not be directly comparable.

Beginning in 2009, survey participants with an Eco-Pass were asked how often, on average, they used their Eco-Pass. Nearly three-quarters of those with an Eco-Pass use it at least once a month.

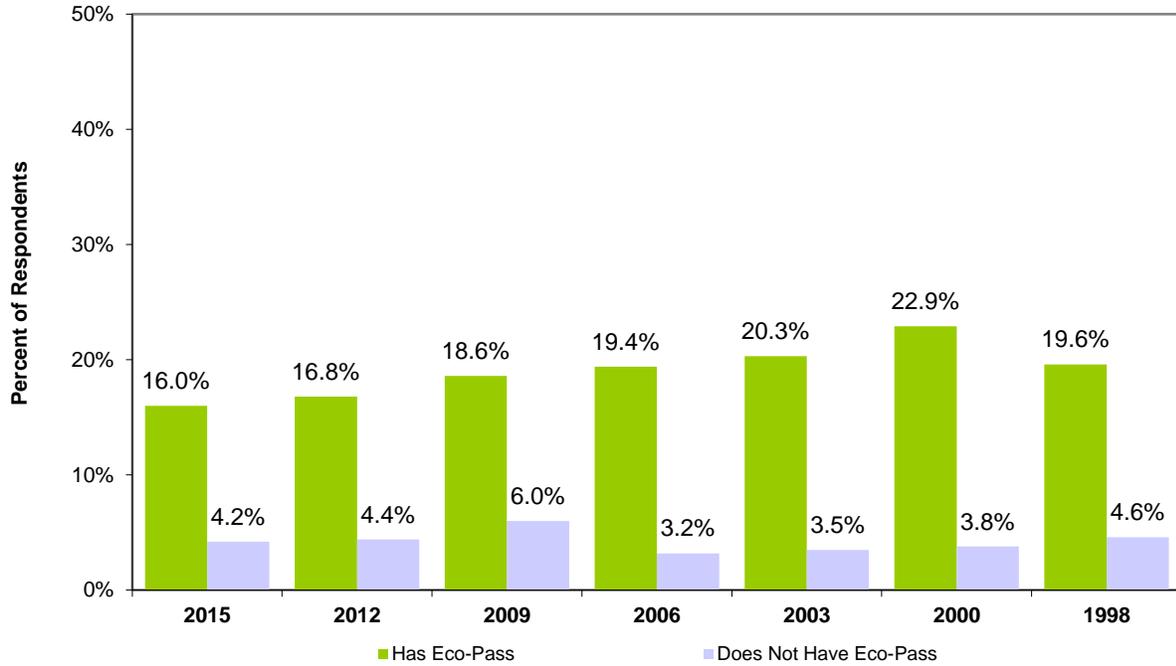
Figure 32: Use of the Eco-Pass, 2009-2015

About how often, on average, do you use your Eco-Pass?*	2015	2012	2009
More than once a week	31.2%	33.0%	41.4%
About once a week	11.1%	11.8%	15.4%
About once every two weeks	16.8%	15.1%	10.2%
About once a month	16.7%	17.8%	10.7%
Less often than once a month	24.3%	22.3%	22.3%
Total	100.0%	100.0%	100.0%
Number of Respondents	552	449	488

** Only asked of who have an Eco-Pass.

Bus ridership has been positively associated with having an Eco-Pass. Since 1998, between 3% and 6% of non-Eco-Pass holders made at least one bus trip compared to 16% to 23% of Eco-Pass holders (Figure 33).

Figure 33: Bus Ridership by Eco-Pass Status: Percent of Respondents Who Made at Least One Trip on the Bus



Non-Vehicle Trip Characteristics: Walking and Biking

In all study years about a third of respondents made at least one walking trip on their assigned travel day (see Figure 34). Walking trips have tended to be quite short in distance; the average trip length was 0.8 miles in 2015. The proportion of respondents making one or more trips by bicycle on their assigned travel day increased from 15% in 1990 to 33% in 2015, with a large increase from 2012 to 2015 (see Figure 35). In 2015 the average distance of a bike trip was about 2 miles and took about 24 minutes to complete.

Figure 34: Summary Trip Characteristics, Pedestrian Trips, 1990-2015

Summary Travel Characteristics	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of pedestrian trips per day per person	0.90	0.92	0.86	0.99	0.98	1.15	1.21	1.21	1.11	0.97	1.04
Percent of people making at least one pedestrian trip	34.3%	30.8%	33.0%	34.6%	34.8%	36.9%	39.1%	39.9%	36.9%	34.8%	33.0%
Average number of pedestrian trips per day per person who made at least one pedestrian trip	2.61	2.99	2.62	2.85	2.81	3.11	3.09	3.04	3.00	2.78	3.16
Average estimated pedestrian trip length in miles	0.8	0.7	0.7	0.9	0.9	0.7	0.8	0.7	0.7	0.7	0.7
Average estimated pedestrian trip time in minutes	17.4	13.2	14.9	17.3	13.6	14.8	15.3	15.1	15.1	13.6	14.4
Average miles per hour of pedestrian trips	3.3	3.7	3.2	3.6	3.9	2.8	3.5	3.3	3.6	3.4	3.3

Figure 35: Summary Trip Characteristics, Bicycle Trips, 1990-2015

Summary Travel Characteristics	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Average number of bicycle trips per day per person	0.97	0.84	0.72	0.70	0.70	0.55	0.45	0.52	0.65	0.66	0.50
Percent of people making at least one bicycle trip	32.7%	25.2%	23.9%	20.4%	23.2%	17.1%	15.0%	16.6%	19.8%	20.9%	15.2%
Average number of bicycle trips per day per person who made at least one bike trip	2.95	3.31	3.01	3.44	3.02	3.24	3.00	3.16	3.28	3.14	3.28
Average estimated bicycle trip length in miles	1.8	1.9	2.5	2.2	2.8	2.0	2.4	2.2	2.3	2.0	2.1
Average estimated bicycle trip time in minutes	23.5	14.6	18.3	16.3	16.9	15.4	13.6	14.3	9.5	14.1	15.1
Average miles per hour	7.7	7.8	8.1	8.1	8.8	8.2	8.7	8.4	8.4	7.7	8.2

Biking for Work, Errands and Recreation

Beginning in 2000, respondents have been asked about their bicycle use for work and for recreation. People surveyed were asked how many times each week, if at all, they biked to work. Additionally, they were asked the number of times per week they used a bike for recreational trips. In 2009, the question was changed to ask about three types of trips: commuting, shopping/meals/errands and fun or exercise. Nearly 6 in 10 respondents since 2009 have said they used a bike for some kind of trip at least once in the previous week (see Figure 38).

About 4 in 10 respondents in 2015 said they had used a bicycle at least once in the previous week to shop, get a meal or run errands, similar to what had been observed in 2009 and 2012. Likewise, about 4 in 10 respondents in 2015 reported having ridden a bicycle for fun or exercise at least once in the previous week, as had been seen in 2009 and 2012. However, an increase in the proportion of respondents who reported riding a bicycle for the work commute was seen, with most of the increase in the proportion of respondents who said they rode a bike for the commute 5 days or more. This increased from 19% in 2012 to about 24% in 2015.

Figure 36: Use of Bicycle in Previous Week for Shopping/Errands, Fun/Exercise and Commuting, 2009-2015

In the last week, about how frequently have you ridden a bicycle:	to shop, get a meal or run errands			for commuting			for fun or exercise		
	2015	2012	2009	2015	2012	2009	2015	2012	2009
5 or more times	8.7%	8.9%	8.3%	23.5%	19.0%	17.3%	4.5%	2.6%	4.3%
3 to 4 times	9.8%	10.9%	9.5%	8.0%	7.8%	9.7%	7.8%	11.5%	13.3%
Once or twice	19.7%	17.4%	21.0%	7.7%	9.9%	9.3%	28.8%	27.0%	23.6%
Not at all	61.8%	62.9%	61.2%	60.7%	63.3%	63.7%	58.9%	59.0%	58.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	1,127	1,047	1,120	1,126	1,047	1,120	1,128	1,047	1,120

Figure 37: Bicycle Trips for Work and Recreation, 2000-2015

Number of Times a Bicycle was used	Bicycle trips for work (commuting)						Bicycle trips for recreation/fun or exercise/shop/meals/errands					
	2015	2012	2009	2006	2003	2000	2015	2012	2009	2006	2003	2000
5 or more times per week	23.5%	19.0%	17.3%	16.0%	18.5%	14.1%	11.2%	10.5%	10.0%	6.9%	6.1%	6.7%
4 times per week or less	15.7%	17.7%	19.0%	24.7%	22.1%	21.0%	40.6%	43.5%	43.3%	53.6%	48.5%	50.4%
Not at all	60.7%	63.3%	63.7%	59.3%	59.4%	64.9%	48.2%	45.9%	46.7%	39.5%	45.5%	42.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	1,126	1,047	1,121	1,154	1,269	1,180	1,126	1,047	1,121	1,154	1,269	1,180

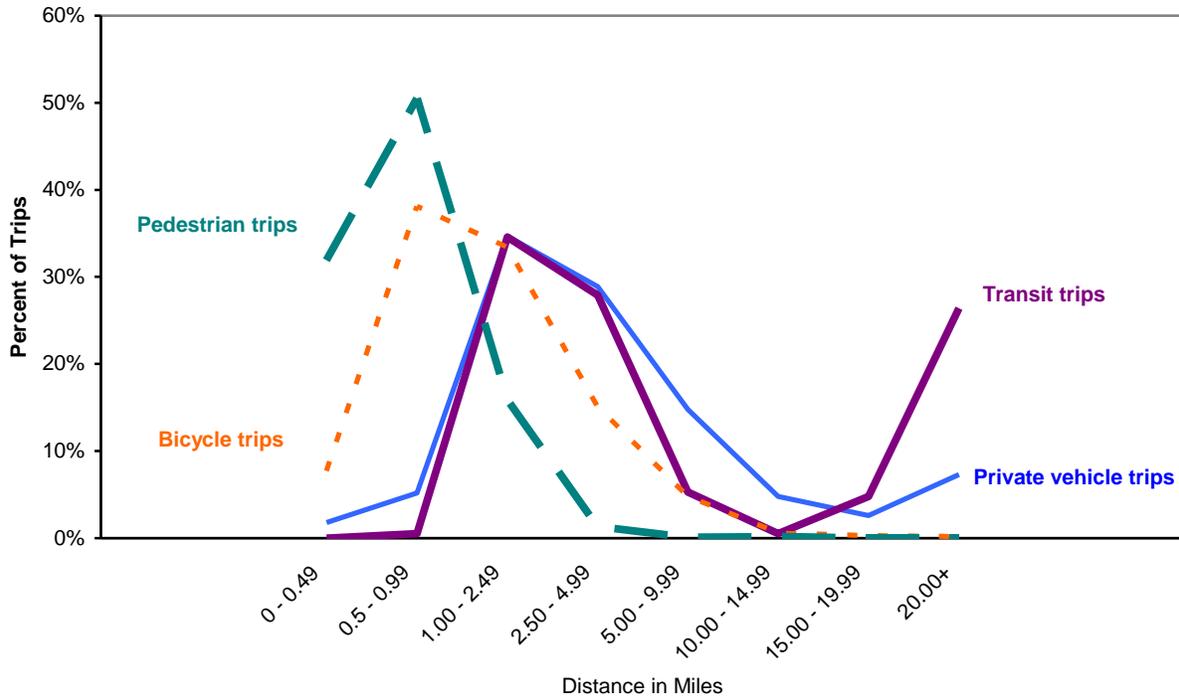
Figure 38: Bicycle Trips in Previous Week or Month, 2000-2015

Ever use a bike to shop/run errands, fun/exercise, or commuting in the last week (2009) or month (2000-2006)?	2015	2012	2009	2006	2003	2000
Yes	59.3%	58.0%	58.2%	65.0%	61.7%	61.9%
No	40.7%	42.0%	41.8%	35.0%	38.3%	38.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Respondents	1,126	1,047	1,121	1,154	1,269	1,180

Trip Distance

In Figure 39, trip distances are exhibited by mode of travel. For motorized vehicle trips, private vehicle trips and transit, distances tend to be either of middle distance, between one and two-and-a-half miles, or over a longer length (20 or more miles). These “peaks” are even more evident for bus trips than for drive alone or carpool trips. Bike and walk trips, on the other hand, tend to be much shorter, especially for walking trips.

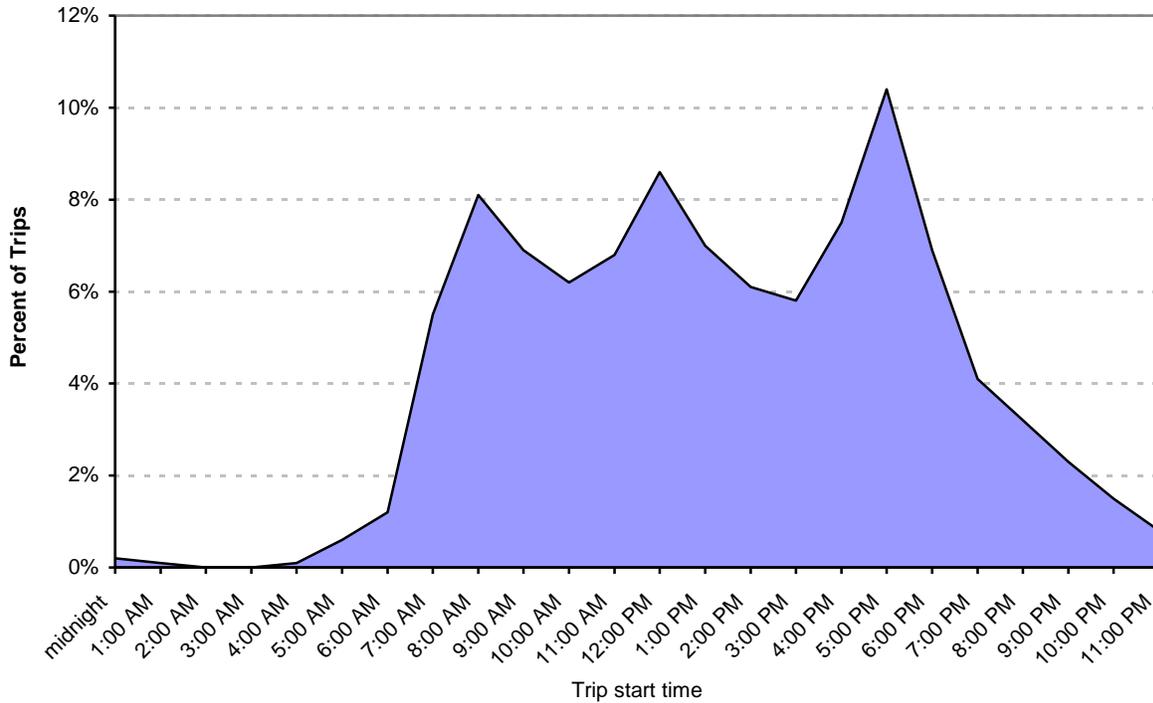
Figure 39: Trip Distance by Mode of Travel, 2015



Trip Start Times

Trip start and end times were recorded by respondents as they kept track of their travel throughout their assigned travel day. The graph in Figure 40 shows when travel activity took place. Most travel occurred between 6:00 am and 8:00 pm, with a large spike during the afternoon commute time (about 4:00 pm to 6:00 pm), and smaller peaks for the morning commute time and the noontime lunch hour.

