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RESOURCE SYSTEMS GROUP, INC.

Chittenden County Regional Planning Commission

Transportation Survey

Report of Results

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Submitted by
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1.0 Executive Summary

Study Background and Purpose

In the spring of 2012, the Chittenden County Regional Planning Commission (CCRPC) worked with an independent market research firm, Resource Systems Group, Inc. (RSG), to conduct an important survey in order to better understand the transportation-related attitudes and opinions of Chittenden County residents. The CCRPC was primarily interested in assessing the public's thoughts on the current performance of the region's transportation system and their priorities for future transportation investment and improvement. The results of this study, the "Chittenden County Transportation Survey", will help inform potential transportation initiatives grounded in the opinions and expectations of its citizens. In addition, given that this was the third iteration of the survey (the first two were conducted in 2000 and 2006, respectively), results from this year's survey will also be used to track changes in opinions over time.

Methodology and Results

RSG developed a questionnaire that was largely consistent with prior versions. It was programmed into an online survey as well as converted into a paper-based instrument. When a random sample of Chittenden County residents were mailed invitations to the survey, they had the option of either filling out the paper version and mailing it back free of charge or using a web-link provided with the invitation to complete the survey online. This hybrid approach allowed citizens without Internet access or with a preference for completing the paper survey to voice their opinions.

After closing the survey in July 2012, RSG merged the data collected with datasets from 2000 and 2006 before conducting a data cleaning process, which involved checking for incompletes. The final, "cleaned" dataset included individuals who provided age and gender information and filled out at least a large majority of the attitudinal questions. In total, 519 individuals completed the survey, 114 (22%) of whom elected to fill out the survey online. In order to more closely reflect the true population of Chittenden County residents, the collected survey data (including 2000 and 2006 data) were weighted by age and gender. The control data were based on the most recent and available 2010 U.S. Census data. The details of this process are described in greater detail in the body of this report.

For analysis presented in this report, the confidence level is 95%. In general, the confidence interval is determined by the sample size, the population size, and the percentage that are, for example, agreeing with a particular statement. The margins of error for each type of analysis are as follows (exceptions are noted in the body of this report):

- Analysis of 2012 data: ±5%
- Comparisons across subsets of 2012 data (e.g. CCTA users vs. non users): ±7%
- Comparisons across years: (±6%).

A full analysis of these survey results are described in the body of this report and in the appendices. However, here are some key findings:

2012 Results

The overall satisfaction with most aspects of transportation is quite high. Notably:

- 65% of residents believe that driving is a pleasant experience in Chittenden County
- 63% of residents who have ridden the CCTA bus in the past month are satisfied with the overall experience

- 54% of all residents consider biking to be a pleasant experience;
- 80% of all residents think that walking in Chittenden County is a pleasant experience
- 70% of all residents agreed with the statement: "Overall, Chittenden County's transportation system enhances the quality of my life by allowing me to travel to work and other daily activities in a safe and efficient manner"

As was the case in prior years, residents emphasize the importance of preserving existing infrastructure and improving safety. In fact, only 0.5% of residents consider preservation of existing transportation infrastructure and services to be "Not at all important". Likewise, only 2.8% of residents consider improvements in safety to be "Not at all important".

Residents also expressed their general sentiments in an open-end text box at the conclusion of the survey. Frequent topics included: bus service, safety, road capacity, travel conditions, bicycling and walking, and specific problem areas/intersections/roadways. The comments are visually summarized in Figure 1, where word size corresponds to the frequency with which it appeared.

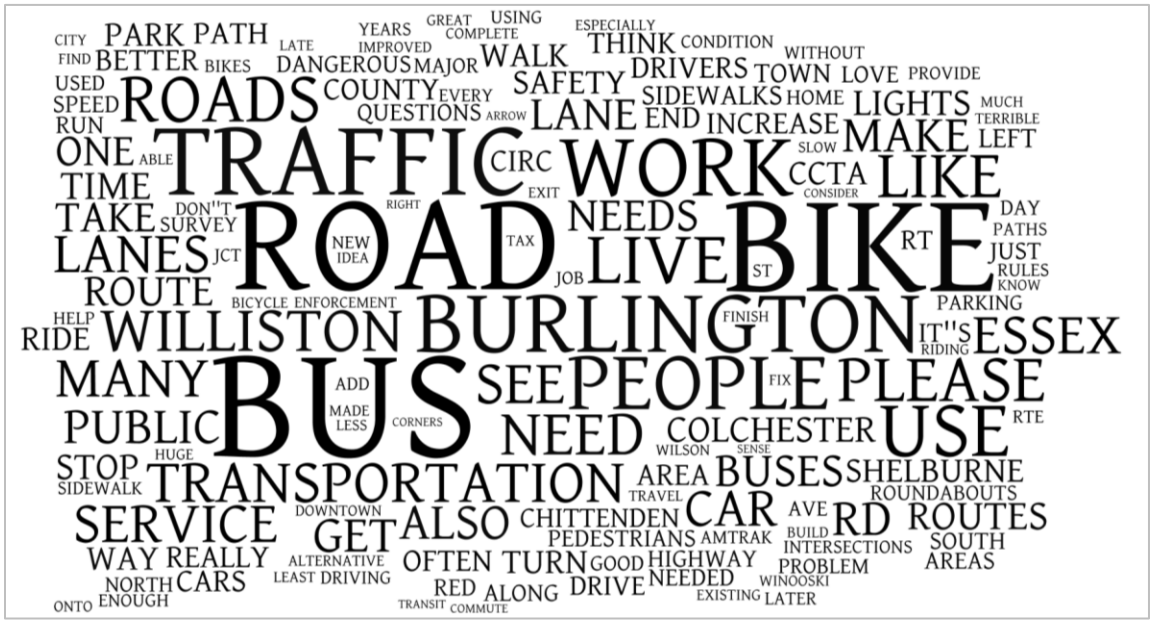


Figure 1: Open-end Comments Visualization

Trends

In general, attitudes and opinions about transportation topics have been fairly steady over the past 12 years. If changes have occurred, they tend to be relatively small; in fact, most are not statistically significant. However, there are some trends that have emerged. For example the following reveal statistically significant changes over time:

- Fewer residents are agreeing with the statement "traffic congestion gets noticeably worse every year" over time. In other words, their perception is that traffic congestion is lessening. Additionally, residents have been less likely to drive on back roads to avoid congestion in recent years.
- Residents are increasingly agreeing with the statement "I live close enough to walk to work, schools, shopping, services, etc." Likewise, there is a positive trend in terms of residents feeling as though there are enough sidewalks in their areas.
- Internet use is increasingly reducing the total number of trips that residents of Chittenden County make.

