City of Boulder

# DRIVE TIME 2012

## Broadway • 28th Street • Foothills Parkway


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## 1.0 Background

A drive time study measuring the time it takes to get across town in Boulder during peak traffic hours (7:30am, 12:00 noon and 5:00 pm) has been performed each year since 1986. The purpose of these annual studies is to determine how congestion on the major arteries in Boulder is changing over time. Historically, in even-numbered years, the north/south routes (Broadway, 28th Street, and recently Foothills Parkway) have been studied and in odd-numbered years, the east/west routes (Valmont and Arapahoe) have been studied (see Methodology section for exact routes). The frequency of travel time and delay studies in the City has been reduced in the past few years due to budgetary constraints. Thus, the previous east-west travel time evaluations were performed in 2008. Before 2004 these studies were performed by staff of the City of Boulder Audit and Evaluation Division. Since 2004, data has been collected by a consultant team consisting of the Fox Tuttle Transportation Group, LLC and Short Elliott Hendrickson, Inc. Foothills Parkway was added to the data collection in 2006 as a third north-south corridor.

This report focuses on the results from 2012 when the north-south routes of Broadway, 28th Street, and Foothills Parkway were studied. Appendix I contains comparison summaries of drive time information by street and direction for all years when data was collected. Appendix II contains the results in detail for data collected in 2012. Refer to older reports for detailed results of past study years.

In 2004, a significant change in study methodology was made: travel time runs were aborted any time there were conditions along the corridor that were considered atypical. This may have been due to construction, lane closures, traffic accidents, or severe weather. Since these runs, which are typically much longer and experience greater delays, were removed from the data set, the average trip times in subsequent years are generally shorter than previous years. For this reason, direct comparisons between new data and previous study years should be used with some caution. The change in data collection methodology was made to provide a more direct evaluation of the performance of the corridor signal system by only collecting data in typical conditions.

*Note: Prior to 2004, the north end of the travel time and delay study areas terminated at Violet Avenue along Broadway and at Kalmia Avenue along 28th Street. Data collected in 2004 and since has extended both of these corridors: north to Lee Hill Road along Broadway and north to Jay Road along 28th Street. Where comparisons are made to pre-2004 data in this report, only the original study area segments were included in the calculations to provide a consistent basis for comparison.*

## 2.0 Comparison of Drive Time by Street

The average trip times and the average time spent stopped (or "stopped time") on Broadway, 28th Street, and Foothills Parkway over all of the years studied are displayed in **Figure 1**. On both Broadway and 28th , total travel times and stopped times have increased steadily between 1986 and 1998, with a sharp increase between 1998 and 2000. After 2000, total trip times decreased steadily to a 12-year low-point in 2004. Recent data (2006, 2008, and 2012) shows similar rates of increase in travel and stop times as pre-1998 data. There we no significant changes to travel or stopped times in 2012.

As discussed in previous reports, the Skunk Creek underpass project on Broadway and the Goose Creek underpass project on 28th Street may have contributed to the spike in 2000. The dip in 2004 was most likely due to a change in the study methodology which excluded travel time runs during atypical conditions (construction, lane closures, traffic accidents, severe weather). The reduction in travel times in 2004 may also have been partially attributable to corridor signal timing and roadway improvements, completion of the Broadway reconstruction project between University Avenue & Pine Street (both from decreases in construction-related delays and some diversion of traffic to other parallel corridors), and overall decrease in traffic volumes on these corridors than in previous years. More recently on 28th Street, the completion of improvements at the Iris intersection have likely contributed to the decreased in travel times along this corridor.

**Figure 1. Comparison of Total Trip Time and Time Stopped 1986 to 2012**

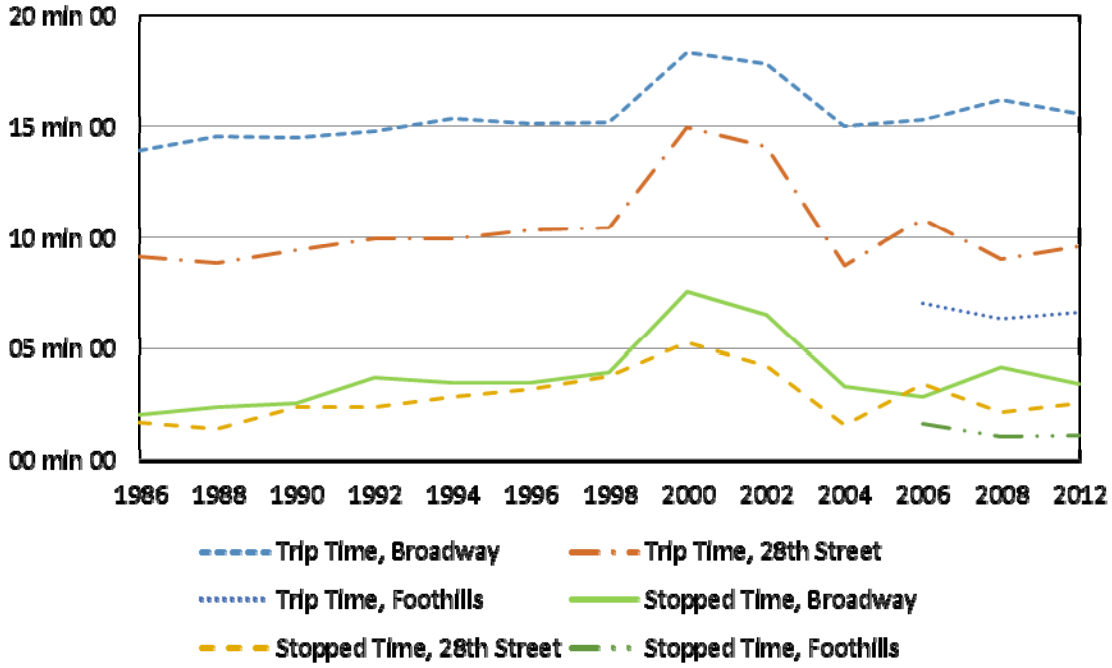



**Table 1** shows the mean trip times, mean time spent stopped, and the mean percent of time spent stopped by year. Differences between each study year and the first year of data collection (1986 for Broadway and 28th Street, 2006 for Foothills) are also provided.

**Table 1**

**Comparison of Broadway, 28th Street, and Foothills Parkway**

**Mean Total Trip Time, Mean Total Time Stopped, and Mean Percent of Time Stopped**

| Street | Year | Mean Total Trip Time | | Mean Total Time Stopped | | Mean % of Time Stopped | |
|---|---|---|---|---|---|---|---|
| | | Trip Time | Difference from 1986 | Time Stopped | Difference from 1986 | Percent of Time Stopped | Difference from 1986 |
| Broadway | 1986 | 13 min 56 sec | n/a | 02 min 02 sec | n/a | 14% | n/a |
| | 1988 | 14 min 33 sec | + 00 min 37 sec | 02 min 25 sec | + 00 min 23 sec | 16% | + 2% |
| | 1990 | 14 min 30 sec | + 00 min 34 sec | 02 min 35 sec | + 00 min 33 sec | 18% | + 4% |
| | 1992 | 14 min 47 sec | + 00 min 51 sec | 03 min 42 sec | + 01 min 40 sec | 24% | + 10% |
| | 1994 | 15 min 22 sec | + 01 min 26 sec | 03 min 28 sec | + 01 min 26 sec | 22% | + 8% |
| | 1996 | 15 min 06 sec | + 01 min 10 sec | 03 min 29 sec | + 01 min 27 sec | 23% | + 9% |
| | 1998 | 15 min 09 sec | + 01 min 13 sec | 03 min 57 sec | + 01 min 55 sec | 26% | + 12% |
| | 2000 | 18 min 20 sec | + 04 min 24 sec | 07 min 34 sec | + 05 min 32 sec | 38% | + 24% |
| | 2002 | 17 min 49 sec | + 03 min 53 sec | 06 min 33 sec | + 04 min 31 sec | 35% | + 21% |
| | 2004 | 15 min 01 sec | + 01 min 05 sec | 03 min 17 sec | + 01 min 15 sec | 21% | + 7% |
| | 2006 | 15 min 19 sec | + 01 min 23 sec | 02 min 50 sec | + 00 min 48 sec | 18% | + 4% |
| | 2008 | 16 min 14 sec | + 02 min 18 sec | 04 min 12 sec | + 02 min 10 sec | 25% | + 11% |
| | 2012 | 15 min 36 sec | + 01 min 40 sec | 03 min 24 sec | + 01 min 22 sec | 21% | + 7% |
| 28th Street | 1986 | 09 min 07 sec | n/a | 01 min 43 sec | n/a | 18% | n/a |
| | 1988 | 08 min 49 sec | - 00 min 18 sec | 01 min 25 sec | - 00 min 18 sec | 16% | - 2% |
| | 1990 | 09 min 24 sec | + 00 min 17 sec | 02 min 22 sec | + 00 min 39 sec | 24% | + 6% |
| | 1992 | 09 min 55 sec | + 00 min 48 sec | 02 min 22 sec | + 00 min 39 sec | 23% | + 5% |
| | 1994 | 09 min 57 sec | + 00 min 50 sec | 02 min 52 sec | + 01 min 09 sec | 26% | + 8% |
| | 1996 | 10 min 19 sec | + 01 min 12 sec | 03 min 13 sec | + 01 min 30 sec | 30% | + 12% |
| | 1998 | 10 min 27 sec | + 01 min 20 sec | 03 min 46 sec | + 02 min 03 sec | 32% | + 14% |
| | 2000 | 14 min 56 sec | + 05 min 49 sec | 05 min 16 sec | + 03 min 33 sec | 32% | + 14% |
| | 2002 | 14 min 05 sec | + 04 min 58 sec | 04 min 13 sec | + 02 min 30 sec | 28% | + 10% |
| | 2004 | 08 min 42 sec | - 00 min 25 sec | 01 min 35 sec | - 00 min 08 sec | 16% | - 2% |
| | 2006 | 10 min 51 sec | + 01 min 44 sec | 03 min 24 sec | + 01 min 41 sec | 29% | + 11% |
| | 2008 | 09 min 00 sec | - 00 min 07 sec | 02 min 09 sec | + 00 min 26 sec | 22% | + 4% |
| | 2012 | 09 min 34 sec | - 00 min 27 sec | 02 min 34 sec | + 00 min 51 sec | 25% | + 7% |
| Foothills Pkwy | **** No data prior to 2006 **** | | | | | | |
| | 2006 | 07 min 04 sec | n/a | 01 min 38 sec | n/a | 20% | n/a |
| | 2008 | 06 min 21 sec | - 00 min 43 sec | 01 min 04 sec | - 00 min 34 sec | 16% | - 4% |
| | 2012 | 06 min 38 sec | - 00 min 26 sec | 01 min 07 sec | - 00 min 31 sec | 15% | + 5% |