Figure 40: Time When Trip Began, 2015



Deliveries to the Home or Office

Beginning in 1998, study participants were asked about certain behaviors which might replace trips. They were asked whether they had any goods or services delivered to their work or home and whether they had telecommuted on their assigned travel day (see page 13 for information on telecommuting).

About 8% of respondents in 1998 had received at least one delivery on their assigned travel day, and about 10% received a delivery in 2015 (see Figure 41). A greater proportion of respondents who had received a delivery in 2015 felt that the delivery took the place of a drive alone a trip compared to previous years (see Figure 42).

Figure 41: Deliveries Received by Respondents, 1998-2015

Percent of Respondents Who Received Any Deliveries On Their Assigned Travel Day	2015	2012	2009	2006	2003	2000	1998
No, did not receive deliveries	90.4%	93.7%	94.9%	93.6%	93.8%	94.6%	92.1%
Yes, received deliveries	9.6%	6.3%	5.1%	6.4%	6.2%	5.4%	7.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<i>Number of respondents</i>	1,109	1,036	1,107	1,130	1,262	1,150	1,008

Figure 42: Did Deliveries Replace Any Drive Alone Trips, 2000-2015

Did the delivery substitute for a travel trip you might have made to seek the good or service?*	2015	2012	2009	2006	2003	2000
Yes	51.0%	36.4%	46.3%	41.8%	43.7%	44.2%
No	49.0%	63.6%	53.7%	58.2%	56.3%	55.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<i>Number of respondents</i>	104	67	54	72	81	97

***Question only asked of those who had received deliveries.*

Purpose of Travel

In addition to recording information about the time of day and mode of transportation used for each trip, respondents were also asked to document the purpose of each trip they made. Figure 43 (below) and Figure 44 (on the next page) show the reasons for travel by trips made and by miles traveled, respectively. Patterns of trip purpose were fairly similar over the entire study period. Aside from the “go home” trips (about a third of all trips and miles) and work-related trips (14% of trips and 16% of miles in 2015), recreational trips account for one of the largest proportion of trip purposes; 16% of trips and 20% of miles in 2015. Shopping accounted for about 10% of trips and 6% of miles.

Figure 43: Purpose of Trips, 1990-2015

Trip Purpose		2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Go Home		35.0%	34.7%	33.7%	33.1%	33.3%	33.7%	32.0%	31.6%	32.8%	32.3%	33.6%
Work	Work Commute	8.8%	9.2%	8.6%	8.5%	9.2%	9.0%	8.8%				
	Other Work/ Business	14.3%	13.8%	13.9%	13.9%	13.2%	13.1%	13.1%	15.5%	14.4%	14.1%	15.1%
Social/Recreation		16.4%	13.4%	16.2%	14.8%	16.2%	12.9%	14.4%	13.9%	13.5%	12.6%	12.3%
Shopping		9.6%	11.1%	10.3%	11.5%	10.8%	11.0%	10.2%	11.3%	10.6%	11.7%	11.0%
Personal Business		7.3%	6.3%	6.5%	8.6%	8.1%	8.7%	9.5%	10.1%	9.4%	11.1%	11.9%
School		4.7%	6.3%	4.6%	3.8%	5.5%	5.5%	6.0%	4.6%	5.4%	6.5%	5.6%
Eat a Meal		5.6%	7.1%	6.3%	5.4%	5.0%	5.3%	5.9%	6.1%	3.5%	5.4%	4.6%
Drive a Passenger		3.5%	4.8%	3.9%	4.7%	4.5%	5.0%	4.7%	4.3%	4.4%	3.8%	4.0%
Change Travel Mode		3.1%	2.5%	4.2%	3.5%	3.1%	4.8%	4.2%	2.7%	5.4%	2.0%	1.7%
Other		0.4%	0.0%	0.4%	0.7%	0.2%	0.0%	0.1%	0.0%	0.5%	0.6%	0.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of trips		5,763	4,830	5,496	6,076	6,373	6,773	5,981	6,446	6,711	6,672	7,350

Figure 44: Purpose of Trips Miles, 1990-2015

Trip Purpose		2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Go Home		35.7%	35.4%	34.3%	35.5%	30.3%	32.5%	31.7%	32.1%	32.7%	33.8%	34.3%
Work	Work Commute	10.0%	14.9%	10.7%	11.1%	11.0%	11.8%	10.5%				
	Other Work/ Business	16.4%	18.6%	15.6%	15.6%	15.6%	18.3%	18.1%	16.6%	19.2%	18.1%	18.1%
Social/Recreation		19.9%	15.0%	21.4%	15.2%	25.8%	16.4%	18.3%	18.6%	17.9%	18.1%	16.8%
Shopping		6.3%	8.4%	6.9%	8.5%	7.0%	8.7%	6.6%	7.0%	5.7%	7.3%	7.8%
Personal Business		6.8%	5.7%	6.3%	7.6%	7.5%	6.9%	7.5%	10.2%	7.9%	8.4%	11.1%
School		1.3%	3.4%	1.6%	2.6%	2.8%	1.8%	2.8%	1.6%	2.4%	3.1%	2.5%
Eat a Meal		4.5%	4.0%	3.1%	4.2%	2.8%	3.4%	3.3%	3.6%	5.9%	3.4%	2.7%
Drive a Passenger		5.0%	6.6%	5.4%	5.5%	4.7%	5.6%	5.8%	6.2%	4.8%	3.8%	3.8%
Change Travel Mode		3.7%	2.7%	5.0%	4.2%	3.4%	6.4%	5.9%	4.2%	3.1%	3.4%	3.0%
Other		0.4%	0.0%	0.4%	1.1%	0.1%	0.0%	0.1%	0.0%	0.4%	0.5%	0.1%
Total		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of trips		25,304	18,251	26,983	25,742	31,195	28,657	25,538	30,033	30,282	29,710	29,587

Trip purpose by travel mode is exhibited in Figure 45, while Figure 46, which is similar to Figure 45, displays the modal split of trips by the trip purpose. The types of trips most likely to have been made by driving alone in 2015 were work-related trips and shopping trips. The trips most likely to be made by transit were “change travel mode,” school and work. Social/recreation trips and the work commute and school commute were a popular choice for traveling by bicycle.

Figure 45: Purpose of Trips by Travel Mode, 2015

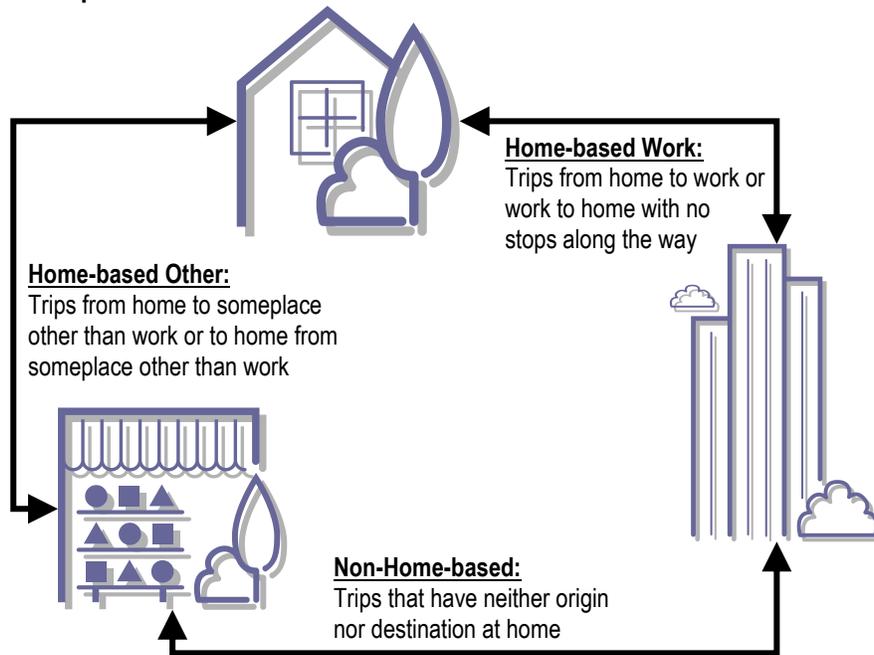
Trip Purpose	Percent of Trips by Travel Mode				
	Single-Occupancy Vehicle	Multiple-Occupancy Vehicle	Transit	Bicycle	Foot
go home	36.3%	34.0%	30.0%	38.2%	31.1%
personal business	11.2%	7.2%	3.8%	3.9%	4.1%
shopping	13.5%	11.9%	0.5%	5.0%	6.1%
school	1.2%	0.6%	8.9%	11.1%	8.8%
work or work commute	9.8%	2.2%	17.8%	14.7%	6.5%
other work/business	8.2%	2.7%	5.6%	3.8%	5.5%
social/recreation	11.4%	19.8%	5.2%	16.8%	24.3%
change travel mode	2.0%	0.9%	23.0%	1.6%	5.9%
drive a passenger	2.5%	10.8%	0.0%	0.7%	0.1%
eat a meal	3.5%	9.3%	5.2%	3.9%	7.5%
other	0.4%	0.6%	0.0%	0.3%	0.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Number of trips	2,085	1,270	213	1,173	1,024

Figure 46: Modal Split of All Trips by Trip Purpose, 2015

Modal Split of All Trips	Percent of Trips by Trip Purpose									
	go home	personal business	shopping	School	work or work commute	other work/business	social/recreation	change travel mode	drive a passenger	eat a meal
SOV	37.5%	55.5%	50.8%	9.5%	40.0%	53.6%	25.1%	22.7%	26.6%	22.5%
MOV with adults	14.2%	16.6%	18.9%	.4%	5.1%	9.5%	20.4%	5.0%	32.7%	31.1%
MOV with children	7.2%	5.2%	8.3%	2.6%	.4%	1.6%	6.1%	1.7%	36.2%	4.9%
Transit	3.2%	1.9%	.2%	7.0%	7.5%	3.8%	1.2%	27.1%		3.4%
Bicycle	22.2%	10.9%	10.6%	47.6%	33.9%	13.9%	20.8%	10.5%	4.0%	14.1%
Foot	15.8%	10.0%	11.2%	33.0%	13.1%	17.7%	26.3%	33.1%	.5%	23.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	2018	422	555	273	510	317	945	181	199	325

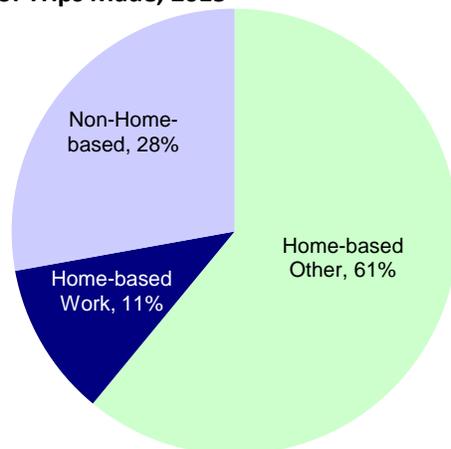
Traditional transportation planning has often focused on origins and destinations of trips, particularly those based at home or work, to study trends regarding trip purpose. Thus trips have often been classified in more aggregated categories of purpose depicting “home-based work” trips, “home-based other” trips and “non-home” trips. The following figure with definitions describes the classification scheme.⁷

Figure 47: Types of Trips



Boulder residents’ trips were categorized using this model. The proportion of trips made with origins and destinations of “home work”, “home other” and “non-home” was similar for all study years. A majority of trips were made between respondents’ homes and a destination other than work. One of three trips neither began nor ended at home. About 11% of trips were direct travel between work and home.

Figure 48: Types of Trips Made, 2015



⁷ This coding scheme was taken from the Puget Sound Council of Governments Travel Study, 1985. Some small alterations were made to the scheme.

The typology of trips by travel mode used is presented in Figure 49, while Figure 50 shows the modal split of all trips by the trip type category. Among all modes, home-other trips were the most common, except for the transit trips, which were often non-home based (probably due to the use of another mode to get to or from the bus). Home-work trips were the type most likely to have been made via SOV, while alternate mode use was a bit higher for home-other and non-home trips.

Figure 49: Type of Trips by Mode of Trip, 2015

Trip Type	Percent of Trips by Travel Mode				
	Single-Occupancy Vehicle	Multiple-Occupancy Vehicle	Transit	Bicycle	Foot
Home-based Other	58.5%	69.8%	35.3%	59.8%	61.8%
Home-based Work	13.5%	1.6%	14.9%	22.3%	5.2%
Non-home Based	28.0%	28.7%	49.8%	17.9%	33.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
<i>Number of trips</i>	2,083	1,270	215	1,171	1,022

Figure 50: Modal Split of All Trips by Type of Trip, 2015

Modal Split of All Trips	Percent of Trips by Type of Trip		
	Home-based Other	Home-based Work	Non-home Based
SOV	34.7%	43.4%	36.4%
MOV with adults	16.8%	2.8%	17.9%
MOV with children	8.4%	0.3%	4.8%
Transit	2.2%	4.9%	6.7%
Bicycle	19.9%	40.3%	13.1%
Foot	18.0%	8.2%	21.0%
Total	100.0%	100.0%	100.0%
<i>Number of trips</i>	3,512	647	1,603

Appendix A. National Travel Data

This appendix contains data from other sources about travel behavior in the nation as whole, to which the travel behavior of Boulder Valley residents can be compared. The data sources included are the National Household Transportation Survey and the U.S. Census.

The 2009 National Household Transportation Survey (NHTS, formerly the National Personal Transportation Study (NPTS)), commissioned by the U.S. Department of Transportation, is a study of the travel patterns of the nation as a whole using a diary methodology similar to the one used in this research project.

The NHTS was conducted previously in 2001, and the NPTS in 1995, 1990, 1983, 1977 and 1969. Comparisons are made in this report between the 1990 NPTS and the 2009 NHTS to the Boulder Travel Diary Study of 1990 and 2009 so that the time periods between the national study and the Boulder study overlap. This way, comparisons can be made between temporal trends and point-in-time observations, to understand how Boulder’s travel patterns may differ from those seen nationally.