- Fewer residents consider their neighborhood streets to be safe and pleasant for all users but by contrast, fewer feel that vehicular noise and emissions are getting worse.
- In 2012, residents were much less likely to support building more freeways.
- Residents are decreasingly finding minor highway efficiency projects and highway initiatives to be highly important.

2.0 QUESTIONNAIRE

2.1 Overview

Resource Systems Group, Inc. (RSG) worked closely with the Chittenden County Regional Planning Commission (CCRPC) staff to design a questionnaire which would provide the CCRPC with the information needed to make sound decisions about countywide transportation projects that incorporate citizen feedback. To that end, RSG reviewed past Public Opinion Survey on Transportation questionnaires as well as other relevant transportation reports to inform the questionnaire design. Special attention was placed on maintaining consistency with past questionnaires in order to make accurate and statistically significant comparisons with results from prior survey administrations. Some attitudinal statements from the 2006 survey that were not useful or no longer relevant were removed (or combined with another statement). Other attitudinal statements were modified slightly to more closely represent the intended interpretation. Finally, the project team added some statements that were deemed important to evaluate.

The questionnaire itself first asked each resident to indicate the transportation modes used in the past month. This information will help identify differences in attitudes by, for example, those who use CCTA against those who do not.

In order to measure satisfaction, the questionnaire asked how well the transportation system serves the public's travel needs, affects livability, promotes economic development and opportunity, and affects the environment. This first major section consisted of six topics (themes), each of which included several attitudinal statements. Respondent were asked to indicate their level of agreement with each of those statements, selecting from the following categories:

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree
- Don't know

The topics were:

1. Highway/Auto Travel
2. Transportation Planning Activities
3. Public Transportation Systems
4. Bicycling and Walking
5. Transportation Behavior
6. Quality of Life, the Environment, and Economy

To understand improvement strategies, the second major section of the questionnaire asked respondents their opinion on transportation alternatives such as highway capacity, transit expansion, pedestrian and bicycle facilities, transportation demand measures, and land use. Respondents were presented with seven transportation topics relevant to Chittenden County. For

each topic, they were asked to rate the importance of several proposed measures for improving that area of the transportation system. This time, the category options were as follows:

- Essential
- Very important
- Somewhat important
- Not at all important
- Don't know

The topics were:

1. Highway Initiatives
2. Expanding Public Transportation Service
3. Improved Bike/Walk Facilities
4. Incentives to Use Transportation Alternatives
5. Preserving the Condition of Existing Roads, Bridges, Sidewalks, Bike Paths, and Public Transportation Services and Facilities
6. Improved Safety
7. Minor Highway Efficiency Projects

After commenting on individual statements ("Adding more travel lanes to congested roads", "Providing more Park-and-Ride lots", "Fixing poor bridges", etc.), respondents rated the importance of each topic. In addition they were asked to rank at least three priorities from the list of seven topics.

Lastly, respondents were given the opportunity to leave comments in an open-ended box before answering a series of demographics questions, including, but not limited to:

- Number of vehicles in the household
- Number of adults and children in the household
- Employment status
- Age
- Gender
- Household income

The full version of the written questionnaire is included in this report's appendix.

Once the CCRPC provided feedback and signed off on the final version of the written questionnaire, RSG began two concurrent efforts: 1) programming a web-based survey and 2) converting the written questionnaire into a user-friendly, paper-based survey that was eventually mailed to survey invitees. Both of these versions matched the content of the written questionnaire; both were also reviewed by the CCRPC staff before being finalized.

2.2 Web-Based Survey

RSG created an intuitive and easy-to-use survey that would be enjoyable for respondents of all levels of computer literacy. For the Chittenden County Transportation Survey, the most useful feature of the online instrument was that before a respondent could continue to the next question in the survey, the answer was validated to ensure 1) an answer was given and 2) the answer makes logical sense (e.g., a text response is not given in a numeric field, the range of a numeric response is not outside reasonable expectations). This validation positively affected data quality, as did the

requirement that each respondent enter their unique password to log into the survey (Figure 2).

Figure 2: Online survey - entry page

After successfuilly logging in, respondents saw a "header" image – one that matched the look and feel of the entry page – on all subsequent survey screens. This element of consistency helped to link pages together and display a single theme for the duration of the survey. Figure 3 shows that header image as well as an example of the attidude statements and agreement scale that respondents encountered.