**Figure 2** and **Figure 3** show the percent change in mean total trip times and stopped times since 1986.

**Figure 2. Broadway**
**Percent Change in Total Trip Times and Stopped Times from 1986**

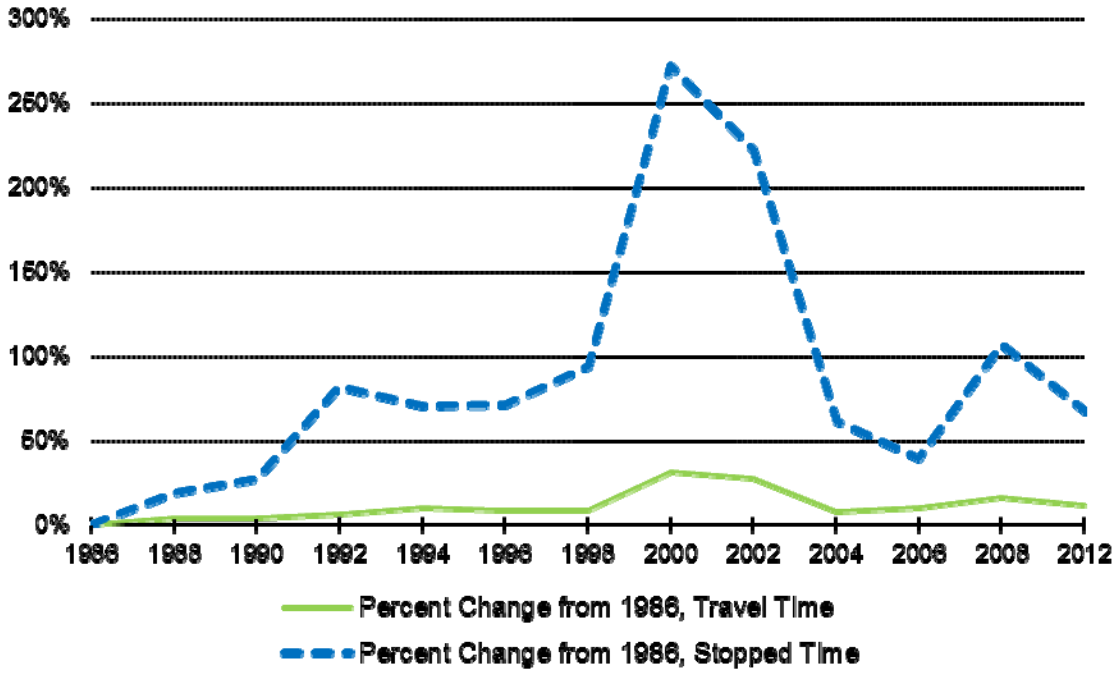
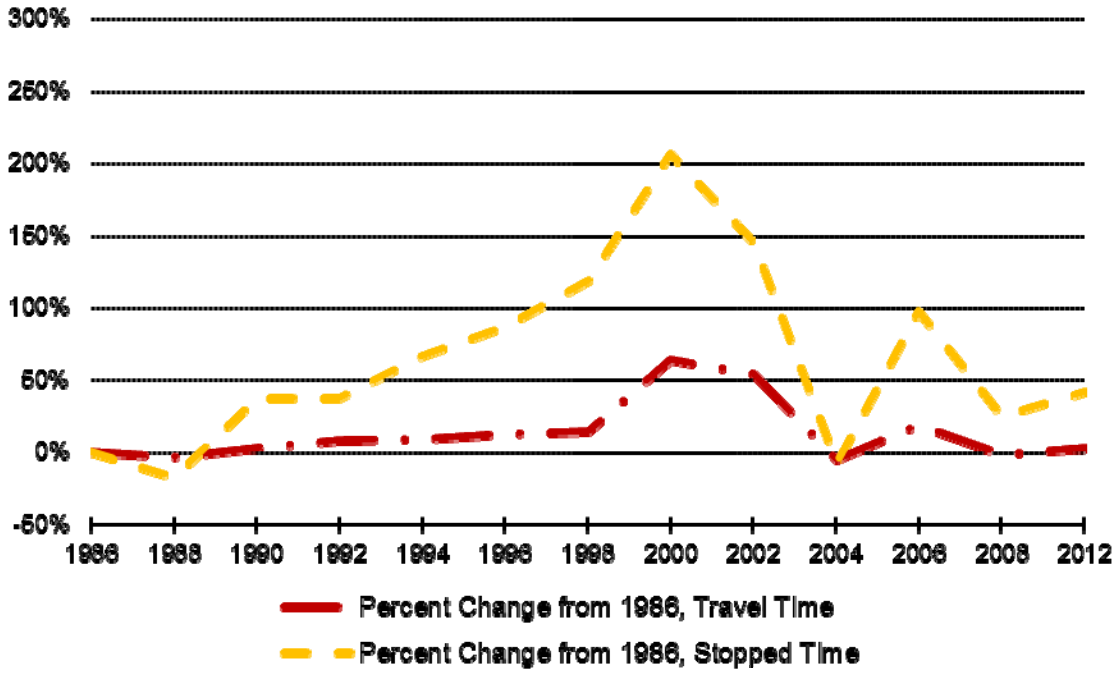



**Figure 3. 28th Street**
**Percent Change in Mean Total Trip Times and Stopped Times from 1986**



## 3.0 Comparison of Drive Times by Street and Direction

Mean trip time, time stopped, and percent of time stopped were examined for each street by direction. **Table 2** provides a summary of Mean Total Trip Time, Mean Total Stopped Time, and Mean % of Time Stopped for Broadway by direction. **Figure 4** and **Figure 5** (on the following page) provide an historic breakdown of mean travel times between nodes, to provide some sense of where the changes in travel time have occurred within the corridor over time. *Note: node data is only available for years in which the GPS data collection has been used (2004 to present).*

**Table 2**

**Comparison of Broadway North and South**

**Mean Total Trip Time, Mean Total Time Stopped, and Mean Percent of Time Stopped**

| Street | Year | Mean Total Trip Time | | Mean Total Time Stopped | | Mean % of Time Stopped | |
|---|---|---|---|---|---|---|---|
| | | Trip Time | Difference from 1986 | Time Stopped | Difference from 1986 | Percent of Time Stopped | Difference from 1986 |
| Broadway North | 1986 | 13 min 43 sec | n/a | 01 min 46 sec | n/a | 12% | n/a |
| | 1988 | 15 min 24 sec | + 01 min 41 sec | 02 min 57 sec | + 01 min 11 sec | 18% | + 6% |
| | 1990 | 14 min 53 sec | + 01 min 10 sec | 02 min 50 sec | + 01 min 04 sec | 19% | + 7% |
| | 1992 | 15 min 20 sec | + 01 min 37 sec | 03 min 51 sec | + 02 min 05 sec | 23% | + 11% |
| | 1994 | 15 min 52 sec | + 02 min 09 sec | 03 min 46 sec | + 02 min 00 sec | 23% | + 11% |
| | 1996 | 15 min 39 sec | + 01 min 56 sec | 03 min 52 sec | + 02 min 06 sec | 24% | + 12% |
| | 1998 | 15 min 09 sec | + 01 min 26 sec | 04 min 02 sec | + 02 min 16 sec | 27% | + 15% |
| | 2000 | 18 min 29 sec | + 04 min 46 sec | 07 min 26 sec | + 05 min 40 sec | 37% | + 25% |
| | 2002 | 18 min 45 sec | + 05 min 02 sec | 07 min 02 sec | + 05 min 16 sec | 37% | + 25% |
| | 2004 | 15 min 51 sec | + 02 min 08 sec | 03 min 46 sec | + 02 min 00 sec | 23% | + 11% |
| | 2006 | 16 min 00 sec | + 02 min 17 sec | 03 min 06 sec | + 01 min 20 sec | 19% | + 7% |
| | 2008 | 17 min 08 sec | + 03 min 25 sec | 05 min 08 sec | + 03 min 22 sec | 28% | + 16% |
| | 2012 | 16 min 20 sec | + 02 min 37 sec | 04 min 03 sec | + 02 min 17 sec | 24% | + 12% |
| Broadway South | 1986 | 14 min 08 sec | n/a | 02 min 19 sec | n/a | 16% | n/a |
| | 1988 | 13 min 42 sec | - 00 min 26 sec | 01 min 54 sec | - 00 min 25 sec | 14% | - 2% |
| | 1990 | 14 min 08 sec | - 00 min 00 sec | 02 min 20 sec | + 00 min 01 sec | 16% | - 0% |
| | 1992 | 14 min 15 sec | + 00 min 07 sec | 03 min 33 sec | + 01 min 14 sec | 25% | + 9% |
| | 1994 | 14 min 52 sec | + 00 min 44 sec | 03 min 10 sec | + 00 min 51 sec | 21% | + 5% |
| | 1996 | 14 min 34 sec | + 00 min 26 sec | 03 min 05 sec | + 00 min 46 sec | 21% | + 5% |
| | 1998 | 15 min 10 sec | + 01 min 02 sec | 03 min 53 sec | + 01 min 34 sec | 25% | + 9% |
| | 2000 | 18 min 11 sec | + 04 min 03 sec | 07 min 43 sec | + 05 min 24 sec | 40% | + 24% |
| | 2002 | 16 min 59 sec | + 02 min 51 sec | 06 min 04 sec | + 03 min 45 sec | 34% | + 18% |
| | 2004 | 14 min 05 sec | - 00 min 03 sec | 02 min 43 sec | + 00 min 24 sec | 19% | + 3% |
| | 2006 | 14 min 33 sec | + 00 min 25 sec | 02 min 32 sec | + 00 min 13 sec | 17% | + 1% |
| | 2008 | 15 min 19 sec | + 01 min 11 sec | 03 min 16 sec | + 00 min 57 sec | 21% | + 5% |
| | 2012 | 14 min 51 sec | + 00 min 43 sec | 02 min 46 sec | + 00 min 27 sec | 18% | + 2% |

**Figure 4.** Historic Travel Time from Previous Node, Broadway Northbound
*(2012 data in Green, Previous Years in Grey)*

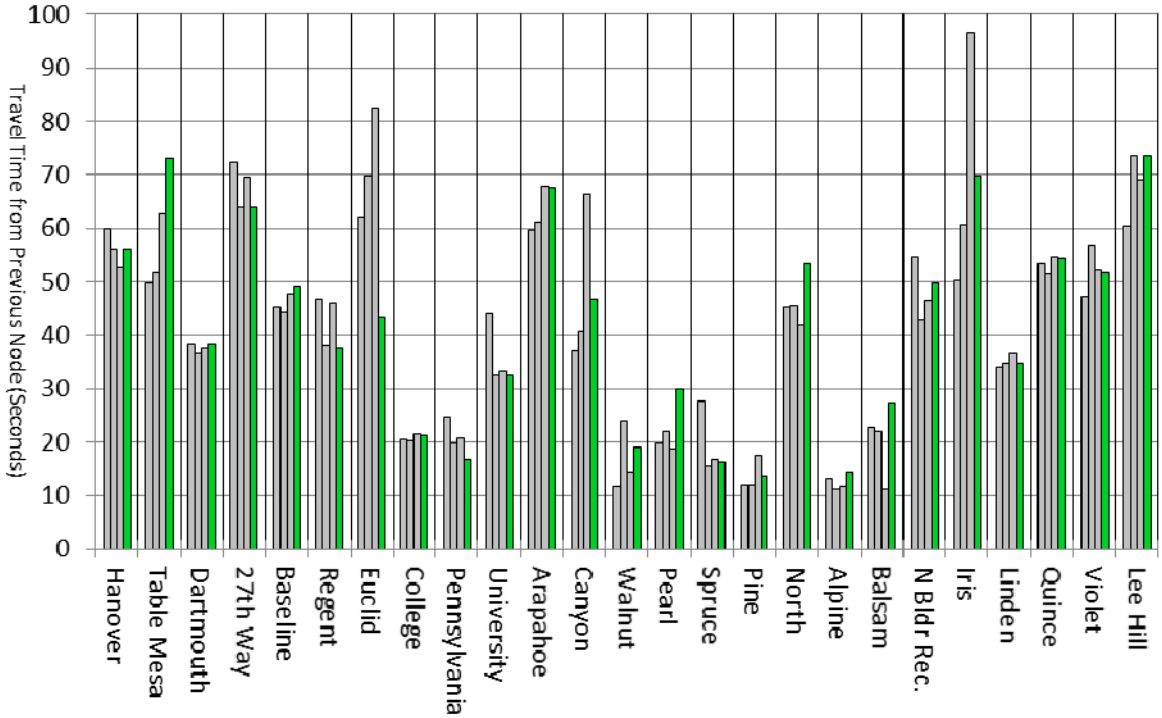



**Figure 5.** Historic Travel Time from Previous Node, Broadway Southbound
*(2012 data in Green, Previous Years in Grey)*