In general, Boulder Valley residents made somewhat more trips per day compared to the U.S. population. The average trip distance of Boulder Valley residents was about half of that observed among residents in the nation as a whole. Work commute distances and durations of Boulder residents were somewhat lesser than that of U.S. residents. The number of personal vehicles per household decreased among Boulder residents from 1.83 in 1990 to 1.66 in 2009, while it increased slightly among U.S. residents.

Figure 51: Household and Travel Characteristics, Boulder Compared to the U.S.

Characteristic	Boulder				U.S.			
	2009	2000	1996	1990	NHTS 2009	NHTS 2001	NPTS 1995	NPTS 1990
Average number of trips	5.1	6.1	6.2	5.9	3.79	3.74	4.30	3.76
Average trip distance, all trips	5.0	4.3	4.7	4.0	9.75	10.04	9.13	9.47
Average work-related trip distance	6.1	5.7	5.3	5.2	11.79	12.11	11.63	10.65
Average work-related trip duration	17.1	16.3	13.7	15.1	23.85	23.32	20.65	19.60
Personal vehicles per household	1.66	1.79	1.63	1.83	1.86	1.89	1.78	1.77

Over the period of 1990 to 2009, the proportion of trips made by Boulder Valley residents in a private vehicle have decreased from 70.5% to 60.8%, an average annual decrease of 0.51%. In the U.S. as a whole, the decline was from 87.7% in 1990 to 83.4% in 2009, an average annual decrease of 0.23%.

Figure 52: Modal Split of All Trips, Boulder Compared to the U.S.

Travel Mode	Boulder				NHTS/NPTS	
	2009		1990		2009	1990
SOV	37.1%	60.8%	44.2%	70.5%	83.4%	87.7%
MOV	23.7%		26.3%			
Public Transportation/Transit	5.4%		1.6%		1.9%	1.8%
Walk	17.9%		18.2%		10.4%	7.2%
School Bus	0.1%	16.0%	0.6%	9.9%	4.2%	3.3%
Bike	15.9%		9.1%			
Total	100.0%		100.0%		100.0%	100.0%

The proportion of miles traveled by private vehicle was similar in Boulder and the nation in 1990, about 88% (see Figure 53). From 1990 to 2009, however, the proportion of miles traveled by Boulder residents dropped to 82%, a 6% shift away from private vehicles, while it remained unchanged among U.S. residents. Miles traveled by public transit was somewhat higher among Boulder residents in 1990 and 2009 compared to national residents, and increased slightly in Boulder over the time period, while remaining relatively stable in the nation.

Figure 53: Modal Split of All Miles, Boulder Compared to the U.S.

Travel Mode	Boulder				NHTS/NPTS	
	2009		1990		2009	1990
SOV	46.1%	82.0%	50.0%	87.7%	88.4%	88.4%
MOV	35.9%		37.7%			
Public Transportation/Transit	6.9%		4.1%		1.5%	2.1%
Walk	2.5%	11.1%	3.0%	8.1%	10.2%	9.5%
School Bus	0.5%		0.2%			
Bike	8.1%		4.9%			
Total	100.0%		100.0%		100.0%	100.0%

In examining the proportion of work commute trips made by personal vehicle, a decrease from 76.5% in 1990 to 55.9% in 2009 was observed among Boulder Valley residents, representing an average annual decrease of 1.08%. However, in the U.S., from 1990 to 2009, a small increase in the proportion of work commute trips made by personal vehicle was observed.

Figure 54: Modal Split of Work Commute Trips, Boulder Compared to the U.S.

Travel Mode	Boulder				NHTS/NPTS*	
	2009		1990		2009	1990
SOV	47.4%	55.9%	66.6%	76.5%	89.4%	87.8%
MOV	8.5%		9.9%			
Public Transportation/Transit	9.7%		4.0%		5.1%	5.3%
Walk	11.1%		8.9%		2.8%	4.0%
Bike/Other	23.3%		10.6%		2.7%	2.9%
Total	100.0%		100.0%		100.0%	100.0%

* This represents usual commute mode, not mode used on travel day.

Likewise, in examining the number of miles traveled for the work commute, an average annual decrease of 0.74% was observed among Boulder Valley residents from 1990 to 2009, while the proportion of miles traveled for the work commute by personal vehicle remained steady from in the same time frame among the U.S. as a whole.

Figure 55: Modal Split of Work Commute Miles, Boulder Compared to the U.S.

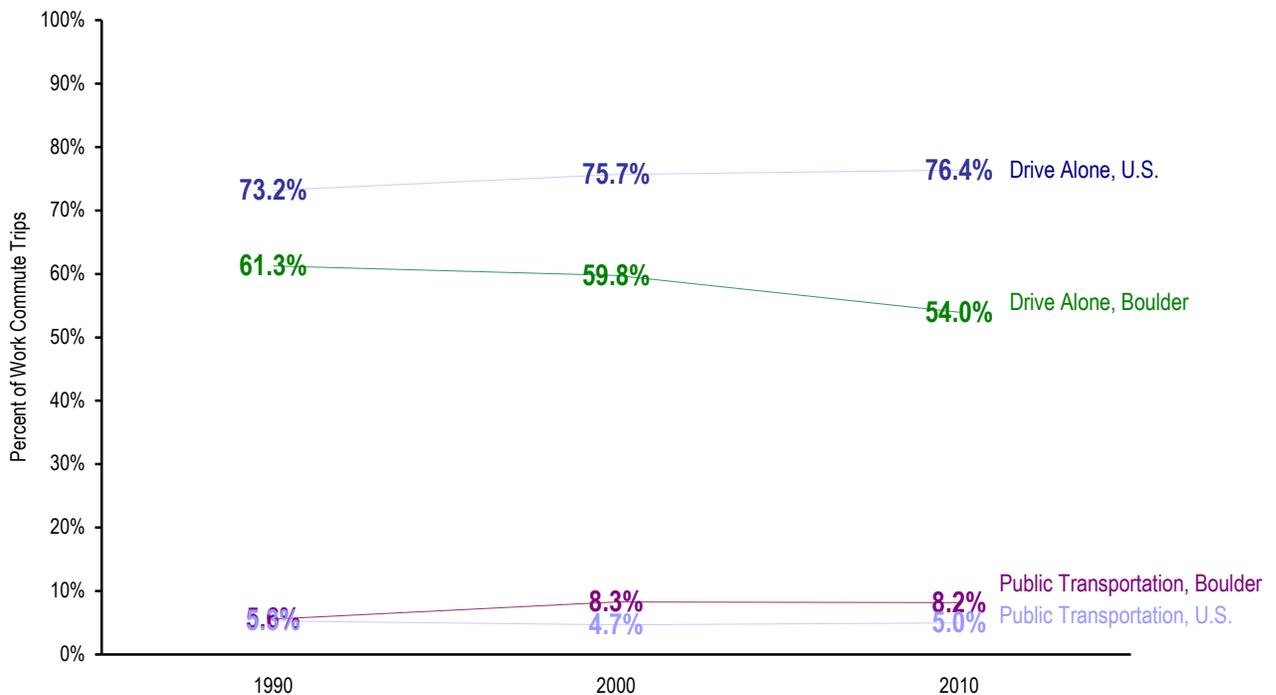
Travel Mode	Boulder				NHTS/NPTS	
	2009		1990		2009	1990
SOV	59.7%	68.8%	71.9%	82.8%	94.9%	94.5%
MOV	9.1%		10.9%			
Public Transportation/Transit	19.5%		11.2%		4.2%	2.6%
Walk	1.1%	11.7%	1.3%	6.0%	0.9%	2.9%
Bike	10.6%		4.7%			
Total	100.0%		100.0%		100.0%	100.0%

The 1990, 2000 and 2010 Census report modal split estimates for the “Journey to Work”. The data are derived by asking residents about their usual mode of travel to work. As one might expect, Boulder residents used SOVs far less and alternate modes more frequently for the work commute when compared to the rest of the nation. Additionally, while a slight increase was seen in the proportion of work commutes made by driving alone in the U.S. as a whole, in Boulder a decrease was observed (see Figure 57). An increase was also observed in the proportion of work commutes in Boulder made by public transportation, bicycling, walking and working at home.

Figure 56: Census Journey to Work Data, Boulder Compared to the U.S., 1990-2010

Travel Mode	Percent of People Using Mode						Difference Between Boulder and U.S. 2010
	Boulder			U.S.			
	2010	2000	1990	2010	2000	1990	
Drive alone	54.0%	59.8%	61.3%	76.4%	75.7%	73.2%	-22.4%
Carpool	6.3%	8.7%	9.5%	9.7%	12.2%	13.4%	-3.4%
Public transportation (bus, trolley, subway, etc.)	8.2%	8.3%	5.6%	5.0%	4.7%	5.3%	+3.2%
Worked at home	11.8%			4.3%			+7.5%
Walked	9.0%	15.5%	15.8%	2.8%	6.2%	6.9%	+6.2%
Bicycle	9.6%			0.6%			+9.0%
Other means (motorcycle, etc.)	1.1%	7.6%	7.8%	1.2%	1.2%	1.3%	-0.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

Figure 57: Census Journey to Work: Boulder Compared to the U.S., 1990-2010/2012



Appendix B. Modal Split by Trip and Respondent Characteristics

This section contains breakdowns of modal split of all trips, and modal split of work commute trips by respondent characteristics. It also displays the percent of respondents making at least one trip by each mode on the assigned travel day by respondent characteristics. Figure 58 below displays the proportions of survey participants in each of the categories displayed on the following pages. Where differences between subgroups are statistically significant, they are highlighted in grey.

Figure 58: Respondent Characteristics

Survey Respondent Characteristic		Percent of Respondents
Sex	Male	50%
	Female	50%
Age	16-34	53%
	35-54	28%
	55+	19%
CU Student Status	Not a Student	77%
	Student at CU-Boulder	23%
Tenure	Owner-Occupied	47%
	Renter-Occupied	53%
Type of Housing Unit	Attached housing unit	56%
	Single family, detached	44%
Children in Household	No	83%
	Yes	17%
Vehicles to Driver Ratio	Less than one car per driver	32%
	One or more cars per driver	68%
Any bikes in household?	Yes, at least one bike	89%
	No bikes	11%
Eco-Pass Status	No, do not have an Eco-Pass	44%
	Yes, have an Eco-Pass	56%
Day of Week	Weekday	76%
	Weekend	24%

Figure 59: Modal Split of All Trips by Respondent Characteristics, part 1

Modal Split of All Trips	Sex of Respondent		Age of Respondent			CU Student?	
	male	female	16-34	35-54	55+	NOT a student	CU student
Single-Occupancy Vehicle	32.3%	38.4%	26.9%	37.7%	54.5%	39.5%	21.1%
Multiple-Occupancy Vehicle with Adults Only	15.5%	14.3%	16.7%	8.5%	19.8%	16.1%	11.3%
Multiple-Occupancy Vehicle with Children	3.8%	9.8%	3.5%	15.2%	3.4%	8.5%	.9%
Bus (Transit), including School Bus	4.0%	3.4%	4.6%	2.9%	2.7%	2.9%	6.6%
Bicycle	28.5%	14.1%	27.0%	20.8%	6.6%	17.4%	34.5%
Foot	15.9%	19.9%	21.3%	15.0%	12.9%	15.6%	25.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=2687	N=2664	N=2822	N=1496	N=1043	N=4134	N=1230

Figure 60: Modal Split of All Trips by Respondent Characteristics, part 2

Modal Split of All Trips	Have Children?		Tenure Status		Type of Housing Unit	
	No children	Have children	Owner-Occupied	Renter-Occupied	Attached (Multi-Family Housing)	Detached (Single-Family)
Single-Occupancy Vehicle	36.9%	27.5%	43.1%	33.3%	33.5%	41.5%
Multiple-Occupancy Vehicle with Adults Only	17.2%	4.2%	15.9%	14.7%	15.8%	13.9%
Multiple-Occupancy Vehicle with Children	1.8%	30.8%	9.6%	4.8%	2.8%	12.5%
Bus (Transit), including School Bus	3.8%	3.3%	2.2%	4.9%	5.0%	2.5%
Bicycle	21.2%	21.9%	15.6%	22.2%	20.5%	18.8%
Foot	19.1%	12.4%	13.5%	20.1%	22.5%	10.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=4452	N=901	N=2342	N=2652	N=2864	N=2256

Figure 61: Modal Split of All Trips by Respondent Characteristics, part 3

Modal Split of All Trips	Ratio of Autos to Drivers		HH own any bikes?	
	Less than 1 vehicle per driver	1 or more vehicles per driver	Yes	No
Single-Occupancy Vehicle	24.0%	43.1%	33.5%	47.8%
Multiple-Occupancy Vehicle with Adults Only	16.5%	14.3%	13.3%	29.0%
Multiple-Occupancy Vehicle with Children	4.3%	8.3%	7.3%	2.0%
Bus (Transit), including School Bus	6.7%	2.6%	3.7%	3.9%
Bicycle	26.0%	16.9%	24.1%	.2%
Foot	22.6%	14.9%	18.1%	17.0%
Total	100.0%	100.0%	100.0%	100.0%
	N=1636	N=3466	N=4735	N=570

Figure 62: Modal Split of All Trips by Respondent Characteristics, part 4

Modal Split of All Trips	Have an Eco-Pass?		Day of the Week	
	No, don't have	Yes, have Eco-Pass	weekend	weekday
Single-Occupancy Vehicle	46.0%	27.1%	35.2%	36.0%
Multiple-Occupancy Vehicle with Adults Only	17.8%	12.8%	24.0%	13.2%
Multiple-Occupancy Vehicle with Children	9.4%	4.7%	8.4%	5.8%
Bus (Transit), including School Bus	1.3%	5.6%	2.8%	4.4%
Bicycle	13.7%	27.1%	13.0%	22.8%
Foot	11.8%	22.6%	16.5%	17.9%
Total	100.0%	100.0%	100.0%	100.0%
	N=2343	N=3023	N=1302	N=4012

Figure 63: Modal Split of Work Commute Trips by Respondent Characteristics, part 1