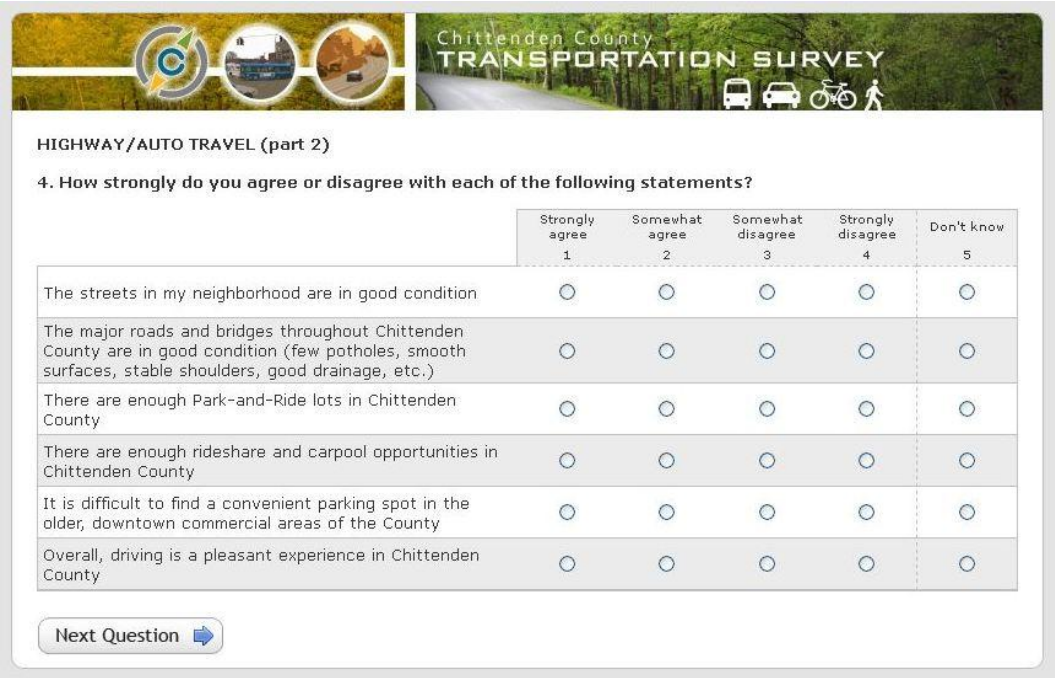


Figure 3: Online survey - attitudes about highway/auto travel

Before reaching the demographics section, respondent were asked to rank their priorities from the set of seven transportation topics (Figure 4). This user-friendly "drag-and-drop" approach allowed respondents to quickly and easily indicate how important the various topics are relative to one another.

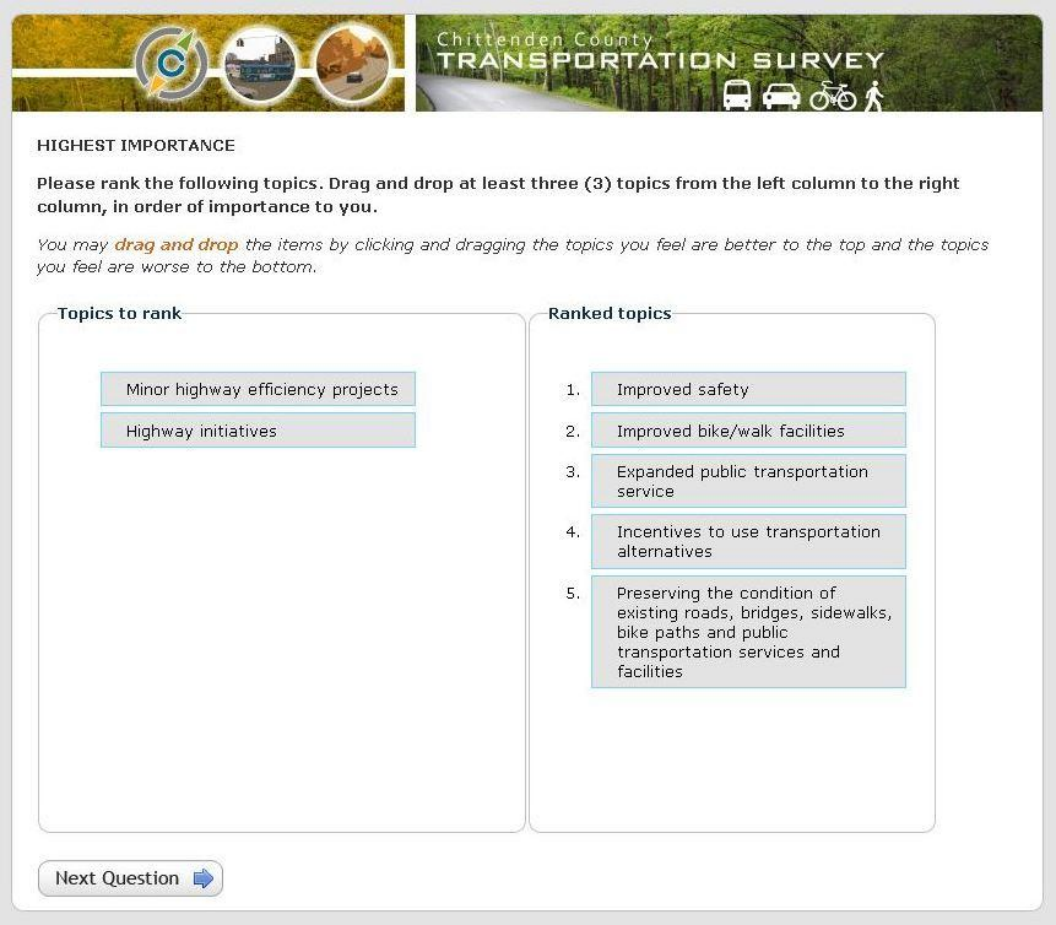


Figure 4: Online survey - topic ranking

2.3 Paper-Based Survey

The paper-based survey was created to match the online version in a way that answers provided via the web and via the paper-based instrument could be combined into one integrated dataset. Special consideration was given to: a) the cost of producing hard-copy invitations, b) the ease of navigation through the survey, c) the clarity of the instructions, and d) a layout that compared to that of the online instrument. The final version of the survey was printed on five pages (the sixth included the mailing address, instructions, and the invitation itself). Figure 5 shows an example the layout used in the paper-based version.