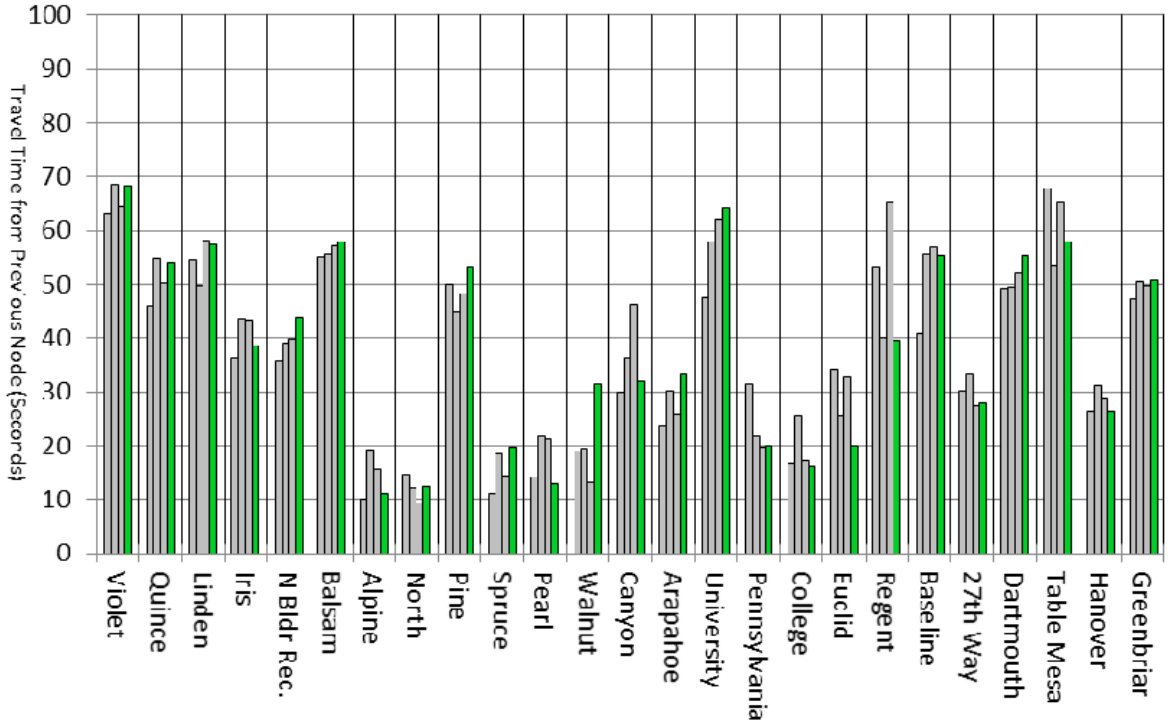


**Table 3** provides a summary of Mean Total Trip Time, Mean Total Stopped Time, and Mean % of Time Stopped for 28th Street by direction. **Figure 6** and **Figure 7** (on the following page) provide an historic breakdown of mean travel times between nodes, to provide some sense of where the changes in travel time have occurred within the corridor over time. *Note: node data is only available for years in which the GPS data collection has been used (2004 to present).*

**Table 3**
**Comparison of 28th Street North and South**
**Mean Total Trip Time, Mean Total Time Stopped, and Mean Percent of Time Stopped**

| Street | Year | Mean Total Trip Time | | Mean Total Time Stopped | | Mean % of Time Stopped | |
|---|---|---|---|---|---|---|---|
| | | Trip Time | Difference from 1986 | Time Stopped | Difference from 1986 | Percent of Time Stopped | Difference from 1986 |
| 28th Street North | 1986 | 08 min 51 sec | n/a | 01 min 27 sec | n/a | 16% | n/a |
| | 1988 | 09 min 04 sec | + 00 min 13 sec | 01 min 31 sec | + 00 min 04 sec | 16% | - 0% |
| | 1990 | 08 min 59 sec | + 00 min 08 sec | 01 min 58 sec | + 00 min 31 sec | 21% | + 5% |
| | 1992 | 09 min 42 sec | + 00 min 51 sec | 01 min 56 sec | + 00 min 29 sec | 20% | + 4% |
| | 1994 | 09 min 22 sec | + 00 min 31 sec | 02 min 32 sec | + 01 min 05 sec | 22% | + 6% |
| | 1996 | 10 min 00 sec | + 01 min 09 sec | 02 min 59 sec | + 01 min 32 sec | 28% | + 12% |
| | 1998 | 11 min 03 sec | + 02 min 12 sec | 04 min 24 sec | + 02 min 57 sec | 34% | + 18% |
| | 2000 | 15 min 10 sec | + 06 min 19 sec | 05 min 37 sec | + 04 min 10 sec | 34% | + 18% |
| | 2002 | 13 min 46 sec | + 04 min 55 sec | 03 min 58 sec | + 02 min 31 sec | 27% | + 11% |
| | 2004 | 08 min 21 sec | - 00 min 30 sec | 01 min 21 sec | - 00 min 06 sec | 15% | - 1% |
| | 2006 | 10 min 36 sec | + 01 min 45 sec | 03 min 35 sec | + 02 min 08 sec | 31% | + 15% |
| | 2008 | 09 min 16 sec | + 00 min 25 sec | 02 min 17 sec | + 00 min 50 sec | 23% | + 7% |
| | 2012 | 09 min 53 sec | + 01 min 02 sec | 02 min 45 sec | + 01 min 18 sec | 26% | + 10% |
| 28th Street South | 1986 | 09 min 24 sec | n/a | 01 min 58 sec | n/a | 20% | n/a |
| | 1988 | 08 min 33 sec | - 00 min 51 sec | 01 min 19 sec | - 00 min 39 sec | 15% | - 5% |
| | 1990 | 09 min 50 sec | + 00 min 26 sec | 02 min 46 sec | + 00 min 48 sec | 26% | + 6% |
| | 1992 | 10 min 08 sec | + 00 min 44 sec | 02 min 48 sec | + 00 min 50 sec | 27% | + 7% |
| | 1994 | 10 min 33 sec | + 01 min 09 sec | 03 min 13 sec | + 01 min 15 sec | 29% | + 9% |
| | 1996 | 10 min 40 sec | + 01 min 16 sec | 03 min 26 sec | + 01 min 28 sec | 31% | + 11% |
| | 1998 | 09 min 51 sec | + 00 min 27 sec | 03 min 07 sec | + 01 min 09 sec | 30% | + 10% |
| | 2000 | 14 min 43 sec | + 05 min 19 sec | 04 min 54 sec | + 02 min 56 sec | 31% | + 11% |
| | 2002 | 14 min 26 sec | + 05 min 02 sec | 04 min 28 sec | + 02 min 30 sec | 28% | + 8% |
| | 2004 | 09 min 00 sec | - 00 min 24 sec | 01 min 48 sec | - 00 min 10 sec | 17% | - 3% |
| | 2006 | 10 min 11 sec | + 00 min 47 sec | 03 min 06 sec | + 01 min 08 sec | 29% | + 9% |
| | 2008 | 08 min 43 sec | - 00 min 41 sec | 02 min 00 sec | + 00 min 02 sec | 22% | + 2% |
| | 2012 | 09 min 15 sec | - 00 min 09 sec | 02 min 23 sec | + 00 min 25 sec | 24% | + 4% |

**Figure 6.** Historic Travel Time from Previous Node, 28th Street Northbound
*(2012 data in Green, Previous Years in Grey)*

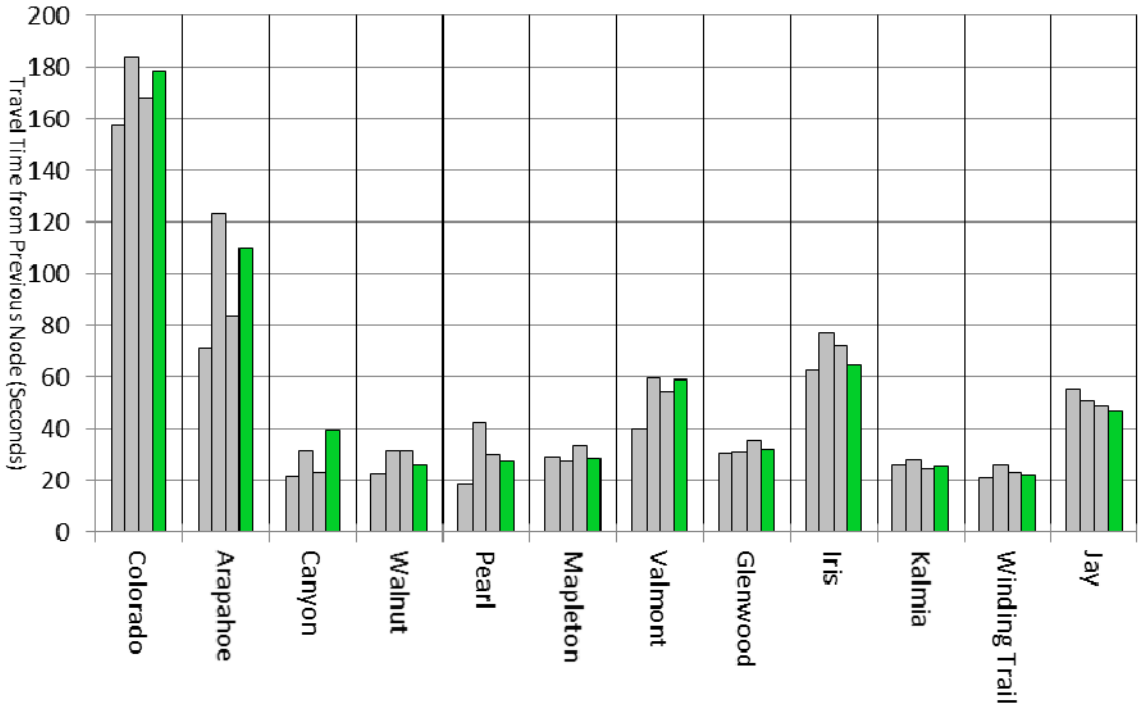
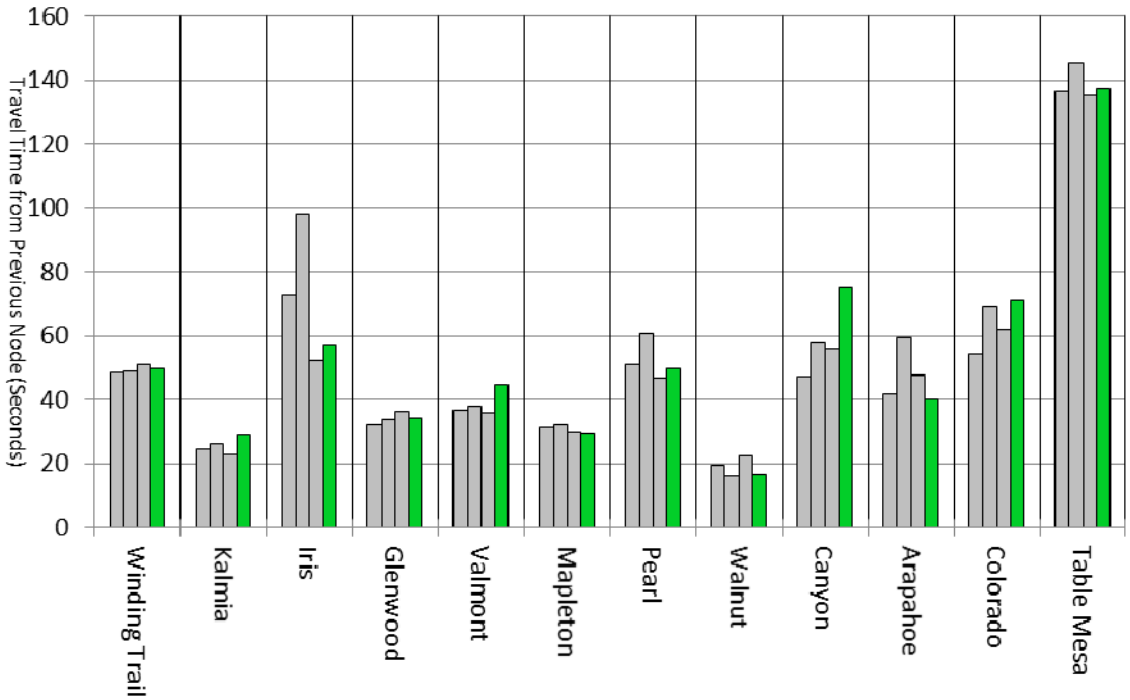