Modal Split of Work Commute Trips	Sex of Respondent		Age of Respondent			CU Student?	
	male	female	16-34	35-54	55+	NOT a student	CU student
Single-Occupancy Vehicle	35.1%	45.4%	36.8%	36.4%	62.6%	40.7%	33.1%
Multiple-Occupancy Vehicle with Adults Only	3.0%	5.4%	2.8%	5.0%	10.0%	5.0%	1.3%
Multiple-Occupancy Vehicle with Children	2.0%	3.7%	.0%	7.9%	2.0%	3.4%	0.0%
Bus (Transit), including School Bus	7.8%	8.6%	8.6%	7.9%	5.4%	6.7%	13.0%
Bicycle	43.9%	23.3%	39.0%	35.9%	15.0%	35.2%	37.9%
Foot	8.1%	13.6%	12.8%	6.8%	5.0%	9.0%	14.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=536	N=340	N=527	N=270	N=81	N=685	N=193

Figure 64: Modal Split of Work Commute Trips by Respondent Characteristics, part 2

Modal Split of Work Commute Trips	Have Children?		Tenure Status		Type of Housing Unit	
	No children	Have children	Owner-Occupied	Renter-Occupied	Attached (Multi-Family Housing)	Detached (Single-Family)
Single-Occupancy Vehicle	40.8%	31.3%	40.2%	38.4%	37.2%	41.3%
Multiple-Occupancy Vehicle with Adults Only	4.7%	1.7%	6.1%	3.0%	2.4%	6.4%
Multiple-Occupancy Vehicle with Children	.7%	11.3%	5.2%	1.1%	.1%	5.8%
Bus (Transit), including School Bus	8.3%	7.4%	5.7%	9.6%	9.8%	6.0%
Bicycle	33.5%	46.1%	37.6%	34.6%	34.3%	37.8%
Foot	12.0%	2.2%	5.3%	13.3%	16.2%	2.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	N=718	N=160	N=332	N=545	N=490	N=389

Figure 65: Modal Split of Work Commute Trips by Respondent Characteristics, part 3

Modal Split of Work Commute Trips	Ratio of Autos to Drivers		HH own any bikes?	
	Less than 1 vehicle per driver	1 or more vehicles per driver	Yes	No
Single-Occupancy Vehicle	28.4%	44.7%	37.4%	59.4%
Multiple-Occupancy Vehicle with Adults Only	3.9%	4.4%	4.2%	3.1%
Multiple-Occupancy Vehicle with Children	2.8%	2.5%	1.9%	8.3%
Bus (Transit), including School Bus	6.9%	8.9%	8.7%	1.5%
Bicycle	46.1%	30.0%	38.9%	1.8%
Foot	11.9%	9.5%	8.9%	25.8%
Total	100.0%	100.0%	100.0%	100.0%
	N=305	N=566	N=806	N=70

Figure 66: Modal Split of Work Commute Trips by Respondent Characteristics, part 4

Modal Split of Work Commute Trips	Have an Eco-Pass?		Day of the Week	
	No, don't have	Yes, have Eco-Pass	weekend	weekday
Single-Occupancy Vehicle	62.4%	28.4%	37.8%	40.6%
Multiple-Occupancy Vehicle with Adults Only	3.9%	4.3%	0.6%	4.3%
Multiple-Occupancy Vehicle with Children	3.3%	2.3%	0.0%	3.0%
Bus (Transit), including School Bus	0.6%	11.6%	12.4%	8.5%
Bicycle	25.1%	40.7%	34.2%	34.4%
Foot	4.7%	12.8%	15.1%	9.3%
Total	100.0%	100.0%	100.0%	100.0%
	N=279	N=601	N=57	N=763

Figure 67: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 1

Travel Mode	Sex of Respondent		Age of Respondent			CU Student?	
	male	female	16-34	35-54	55+	NOT a student	CU student
Single-Occupancy Vehicle	43.6%	52.2%	40.7%	51.8%	58.8%	51.8%	32.2%
Multiple-Occupancy Vehicle with Adults Only	28.5%	31.5%	30.8%	27.7%	31.0%	30.7%	27.1%
Multiple-Occupancy Vehicle with Children	7.0%	12.4%	3.9%	25.1%	4.5%	11.9%	1.3%
Bus (Transit), including School Bus	10.1%	11.7%	15.1%	6.9%	5.6%	7.4%	23.3%
Bicycle	41.2%	27.6%	46.8%	30.2%	10.7%	25.2%	67.7%
Foot	30.8%	39.0%	42.3%	30.4%	22.6%	29.8%	52.9%
<i>Number</i>	<i>N=577</i>	<i>N=550</i>	<i>N=583</i>	<i>N=298</i>	<i>N=251</i>	<i>N=890</i>	<i>N=244</i>

Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Figure 68: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 2

Travel Mode	Have Children?		Tenure Status		Type of Housing Unit	
	No children	Have children	Population in Owner-Occupied Home	Population in Renter-Occupied Home	Attached (Multi-Family Housing)	Detached (Single-Family)
Single-Occupancy Vehicle	48.6%	44.4%	54.5%	48.0%	46.5%	52.7%
Multiple-Occupancy Vehicle with Adults Only	31.7%	22.3%	32.9%	27.9%	28.0%	30.9%
Multiple-Occupancy Vehicle with Children	3.6%	42.4%	14.3%	6.4%	3.9%	16.9%
Bus (Transit), including School Bus	10.7%	12.2%	6.1%	13.4%	14.8%	7.1%
Bicycle	35.3%	31.1%	21.9%	37.3%	35.1%	29.0%
Foot	37.1%	23.6%	27.1%	36.9%	41.8%	22.3%
<i>Number</i>	<i>48.6%</i>	<i>44.4%</i>	<i>N=508</i>	<i>N=545</i>	<i>N=583</i>	<i>N=508</i>

Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Figure 69: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 3

Travel Mode	Ratio of Autos to Drivers		HH own any bikes?	
	Less than 1 vehicle per driver	1 or more vehicles per driver	Yes	No
Single-Occupancy Vehicle	29.9%	59.0%	47.2%	50.1%
Multiple-Occupancy Vehicle with Adults Only	29.1%	29.9%	29.1%	37.5%
Multiple-Occupancy Vehicle with Children	6.1%	11.9%	10.4%	4.7%
Bus (Transit), including School Bus	18.8%	7.6%	11.2%	8.1%
Bicycle	45.9%	25.7%	39.5%	0.5%
Foot	39.6%	29.7%	36.4%	24.2%
<i>Number</i>	<i>N=355</i>	<i>N=728</i>	<i>N=983</i>	<i>N=136</i>

Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Figure 70: Percent of Respondents Making at Least One Trip Using Each Mode by Respondent Characteristics, part 4

Travel Mode	Have an Eco-Pass?		Day of the Week	
	No, don't have	Yes, have Eco-Pass	weekend	weekday
Single-Occupancy Vehicle	56.1%	40.8%	50.6%	50.6%
Multiple-Occupancy Vehicle with Adults Only	32.3%	28.1%	39.3%	29.0%
Multiple-Occupancy Vehicle with Children	12.7%	7.1%	13.1%	8.7%
Bus (Transit), including School Bus	4.3%	16.0%	8.3%	13.4%
Bicycle	19.3%	46.4%	21.1%	38.3%
Foot	22.8%	44.2%	33.4%	36.6%
<i>Number</i>	<i>N=505</i>	<i>N=630</i>	<i>N=287</i>	<i>N=790</i>

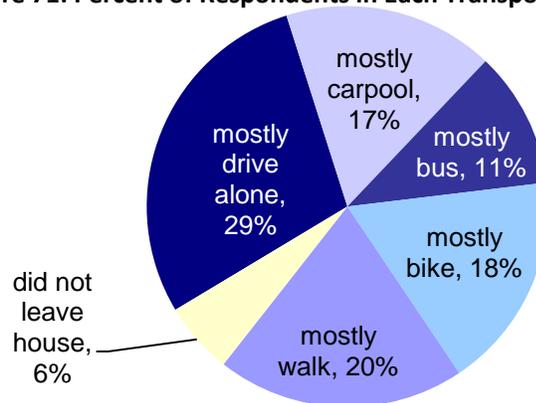
Note: Numbers in each cell represent the proportion of respondents who made at least ONE trip by that mode

Appendix C. Transportation Market Segmentation

In order to better understand the types of “markets” in respect to Boulder residents’ transportation mode choices, the 2015 travel diary dataset was analyzed using an analysis technique referred to as cluster analysis or market segmentation. This analysis sorted respondents into the “clusters,” that is, groups in which respondents’ responses were most similar to other respondents within the same group and different from respondents’ responses in other groups. A brief description of the analysis procedure can be found in *Appendix E. Study Methodology*. For this analysis, the variables used were the percent of trips made on the Travel Diary day by each of five modes: drive alone (single-occupancy vehicle), carpool (multiple-occupancy vehicle), bus (transit and school bus), bicycle and walk. Five groups emerged, with the preponderance of trips being made by each of the five modes in each of the five groups. A sixth group was formed of those study participants who had not left the house on their assigned travel day. These six groups were:

- ◆ The “*mostly drive alone*” group represented the largest proportion of the population with 29% of respondents. This group made 88% of their trips on the assigned travel day by driving alone. This group had the highest proportion of households with one or more vehicles per driver. Employed members were more likely to work outside Boulder compared to other groups.
- ◆ The “*mostly carpool*” segment, representing 17% of the population made 81% of their trips on the assigned travel day by carpooling. This group had the highest proportion of households that included children. Along with those who mostly drive alone, they were the least likely to have an Eco-Pass (39% had an Eco-Pass).
- ◆ The “*mostly bus*” group, which was smaller, representing 11% of the population, made 23% of their trips via transit. They made an even larger proportion of their trips by driving alone, 32% of trips on average. So while this group actually made a greater proportion of their trips by driving alone than by bus, they were the group with the highest proportion of trips made via transit. A high proportion of them had an Eco-Pass (67%), and they were the most likely to have used their Eco-Pass in the last week (79%). This group, along with the “*mostly walk*” and “*mostly bike*” group, had the highest proportion of CU students.
- ◆ The “*mostly bike*” sector comprised 18% of the population. This group made the large majority of their trips (86%) by bike. This group was also the most likely to have ridden a bicycle in the previous week to commute, to shop or run errands, or for fun or exercise. This group had the highest proportion of male members (74%), and the lowest proportion of members age 55 or more (7%). All members of this group were in households that owned at least one bike, and this group was the most likely to have less than one vehicle per driver (50%).
- ◆ The “*mostly walk*” group represented 20% of the population. They made 62% of their trips by walking, on average, and 14% of their trips by bicycle. They were among the youngest group (66% were age 16-34), the highest proportion of females (59%) and had a high proportion of CU students (47%).
- ◆ Six percent of respondents “*did not leave the house*” on their assigned travel day. This group was the least likely to be employed. Among those who were employed, a significantly larger proportion said they telecommuted to work every day compared to the other group. This group had the highest proportion of members age 55 or more (45%).

Figure 71: Percent of Respondents in Each Transportation Segment



Key Characteristics of the Transportation Segments

The key characteristics of the six transportation segments are shown in the table below. Detailed tables showing selected survey results by transportation segment are presented on the pages following.

Figure 72: Key Characteristics of the Transportation Segments

Transportation Segment	Percent of Population	Average Percent of Trips Made Via Each Mode	Other Characteristics
mostly drive alone	29%	SOV, 88% MOV, 6% Bus, 0% Bike, 3% Foot, 3%	<ul style="list-style-type: none"> This group had the highest proportion of households with one or more vehicles per driver (80%). This group had among the highest proportion of female members (57%). Those employed were more likely to work outside Boulder (39%). Along with those who mostly carpool, they were the least likely to have an Eco-Pass (39% had an Eco-Pass)
mostly carpool	17%	SOV, 11% MOV, 82% Bus, 0% Bike, 1% Foot, 5%	<ul style="list-style-type: none"> This group had the highest proportion of households that included children (27%). Along with those who mostly drive alone, they were the least likely to have an Eco-Pass (39% had an Eco-Pass)
mostly bus	11%	SOV, 32% MOV, 13% Bus, 23% Bike, 18% Foot, 14%	<ul style="list-style-type: none"> This group had a high proportion of members with an Eco-Pass (67%). This group was the most likely to use their Eco-Pass one or more times a week (79%). This group had among the highest proportion of CU students (30%). This group was among the youngest; 65% were age 18-34.
mostly bike	18%	SOV, 3% MOV, 5% Bus, 1% Bike, 86% Foot, 5%	<ul style="list-style-type: none"> This group had the highest proportion of households that owned a bicycle (100%). This group was the most likely to have less than one vehicle per driver (50%). This group had a high proportion of members with an Eco-Pass (72%). This group had among the highest proportion of CU students (33%). This group was the most likely to have ridden a bicycle in the last week for commuting (94%), for shopping/errands (83%), or for fun or exercise (70%). This group had the highest proportion of male members (74%). This group had the lowest proportion of members aged 55+ (7%).
mostly walk	20%	SOV, 7% MOV, 11% Bus, 6% Bike, 14% Foot, 62%	<ul style="list-style-type: none"> This group had the highest proportion of members with an Eco-Pass (79%). This group was among the most likely to have less than one vehicle per drive (45%). This group was among the youngest; 66% were age 18-34. This group had the highest proportion of female members (59%). This group had the highest proportion of CU students (47%). This group had the highest proportion of people with annual household incomes less than \$30,000 (31%).
did not leave house	6%	No trips made	<ul style="list-style-type: none"> This group was the least likely to be employed (44% were not employed). Among those who were employed, 21% said they telecommuted every day for work. This group had the highest proportion of members aged 55+ (45%). This group had among the highest proportion of people with annual household incomes less than \$30,000 (30%).