{Please circle the response that most closely represents your opinion for each question.}

HIGHWAY/AUTO TRAVEL (PART 1)

3. How strongly do you agree or disagree with each of the following statements?	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Don't know
a. Traffic congestion affects the majority of trips I make	1	2	3	4	5
b. Traffic congestion gets noticeably worse every year	1	2	3	4	5
c. I don't know where to find information on traffic condition and highway construction	1	2	3	4	5
d. I often drive on back roads and residential streets to avoid congested highways	1	2	3	4	5
e. I am often delayed by road construction, accidents, or special event traffic	1	2	3	4	5
f. Travelling by car is safe in Chittenden County	1	2	3	4	5
g. Driving in Chittenden County becomes more dangerous each year	1	2	3	4	5

Figure 5: Paper survey – attitudes about highway/auto travel

The primary differences between the online and paper versions were that in the paper version, the attitudinal statements were not randomized and there was no way to prevent a respondent from skipping a question, either accidentally or deliberately.

The entire printed survey (and invitation) are included in this report's appendix.

3.0 Survey Methodology

3.1 Sample

RSG used address-based sampling to obtain the desired number of completes (500). This method was selected because it is both consistent with previous studies and it is increasingly considered an important element of best practices in survey sampling, especially when combined with web-based completion options.

The sampling unit was an individual address. RSG used an address database from the U.S. Postal Service's Computerized Delivery Sequence (CDS) File, an electronic database that provides and continually updates all mailing addresses served by the USPS, with the exception of general delivery. The CDS File contains address information for all other varieties of addresses, including addresses that receive (or have received) mail delivery, addresses only delivered on a seasonal basis, vacant addresses, and throwback addresses (addresses not delivered to because of PO boxes). The CDS File contains households with all types of telephone (e.g. no-telephone, landline only, cell phone mostly, cell phone only) and combinations therein. RSG used the address-based sample frame maintained by Marketing Systems Group (MSG), which is updated bimonthly and stratified based on residential land use classifications, as well as by geographic location within Chittenden County.

The sample was randomly selected among all existing residential addresses throughout Chittenden County, proportional to the number of households in the County. Based on assumptions about response rate and the final sample size desired (500 completed surveys), RSG obtained 4,000 residential addresses from MSG. Given that there was a mismatch between the available sampling unit (individual address) and the desired sample unit (individual citizen), RSG employed the "birthday method" to randomly select an individual within the household to complete the survey. The "birthday method" selects a person within the household by having the person whose birthday has most recently passed complete the survey. In the invitation, RSG instructed the recipient as follows: "Please complete this questionnaire if you are the adult (age 18 or older) in the household who most recently had a birthday. The adult's year of birth does not matter." The underlying

assumption in this method is that the day of birth has no relationship to the manner in which people respond to surveys. It is also consistent with the 2006 methodology.

3.2 Invitation Outreach

The Chittenden County Transportation Study invitation and outreach process included a pre-notification postcard and an invitation to the survey, both of which were sent via first class mail. All printed materials and online graphics featured consistent visual elements, including survey titles and description, color scheme (when possible), fonts, logos and picture graphics. The intended effect of this coordination is to connect invitation and reminder materials with the online survey instrument.

A pre-notification postcard (6" by 4.25") was sent out in advance of the invitation (Figure 6 and Figure 7). The postcard announced the study and conditions the household to expect a survey invitation in the coming days. On average, pre-notification announcements have been shown to improve the base response by 15%.[1]

Figure 6: Pre-notification postcard (front)

[1] Hill, N., Self, B., and Roche, G. Customer Satisfaction Measurement for ISO 9000:2000. Institute of Quality Assurance, Butterworth-Heinemann Press, 2002.

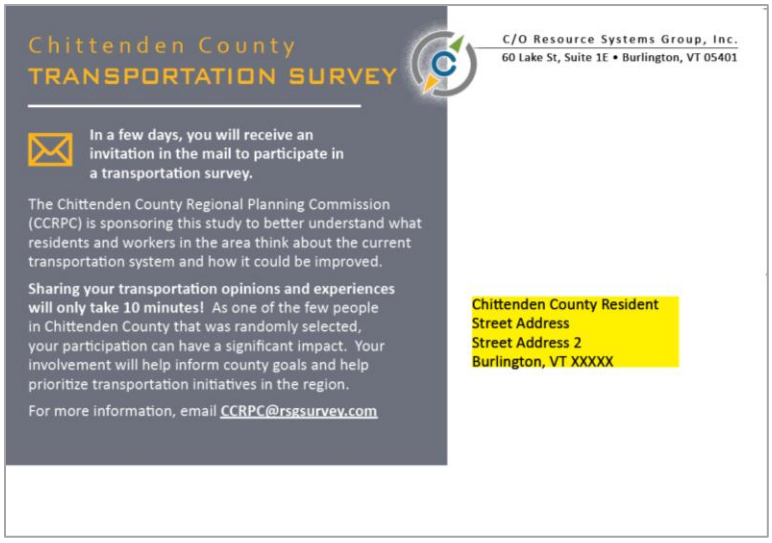


Figure 7: Pre-notification postcard (back)

The invitation packet was mailed out in a standard envelope and scheduled to arrive approximately three days after the pre-notification postcard arrived. The invitation included:

- An introduction to the project
- A web-link and password to optionally access the survey online
- The entire paper-based survey
- A self-mailing envelope to return the completed survey
  - These mailings were directed to RSG's office in Burlington, VT

RSG also offered an incentive to encourage participation in the survey: a $200 gift card the Outdoor Gear Exchange in Burlington, VT. A survey respondent was randomly drawn from the group of individuals who completed the survey and indicated that they wanted to be entered in the raffle. That winner ("GL" of Burlington) was selected and notified on August 15, 2012.