**Figure 7 .** Historic Travel Time from Previous Node, 28th Street Southbound
*(2012 data in Green, Previous Years in Grey)*



The 2012 data for the Foothills Parkway corridor is summarized in **Table 4**, below, with comparisons to 2006 (the first year that the Foothills Parkway corridor was studied). **Figure 8** and **Figure 9** provide an historic breakdown of mean travel times between nodes, to provide some sense of where the changes in travel time have occurred within the corridor data years.

**Table 4**
**Comparison of Foothills Pkwy North and South**
**Mean Total Trip Time, Mean Total Time Stopped, and Mean Percent of Time Stopped**

| Street | Year | Mean Total Trip Time | | Mean Total Time Stopped | | Mean % of Time Stopped | |
|---|---|---|---|---|---|---|---|
| | | Trip Time | Difference from 1986 | Time Stopped | Difference from 1986 | Percent of Time Stopped | Difference from 1986 |
| Foothills North | **** No data prior to 2006 **** | | | | | | |
| | 2006 | 06 min 24 sec | n/a | 01 min 10 sec | n/a | 17% | n/a |
| | 2008 | 06 min 15 sec | - 00 min 09 sec | 01 min 10 sec | - 00 min 00 sec | 17% | - 0% |
| | 2012 | 06 min 31 sec | + 00 min 07 sec | 01 min 13 sec | + 00 min 03 sec | 17% | - 0% |
| Foothills South | **** No data prior to 2006 **** | | | | | | |
| | 2006 | 07 min 45 sec | n/a | 02 min 07 sec | n/a | 23% | n/a |
| | 2008 | 06 min 28 sec | - 01 min 17 sec | 00 min 59 sec | - 01 min 08 sec | 14% | - 9% |
| | 2012 | 06 min 45 sec | - 01 min 00 sec | 01 min 01 sec | - 01 min 06 sec | 14% | - 9% |

**Figure 8.** Historic Travel Time from Previous Node, Foothills Northbound
*(2012 data in Green, Previous Years in Grey)*

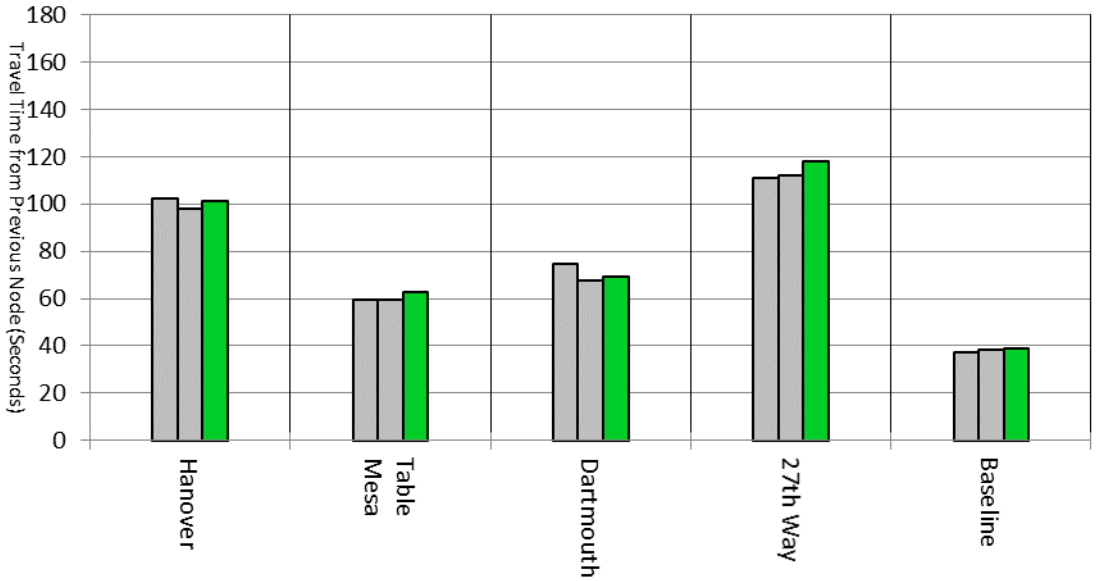
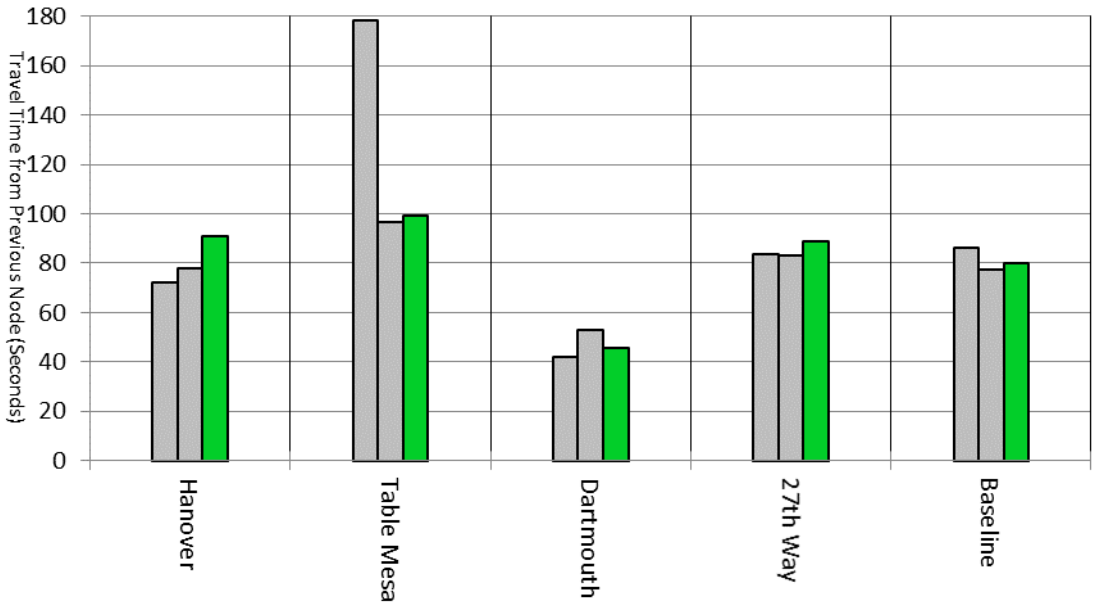


**Figure 9.** Historic Travel Time from Previous Node, Foothills Southbound
*(2012 data in Green, Previous Years in Grey)*




## 4.0 "Worst" Lights

Each year, the data collected in the Drive Time study are used to determine the ten most frequently stopped-at traffic signals in a given year. These results are categorized into a "ten worst" lights list (worst lights by chance of hitting the red traffic light). Appendix II displays the complete list along with lists of the "ten best" lights.

As shown in **Table 5** below, a red light was experienced during all northbound runs at the Iris & Broadway intersection. This was the "worst" light with respect to chances of hitting a red light.

**Table 5 - "Worst" Lights 2012**

| Worst Lights by Chance of Hitting the Traffic Light | |
|---|---|
| **Intersection, Direction** | **Mean Chance in 2012** |
| Foothills @ Valmont, Southbound | 87% |
| 28th @ Colorado, Northbound | 80% |
| 28th @ Canyon, Southbound | 80% |
| Broadway @ Arapahoe, Northbound | 80% |
| Broadway @ University, Southbound | 80% |
| Broadway @ Table Mesa, Northbound | 73% |
| 28th @ Arapahoe, Northbound | 67% |
| 28th @ Iris/Diagonal, Northbound | 67% |
| 28th @ Iris/Diagonal, Southbound | 67% |
| Broadway @ Iris, Northbound | 67% |

## 5.0 Methodology

A similar methodology is used every year for the drive time studies, although the routes alternate from north/south to east/west. In 2004, a new data collection methodology was adopted which utilizes a hand-held GPS device, a laptop computer, and TS-PP Draft software to record the travel time and delay data. This replaced the manual stop-watch method previously used by City staff from 1986 to 2003. Both the old and new methods involve one person who operates the vehicle and performs the data collection simultaneously. In contrast to the old method, however, the new GPS/laptop method does not require any effort on the part of the driver once the study has begun.

GPS coordinates for each traffic signal were mapped into the TS-PP Draft software prior to beginning travel time runs for the new year. Since there is an inherent margin of error in the GPS locations, several mapping runs were performed along each of the corridors to provide the most accurate locations possible. Even so, there is generally a margin of error of 15 feet in all calculations. However, over many runs, the significance of these errors is diminished.

In 2012, 30 total runs were performed on each of the three study corridors per year, with one corridor being studied in both directions during a signal outing (15 runs per direction per corridor per year). Trips are made at 7:30 am, 12:00 noon, or 5:00 pm to correspond with peak traffic periods. During an outing, a trip is made in one direction and then back in the opposite direction on the same corridor. Prior to 2006, 60 runs were performed on each corridor per year. Standard deviation calculations indicate that the reduced number of runs has not affected annual result tabulations.

Previous to 2004, it is believed that travel time runs were collected by the City of Boulder on each corridor regardless of roadway construction, traffic accidents, severe weather, and all other factors. Travel time runs were not aborted under any of these conditions. Since 2004, this practice has been changed. Now, travel time runs are aborted if there any uncommon conditions that would cause delays typically not experienced along the corridor. This change was made to provide a more useful evaluation of the corridor signal system under the conditions it is designed to operate. Since lane closures, construction, accidents, etc. are special circumstances which significantly affect traffic flow, speeds, and delays, incorporating these conditions into the data set disables the ability to effectively evaluate corridor timing plans.