Figure 73: Percent of Trips Made on Assigned Travel Day by Transportation Segment

Percent of Trips Made by:	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
SOV	88%	11%	32%	3%	7%	0%	33%
MOV	6%	82%	13%	5%	11%	0%	20%
Bus	0%	0%	23%	1%	6%	0%	4%
Bike	3%	1%	18%	86%	14%	0%	21%
Foot	3%	5%	14%	5%	62%	0%	17%

Figure 74: Frequency of Bike Use for Shopping, Meals and Errands by Transportation Segment

How frequently in last week ridden a bicycle to shop, get a meal or run errands?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
5 or more times	2%	7%	2%	24%	11%	0%	9%
3 to 4 times	6%	1%	15%	11%	22%	1%	10%
Once or twice	13%	13%	20%	48%	12%	9%	20%
Not at all	79%	79%	62%	17%	55%	90%	62%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 75: Frequency of Bike Use for Commuting by Transportation Segment

How frequently in last week ridden a bicycle for commuting?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
5 or more times	7%	4%	21%	70%	29%	0%	24%
3 to 4 times	5%	9%	13%	14%	6%	0%	8%
Once or twice	6%	7%	14%	9%	8%	0%	8%
Not at all	82%	80%	52%	6%	57%	100%	61%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 76: Frequency of Bike Use for Fun or Exercise by Transportation Segment

How frequently in last week ridden a bicycle for fun or exercise?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
5 or more times	3%	2%	3%	10%	6%	2%	4%
3 to 4 times	7%	6%	9%	16%	5%	1%	8%
Once or twice	22%	21%	31%	45%	35%	14%	29%
Not at all	68%	72%	56%	30%	54%	84%	59%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 77: Employment Status by Transportation Segment

Are you employed?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	27%	27%	15%	24%	22%	44%	25%
Yes, part-time	19%	19%	22%	16%	25%	5%	19%
Yes, full-time	54%	54%	63%	60%	53%	50%	56%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 78: City of Employment by Transportation Segment

City where respondent works	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Boulder	61%	74%	76%	73%	77%	65%	71%
Other	39%	26%	24%	27%	23%	35%	29%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 79: Frequency of Telecommuting by Transportation Segment

How often, if ever, do you telecommute for work? (Among those who are employed.)	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Every work day (I always work from my home)	12%	19%	8%	12%	10%	21%	13%
3 to 4 times per week	2%	4%	3%	1%	3%	3%	3%
2 to 3 times per week	5%	6%	12%	13%	5%	21%	8%
Once or twice a month	18%	11%	21%	12%	21%	8%	16%
Occasionally	16%	24%	21%	14%	16%	8%	17%
Never	47%	36%	35%	48%	45%	39%	42%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 80: Telecommuting Status on Assigned Travel Day by Transportation Segment

Telecommuted on the day of the survey? (Among those who are employed and at least occasionally telework.)	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	73%	81%	84%	78%	80%	87%	78%
Yes	27%	19%	16%	22%	20%	13%	22%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 81: Receipt of Goods or Services via Delivery by Transportation Segment

Receive any goods or services by delivery?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	91%	89%	83%	93%	91%	96%	90%
Yes	9%	11%	17%	7%	9%	4%	10%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 82: Substitution of Travel by Deliveries by Transportation Segment

Did deliveries substitute for travel?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No	47%	53%	48%	15%	70%	26%	49%
Yes	53%	47%	52%	85%	30%	74%	51%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 83: Eco-Pass Status by Transportation Segment

Eco-Pass status	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No, don't have an Eco-Pass	61%	61%	33%	28%	21%	54%	44%
Yes, have an Eco-Pass	39%	39%	67%	72%	79%	46%	56%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 84: Frequency of Use of Eco-Pass by Transportation Segment

Number of times use Eco-pass	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
more than once a week	21%	47%	69%	9%	26%	51%	31%
about once a week	25%	2%	10%	12%	8%	4%	11%
about once every two weeks	3%	15%	6%	31%	21%	2%	17%
about once a month	16%	14%	9%	21%	19%	13%	17%
less than once a month	34%	22%	6%	27%	26%	31%	24%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 85: Ratio of Autos to Drivers by Transportation Segment

Ratio of Autos to Drivers	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Less than 1 vehicle per driver	20%	30%	27%	50%	45%	26%	33%
1 or more vehicles per driver	80%	70%	73%	50%	55%	74%	67%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 86: Household Bicycle Ownership by Transportation Segment

Household own any bicycles?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Yes	83%	80%	94%	100%	92%	65%	88%
No	17%	20%	6%	0%	8%	35%	12%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 87: Sex of Respondent by Transportation Segment

Sex of Respondent	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Male	43%	53%	54%	74%	41%	46%	51%
Female	57%	47%	46%	26%	59%	54%	49%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 88: Age of Respondent by Transportation Segment

Age of Respondent	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
18-34	38%	45%	65%	64%	66%	41%	51%
35-54	27%	31%	22%	29%	21%	14%	26%
55+	35%	25%	13%	7%	13%	45%	22%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 89: CU Student Status by Transportation Segment

CU Student Status	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
NOT a student	87%	95%	70%	67%	63%	85%	78%
CU student	13%	5%	30%	33%	37%	15%	22%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 90: Housing Tenure by Transportation Segment

Tenure	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Rent	47%	41%	66%	53%	64%	44%	52%
Own	53%	59%	34%	47%	36%	56%	48%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 91: Type of Housing Unit by Transportation Segment

Type of Housing Unit	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Attached (Multi-Family)	52%	41%	49%	53%	73%	51%	53%
Detached (Single-Family)	48%	59%	51%	47%	27%	49%	47%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 92: Annual Household Income by Transportation Segment

Annual Household Income	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Less than \$10,000	3%	1%	6%	2%	19%	18%	7%
\$10,000 to \$19,999	6%	4%	4%	5%	9%	5%	6%
\$20,000 to \$29,999	11%	2%	10%	1%	3%	7%	6%
\$30,000 to \$39,999	6%	7%	0%	11%	2%	3%	6%
\$40,000 to \$49,999	6%	6%	5%	5%	5%	3%	5%
\$50,000 to \$74,999	21%	18%	14%	14%	8%	15%	15%
\$75,000 to \$99,999	13%	18%	12%	24%	11%	9%	15%
\$100,00 to \$149,999	16%	20%	29%	25%	21%	14%	21%
\$150,000 or more	19%	25%	20%	13%	21%	27%	20%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 93: Presence of Children in Household by Transportation Segment

Presence of Children in Household?	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
No children	90%	73%	83%	82%	89%	91%	84%
Have children	10%	27%	17%	18%	11%	9%	16%
Total	100%	100%	100%	100%	100%	100%	100%

Figure 94: Day of Assigned Travel by Transportation Segment

Day of the Week	mostly drive alone	mostly carpool	mostly bus	mostly bike	mostly walk	did not leave house	OVERALL
Weekend	23%	47%	22%	17%	20%	48%	27%
Weekday	77%	53%	78%	83%	80%	52%	73%
Total	100%	100%	100%	100%	100%	100%	100%

Appendix D. References

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Appendix E. Study Methodology

The 2015 travel diary study used similar materials to that used in the previous implementations of the study (1990, 1992, 1994, 1996, 1998, 2000, 2003, 2006, 2009 and 2012). However, in 2015, a new data collection methodology was employed: a travel diary app that could be downloaded by survey recipients and used to record trips made during the day.

Study Design

The Travel Diary Study is designed to capture all trips made during a 24-hour period by a random selection of adults within households in the Boulder Valley. Each selected household is assigned a specific day on which to complete the travel diary. The study is always scheduled to take place during the third week of September, as that week has historically had mild weather allowing people to use all modes of transportation.

The traditional data collection methodology for the Travel Diary Study is to send a study packet with the materials needed to complete in the study accompanied by instructions on how to participate to 7,000 randomly selected households within the Boulder Valley. For households in which more than one adult resides, an adult is randomly selected for the study by requesting that the adult who most recently had a birthday (regardless of year of birth) complete the study.

The City of Boulder has been interested in using new technology to increase participation in the study, as experience across the country shows increasing difficulty in soliciting participation in surveys. As the app matures, it could also be used to capture data that is difficult to collect through a survey study. They contracted with DVMobile to create a travel diary app for both Android smartphones and Apple iPhones. The study design in 2015 was modified to be able to test the use of this app for the study.

Thus, instead of mailing to just 7,000 households, an additional 3,500 households were selected for the study. (See the next section for more information on how these households were selected.) Each of these 10,500 households were randomly assigned to one of three conditions:

- 1) The traditional Travel Diary invitation, where a packet with the materials and instructions for the study were mailed to the household several days before their assigned travel day. These 3,500 households were assigned travel days from September 14 through September 20.
- 2) A traditional Travel Diary study packet with additional information about the Travel Diary app, inviting recipients to choose whether they wanted to participate by using the hard copy materials or going to a designated URL to download the app to their phone. These 3,500 households were assigned travel days from September 21 to September 27.
- 3) The third group of 3,500 households were mailed a letter explaining the purpose of the study and inviting them to download the Travel Diary app in order to participate in the study. They were told if they did not want to use the app, or did not have the kind of phone on which an app could be used, they could instead download and print copies of the traditional Travel Diary materials in order to participate in that way.

Copies of the various travel diary study materials can be found in Appendix F. Data Collection Materials.

Selecting Survey Recipients

A total of 10,500 households within the Boulder Valley were invited to participate in the travel study, as described above. This number was selected based on the number of people desired to eventually participate, factoring for the probable non-response and drop-out rates of households. The goal was to obtain about 1,200 completed travel diaries.

All households located in the Boulder Valley boundaries, defined as zip codes 80301, 80302, 80303, 80304 and 80305 were eligible for the survey. Because local governments generally do not have inclusive lists of all the residences in the jurisdiction (tax assessor and utility billing databases often omit rental units), lists from the United States Postal Service (USPS) Delivery Sequence File (DSF), updated every three months, usually provide the best representation of all households in a specific geographic location. NRC used the DSF data to select the sample of households. Selected addresses were processed for certification and verification using CASS™/NCOA software that relies on the USPS National Directory information to verify and standardize the address elements and assign each a complete, nine-digit zip code where possible.

An additional 700 students were selected from students in the University of Colorado at Boulder dormitories. According to the University of Colorado's Research and Analysis website, just over 6,600 CU-Boulder students live in the dormitories.⁸

⁸ <http://www.colorado.edu/pba/records/zip/>

Response Rates

Figure 95 displays the response rates for the 2015 study. If the undeliverable addresses are eliminated from the sample, about 11,200 households or students in group quarters were contacted to participate in the study. Of these, 1,227 returned a usable travel diary and/or household survey, representing 11% of everyone contacted.

However, response rates varied greatly by the type of invitation received. Among those who were mailed the traditional hard copy travel diary, similar to the mailings of the past, a 16% response was obtained, similar to that observed in 2012 and 2009 (see Figure 96). Among those who received the hard copy travel diary with information on how to complete the survey by app, the overall response rate was about 14%. Of these respondents, most (93%) chose to do the hard copy version of the travel diary, with 7% of these respondents choosing to do the app version.

Among those who were mailed only a letter with instructions on how to go online and download the travel diary app, the response rate was 5%. Of these, about two-thirds chose to do the app version of the travel diary, while a third downloaded and printed electronic documents so they could do the hard copy version of the travel diary.

Figure 95: Response Rate for the 2015 Travel Diary Study

Type of Mailings	Number of Recipients	Returned with Undeliverable Address	Eligible to Participate	Returned a Usable Travel Diary			Response Rate
				Hard Copy	App	Total	
"Regular" Hard Copy Travel Diary	3,500	148	3,352	524		524	16%
Hard Copy Travel Diary with Option to do Travel Diary App	3,500	168	3,332	446	32	478	14%
Invitation to Travel Diary App	3,500	162	3,338	63	111	174	5%
CU-Boulder Dormitories—Invitation to Travel Diary App	700	0	700		4	4	1%
(Unknown)	0	6		46	1	47	
Total	11,200	484	10,722	1,079	148	1,227	11%

Figure 96: Comparison of Response Rates Across Study Years

Response Rates	2015*	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990*
Percent agreeing to participate (returning the postcard)	N/A**	N/A**	N/A**	N/A**	N/A**	30%	27%	29%	30%	32%	36%
Percent of those who agreed to participate who completed a travel diary	N/A**	N/A**	N/A**	N/A**	N/A**	64%	72%	67%	64%	64%	70%
Percent of entire sample who completed a travel diary	11%	15%	15%	18%	18%	19%	19%	18%	20%	20%	25%
	16%										

*Note: 1990 response rates are for households only, and do not include the response rates of students in group quarters (dormitories and Greek houses). Response rates among these groups are much lower than among those in households, and thus 1990 response rates are probably inflated compared to the other years. In 2015, the response rate for the entire sample was 11%, but for the recipients who were surveyed in the same way as recipients were from 2003 to 2012, the response rate was 16%.

**Not applicable starting in 2003.

Analysis of Results

Cleaning and Coding of Data

Once received, the diaries were prepared for the analysis. Every diary was examined to ensure that it was filled out correctly with accurate trip descriptions. A very common mistake in all study years was to count round trips as one trip rather than two. For ease in keypunch the diary data were transferred to coding sheets, disregarding origin and destination data which would not be used for this report. Three other variables were coded at this time: 1) the type of trip made (HW, HO or NH), 2) if the trip was a “link” in the work commute, and 3) if the trip had both origin and destination outside the Valley boundaries (see *Appendix F. Data Collection Materials*). In 1996, a few changes were made to the survey instruments. It was felt that respondents were not using the “truck” category correctly in previous study years, and quite often trips recorded as having been made in a truck were changed to automobile, because staff believed respondents were using the truck category to record trips made in their sports utility vehicle or pick-up truck. Thus, to reduce the number of this type of error, the categories for “travel method” on the recording form were changed as follows:

1990-1994	1996-2009
1 car (driver)	1 car or light truck (driver)
2 car (passenger)	2 car or light truck (passenger)
3 bus (transit)	3 bus (transit)
4 school bus	4 school bus
5 motorcycle	6 motorcycle
6 taxi (passenger)	7 taxi (passenger)
7 truck (driver)	5 large truck
8 truck (passenger)	
9 bicycle	8 bicycle
10 walk only	9 walk only
11 other _____	10 other _____

As in years’ past, the instructions explained that the truck category was to be used for large commercial trucks, although more even more explanation was added in 1996 (see *Appendix F. Data Collection Materials* for a copy of all the travel diary materials).

Estimating Trip Length

An important element in travel studies such as this one is the length of the trips. Early in the study’s history, elaborate and expensive geocoding schemes were most often used by coding origins and destinations by Census tract or transportation zone and inputting these codes into a complex database which calculates mileage. In the 1990 Diary Study, after researching previous studies and discerning the difficulties and large expense associated with database systems, the research staff devised a geocoding scheme which was more attractive in price as well as accuracy.⁹ On the diary document the participants were asked to estimate how many miles each

⁹ When coding origins and destinations into Census tracts or transportation zones, there is an ambiguous amount of error associated with the amount of area a zone encompasses. For example, if one Census tract is 5 square miles, and a bordering tract is 3 square miles, a trip from one zone to the other may range from less than 1 mile to 8 miles. A database would produce the same estimate of miles for both circumstances

trip had taken them. At baseline (1990), uncertain of how accurate people are at estimating miles traveled, the research staff geocoded a random subset of 400 trips, 300 in motorized vehicles and 50 on bike and foot each. The geocoding was performed with rulers and Boulder Valley maps, where the staff member literally measured the journey by hand. A rule of thumb derived from transportation planning was used to save the effort of deciphering which path the participant made to a various destination: multiplying the distance calculated between locations as the crow flies by 1.5. This formula was believed to work fairly accurately 90% of the time.¹⁰

The geocoded miles were then correlated with the miles estimated by the participants. The estimates were found to be extremely accurate;¹¹ on average the people overestimated the trips by only .12 miles or 17% of the trip distance. To correct for this overestimation, data extracted from the regression equation was used to reduce the estimates.¹² The adjusted estimates were used for all analyses using trip length. The same statistical adjustments were made in subsequent years.