4.0 Results

4.1 Data processing

After closing the online survey on June 7, 2012, completed paper surveys that were mailed back to RSG were entered into the system by Tab Service Company, who provided accurate data transferring. In Tab Service Company's data entry process, each paper survey was entered into the system twice; any differences between the two entries were resolved by a third staff member. This process allowed RSG to obtain a dataset that fully integrated the data collected online with those from the paper survey.

4.1.1 Merging Datasets

2012 data were then merged with the survey datasets from 2006 and 2000. This process included:

- Examining all survey variables across the three years
- Removing variables that were:
  - No longer comparable across years (e.g. the statement wording had changed significantly)
  - Not a part of the 2012 dataset (e.g. a question that was only asked in 2000)

- Removing individual records that were missing a value for age, gender, or both. These records were excluded because they could not be accurately weighted.
- Removing records from the 2006 survey that participated via the business recruitment. These records were removed because they could not be accurately weighted (the business recruitment process was not random).

This yielded a final dataset of 1,293 respondents, which included 328 valid records from 2000, 446 from 2006, and 519 from 2012. This equates to a 2012 response rate of 12.98%, excluding the undeliverable mailings (13.45% if you exclude the 142 undeliverable addresses).

4.1.2 Weighting

In order to more closely reflect the true population of Chittenden County residents, the collected survey data (including 2000 and 2006 data) were weighted by age and gender. The control data were based on the most recent and available 2010 U.S. Census dataset, which was a joint distribution of age and gender within Chittenden County (Table 1). After obtaining these observed data, RSG expanded the survey dataset to control for totals across these two dimensions. This process was completed for each of the three years of data. Once these weights have been applied, the survey results can be interpreted as follows: "Holding demographic (age/gender) shifts constant, the attitudes toward [insert statement] have changed by X amount in the past 6 (or 12) years." In other words, applying the weights means that we are effectively holding the demographic profile of the sample constant across all the survey years, anchored to the characteristics of the full population in 2010.

Table 1: 2010 Census Data - Age by Gender in Chittenden County

	Count			Percent (of total pop)		
	Female	**Male**	**Total**	**Female**	**Male**	**Total**
18 to 24 years	12282	11895	24177	10%	9%	19%
25 to 34 years	10381	10231	20612	8%	8%	16%
35 to 44 years	10137	9762	19899	8%	8%	16%
45 to 54 years	12390	11906	24296	10%	10%	19%
55 to 64 years	9507	9056	18563	8%	7%	15%
65 years and over	10313	7372	17685	8%	6%	14%
Total	**65010**	**60222**	**125232**	**52%**	**48%**	**100%**

Table 1 demonstrates the process for applying weights to the survey data. Table 2A and table 2B are raw (un-weighted) survey data. Table 2C shows the ratio of Census counts (Table 1) to survey counts which equals the expansion (weighting) factor. For example, each female survey participant between the age of 45 and 54 years old represents 275.3 females between the age of 45 and 54 in all of Chittenden County. Once these weights are applied, the distribution of age and gender in the survey match up with the same distribution in the full population, as displayed in Table 2D.

Table 2: Data weighting progression

A.) Survey data: raw counts

	2012			2006			2000		
	Female	**Male**	**Total**	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
18 to 24 years	9	6	15	7	8	15	12	29	41
25 to 34 years	42	29	71	36	26	62	37	42	79
35 to 44 years	30	34	64	57	42	99	36	49	85
45 to 54 years	45	43	88	59	53	112	23	49	72
55 to 64 years	69	71	140	42	34	76	15	23	38
65 years and over	63	78	141	39	43	82	11	2	13
Total	**258**	**261**	**519**	**240**	**206**	**446**	**134**	**194**	**328**

B.) Survey data: raw percents

	2012			2006			2000		
	Female	**Male**	**Total**	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
18 to 24 years	2%	1%	3%	2%	2%	3%	4%	9%	13%
25 to 34 years	8%	6%	14%	8%	6%	14%	11%	13%	24%
35 to 44 years	6%	7%	12%	13%	9%	22%	11%	15%	26%
45 to 54 years	9%	8%	17%	13%	12%	25%	7%	15%	22%
55 to 64 years	13%	14%	27%	9%	8%	17%	5%	7%	12%
65 years and over	12%	15%	27%	9%	10%	18%	3%	1%	4%
Total	**50%**	**50%**	**100%**	**54%**	**46%**	**100%**	**41%**	**59%**	**100%**

C.) Weighting factors (ratio of Census counts to survey counts)

	2012		2006		2000	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
18 to 24 years	1364.7	1982.5	1754.6	1486.9	1023.5	410.2
25 to 34 years	247.2	352.8	288.4	393.5	280.6	243.6
35 to 44 years	337.9	287.1	177.8	232.4	281.6	199.2
45 to 54 years	275.3	276.9	210.0	224.6	538.7	243.0
55 to 64 years	137.8	127.5	226.4	266.4	633.8	393.7
65 years and over	163.7	94.5	264.4	171.4	937.5	3686.0
Total	**2526.5**	**3121.4**	**2921.6**	**2775.2**	**3695.7**	**5175.7**

D.) Survey data: weighted percents

	2012		2006		2000	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
18 to 24 years	10%	9%	10%	9%	10%	9%
25 to 34 years	8%	8%	8%	8%	8%	8%
35 to 44 years	8%	8%	8%	8%	8%	8%
45 to 54 years	10%	10%	10%	10%	10%	10%
55 to 64 years	8%	7%	8%	7%	8%	7%
65 years and over	8%	6%	8%	6%	8%	6%
Total	**52%**	**48%**	**52%**	**48%**	**52%**	**48%**

4.1.3 Scale differences

Survey administration methodologies were nearly identical between 2012 and 2006: an address-based sample approach that targeted a statistically representative segment of the Chittenden County population. It is worth noting that responses from the "business recruitment" approach that was used in 2006 were removed for the sake of valid comparisons. There was, however, a different

approach used in the year 2000: a combination of intercept and Web-based administration. Although all three survey datasets were weighted according to Census data, it should not be forgotten that different methodologies were employed in 2000.