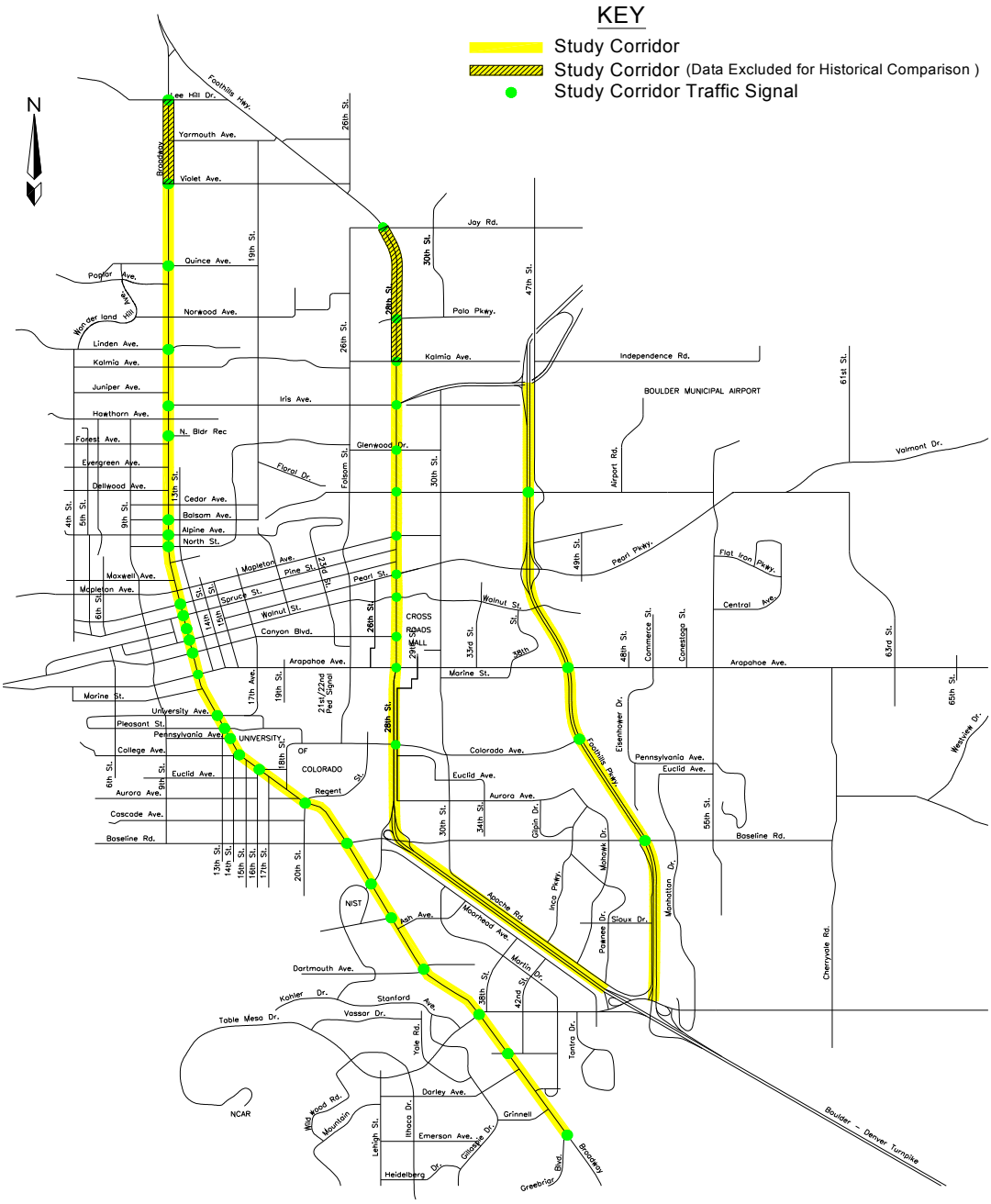
### Routes

The endpoints of the timed portion Broadway are Greenbriar Blvd. on the north and Lee Hill Road on the north. Prior to 2004, the north end of the timing runs terminated at Violet Avenue. For this reason, the data from Violet Avenue to Lee Hill Road is excluded from historical comparisons.

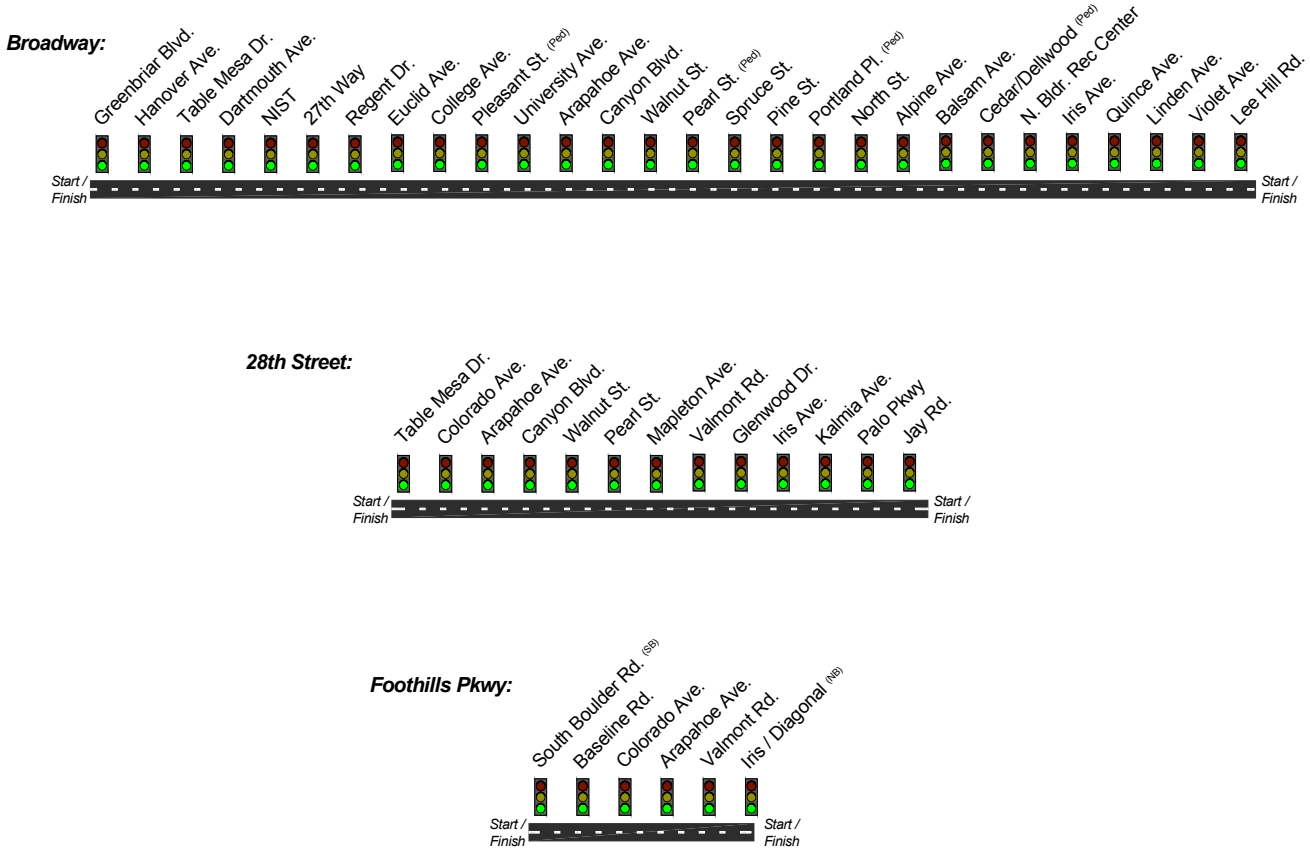
The timed segment of 28th Street extends from Table Mesa on the south to Jay Road on the north. The data from Kalmia Avenue to Jay Road is not included in historical comparisons since this section was only recently added in 2004.

The Foothills Parkway corridor, added in 2006, extends from South Boulder Road on the south to Iris / Diagonal on the north. **Figure 10** provides a map showing the three north-south corridor study limits and signalized intersections.

**Figure 10.** North-South Corridor Study Limits



**Drive Time Map for North-South Routes**




## Weighting

In 1992, 1993, and 2004 not all the scheduled drive time trips for the year were completed. In 1992 there was a major construction project on Broadway which if included in the study would unfairly bias the results for 1992. In 1993, misunderstandings with research assistants resulted in missed trips. In 2004, budget constraints resulted in no data collected for the first four months of the year. Thus, to compensate for the missing data, the results were weighted statistically.

The data were weighted by street driven, direction of trip, and start time so that there were an equal number of trips in each direction on each street for each time of day across all the years. This counterbalances the effect these variables may have on the average trip time.

## Appendix I: Drive Time Comparison for All North-South Years


Table I-1 Comparison of Drive Time by Street across All Years

Table I-2 Comparison of Drive Time by Street and Direction across All Years

Table I-3 Mean Time Stopped at Four Boulder Intersections

Table I-4 Probability of Being Stopped at Four Boulder Intersections

**Table I-1**
**Comparison of Drive Time by Street Across all Years**

| Street | Year | Distance | Mean Total Trip Time | Mean Speed (mph) | Total Stops Possible at Signals (NB/SB) | Mean Number of Stops | Mean Total Time Stopped | Mean Percent of Time Stopped | Number of Trips |
|---|---|---|---|---|---|---|---|---|---|
| **Broadway** | 1986 | 6.0 miles | 13 min 56 sec | 26.2 | 22 | 6.4 | 02 min 02 sec | 14% | 54 |
| | 1988 | 6.0 miles | 14 min 33 sec | 25.3 | 22 | 6.1 | 02 min 25 sec | 16% | 41 |
| | 1990 | 6.0 miles | 14 min 30 sec | 25.1 | 22 | 5.9 | 02 min 35 sec | 18% | 57 |
| | 1992 | 6.0 miles | 14 min 47 sec | 25.0 | 22 / 21 | 6.5 | 03 min 42 sec | 24% | 47 |
| | 1994 | 6.0 miles | 15 min 22 sec | 23.7 | 21 / 22 / 23 | 6.7 | 03 min 28 sec | 22% | 57 |
| | 1996 | 6.0 miles | 15 min 06 sec | 24.2 | 24 / 23 | 6.9 | 03 min 29 sec | 23% | 59 |
| | 1998 | 6.0 miles | 15 min 09 sec | 24.0 | 22 / 23 | 7.1 | 03 min 57 sec | 26% | 61 |
| | 2000 | 6.0 miles | 18 min 20 sec | 21.4 | 23 | 10.2 | 07 min 34 sec | 38% | 59 |
| | 2002 | 6.0 miles | 17 min 49 sec | 28.1 | 24 | 8.6 | 06 min 33 sec | 35% | 60 |
| | 2004 | 6.2 miles | 15 min 01 sec | 25.1 | 24 / 25 | 7.6 | 03 min 17 sec | 21% | 28 |
| | 2006 | 6.2 miles | 15 min 19 sec | 24.9 | 24 / 25 | 7.1 | 02 min 50 sec | 18% | 28 |
| | 2008 | 6.2 miles | 16 min 14 sec | 26.2 | 24 / 25 | 7.5 | 04 min 12 sec | 25% | 30 |
| | 2012 | 6.2 miles | 15 min 36 sec | 26.1 | 26* | 7.5 | 03 min 24 sec | 21% | 30 |
| **28th Street** | 1986 | 4.0 miles | 09 min 07 sec | 26.9 | 8 | 3.8 | 01 min 43 sec | 18% | 56 |
| | 1988 | 4.0 miles | 08 min 49 sec | 27.7 | 8 | 3.0 | 01 min 25 sec | 16% | 40 |
| | 1990 | 4.0 miles | 09 min 24 sec | 26.2 | 8 | 3.4 | 02 min 22 sec | 24% | 57 |
| | 1992 | 4.0 miles | 09 min 55 sec | 25.0 | 8 | 3.5 | 02 min 22 sec | 23% | 47 |
| | 1994 | 4.0 miles | 09 min 57 sec | 24.7 | 8 | 3.7 | 02 min 52 sec | 26% | 57 |
| | 1996 | 4.0 miles | 10 min 19 sec | 24.0 | 8 | 4.2 | 03 min 13 sec | 30% | 59 |
| | 1998 | 4.0 miles | 10 min 27 sec | 24.0 | 8 | 4.2 | 03 min 46 sec | 32% | 61 |
| | 2000 | 4.0 miles | 14 min 56 sec | 17.6 | 8 / 9 | 5.1 | 05 min 16 sec | 32% | 59 |
| | 2002 | 4.0 miles | 14 min 05 sec | 23.9 | 9 | 4.0 | 04 min 13 sec | 28% | 60 |
| | 2004 | 4.4 miles | 08 min 42 sec | 28.5 | 9 | 2.8 | 01 min 35 sec | 17% | 19 |
| | 2006 | 4.4 miles | 10 min 25 sec | 26.8 | 9 | 4.9 | 03 min 28 sec | 28% | 36 |
| | 2008 | 4.4 miles | 09 min 00 sec | 29.9 | 9 | 3.7 | 02 min 09 sec | 22% | 30 |
| | 2012 | 4.4 miles | 09 min 34 sec | 28.8 | 9 | 4.6 | 02 min 34 sec | 25% | 30 |
| **Foothills Pkwy** | **** No data prior to 2006 **** | | | | | | | | |
| | 2006 | 3.5 miles | 07 min 29 sec | 35.1 | 5 | 2.4 | 01 min 38 sec | 20% | 30 |
| | 2008 | 3.5 miles | 06 min 21 sec | 36.2 | 5 | 2.0 | 01 min 04 sec | 16% | 30 |
| | 2012 | 3.5 miles | 06 min 28 sec | 35.4 | 5 | 2.2 | 01 min 07 sec | 15% | 30 |