Prior to 2000, when trip distance was missing, it was estimated, when possible, by study staff using the same hand geocoding methodology described above. Beginning in 2000, however, the internet-based program “MapQuest” (www.mapquest.com/directions) was used to estimate trip distances, replaced by Google Maps (maps.google.com) in 2009.

¹⁰ Chuck Green, DRCOG

¹¹ Simple Correlation of 0.9, $p < .001$.

¹² Equation used to adjust motorized vehicles: adjusted miles = (.88 x estimated miles) + .20
 Equation used to adjust non-motorized vehicles: adjusted miles = (.86 x estimated miles) + .10

Data Entry, Weighting and Analysis

The data from the travel diary coding sheets and household travel surveys were data entered into electronic datasets using a key and verify methodology. This means that the data were entered twice and the two datasets compared. Where there were discrepancies, the results were compared to the hard copy survey and keyed correctly. These plain-text datasets were then imported into SPSS®, a statistical software package, for analysis.

Using the assigned unique identifier, the household travel survey responses were matched with the travel diary information. Two types of datasets were created: a trip-level dataset, where every record in the dataset represented a single trip, and a person-level dataset, where every record in the dataset represented a single person.

Due to the differences in travel behavior by various socioedemographic groups, the participants' responses were statistically weighted. Using the data from the 2010 Census, the results were adjusted to give more weight to the travel of those who were under represented in the sample. Figure 97 below displays the sociodemographic profile of the 2015 study participants using unweighted and weighted data compared to the 2010 Census data for comparison. Rows which are shaded indicate the variables used for the weighting.

Figure 97: Comparison of 2015 Weighted and Unweighted Data to 2010 Census Population Estimates

Characteristic	Population Profile*	Unweighted Data	Weighted Data
Tenure in Housing Unit**			
Owner-Occupied	47.7%	78.2%	48.2%
Renter-Occupied	52.3%	21.8%	51.8%
Age**			
18-34 years of age	48.7%	14.1%	48.3%
35-54 years of age	28.3%	28.9%	28.2%
55+ years of age	23.0%	57.0%	23.5%
Sex**			
Male	51.6%	38.6%	51.3%
Female	48.4%	61.4%	48.7%
CU-Boulder Student Status**			
Not a CU Student	81.0%	94.8%	83.9%
CU-Boulder Student (in Boulder)	19.0%	5.2%	16.1%
Population Age 18+ in Housing Units OR CU Boulder Residence Halls			
In Housing Units	92.0%	99.6%	94.0%
In College/University Group Quarters Housing***	8.0%	0.4%	6.0%

* 2010 Census ** Only of the population in housing units *** <http://www.colorado.edu/pba/records/zjp/>

For the most part, simple descriptive statistics (e.g., averages and frequencies) are reported in the body of the report. Crosstabulations and crossbreak analyses (e.g, chi-square and anova) are shown in *Appendix B. Modal Split by Trip and Respondent Characteristics*. In that appendix, differences between subgroups were considered “statistically significant” if the p-value from the statistical test was less than 0.05; that is, that there was a less than 5% probability that differences observed were due to chance alone.

A market segmentation analysis was performed on the data. The results of this analysis are shown in *Appendix C. Transportation Market Segmentation*. The statistical technique most commonly used to derive segments from survey data is cluster analysis. The analysis itself sorts cases (respondents) into the “clusters,” that is, groups in which cases are most similar to other cases within the same group and different from cases in other groups.

The SPSS procedure “K-Means Cluster Analysis” was used to perform this analysis. The algorithm employed by this procedure allows larger datasets to be analyzed into “clusters.” Clusters are formed by comparing responses to a set of selected variables. The procedure seeks patterns of response that are shared by a number of individuals and that are distinct from other groups of individuals. These groups are the clusters. This procedure uses continuous (numeric) variables. For this analysis, the variables used were the percent of trips made by the respondent on the assigned travel day by each mode: percent of trips made by driving alone, percent of trips made by carpooling, percent of trips made by transit, percent of trips made by bicycling, and percent of trips made by walking.

Comparison of Hard Copy and App Travel Diary Respondents

While response rates were lower for those invited to use the travel diary app for the study, it is also of interest to see if there were differences in the demographic and travel characteristics of those completing the hard copy or app version of the travel diary.

The tables below examine the demographic characteristics of the population in households completing the travel diary study. (Students in dormitories were only given the app option, so they could not be included in the hard copy version and are thus excluded from these analyses.)

Younger people under age 35 were less likely to participate in either version of the travel study than were those age 35 and older. However, a greater proportion of the hard copy participants were over age 55 compared to app participants, while a lesser proportion of the hard copy participants were age 35 to 54 compared to the app participants (see Figure 98). A weighting scheme was applied within the app respondents and within the hard copy respondents so that comparisons of travel characteristics could be more fairly made and differences attributed to choice of study mode rather than demographic differences. As shown in Figure 99, the weighted demographic profile of the two groups was fairly similar.

Figure 98: Comparison of Unweighted Demographic Characteristics of 2015 Respondents by Type of Invitation and Travel Diary Version

Demographic Characteristic	Type of Invitation			Travel Diary Version	
	Hard Copy Only	Hard Copy or App	App Only	Hard Copy	App
Female 18-34	9.6%	7.5%	7.1%	8.0%	9.2%
Female 35-54	17.1%	18.5%	18.9%	16.8%	26.8%
Female 55+	35.6%	36.8%	30.2%	37.5%	19.0%
Male 18-34	4.5%	7.5%	5.9%	5.5%	8.5%
Male 35-54	11.0%	8.9%	14.2%	9.7%	18.3%
Male 55+	22.4%	20.8%	23.7%	22.4%	18.3%
Own	78.9%	76.7%	79.4%	78.7%	74.8%
Rent	21.1%	23.3%	20.6%	21.3%	25.2%

Figure 99: Comparison of Weighted Demographic Characteristics of 2015 Respondents by Type of Invitation and Travel Diary Version

Demographic Characteristic	Type of Invitation			Travel Diary Version	
	Hard Copy Only	Hard Copy or App	App Only	Hard Copy	App
Female 18-34	25.8%	19.9%	19.7%	22.1%	21.5%
Female 35-54	14.0%	13.7%	12.7%	13.9%	14.8%
Female 55+	12.0%	11.8%	16.2%	12.4%	13.3%
Male 18-34	20.7%	33.6%	23.2%	26.5%	25.9%
Male 35-54	16.4%	11.6%	14.8%	14.3%	14.1%
Male 55+	11.1%	9.5%	13.4%	10.8%	10.4%
Own	50.7%	43.4%	50.7%	48.0%	49.6%
Rent	49.3%	56.6%	49.3%	52.0%	50.4%

The modal split of all trips and of work commute trips was examined on the weighted dataset by the version of the travel diary study in which the respondent had participated. As can be seen in Figure 100 below, those who completed the app version of the study were less likely to drive alone and more likely to bicycle than were those who completed the hard copy version of the study. However, this did not greatly influence the overall results, as the hard copy portion of the study accounted for over 80% of trips. Likely there is a correlation between the type of people who would be willing to participate in the app version of the study and the type of trips that they take. The same overall results would likely have been seen if the app version had not been an option. On other travel characteristics such as number of trips completed and likelihood of having not left the house the day of the study, the results were similar between app respondents and hard copy respondents (see Figure 101).

Figure 100: Comparison of 2015 Modal Split of All Trips and Work Commute Trips by Travel Diary Version

Travel Mode	All Trips			Work Commute Trips		
	App	Hard Copy	Overall	App	Hard Copy	Overall
Single-Occupancy Vehicle	22.7%	39.0%	36.1%	22.8%	41.7%	39.8%
Multiple-Occupancy Vehicle	15.8%	23.4%	22.1%	10.9%	6.1%	6.7%
Transit	4.5%	3.6%	3.7%	7.6%	8.3%	8.3%
School Bus		<0.1%	<0.1%			
Bicycle	32.9%	17.7%	20.3%	43.5%	34.4%	35.3%
Foot	24.1%	16.4%	17.7%	15.2%	9.4%	10.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Trips	1,004	4,763	5,767	93	817	910

Figure 101: Comparison of 2015 Modal Split of All Trips and Work Commute Trips by Travel Diary Version

Travel Characteristics	All Trips		
	App	Hard Copy	Overall
Average Number of Trips Made	5.07	5.15	5.13
Proportion of Respondents Who Did Not Leave the House on Their Assigned Day	6.5%	5.6%	5.7%

While the modal split of all trips did not change much from 2012 to 2015, there was a large increase in the proportion of work commute trips made by bicycling from 2012 to 2015 (see Figure 8), some additional analyses were conducted to see what might have contributed to this shift. The table below shows the unweighted demographic profile of respondents over time. As can be seen, since the study began in 1990, there has been a gradual but significant decline over time in the proportion of younger people participating in the study, and an increase in the proportion of older people. However, these differences were not extreme in 2015 compared to 2012, except for the increase in the proportion of older females. Respondents were also more likely to reside in owner-occupied homes in 2015 compared to 2012 and 2009, but the differences were not much greater than what had been seen in 2006. There were fewer students in the dormitories who participated in 2015, which accounts for some of the differences.

Figure 102: Comparison of Unweighted Demographic Characteristics Over Time

Demographic Characteristics	2015	2012	2009	2006	2003	2000	1998	1996	1994	1992	1990
Female 18-34	8.3%	13.5%	14.2%	11.0%	16.1%	11.8%	14.4%	14.6%	22.4%	21.3%	22.2%
Female 35-54	18.0%	17.2%	19.9%	23.3%	23.8%	27.0%	28.2%	27.5%	22.1%	23.2%	22.2%
Female 55+	35.1%	26.9%	23.6%	24.8%	19.9%	15.7%	13.0%	12.1%	11.4%	11.1%	8.6%
Male 18-34	6.1%	10.6%	9.9%	7.3%	10.0%	11.0%	11.8%	13.2%	18.7%	17.6%	21.9%
Male 35-54	10.8%	11.0%	12.0%	16.6%	15.2%	20.3%	21.3%	22.1%	17.2%	17.2%	16.3%
Male 55+	21.8%	20.7%	20.4%	17.0%	15.0%	14.1%	11.4%	10.5%	8.1%	9.6%	8.8%
Population in Owner-Occupied Home	77.9%	63.8%	63.5%	74.4%							
Population in Renter-Occupied Home or Group Quarters	22.1%	36.2%	36.5%	25.6%							

A comparison was also made of the employment characteristics of respondents. This analysis was done with the weighted data set. The proportion of respondents that were employed in 2015 compared to previous years was similar, as was the workplace location, although somewhat more respondents reported working in Boulder in 2015 compared to previous years.

Figure 103: Comparison of Weighted Employment Characteristics Over Time

Employment Characteristics	2015	2012	2009	2006	2003
No, not employed	24.6%	28.2%	27.0%	22.7%	28.6%
Yes, employed part-time	19.4%	20.6%	22.5%	23.2%	25.4%
Yes, employed full-time	55.9%	51.2%	50.6%	54.0%	46.0%
Boulder	83.5%	80.6%	76.7%	73.2%	77.4%
Denver	6.0%	6.3%	6.2%	6.3%	6.2%
Longmont	2.0%	2.3%	3.4%	4.8%	3.8%
Broomfield	1.9%	4.1%	2.5%	3.9%	2.4%
Louisville	0.9%	0.8%	2.5%	3.0%	2.3%
Lafayette	0.8%	0.8%	1.8%	1.6%	1.0%
Other location	5.0%	5.1%	6.7%	7.1%	6.8%

Compared to 2012, respondents with workplaces in all locations showed a decrease in the proportion of work commute trips made by driving alone. However, the increase in the proportion of work commute trips made by bicycling was large for those who worked in Boulder, and showed almost no change in other locations. Interestingly, transit trips made a big gain among those who worked in Denver or other locations, but this is a fairly small sample. (See Figure 104 below and Figure 12 on page 12.)

Figure 104: Comparison of Weighted Employment Characteristics Over Time

Travel Mode	Location of Workplace					
	Boulder		Denver		Other	
	2015	2012	2015	2012	2015	2012
Single-Occupancy Vehicle	32.5%	40.2%	56.9%	66.7%	68.5%	84.0%
Multiple-Occupancy Vehicle	6.0%	3.5%	5.9%	6.7%	13.0%	10.6%
Transit	6.0%	11.5%	27.5%	13.3%	14.8%	3.2%
Bicycle	43.7%	33.3%	3.9%	6.7%	2.8%	2.1%
Foot	11.9%	11.5%	5.9%	6.7%	0.9%	---
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<i>Number of Work Commute Trips</i>	705	574	51	45	108	94

Dear Boulder Valley Resident:

Travel is something we all do and it can be challenging at times. I am inviting a member of your household to log your travel on a simple diary for a single day during the last two weeks of September, 2015. These travel diaries show how Boulder residents travel and help us plan to better meet your transportation needs.

This travel diary survey is conducted every few years by a professional research firm and is the major tool to help the city better understand existing travel patterns. The results will be used for transportation planning to improve our community.

Your household was chosen at random and your participation will be completely confidential. We are only mailing the diaries to a small number of Boulder Valley residents, so your participation is extremely important and greatly appreciated.

Your diary packet will arrive in about a week at which time you'll receive your assigned tracking day.

Many thanks in advance for your help.

Sincerely,



Matthew Appelbaum, Mayor

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Travel is something we all do and it can be challenging at times. I am inviting a member of your household to log your travel on a simple diary for a single day during the last two weeks of September, 2015. These travel diaries show how Boulder residents travel and help us plan to better meet your transportation needs.