In addition to methodological comparisons, RSG examined the scales used in the opinion and attitudinal questions. Those are presented in Table 3 and Table 4. For the agreement portion of the survey (section 1), Table 3 shows that in the year 2000, a "No opinion" option was split between the "Disagree" and "Agree" categories. In 2006 and 2012, this option choice was replaced with "Don't know" (it was also positioned on the far right). Respondents who selected "No opinion" in 2000 were treated identically as those who selected "Don't know" in either 2006 or 2012.

Table 3: Agreement Scales, 2000-2012

	2000	2006	2012
1	Strongly disagree	Strongly agree	Strongly agree
2	Disagree	Somewhat agree	Somewhat agree
3	No opinion	Somewhat disagree	Somewhat disagree
4	Agree	Strongly disagree	Strongly disagree
5	Strongly agree	Don't know	Don't know

Table 4 shows that there were significant differences between the importance scale of 2000 and those from the other two years (2006 and 2012). Not only is the text different — "Not important" versus "Somewhat important", e.g. — but the positions on screen (or paper) are also different. More specifically, whereas "Very important" was the highest rating in 2000, it was the second-highest rating in both 2006 and 2012. This visual change is potentially enough to skew the results. For these reasons, RSG is of the opinion that these differences are significant enough that making comparisons across years is unwise and, therefore, was not completed as a part of this project.

Table 4: Importance Scales, 2000-2012

	2000	2006	2012
1	Not at all important	Essential	Essential
2	Not important	Very Important	Very Important
3	No opinion	Somewhat important	Somewhat important
4	Important	Not at all important	Not at all important
5	Very important	Don't know	Don't know

4.2 Confidence Level and Intervals

For analysis presented in this report, the confidence level is 95%. In general, the confidence interval is determined by the sample size, the population size, and the percentage that are, for example, agreeing with a particular statement.

- **Sample size:** The 2012 dataset consists of 519 individuals; however, some of those individuals skipped questions in the paper survey and more selected the "Don't know" option (11%, on

average) when asked about their agreement with or opinion on a particular statement. Both of these scenarios result in a lower sample size. See below for more details.
- **Population size:** The Chittenden County population, according to the 2010 Census, is 156,546. Because that number is so large, it is a non-factor in the calculation of a confidence level.
- **Percentage:** If 50% of your sample agrees with a particular statement, the chance of error is higher than if 99% of your sample agrees (or disagrees) with a particular statement. Therefore, it is prudent to use the "worst case percentage" of 50% when calculating the confidence interval.

Of these three factors, only sample size impacts the margin of error in this analysis. The margins of error for each type of analysis are as follows:

- Analysis of 2012 data: ±5%
- Comparisons across subsets of 2012 data (e.g. CCTA users vs. non users): ±7%
- Comparisons across years: (±6%).

4.3 Responses from the 2012 Survey

This section contains the weighted results from the 2012 administration of the Chittenden County Transportation Survey, including paper-based and web-based responses.

4.3.1 Mode Usage

After reading the instructions, respondents were first asked to describe their current transportation behavior, specifically their mode choice. This question was asked in two parts:

- Which transportation option do you use most often?
- Which other transportation option(s) have you used in the past month? Circle all that apply.

Driving alone is the dominant mode for Chittenden County residents: nearly three-quarters indicated that driving alone was the mode they used most often. Walking and carpooling represent the next most often used modes. See Figure 8 on page 15.

For mode use in the past month, nearly half of residents had walked (45%) and almost as many (44%) had carpooled or been dropped off[2]. Fourteen percent of residents selected "None of the above" to the second question about mode use in the past month, which means that they exclusively used their "most often" mode identified in the first question.

[2] Some respondents selected the same mode in the "often" and "other" question.