* Additional signals (potential stops) at 18th (NB and SB), 17th (NB & SB), and Euclid (NB only) were added in 2012 with the completion of the Broadway (Euclid to 18th) transportation improvements project.

**Table I-2a**
**Comparison of Drive Time by Street and Direction Across all Years**

| Street | Year | Distance | Mean Total Trip Time | Mean Speed (mph) | Total Stops Possible at Signals | Mean Number of Stops | Mean Total Time Stopped | Mean Percent of Time Stopped | Number of Trips |
|---|---|---|---|---|---|---|---|---|---|
| Broadway North | 1986 | 6.0 miles | 13 min 43 sec | 26.6 | 22 | 5.5 | 01 min 46 sec | 12% | 27 |
| | 1988 | 6.0 miles | 15 min 24 sec | 24.0 | 2 | 6.6 | 02 min 57 sec | 18% | 19 |
| | 1990 | 6.0 miles | 14 min 53 sec | 24.5 | 22 | 6.0 | 02 min 50 sec | 19% | 30 |
| | 1992 | 6.0 miles | 15 min 20 sec | 24.1 | 22 / 21 | 6.2 | 03 min 51 sec | 23% | 28 |
| | 1994 | 6.0 miles | 15 min 52 sec | 23.0 | 21 / 22 | 7.1 | 03 min 46 sec | 23% | 30 |
| | 1996 | 6.0 miles | 15 min 39 sec | 23.4 | 23 | 7.1 | 03 min 52 sec | 24% | 29 |
| | 1998 | 6.0 miles | 15 min 09 sec | 24.0 | 23 | 7.0 | 04 min 02 sec | 27% | 33 |
| | 2000 | 6.0 miles | 18 min 29 sec | 20.8 | 24 | 10.0 | 07 min 26 sec | 37% | 31 |
| | 2002 | 6.0 miles | 18 min 45 sec | 26.8 | 24 | 9.2 | 07 min 02 sec | 37% | 30 |
| | 2004 | 6.2 miles | 15 min 51 sec | 24.2 | 24 | 8.8 | 03 min 46 sec | 23% | 15 |
| | 2006 | 6.2 miles | 16 min 00 sec | 24.8 | 24 | 8.2 | 03 min 06 sec | 18% | 15 |
| | 2008 | 6.2 miles | 17 min 08 sec | 25.7 | 24 | 8.3 | 05 min 08 sec | 28% | 15 |
| | 2012 | 6.2 miles | 16 min 20 sec | 25.4 | 26 | 8.1 | 04 min 03 sec | 24% | 15 |
| Broadway South | 1986 | 6.0 miles | 14 min 08 sec | 25.8 | 22 | 7.3 | 02 min 19 sec | 16% | 27 |
| | 1988 | 6.0 miles | 13 min 42 sec | 26.5 | 22 | 5.6 | 01 min 54 sec | 14% | 22 |
| | 1990 | 6.0 miles | 14 min 08 sec | 25.7 | 22 | 5.7 | 02 min 20 sec | 16% | 27 |
| | 1992 | 6.0 miles | 14 min 15 sec | 25.9 | 22 | 6.8 | 03 min 33 sec | 25% | 19 |
| | 1994 | 6.0 miles | 14 min 52 sec | 24.5 | 22 / 23 | 6.3 | 03 min 10 sec | 21% | 27 |
| | 1996 | 6.0 miles | 14 min 34 sec | 24.9 | 24 | 6.7 | 03 min 05 sec | 21% | 30 |
| | 1998 | 6.0 miles | 15 min 10 sec | 24.1 | 24 | 7.3 | 03 min 53 sec | 25% | 28 |
| | 2000 | 6.0 miles | 18 min 11 sec | 22.0 | 24 | 10.4 | 07 min 43 sec | 40% | 28 |
| | 2002 | 6.0 miles | 16 min 59 sec | 29.3 | 24 | 7.6 | 06 min 04 sec | 34% | 30 |
| | 2004 | 6.2 miles | 14 min 05 sec | 26.1 | 25 | 6.2 | 02 min 43 sec | 19% | 13 |
| | 2006 | 6.2 miles | 14 min 33 sec | 25.0 | 25 | 5.8 | 02 min 32 sec | 17% | 13 |
| | 2008 | 6.2 miles | 15 min 19 sec | 26.7 | 25 | 6.5 | 03 min 16 sec | 21% | 15 |
| | 2012 | 6.2 miles | 14 min 51 sec | 26.7 | 26 | 7.0 | 02 min 46 sec | 18% | 15 |

**Table I-2b**
**Comparison of Drive Time by Street and Direction Across all Years**

| Street | Year | Distance | Mean Total Trip Time | Mean Speed (mph) | Total Stops Possible at Signals | Mean Number of Stops | Mean Total Time Stopped | Mean Percent of Time Stopped | Number of Trips |
|---|---|---|---|---|---|---|---|---|---|
| 28th Street North | 1986 | 4.0 miles | 08 min 51 sec | 27.5 | 8 | 3.7 | 01 min 27 sec | 16% | 28 |
| | 1988 | 4.0 miles | 09 min 04 sec | 27.0 | 8 | 3.3 | 01 min 31 sec | 16% | 23 |
| | 1990 | 4.0 miles | 08 min 59 sec | 27.1 | 8 | 2.9 | 01 min 58 sec | 21% | 27 |
| | 1992 | 4.0 miles | 09 min 42 sec | 25.6 | 8 | 3.3 | 01 min 56 sec | 20% | 20 |
| | 1994 | 4.0 miles | 09 min 22 sec | 26.1 | 8 | 3.1 | 02 min 32 sec | 22% | 26 |
| | 1996 | 4.0 miles | 10 min 00 sec | 25.0 | 8 | 4.1 | 02 min 59 sec | 28% | 31 |
| | 1998 | 4.0 miles | 11 min 03 sec | 23.8 | 8 | 4.2 | 04 min 24 sec | 34% | 26 |
| | 2000 | 4.0 miles | 15 min 10 sec | 17.2 | 8 / 9 | 5.3 | 05 min 16 sec | 34% | 27 |
| | 2002 | 4.0 miles | 13 min 46 sec | 26.8 | 9 | 3.7 | 03 min 58 sec | 27% | 30 |
| | 2004 | 4.4 miles | 08 min 21 sec | 32.4 | 9 | 2.3 | 01 min 21 sec | 15% | 9 |
| | 2006 | 4.4 miles | 10 min 36 sec | 27.2 | 9 | 5.1 | 03 min 35 sec | 31% | 20 |
| | 2008 | 4.4 miles | 09 min 16 sec | 29.8 | 9 | 4.1 | 02 min 17 sec | 23% | 15 |
| | 2012 | 4.4 miles | 09 min 53 sec | 29.2 | 9 | 4.7 | 02 min 45 sec | 26% | 15 |
| 28th Street South | 1986 | 4.0 miles | 09 min 24 sec | 26.2 | 8 | 3.8 | 01 min 58 sec | 20% | 28 |
| | 1988 | 4.0 miles | 08 min 33 sec | 28.3 | 8 | 2.6 | 01 min 19 sec | 15% | 17 |
| | 1990 | 4.0 miles | 09 min 50 sec | 25.4 | 8 | 3.8 | 02 min 46 sec | 26% | 30 |
| | 1992 | 4.0 miles | 10 min 08 sec | 24.5 | 8 | 3.7 | 02 min 48 sec | 27% | 27 |
| | 1994 | 4.0 miles | 10 min 33 sec | 23.4 | 8 | 4.4 | 03 min 13 sec | 29% | 31 |
| | 1996 | 4.0 miles | 10 min 40 sec | 23.1 | 8 | 4.4 | 03 min 26 sec | 31% | 28 |
| | 1998 | 4.0 miles | 09 min 51 sec | 25.0 | 8 | 4.1 | 03 min 07 sec | 30% | 35 |
| | 2000 | 4.0 miles | 14 min 43 sec | 18.1 | 8 / 9 | 4.9 | 05 min 14 sec | 31% | 32 |
| | 2002 | 4.0 miles | 14 min 26 sec | 28.2 | 9 | 4.4 | 04 min 28 sec | 28% | 30 |
| | 2004 | 4.4 miles | 09 min 00 sec | 25.1 | 9 | 3.2 | 01 min 48 sec | 17% | 11 |
| | 2006 | 4.4 miles | 10 min 11 sec | 26.2 | 9 | 4.7 | 03 min 06 sec | 29% | 16 |
| | 2008 | 4.4 miles | 08 min 43 sec | 30.0 | 9 | 3.3 | 03 min 06 sec | 29% | 15 |
| | 2012 | 4.4 miles | 09 min 15 sec | 28.5 | 9 | 4.5 | 02 min 23 sec | 24% | 15 |

**Table I-2c**
**Comparison of Drive Time by Street and Direction Across all Years**

| Street | Year | Distance | Mean Total Trip Time | Mean Speed (mph) | Total Stops Possible at Signals | Mean Number of Stops | Mean Total Time Stopped | Mean Percent of Time Stopped | Number of Trips |
|---|---|---|---|---|---|---|---|---|---|
| Foothills North | **** No data prior to 2006 **** | | | | | | | | |
| | 2006 | 3.5 miles | 06 min 24 sec | 37.1 | 5 | 1.9 | 01 min 10 sec | 17% | 15 |
| | 2008 | 3.5 miles | 06 min 15 sec | 37.5 | 5 | 1.8 | 01 min 10 sec | 17% | 15 |
| | 2012 | 3.5 miles | 06 min 31 sec | 36.3 | 5 | 1.9 | 01 min 13 sec | 17% | 15 |
| Foothills South | **** No data prior to 2006 **** | | | | | | | | |
| | 2006 | 3.5 miles | 07 min 45 sec | 33.1 | 5 | 2.9 | 02 min 07 sec | 23% | 15 |
| | 2008 | 3.5 miles | 06 min 28 sec | 35.0 | 5 | 2.3 | 00 min 59 sec | 15% | 15 |
| | 2012 | 3.5 miles | 06 min 45 sec | 34.5 | 5 | 2.4 | 01 min 01 sec | 14% | 15 |