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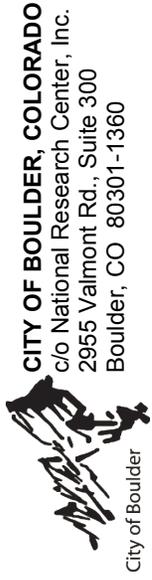
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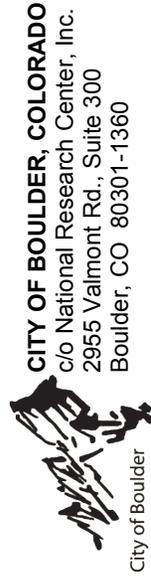
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c/o National Research Center, Inc.
2955 Valmont Rd., Suite 300
Boulder, CO 80301-1360

Presorted
First Class Mail
US Postage
PAID
Boulder, CO
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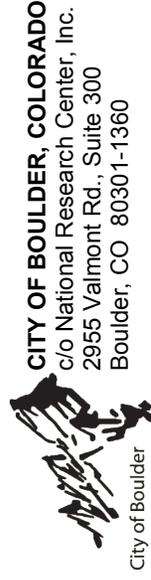
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CITY OF BOULDER OFFICE OF THE CITY COUNCIL

Mayor Matthew Appelbaum
Mayor Pro Tem Suzanne Jones

Council Members: Macon Cowles, George Karakehian, Lisa Morzel,
Tim Plass, Andrew Shoemaker, Sam Weaver, Mary Young

September 8, 2015

Dear Boulder Valley Resident,

We all travel and transportation has been an important concern in the Boulder Valley for many years. The City works to accommodate your travel needs and we all benefit from needed improvements to the transportation system. To meet identified travel needs, we've built and repaired roads, bicycle and pedestrian paths, and added bus routes in Boulder. Periodically we turn to our residents to get updated travel information to understand current travel patterns and further improve your travel experience. This survey is the primary data source for understanding the travel patterns of Boulder Valley residents.

Now you can help! I am inviting a member of your household to be a part of a small group of Boulder Valley residents who will keep a simple log of their travel on **Monday September 14, 2015**. Basically, the travel diary will show how you get where you're going and how long it takes you to get there. This research is being conducted by a professional research firm which chose your household at random and your participation will be completely confidential.

Because we want to know what the travel circumstances are for all of Boulder Valley, we need a representative sample of residents in our community. **That's why it's so important that the person in your household who completes the travel diary be a household member who is in town on that day, is age 16 or older and who most recently had a birthday. Year of birth is not to be considered.**

If that person (the one who's at least 16 and most recently had a birthday) is willing to help with this simple but very important project, he or she should complete the enclosed household survey, read the enclosed instructions and complete the travel diary on **Monday September 14**.

Please complete the survey and log your travel using the materials in this packet. Completed surveys and travel diaries should be mailed to National Research Center, Inc. (the company conducting the study) using the enclosed postage-paid envelope. If you have questions, call Sonya at 303-444-7863 and she'll be happy to talk with you.

Thank you very much! The log is easy to complete and will be helpful to our community.

Sincerely,

Matthew Appelbaum
Mayor



2015 Travel Diary Study INSTRUCTIONS FOR 8½" x 11" PAPER DIARY VERSION

Please review the materials briefly before continuing to read the instructions. If any materials are missing, please call Athena of National Research Center, Inc. at 303-444-7863, and materials will be mailed to you. This packet contains:

- Cover letter & these instructions
- Travel Diary
- Travel Diary overflow sheet
- Household Travel Survey
- Postage paid return envelope

COMPLETE THE TRAVEL DIARY ON YOUR ASSIGNED DAY

- Complete the travel diary on **MONDAY, SEPTEMBER 14, 2015**, regardless of the weather or the number and type of activities planned for that day.
- Take the Travel Diary with you on your assigned day. It is the 8½" x 11" card included in this packet.
- If you will be out of town or forgot to complete the diary on assigned day, you may complete the diary on the same day of the next week (*Monday, September 21*).
- Report every trip segment you make that is longer than a city block:
 - Whether you are a passenger, driver or pedestrian.
 - Whether it is recreational (e.g. going for a run) or has a specific destination.
- Start the diary after 12:01 am (right after midnight) and continue until 12:00 midnight on your assigned day.
- Do not change your travel behavior because you are keeping this diary.

WHAT IS A "TRIP SEGMENT"?

- **A trip segment is all or part of a one-way journey.**
- **Round-trips count as two trip segments.** If you drive to the grocery store and back, record two trip segments on your diary. The purpose of the first is "shopping," the second is "return home."
- In addition to round trips, you may need to record one journey as more than one trip segment if:
 - **You make multiple stops.** For example, if you walk your child to school, then catch the bus outside the school to the grocery store, and then return home, stopping to pick up a prescription at the drugstore, this would count as four trip segments with the following destinations: the school, the grocery store, the drugstore and then home.
 - **You change travel method** (not including bus transfers). For instance, if you walk more than one block to a bus stop to take the bus to work, count the bus stop as the first destination and the purpose of that trip segment as "change travel mode". The next trip segment destination is work and the purpose is "work commute."
 - **You pick up or drop off a passenger.** This should be treated as at least two trip segments. The purpose of the first trip segment is "drive passenger."
 - If you are on a recreational or exercise **loop** (walk, run or bike ride) then your "destination" is the half-way point and you record two trip segments. The purpose of the first is "social/recreation," the second is "return home."

QUICK TIPS

- For your destination, you may **use an address, nearest intersection or commonly recognized buildings**, stores or other specific and unique locations (e.g. "McGuckin Hardware", or "Table Mesa Park and Ride")
- Keep good estimates of the **start and end times**. Use the times you started and ended travel and don't include the time you spend at the destination. For example, if you go to the store, don't count the time you are in the store. When you arrived is the end of the first trip and when you left the store is the start of the second trip.
- If using a car or light truck for your trip, don't forget to **mark if you were a passenger or driver** and fill in the number of adults (include yourself, those 16 or older with drivers licenses and those over age 18) and the number of children in the vehicle.
- To **record mileage**, use a vehicle odometer if possible at the beginning and end of each trip. If you wish, you can record the number of blocks instead of miles if it is easier, but PLEASE write in "blocks" on your form, so we don't mistake it for miles.

(continued on reverse side)

HOW DO I DESCRIBE THE TRIP TYPE?

Go Home	Travel from some location other than your workplace to your usual place of residence.
Work Commute	Travel to or from your workplace.
Other Work/ Business	Travel done for work, to someplace other than the workplace. (E.g., sales calls, trips to purchase office supplies for work.)
Personal Business	Travel which is made to obtain services, not products. (E.g. bank, post office, doctor, auto repair.)
Shopping	Travel to shop or to purchase products.
School	Travel <u>by a student</u> to college or school. <i>Travel to school by a teacher or other school employee is a work commute trip.</i> If you are driving a student to school, the trip should be classified as "drive a passenger."
Social/ Recreation	Travel when no business is transacted. (E.g., parties, participatory sports, cultural or athletic events, church activities, visits to friends.)
Eat a Meal	Examples include going to a restaurant, going to a friend's house for dinner, or home from work for lunch. Stops for snacks or refreshments should be classified as "social/recreation".
Drive a Passenger	Use this category for trips or stops to pick up or deliver someone to a specific location. (E.g., taking a friend to the store, picking up a child from school.)
Change Travel Mode	If you drive your car, walk more than one block, or ride your bike to catch the bus, this is a "change travel mode" trip. However, if you transfer from one bus to another, it should not be included in this category because you traveled in buses without changing travel modes. (Be sure to record all the routes you used to make the trip.)
Other	Travel that does not seem to fit in the categories listed should be put in the "other" category. Please list what the trip purpose was in the blank provided. Also, if you have a question as to where to put a certain trip because you can't decide between two categories, list it in the "other" category.

SPECIAL CIRCUMSTANCES

What if you don't go anywhere during the day assigned to you? On the travel diary, fill out your name, address and the assigned diary date, check the box to indicate that you made no trips. Please continue on the Household Survey. It is important that we get an accurate picture of travel patterns within Boulder, including the number of people who make no trips.

What if you have more than 9 trip segments during the day assigned to you? The Travel Diary has space to record up to 9 trip segments. If you have more than 9 trip segments on your assigned day, please use the overflow sheet. If you have more than the 21 trip segments than can be recorded on the Diary and overflow sheet, call Athena and she will record your trips over the phone or send you more overflow sheets, or make a copy of the overflow sheet and use that.

What if you work a job that requires frequent travel on the day assigned to you? If you work a job that requires you to make many trips during the 24-hour period (e.g., cab driver, pizza delivery driver, sales person), please call National Research Center. Athena will give you special instructions for completing your Travel Diary.

The **EXAMPLE OF A COMPLETED TRAVEL DIARY** on the following page, gives a detailed example that may help you in completing your form.

If you have ANY questions, please contact Athena at National Research Center, Inc. at 303-444-7863
Thank you very much for your participation in this study.

EXAMPLE OF A COMPLETED PAPER TRAVEL DIARY

In the first half of her day, Jane Smith drove from her home at 3523 N. 16th Street to work at CU, first dropping her 9 year old daughter at University Hill Elementary School.

At noon, Jane walked to the Hill for lunch (5 blocks from the building on campus where she works).

The Travel Diary example shows how Jane's form would be completed. Please note the following:

- Jane's travel to work with her daughter is counted as **two** trips; the first is with her daughter to the elementary school -- this trip is designated as "drive a passenger"; the second is from the school to work.
- Although Jane is going to a "school" (CU), it is for the purpose of work, and is designated as a "work commute" trip.
- Jane records her trip (walking) **to** lunch as well as her trip **from** lunch back to work (two trips). Her trip back to the school is recorded as "work commute", because she is returning to her workplace, although she did not come straight from home.

EXAMPLE OF A COMPLETED TRAVEL DIARY, Page 1

Record the location at which you are beginning your travel for the day. If it is your home (the same address as in the information box), you may just write "SAME" however be sure to include the Nearest Cross Streets.

Please remember to fill in the date of the day you complete the travel diary!

Don't include the amount of time you were at the destination.

2012 Travel Diary

Please record all of your trips, whether you are a passenger, driver, or pedestrian.
The information on the first row is included only as an example. Please refer to the instructions if you are not sure how to record your trip.

Name: <u>Jane Smith</u>		STARTING POINT ADDRESS				I did not leave the house today: <input type="checkbox"/>	
Address: <u>3523 N. 16th Street</u>		Street Address: <u>SAME</u>				If using motor vehicle, list odometer reading:	
City/State/Zip: <u>Boulder, CO 80302</u>		City/State/Zip: _____				at beginning of day: <u>79645</u>	
DIARY DATE: <u>9/10/12</u>		Nearest Cross Streets: <u>16th</u> & <u>Kalmia</u>				at end of day: <u>79661</u>	

trip #	DESTINATION (address, building or nearest cross streets)	trip start time		trip end time		trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
1	<u>Uni. Hills School</u> <u>Broadway</u> & <u>16th Street</u>	<u>7:30</u>	<u>AM</u>	<u>7:50</u>	<u>AM</u>	1. go home 3. shopping 5. work commute 7. social/recreation <u>9. drive passenger</u> 10. change travel mode 11. other: _____	<u>1. car or light truck (driver)</u> 2. car or light truck (passenger) 3. bus/transit (route(s): _____) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: _____	4	1	1
2	<u>CU - Old Main</u> _____ & _____	<u>7:55</u>	<u>AM</u>	<u>8:05</u>	<u>AM</u>	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 10. change travel mode 11. other: _____	<u>1. car or light truck (driver)</u> 2. car or light truck (passenger) 3. bus/transit (route(s): _____) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: _____	1	0	1
3	<u>The Hill (Abo's)</u> <u>College</u> & <u>13th Street</u>	<u>12:00</u>	<u>Noon</u>	<u>12:10</u>	<u>PM</u>	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 10. change travel mode 11. other: _____	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s): _____) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: _____	5 blocks		
4	<u>CU - Old Main</u> _____ & _____	<u>12:55</u>	<u>PM</u>	<u>1:05</u>	<u>PM</u>	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 10. change travel mode 11. other: _____	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s): _____) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other: _____	5 blocks		

You can also select that you were a passenger in a car or light truck, if appropriate.

Don't forget to include yourself as an adult in the vehicle.

(example continued on reverse side)

In the second part of Jane’s day, she finished work and picked up her daughter and drove home.

She jogged for two miles in her neighborhood before dinner.

When dinner was over, Jane and her family rode their bikes to the Willow Springs Shopping Center for ice cream.

On the example form, note the following:

1. After work, Jane’s trip to pick up her daughter (even though the daughter is not in the car) is designated as a trip to “drive a passenger”.
2. Jane counts her jog in the neighborhood as **two** trips, even though she made no stops between leaving home and returning home. “Jogging” and “running” are considered “walking” for the purposes of this travel diary.
3. When the family rides their bikes to the shopping center for an ice cream, this is a “snack” and is designated as “social/recreation” rather than eating a meal.

EXAMPLE OF A COMPLETED TRAVEL DIARY, Page 2

trip #	DESTINATION (address, building or nearest cross streets)	trip start time		trip end time		trip purpose	travel method	est. trip miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
5	Uni. Hills School Broadway & 16th Street	5:05	PM	5:15	PM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other:	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s)) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	1	0	1
6	Home & 	5:20	PM	5:35	PM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other:	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s)) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	4	1	1
7	Orchard & 19th Street	5:50	PM	6:05	PM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other:	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s)) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	1		
8	Home & 	6:05	PM	6:20	PM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other:	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s)) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	1		
9	Willow Springs Shopping Center Iris & 28th	7:15	PM	7:40	AM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other:	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s)) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	10 blocks		
10	Home & 	8:05	PM	8:30	PM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other:	1. car or light truck (driver) 2. car or light truck (passenger) 3. bus/transit (route(s)) 4. school bus 5. large commercial truck 6. motorcycle 7. taxi (passenger) 8. bicycle 9. walk 10. other:	10 blocks		

If you have ANY questions, please contact Athena at National Research Center, Inc. at 303-444-7863

Thank you very much for your participation in this study.

2015 Travel Diary

Please record all of your trip segments, whether you are a passenger, driver, cyclist, or pedestrian. The information on the first row is included only as an example. Please refer to the instructions if you are not sure how to record your trips.