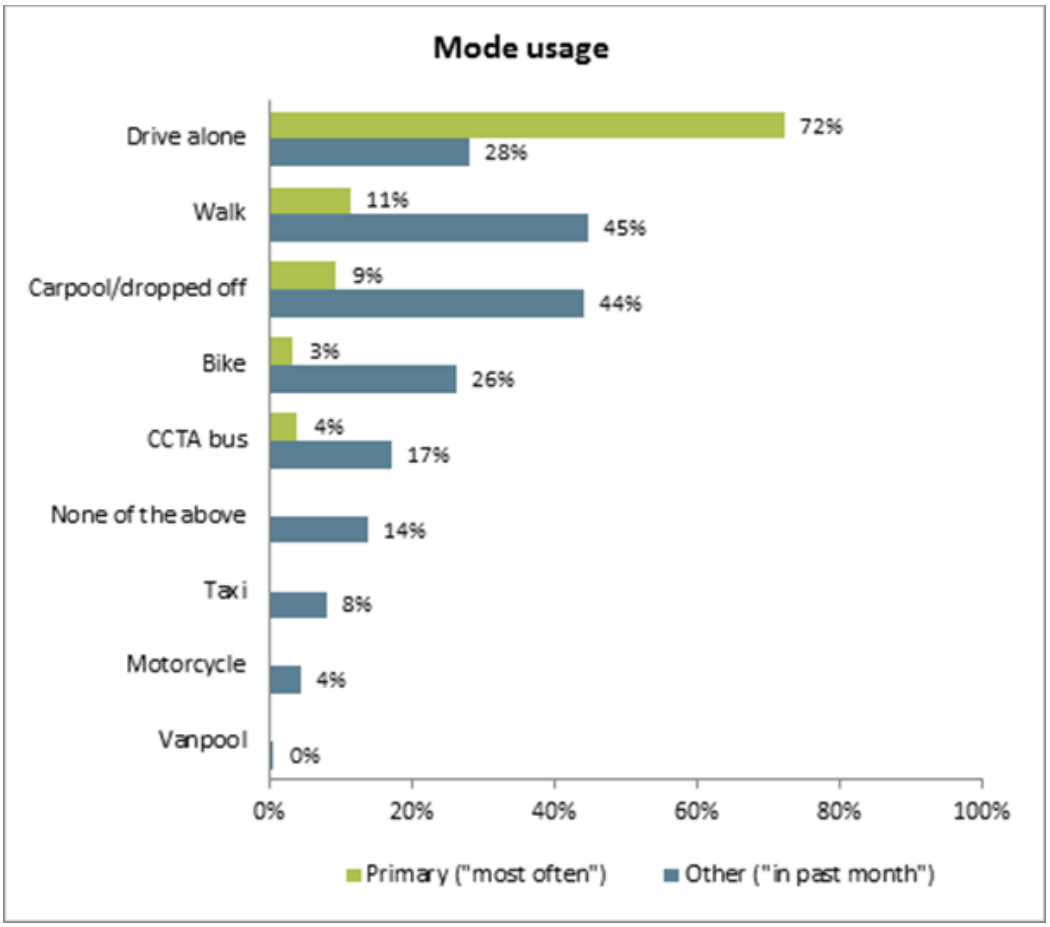


Figure 8: Mode usage

RSG then assigned each respondent to a traveler type based on the answers provided to the two mode questions (Figure 9). Single-occupant-vehicle (SOV) includes "drive alone", "motorcycle", and "taxi". All other modes are classified as non-SOV. The categories are as follows:

- Non-SOV only: selected a non-SOV primary mode and did not select SOV as other mode
- Non-SOV and others: selected a non-SOV primary mode
- SOV and others: selected SOV as primary mode and selected a non-SOV other mode
- SOV only: selected SOV as primary mode and did not select non-SOV as other mode

Eighteen percent of the respondents drive alone as their primary mode and either selected drive alone or none of the above as their other mode used in the past month ("SOV only" in Figure 9). By contrast, 11% of the sample has not driven alone in the past month.

The survey responses by travel mode as identified in Figure 9, as well as other cross tabulations are available in project spreadsheets on request.

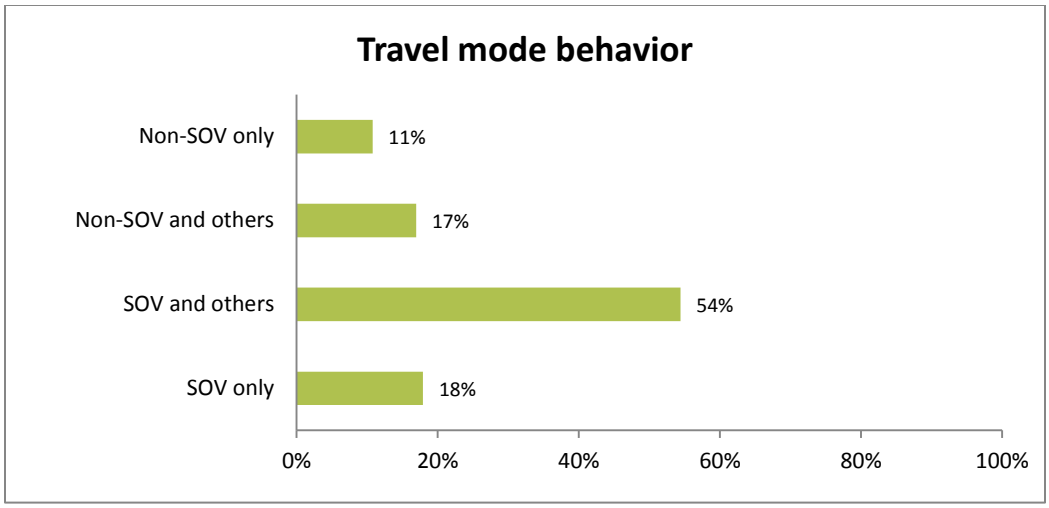


Figure 9: Travel mode behavior

4.3.2 Opinion

The first major section of the questionnaire featured attitudinal questions about various aspects of transportation. In this section, the answer choices of "Strongly agree" and "Somewhat agree" were combined and analyzed as a portion of the total respondents who had an opinion. In other words, the "percent that agree" with each statement is calculated as:

$$\frac{"Strongly\ agree" + "Somewhat\ agree"}{Total\ respondents - "Don't\ know"}$$

All charts display this "percent that agree", unless otherwise noted.

Typically, about 16% of respondents selected "Don't know" for the opinion questions. When the percentage is high enough to increase the confidence interval to ±6%, it is noted with an asterisk (*) in the chart. When the percentage increases the confidence interval to ±7%, it is noted with two asterisks (**) in the chart.

Despite voicing some concerns about parking availability and congestion, most residents are satisfied with the overall experience of driving in Chittenden County (65%) and overwhelmingly find it to be safe (86%). Opportunities for improving satisfaction in auto travel include improving the condition of roads and bridges and increasing the number of Park-and-Ride lots (Figure 10).