**Table I-3**
**Mean Time Stopped at Four Boulder Intersections**

| Intersection | Direction | Mean Time Spent Stopped at Intersection (seconds) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2010 | 2012 | Mean |
| Broadway and Arapahoe | East | | 45 | | 41 | | 45 | | 34 | | 41 | | 40 | | 75 | | 37 | | 35 | | 54 | | 26 | | 47 | | **43** |
| | West | | 44 | | 38 | | 46 | | 46 | | 36 | | 36 | | 61 | | 37 | | 34 | | 35 | | 39 | | 36 | | **41** |
| | North | 7 | | 27 | | 35 | | 56 | | 22 | | 32 | | 47 | | 54 | | 74 | | 38 | | 29 | | 52 | | 38 | **39** |
| | South | 31 | | 20 | | 21 | | 18 | | 34 | | 43 | | 42 | | 55 | | 69 | | 41 | | 45 | | 35 | | 49 | **39** |
| Broadway and Balsam | East | | 28 | | 23 | | 31 | | 25 | | 29 | | 30 | | 31 | | 33 | | 32 | | 39 | | 42 | | 37 | | **32** |
| | West | | 30 | | 30 | | 32 | | 30 | | 29 | | 36 | | 34 | | 30 | | 31 | | 41 | | 36 | | 36 | | **33** |
| | North | 12 | | 22 | | 28 | | 26 | | 27 | | 28 | | 29 | | 31 | | 51 | | 33 | | 19 | | 0 | | 28 | **26** |
| | South | 13 | | 11 | | 31 | | 26 | | 28 | | 22 | | 28 | | 29 | | 64 | | 23 | | 17 | | 29 | | 15 | **26** |
| 28th Street and Arapahoe | East | | 38 | | 54 | | 43 | | 51 | | 39 | | 52 | | 66 | | 46 | | 43 | | 58 | | 62 | | 58 | | **51** |
| | West | | 61 | | 64 | | 62 | | 66 | | 48 | | 48 | | 64 | | 49 | | 47 | | 40 | | 49 | | 53 | | **54** |
| | North | 27 | | 27 | | 37 | | 38 | | 50 | | 38 | | 52 | | 51 | | 65 | | 50 | | 84 | | 70 | | 77 | **51** |
| | South | 38 | | 36 | | 65 | | 71 | | 56 | | 58 | | 61 | | 61 | | 59 | | 29 | | 50 | | 38 | | 31 | **50** |
| 28th Street and Valmont | East | | 39 | | 50 | | 40 | | 30 | | 41 | | 34 | | 59 | | 39 | | 37 | | 48 | | 79 | | 38 | | **45** |
| | West | | 41 | | 54 | | 39 | | 64 | | 42 | | 47 | | 56 | | 41 | | 40 | | 55 | | 74 | | 60 | | **51** |
| | North | 20 | | 21 | | 37 | | 47 | | 43 | | 43 | | 72 | | 71 | | 56 | | 38 | | 47 | | 33 | | 58 | **45** |
| | South | 26 | | 26 | | 37 | | 39 | | 34 | | 36 | | 47 | | 47 | | 53 | | 37 | | 44 | | 39 | | 40 | **39** |

**Table I-4**
**Probability of Being Stopped at Four Boulder Intersections**

| Intersection | Direction | Chance of Stopping at the Intersection (percent) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2010 | 2012 | Mean |
| Broadway and Arapahoe | East | | 90% | | 81% | | 82% | | 87% | | 82% | | 97% | | 62% | | 45% | | 43% | | 76% | | 50% | | 53% | | **71%** |
| | West | | 77% | | 86% | | 77% | | 56% | | 70% | | 88% | | 93% | | 42% | | 41% | | 67% | | 93% | | 73% | | **72%** |
| | North | 15% | | 42% | | 13% | | 54% | | 27% | | 59% | | 61% | | 66% | | 77% | | 80% | | 80% | | 67% | | 80% | **55%** |
| | South | 26% | | 36% | | 37% | | 47% | | 33% | | 60% | | 61% | | 88% | | 76% | | 15% | | 23% | | 20% | | 27% | **42%** |
| Broadway and Balsam | East | | 77% | | 76% | | 65% | | 38% | | 76% | | 79% | | 68% | | 28% | | 27% | | 85% | | 63% | | 80% | | **64%** |
| | West | | 81% | | 93% | | 79% | | 71% | | 83% | | 75% | | 80% | | 28% | | 26% | | 88% | | 93% | | 67% | | **72%** |
| | North | 26% | | 26% | | 33% | | 36% | | 33% | | 31% | | 30% | | 36% | | 27% | | 33% | | 40% | | 0% | | 53% | **31%** |
| | South | 41% | | 9% | | 41% | | 42% | | 56% | | 50% | | 50% | | 28% | | 23% | | 62% | | 38% | | 40% | | 60% | **42%** |
| 28th Street and Arapahoe | East | | 33% | | 52% | | 68% | | 73% | | 71% | | 68% | | 69% | | 43% | | 41% | | 72% | | 88% | | 73% | | **63%** |
| | West | | 18% | | 48% | | 58% | | 78% | | 64% | | 48% | | 38% | | 43% | | 40% | | 50% | | 53% | | 53% | | **49%** |
| | North | 75% | | 61% | | 81% | | 75% | | 65% | | 71% | | 77% | | 86% | | 70% | | 33% | | 80% | | 40% | | 67% | **68%** |
| | South | 93% | | 82% | | 67% | | 67% | | 77% | | 75% | | 77% | | 67% | | 56% | | 53% | | 63% | | 47% | | 47% | **67%** |
| 28th Street and Valmont | East | | 68% | | 81% | | 84% | | 100% | | 88% | | 83% | | 71% | | 25% | | 24% | | 54% | | 50% | | 47% | | **65%** |
| | West | | 90% | | 81% | | 82% | | 64% | | 72% | | 75% | | 57% | | 32% | | 31% | | 65% | | 53% | | 60% | | **64%** |
| | North | 61% | | 22% | | 44% | | 40% | | 54% | | 58% | | 65% | | 81% | | 86% | | 40% | | 55% | | 60% | | 47% | **55%** |
| | South | 89% | | 71% | | 67% | | 63% | | 74% | | 50% | | 54% | | 86% | | 83% | | 13% | | 19% | | 13% | | 33% | **55%** |

## Appendix II: Drive Time 2012


Table II.1 Time Traveled on North-South Corridors, 2012

Table II.2 Stops on North-South Corridors, 2012

Table II.3 Time Stopped on North-South Corridors, 2012

Table II.4 Drive Time by Time of Day, 2012

Table II.5 Ten Worst Intersections by Chances of Being Stopped, 2012

Table II.6 Ten Worst Intersections by Length of Stop, 2012

Table II.7 Ten Best Intersections by Chances of Being Stopped, 2012

Table II.8 Ten Best Intersections by Length of Stop, 2012

Table II.9 Drive Time and Speed between Intersections, 2012 (Broadway North)

Table II.10 Drive Time and Speed between Intersections, 2012 (Broadway South)

Table II.11 Drive Time and Speed between Intersections, 2012 (28th Street North)

Table II.12 Drive Time and Speed between Intersections, 2012 (28th Street South)

Table II.13 Drive Time and Speed between Intersections, 2012 (Foothills North)

Table II.14 Drive Time and Speed between Intersections, 2012 (Foothills South)

| Table II.1: Time Traveled on North-South Corridors, 2012 | | | | | |
|---|---|---|---|---|---|
| | **Mean Total Trip Time** | **Shortest Trip Time** | **Longest Trip Time** | **Trip Distance (miles)** | **Average Speed (mph)** |
| **Broadway** | | | | | |
| **North** | 16 min 20 sec | 13 min 39 sec | 21 min 00 sec | 6.2 | 25.4 |
| **South** | 14 min 51 sec | 12 min 48 sec | 18 min 28 sec | 6.2 | 26.7 |
| **28th Street** | | | | | |
| **North** | 09 min 53 sec | 06 min 41 sec | 14 min 10 sec | 4.2 | 29.2 |
| **South** | 09 min 15 sec | 06 min 31 sec | 12 min 16 sec | 4.2 | 28.5 |
| **Foothills** | | | | | |
| **North** | 06 min 31 sec | 04 min 54 sec | 08 min 09 sec | 3.5 | 35.4 |
| **South** | 06 min 45 sec | 04 min 55 sec | 08 min 42 sec | 3.5 | 36.3 |

| Table II.2: Stops on North-South Corridors, 2012 | | | | | |
|---|---|---|---|---|---|
| | **Mean Number of Stops** | **Fewest Stops** | **Most Stops** | **Mean Chance of Stopping** | **Number of Trips** |
| **Broadway** | | | | | |
| **North** | 8.1 | 4 | 16 | 34% | 15 |
| **South** | 7.0 | 5 | 13 | 29% | 15 |
| **28th Street** | | | | | |
| **North** | 4.7 | 2 | 8 | 47% | 15 |
| **South** | 4.5 | 0 | 7 | 45% | 15 |
| **Foothills** | | | | | |
| **North** | 1.9 | 0 | 4 | 39% | 15 |
| **South** | 2.4 | 0 | 6 | 48% | 15 |

Note: For historic comparison, Tables II.1 and II.2 use the historic (shorter) corridor lengths and do not include recently added nodes.

| Table II.3: Time Stopped on North-South Corridors, 2012 | | | | |
|---|---|---|---|---|
| | **Mean Percent of Time Stopped** | **Mean Total Time Stopped** | **Shortest Time Stopped** | **Longest Time Stopped** |
| **Broadway** | | | | |
| **North** | 24% | 04 min 03 sec | 01 min 30 sec | 08 min 28 sec |
| **South** | 18% | 02 min 46 sec | 01 min 14 sec | 05 min 29 sec |
| **28th Street** | | | | |
| **North** | 26% | 02 min 45 sec | 00 min 19 sec | 05 min 47 sec |
| **South** | 24% | 02 min 23 sec | 00 min 00 sec | 05 min 09 sec |
| **Foothills** | | | | |
| **North** | 17% | 01 min 13 sec | 00 min 00 sec | 02 min 35 sec |
| **South** | 14% | 01 min 01 sec | 00 min 00 sec | 02 min 30 sec |

| Table II.4: Drive Time by Time of Day, 2012 | | | |
|---|---|---|---|
| | **Mean Total Trip Time** | **Mean Number of Stops** | **Mean Time Stopped** |
| **Broadway North** | | | |
| **7:30 AM** | 14 min 58 sec | 5.8 | 02 min 42 sec |
| **12:00 Noon** | 15 min 15 sec | 7.0 | 03 min 12 sec |
| **5:00 PM** | 18 min 47 sec | 11.4 | 06 min 16 sec |
| **Braodway South** | | | |
| **7:30 AM** | 15 min 27 sec | 7.8 | 03 min 02 sec |
| **12:00 Noon** | 13 min 35 sec | 6.0 | 01 min 59 sec |
| **5:00 PM** | 15 min 30 sec | 7.2 | 03 min 16 sec |
| **28th Street North** | | | |
| **7:30 AM** | 07 min 48 sec | 2.6 | 01 min 12 sec |
| **12:00 Noon** | 11 min 21 sec | 6.0 | 03 min 48 sec |
| **5:00 PM** | 10 min 29 sec | 5.6 | 03 min 14 sec |
| **28th Street South** | | | |
| **7:30 AM** | 07 min 44 sec | 3.4 | 01 min 12 sec |
| **12:00 Noon** | 09 min 08 sec | 4.0 | 02 min 12 sec |
| **5:00 PM** | 10 min 54 sec | 6.0 | 03 min 44 sec |
| **Foothills North** | | | |
| **7:30 AM** | 07 min 02 sec | 2.8 | 01 min 30 sec |
| **12:00 Noon** | 05 min 16 sec | 0.6 | 00 min 16 sec |
| **5:00 PM** | 07 min 14 sec | 2.4 | 01 min 53 sec |
| **Foothills South** | | | |
| **7:30 AM** | 06 min 26 sec | 2.0 | 00 min 43 sec |
| **12:00 Noon** | 05 min 43 sec | 1.4 | 00 min 30 sec |
| **5:00 PM** | 08 min 06 sec | 3.8 | 01 min 50 sec |