Name: _____ Address: _____ City/State/Zip: _____ DIARY DATE: _____	STARTING POINT ADDRESS Street Address: _____ City/State/Zip: _____ Nearest Cross Streets: _____ & _____
I did not leave the house today: <input type="checkbox"/>	
If using motor vehicle, list odometer reading: at beginning of day: _____ at end of day: _____	

Trip segment #	DESTINATION (address, building or nearest cross streets)	trip segment start time		trip segment end time		trip segment purpose	travel method	est. trip segment miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
example	Foothill Elementary Broadway & Grape	7:13	AM	7:22	AM	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →	3 miles	1	1
1	_____ & _____	_____:	_____	_____:	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
2	_____ & _____	_____:	_____	_____:	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
3	_____ & _____	_____:	_____	_____:	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			

2015 Overflow Sheet

Trip segment #	DESTINATION (address, building or nearest cross streets)	trip segment start time		trip segment end time		trip segment purpose	travel method	est. trip segment miles	number of people in vehicle (incl. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
10	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
		_____ : _____	_____	_____ : _____	_____	2. personal business 4. school 6. other work/business 8. eat a meal 10. change travel mode 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
12	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
		_____ : _____	_____	_____ : _____	_____	2. personal business 4. school 6. other work/business 8. eat a meal 10. change travel mode 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
14	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
		_____ : _____	_____	_____ : _____	_____	2. personal business 4. school 6. other work/business 8. eat a meal 10. change travel mode 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			

Trip segment #	DESTINATION (address, building or nearest cross streets)	trip segment start time		trip segment end time		trip segment purpose	travel method	est. trip segment miles	number of people in vehicle (incl. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
16	_____ _____ _____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
17	_____ _____ _____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
18	_____ _____ _____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
19	_____ _____ _____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
20	_____ _____ _____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
21	_____ _____ _____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/transit/rail (route(s): 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			

Trip segment #	DESTINATION (address, building or nearest cross streets)	trip segment start time		trip segment end time		trip segment purpose	travel method	est. trip segment miles	number of people in vehicle (inc. yourself)	
		hour:min	am/pm	hour:min	am/pm				children	adults
4	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
5	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
6	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
7	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
8	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			
9	_____ & _____ _____	_____ : _____	_____	_____ : _____	_____	1. go home 3. shopping 5. work commute 7. social/recreation 9. drive passenger 11. other: →	1. car, light truck, SUV or vanpool (driver) 2. car, light truck, SUV or vanpool (passenger) 3. bus/rail/transit (route(s): _____ 4. school bus 5. large commercial truck 6. motorcycle/scooter 7. taxi (passenger) 8. bicycle/B-cycle 9. walk 10. other: →			



c/o National Research Center, Inc.
 2955 Valmont Rd., Suite 300
 Boulder, CO 80301-1360
 303-444-7863

2015 Travel Diary Study HOUSEHOLD TRAVEL SURVEY

Please complete the following survey regarding your household and return it with your Travel Diary in the enclosed postage-paid envelope. The survey should take only a few minutes. It is important because it will help research staff to gauge how representative the people who participate in the diary study are in relation to Boulder Valley residents as a whole. It also provides additional information on the travel patterns of Boulder Valley residents. Your answers to this survey will be kept in strict confidence and only used in the aggregate. Thank you for your time and help.

GENERAL TRAVEL INFORMATION

1. **On the day you completed the travel diary**, did you have any goods or services delivered to your work or home, such as a meal (pizza, etc.), groceries, haircuts or other goods and services? (Please include deliveries for items you ordered by phone, through a mail order catalogue, or by Internet.)

- no → *Go to question #3*
- yes → From how many different sources did you receive deliveries?
 sources

2. Did the delivery or deliveries substitute for a travel trip you might have made to seek the good or service?

- no
- yes

3. In the last week, about how frequently have you ridden a bicycle:

To Shop, Get a Meal or

Run Errands

- 5 or more times
- 3 to 4 times
- Once or twice
- Not at all

For Commuting

- 5 or more times
- 3 to 4 times
- Once or twice
- Not at all

For Fun or Exercise

- 5 or more times
- 3 to 4 times
- Once or twice
- Not at all

4. Are you eligible to have an Eco-Pass, an annual pass that allows you unlimited bus rides?

(Please check all that apply.)

- yes, through my employer
- yes, through my neighborhood
- yes, a CU Boulder student Buff One pass
- yes, CU Boulder faculty/staff Buff One pass
- yes, other pass: _____
- no, I am not eligible for an Eco-Pass → *go to #7*

5. Did you pick up an Eco-Pass or Buff One pass (or passes)?

- yes
- no → *go to question #7*

6. About how often, on average, do you use your Eco-Pass?

- more than once a week
- about once a week
- about once every two weeks
- about once a month
- less often than once a month

7. Are you employed?

- no → *Go to question #13*
- yes, part-time
- yes, full-time

8. Please indicate the city in or nearest to your primary work place.

- Boulder
- Denver
- Broomfield
- I work from my home
- Other city, specify: _____
- Louisville
- Longmont
- Lafayette

9. Please write in the address, building and/or nearest cross streets of your primary work place.

Building or address: _____

Nearest cross streets: _____

& _____

10. Employees telecommute when they fulfill their job responsibilities at home by substituting telecommunications (computer, Internet/Web and/or phone) for work-related travel. How often, if ever, do you telecommute for work? (*Note: do not include times you take work home to do in the evenings, only times you work from home instead of traveling to a workplace.*)

- Every work day (I always work from my home)
- 3 to 4 times per week
- 2 to 3 times per week
- Once or twice a month
- Occasionally
- Never

11. Did you telecommute on the day you completed the travel diary?

- no → *Go to question #13*
- yes

12. Did working at home reduce the number of single-occupancy vehicle (drive alone) trips you made on the day you completed the travel diary compared to days you do not telecommute?

- no, I made the same number of drive alone trips
- yes, reduced about 2 drive-alone trips
- yes, reduced more than 2 drive-alone trips

HOUSEHOLD INFORMATION

13. How many passenger vehicles does your household own or normally have use of?

Cars, SUVs, vans and light trucks Motorcycles/scooters

14. How many usable bicycles does your household have?

Regular bicycles Electric-assisted bicycles

15. About how much was the TOTAL 2014 income before taxes for your household as a whole? In the total, please include income before taxes as well as money from all sources for all persons living in your household. (For example, include everyone's income from self-employment, gifts, interest on savings, social security, AFDC, the value of food stamps received, pension or disability benefits, child support, as well as wages, tips and salary.)

- Less than \$10,000
- \$10,000 to \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,999
- \$40,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 or more

16. Please check the one choice below which best describes the kind of residence in which you live.

- a detached single family home
- a duplex or triplex
- an apartment
- a condominium or townhouse
- a mobile home
- group quarters (e.g., dormitory, nursing home)
→ go to question #20
- other: _____

17. Do you rent or own your residence?

- rent
- own

18. Please record the number of household members in each of the following age categories. (Please remember to include yourself.)

<u>Age category</u>	<u>Number in household</u>
0 to 6 years	_____
7 to 14 years	_____
15 to 17 years	_____
18 to 24 years	_____
25 to 34 years	_____
35 to 44 years	_____
45 to 54 years	_____
55 to 64 years	_____
65 or older	_____

19. Are any of the household members students at the University of Colorado, Boulder campus?

- no
- yes → How many are full-time?
 full-time students

How many are part-time?

part-time students

INDIVIDUAL INFORMATION

20. How many years have you lived in Boulder?
(Please write "0" if less than 6 months.)

Years

21. Are you a student at the University of Colorado, Boulder campus?

- no
- yes

22. What is your gender?

- male
- female

23. Which category contains your age?

- 16 to 24 years old
- 25 to 34 years old
- 35 to 44 years old
- 45 to 54 years old
- 55 to 64 years old
- 65 years or older

24. How much education have you completed?

- 0 to 11 years of school
- high school
- some college or associate's degree
- bachelor's degree
- graduate/professional degree

25. If you drive, what is the year, make and model of the vehicle you usually drive?

Year: _____

Make: _____

Model: _____

Please email RutschR@bouldercolorado.gov if you would like to receive a summary of the results, once the study is complete.

Thank you very much for taking the time to complete this survey. Please return this with your travel diary in the postage-paid envelope provided.



CITY OF BOULDER OFFICE OF THE CITY COUNCIL

Mayor Matthew Appelbaum
Mayor Pro Tem Suzanne Jones

Council Members: Macon Cowles, George Karakehian, Lisa Morzel,
Tim Plass, Andrew Shoemaker, Sam Weaver, Mary Young

September 14, 2015

Dear Boulder Valley Resident,

We all travel and transportation has been an important concern in the Boulder Valley for many years. The City works to accommodate your travel needs and we all benefit from needed improvements to the transportation system. To meet identified travel needs, we've built and repaired roads, bicycle and pedestrian paths, and added bus routes in Boulder. Periodically we turn to our residents to get updated travel information to understand current travel patterns and further improve your travel experience. This survey is the primary data source for understanding the travel patterns of Boulder Valley residents.

Now you can help! I am inviting a member of your household to be a part of a small group of Boulder Valley residents who will keep a simple log of their travel on **Monday September 21, 2015**. Basically, the travel diary will show how you get where you're going and how long it takes you to get there. This research is being conducted by a professional research firm which chose your household at random and your participation will be completely confidential.

Because we want to know what the travel circumstances are for all of Boulder Valley, we need a representative sample of residents in our community. **That's why it's so important that the person in your household who completes the travel diary be a household member who is in town on that day, is age 16 or older and who most recently had a birthday. Year of birth is not to be considered.**

If that person (the one who's at least 16 and most recently had a birthday) is willing to help with this simple but very important project, he or she should complete the enclosed household survey, read the enclosed instructions and complete the travel diary on **Monday, September 21**.

If you have a smartphone or tablet, we ask you to download an app to complete the survey questions and log your travel (instructions to do this are included with this letter). If you do not have access to a smartphone or tablet, you can download a paper version here: www.nrc-survey.com, or call Sonya at 303-444-7863 and she'll be happy to mail a paper version to you.

Thank you very much! The log is easy to complete and will be helpful to our community.

Sincerely,

Matthew Appelbaum
Mayor



2015 Travel Diary Study

INSTRUCTIONS FOR COMPLETING THE STUDY USING THE APP

DOWNLOAD THE TRAVEL DIARY APP

❖ Please go to this website to **get the App**, and for a list of FAQs and our privacy statement

www.nrc-survey.com

*Download the App **before your assigned diary day!** (MONDAY, SEPTEMBER 21, 2015)*

SOME GENERAL INSTRUCTIONS FOR COMPLETING THE TRAVEL DIARY

1. Open the app, and enter the **8-digit password** printed on the **top right corner** of these instructions.
2. Fill out the short Pre-Survey **on or before** your assigned diary day (**MONDAY, SEPTEMBER 21, 2015**).
Once complete, the section will have a check mark, but you can still go back and change your answers if you want.
3. Make sure you have your phone with you on your assigned day.
4. On your assigned day you will use the Travel Diary section of the App.
 - Each time you **START** a new trip segment (you go somewhere new **or** you change your mode of travel):
Open the app and click "Quick Start a Trip" in the Travel Diary Section.
 - Each time you **END** a trip segment (you stop traveling):
Open the app and click "End Trip" in the Travel Diary Section.
5. At the end of the day (or throughout the day, if you prefer)
 - Review each trip segment entry and fill out a few details about the trip purpose, length and travel mode
 - Add any trips that are missing. You should include every trip longer than a city block, whether you are a passenger, driver or pedestrian and whether it is recreational (e.g. a run) or has a specific destination.
 - Review and confirm each trip and until all trips are confirmed.
6. Once you have confirmed all your trips, complete the few Post-Survey questions and submit!
 - After you submit, you cannot go back and change any answers, but before you submit, you can make changes to all parts of the survey.

What if you are out of town on your assigned diary day, or if you forgot?

- ➔ The app will only let you complete the diary on your assigned day (or assigned alternate day)
- ➔ If you will be out of town or forgot to complete the diary on assigned day, you may complete the diary on the same day of the next week (Monday, September 28).
- ➔ To use the app on Monday, September 28, please follow these instructions:
 - If you installed the app on or before Monday, September 21, please uninstall it.
 - For use in the second week install the app after Monday, September 21, but before Monday, September 28.

What if you don't go anywhere during the day assigned to you?

It is important that we get an accurate picture of travel patterns, including the number of people who make no trips!

- Complete the Pre-Survey questions.
- In the Travel Diary Section, do not start a trip, instead choose "Finish" and select "Yes" when asked "Have all your Trips been recorded completely?"
- Complete the Post-Survey questions and submit at the end of the day.

Please do not change your travel behavior because you are keeping this diary!

What is a “trip segment”?

- **A trip segment is all or part of a one-way journey.**
- **Round-trips count as two trip segments.** If you drive to the grocery store and back, record two trip segments on your diary. The purpose of the first is “shopping,” the second is “return home.”
- In addition to round trips, you may need to record one journey as more than one trip segment if:
 - **You make multiple stops.** For example, if you walk your child to school, then catch the bus outside the school to the grocery store, and then return home, stopping to pick up a prescription at the drugstore, this would count as four trip segments with the following destinations: the school, the grocery store, the drugstore and then home.
 - **You change travel method** (not including bus transfers). For instance, if you walk more than one block to a bus stop to take the bus to work, count the bus stop as the first destination and the purpose of that trip segment as “change travel mode”. The next trip segment destination is work and the purpose is “work commute.”
 - **You pick up or drop off a passenger.** This should be treated as at least two trip segments. The purpose of the first trip segment is “drive passenger.”

If you are on a recreational or exercise **loop** (walk, run or bike ride) then your “destination” is the half-way point and you record two trip segments. The purpose of the first is “social/recreation,” the second is “return home.”

How do I describe the trip type?

Go Home	Travel from some location other than your workplace to your usual place of residence.
Work Commute	Travel to your workplace.
Other Work/ Business	Travel done for work, to someplace other than the workplace. (E.g., sales calls, trips to purchase office supplies for work.)
Personal Business	Travel which is made to obtain services, not products. (E.g. bank, post office, doctor, auto repair.)
Shopping	Travel to shop or to purchase products.
School	Travel <u>by a student</u> to college or school. <i>Travel to school by a teacher or other school employee is a work commute trip.</i> If you are driving a student to school, the trip should be classified as "drive a passenger."
Social/ Recreation	Travel when no business is transacted. (E.g., parties, participatory sports, cultural or athletic events, church activities, visits to friends.)
Eat a Meal	Examples include going to a restaurant, going to a friend's house for dinner, or home from work for lunch. Stops for snacks or refreshments should be classified as "social/recreation".
Drive a Passenger	Use this category for trips or stops to pick up or deliver someone to a specific location. (E.g., taking a friend to the store, picking up a child from school.)
Change Travel Mode	If you drive your car, walk more than one block, or ride your bike to catch the bus, this is a "change travel mode" trip. However, if you transfer from one bus to another, it should not be included in this category because you traveled in buses without changing travel modes. (Be sure to record all the routes you used to make the trip.)
Other	Travel that does not seem to fit in the categories listed should be put in the "other" category. Please list what the trip purpose was in the blank provided. Also, if you have a question as to where to put a certain trip because you can't decide between two categories, list it in the "other" category.

If you have ANY questions, please see FAQs at www.nrc-survey.com or contact Sonya at National Research Center, Inc. at 303-444-7863

Thank you very much for your participation in this study.

Appendix F. Data Collection Materials

This appendix contains the instruments and materials used for the data collection of the 2015 Travel Diary Study. Included are:

- Pre-notification postcard
- Diary packet cover letter to Boulder Valley residents
- Travel Diary instructions
- Travel Diary card
- Travel Diary Overflow sheet
- Household Survey
- Travel Diary invitation to the app version of the study