| Table II.5: Ten Worst Intersections by Chances of Being Stopped, 2012 | | |
|---|---|---|
| **Intersection** | **Direction** | **Chances of Being Stopped** |
| Foothills @ Valmont | Southbound | 87% |
| 28th @ Colorado | Northbound | 80% |
| 28th @ Canyon | Southbound | 80% |
| Broadway @ Arapahoe | Northbound | 80% |
| Broadway @ University | Southbound | 80% |
| Broadway @ Table Mesa | Northbound | 73% |
| 28th @ Arapahoe | Northbound | 67% |
| 28th @ Iris/Diagonal | Northbound | 67% |
| 28th @ Iris/Diagonal | Southbound | 67% |
| Broadway @ Iris | Northbound | 67% |

| Table II.6: Ten Worst Intersections by Length of Stop, 2012 | | |
|---|---|---|
| **Intersection** | **Direction** | **Mean Length of Stop** |
| 28th @ Arapahoe | Northbound | 01 min 17 sec |
| 28th @ Valmont | Northbound | 00 min 58 sec |
| Broadway @ Table Mesa | Northbound | 00 min 56 sec |
| Broadway @ Canyon | Northbound | 00 min 55 sec |
| 28th @ Canyon | Southbound | 00 min 54 sec |
| Broadway @ University | Northbound | 00 min 49 sec |
| Broadway @ Arapahoe | Southbound | 00 min 49 sec |
| Foothills @ Baseline | Southbound | 00 min 48 sec |
| 28th @ Canyon | Northbound | 00 min 47 sec |
| Broadway @ Spruce | Southbound | 00 min 46 sec |

| Table II.7: Ten Best Intersections by Chances of Being Stopped, 2012 | | |
|---|---|---|
| **Intersection** | **Direction** | **Chances of Being Stopped** |
| 28th @ Kalmia | Northbound | 0% |
| 28th @ Winding Trail | Northbound | 0% |
| 28th @ Jay Road | Northbound | 0% |
| 28th @ Mapleton | Southbound | 0% |
| 28th @ Walnut | Southbound | 0% |
| 28th @ Table Mesa | Southbound | 0% |
| Broadway @ Dartmouth | Northbound | 0% |
| Broadway @ Pennsylvania | Northbound | 0% |
| Broadway @ Linden | Northbound | 0% |
| Broadway @ Alpine | Southbound | 0% |

| Table II.8: Ten Best Intersections by Length of Stop, 2012 | | |
|---|---|---|
| **Intersection** | **Direction** | **Mean Length of Stop** |
| 28th @ Kalmia | Northbound | 00 min 00 sec |
| 28th @ Winding Trail | Northbound | 00 min 00 sec |
| 28th @ Jay Road | Northbound | 00 min 00 sec |
| 28th @ Mapleton | Southbound | 00 min 00 sec |
| 28th @ Walnut | Southbound | 00 min 00 sec |
| 28th @ Table Mesa | Southbound | 00 min 00 sec |
| Broadway @ Dartmouth | Northbound | 00 min 00 sec |
| Broadway @ Pennsylvania | Northbound | 00 min 00 sec |
| Broadway @ Linden | Northbound | 00 min 00 sec |
| Broadway @ Alpine | Southbound | 00 min 00 sec |

| Table II.9: Drive Time and Speed Between Intersections, 2012 | | | |
|---|---|---|---|
| **Street** | **Intersection** | **Mean Speed From Previous Intersections (mph)** | **Mean Time from Previous Intersection** |
| **Broadway North** | Greenbriar Boulevard | n/a | n/a |
| | Hanover Avenue | 36.2 | 00 min 56 sec |
| | Table Mesa Drive | 18.8 | 01 min 13 sec |
| | Dartmouth Avenue | 38.0 | 00 min 38 sec |
| | 27th Way | 32.7 | 01 min 04 sec |
| | Baseline Road | 27.5 | 00 min 49 sec |
| | Regent Drive | 31.7 | 00 min 38 sec |
| | Euclid Avenue | 25.2 | 00 min 43 sec |
| | College Avenue | 28.7 | 00 min 21 sec |
| | Pennsylvania Avenue | 24.9 | 00 min 17 sec |
| | University Avenue | 21.4 | 00 min 32 sec |
| | Arapahoe Avenue | 16.5 | 01 min 07 sec |
| | Canyon Boulevard | 16.0 | 00 min 47 sec |
| | Walnut Street | 21.4 | 00 min 19 sec |
| | Pearl Street | 14.8 | 00 min 30 sec |
| | Spruce Street | 21.5 | 00 min 16 sec |
| | Pine Street | 24.8 | 00 min 14 sec |
| | North Street | 22.6 | 00 min 53 sec |
| | Alpine Avenue | 24.1 | 00 min 14 sec |
| | Balsam Avenue | 17.0 | 00 min 27 sec |
| | North Boulder Rec. | 27.3 | 00 min 50 sec |
| | Iris Avenue | 19.3 | 01 min 10 sec |
| | Linden Avenue | 32.4 | 00 min 35 sec |
| | Quince Avenue | 33.3 | 00 min 54 sec |
| | Violet Avenue | 33.0 | 00 min 52 sec |
| | Lee Hill Road | 25.0 | 01 min 14 sec |

| Table II.10: Drive Time and Speed Between Intersections, 2012 | | | |
|---|---|---|---|
| **Street** | **Intersection** | **Mean Speed From Previous Intersections (mph)** | **Mean Time from Previous Intersection** |
| **Broadway South** | Lee Hill Road | n/a | n/a |
| | Violet Avenue | 26.7 | 01 min 08 sec |
| | Quince Avenue | 30.8 | 00 min 54 sec |
| | Linden Avenue | 31.6 | 00 min 57 sec |
| | Iris Avenue | 30.0 | 00 min 38 sec |
| | North Boulder Rec. | 25.9 | 00 min 44 sec |
| | Balsam Avenue | 24.1 | 00 min 58 sec |
| | Alpine Avenue | 27.8 | 00 min 11 sec |
| | North Street | 26.5 | 00 min 12 sec |
| | Pine Street | 23.6 | 00 min 53 sec |
| | Spruce Street | 20.9 | 00 min 20 sec |
| | Pearl Street | 20.8 | 00 min 13 sec |
| | Walnut Street | 13.2 | 00 min 31 sec |
| | Canyon Boulevard | 12.5 | 00 min 32 sec |
| | Arapahoe Avenue | 20.5 | 00 min 33 sec |
| | University Avenue | 17.4 | 01 min 04 sec |
| | Pennsylvania Avenue | 25.6 | 00 min 20 sec |
| | College Avenue | 27.3 | 00 min 16 sec |
| | Euclid Avenue | 29.7 | 00 min 20 sec |
| | Regent Drive | 27.2 | 00 min 40 sec |
| | Baseline Road | 25.8 | 00 min 55 sec |
| | 27th Way | 36.1 | 00 min 28 sec |
| | Dartmouth Avenue | 37.8 | 00 min 55 sec |
| | Table Mesa Drive | 28.4 | 00 min 58 sec |
| | Hanover Avenue | 37.5 | 00 min 26 sec |
| | Greenbriar Boulevard | 40.3 | 00 min 51 sec |

| Table II.11: Drive Time and Speed Between Intersections, 2012 | | | |
|---|---|---|---|
| **Street** | **Intersection** | **Mean Speed From Previous Intersections (mph)** | **Mean Time from Previous Intersection** |
| **28th Street North** | Table Mesa Drive | n/a | n/a |
| | Colorado Avenue | 40.4 | 02 min 59 sec |
| | Arapahoe Avenue | 20.5 | 01 min 50 sec |
| | Canyon Boulevard | 24.3 | 00 min 40 sec |
| | Walnut Street | 31.5 | 00 min 26 sec |
| | Pearl Street | 21.3 | 00 min 27 sec |
| | Mapleton Avenue | 27.9 | 00 min 29 sec |
| | Valmont Road | 20.8 | 00 min 59 sec |
| | Glenwood Drive | 29.7 | 00 min 32 sec |
| | Iris Avenue | 17.3 | 01 min 05 sec |
| | Kalmia Avenue | 35.5 | 00 min 26 sec |
| | Winding Trail Drive | 39.1 | 00 min 22 sec |
| | Jay Road | 40.9 | 00 min 47 sec |

| Table II.12: Drive Time and Speed Between Intersections, 2012 | | | |
|---|---|---|---|
| **Street** | **Intersection** | **Mean Speed From Previous Intersections (mph)** | **Mean Time from Previous Intersection** |
| **28th Street South** | Jay Road | n/a | n/a |
| | Winding Trail Drive | 39.2 | 00 min 50 sec |
| | Kalmia Avenue | 32.8 | 00 min 29 sec |
| | Iris Avenue | 21.2 | 00 min 57 sec |
| | Glenwood Drive | 27.7 | 00 min 34 sec |
| | Valmont Road | 25.7 | 00 min 45 sec |
| | Mapleton Avenue | 30.5 | 00 min 30 sec |
| | Pearl Street | 19.4 | 00 min 50 sec |
| | Walnut Street | 28.0 | 00 min 16 sec |
| | Canyon Boulevard | 15.5 | 01 min 15 sec |
| | Arapahoe Avenue | 22.4 | 00 min 40 sec |
| | Colorado Avenue | 27.2 | 01 min 11 sec |
| | Table Mesa Drive | 52.3 | 02 min 17 sec |

| Table II.13: Drive Time and Speed Between Intersections, 2012 | | | |
|---|---|---|---|
| **Street** | **Intersection** | **Mean Speed From Previous Intersections (mph)** | **Mean Time from Previous Intersection** |
| **Foothills Parkway North** | Table Mesa Drive | n/a | n/a |
| | Baseline Drive | 33.1 | 01 min 41 sec |
| | Colorado Avenue | 40.1 | 01 min 03 sec |
| | Arapahoe Avenue | 28.3 | 01 min 09 sec |
| | Valmont Road | 34.9 | 01 min 58 sec |
| | Iris Avenue | 44.9 | 00 min 39 sec |

| Table II.14: Drive Time and Speed Between Intersections, 2012 | | | |
|---|---|---|---|
| **Street** | **Intersection** | **Mean Speed From Previous Intersections (mph)** | **Mean Time from Previous Intersection** |
| **Foothills Parkway South** | Iris Avenue | n/a | n/a |
| | Valmont Road | 23.7 | 01 min 31 sec |
| | Arapahoe Avenue | 38.5 | 01 min 39 sec |
| | Colorado Avenue | 37.5 | 00 min 46 sec |
| | Baseline Drive | 33.6 | 01 min 29 sec |
| | Table Mesa Drive | 39.3 | 01 min 20 sec |