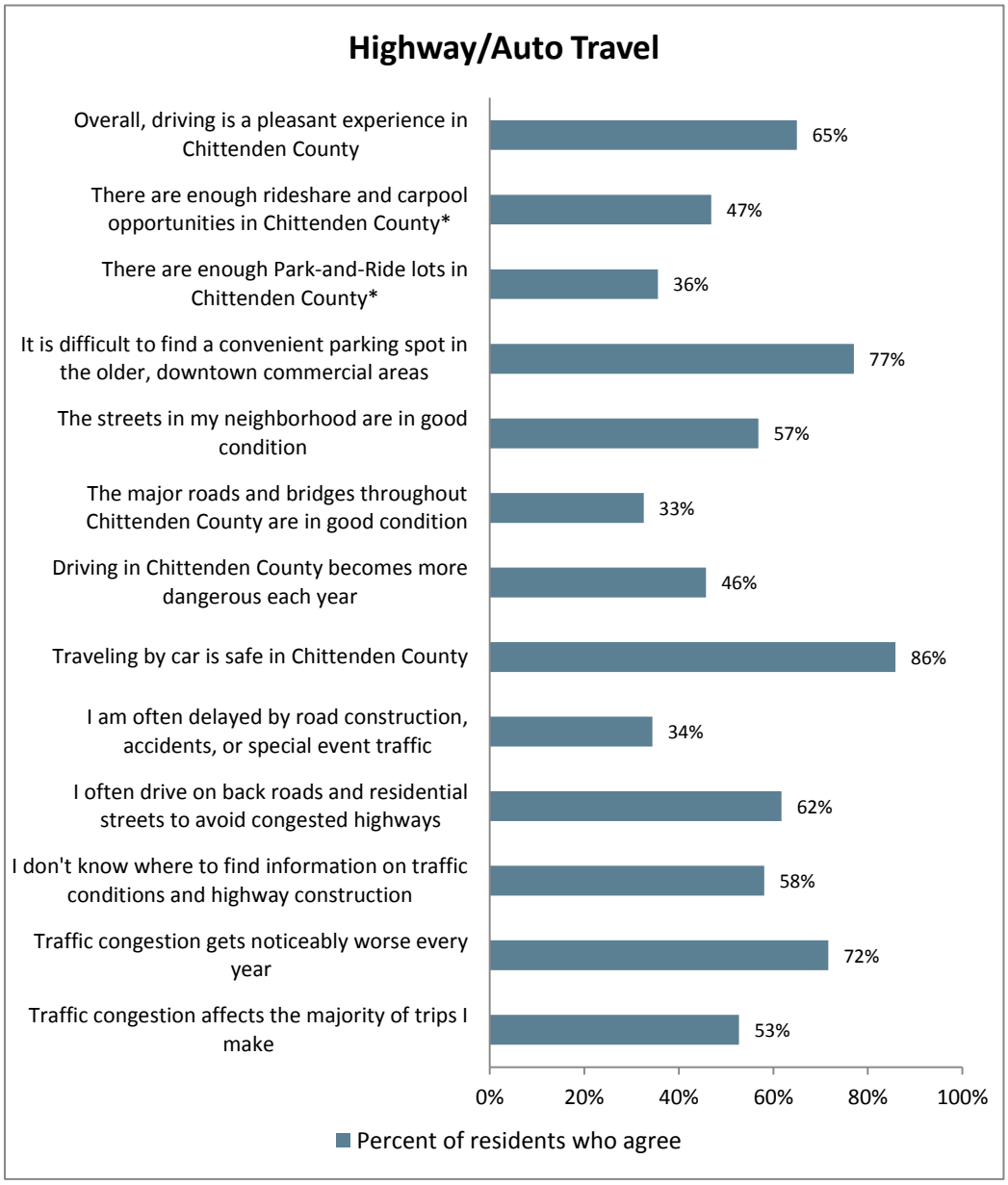


Figure 10: Highway/Auto Travel

Overall, residents lack awareness about Chittenden County's long-range transportation plan and especially about how transportation projects are selected. Moreover, 29% of residents consider transportation planning to be done well in Chittenden County (Figure 11).

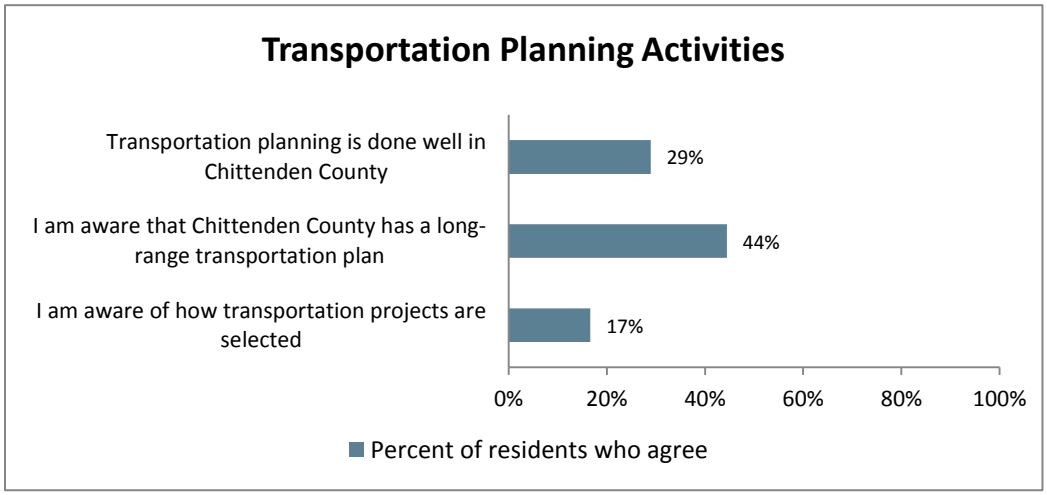


Figure 11: Transportation Planning Activities

Many residents who have not ridden on a CCTA bus in the past month selected "Don't know" for the questions about public transportation systems. Among those that did have an opinion, there are not major differences between those that have ridden on a CCTA bus in the past month (20% of the population) and those who have not (80% of the population). Figure 12 indicates that the biggest difference in opinion between the two groups is in overall satisfaction. Interestingly, many CCTA riders give higher marks when asked about individual features of the bus system (schedule, safety, cleanliness, etc.) than when asked about the system as a whole.

Note that the margin of error around the CCTA user vs. non-CCTA user results is ±10% due to low sample sizes and a high percentage of respondents selecting "Don't know". The "All respondents" group can still be evaluated with a ±5% error, unless otherwise noted.

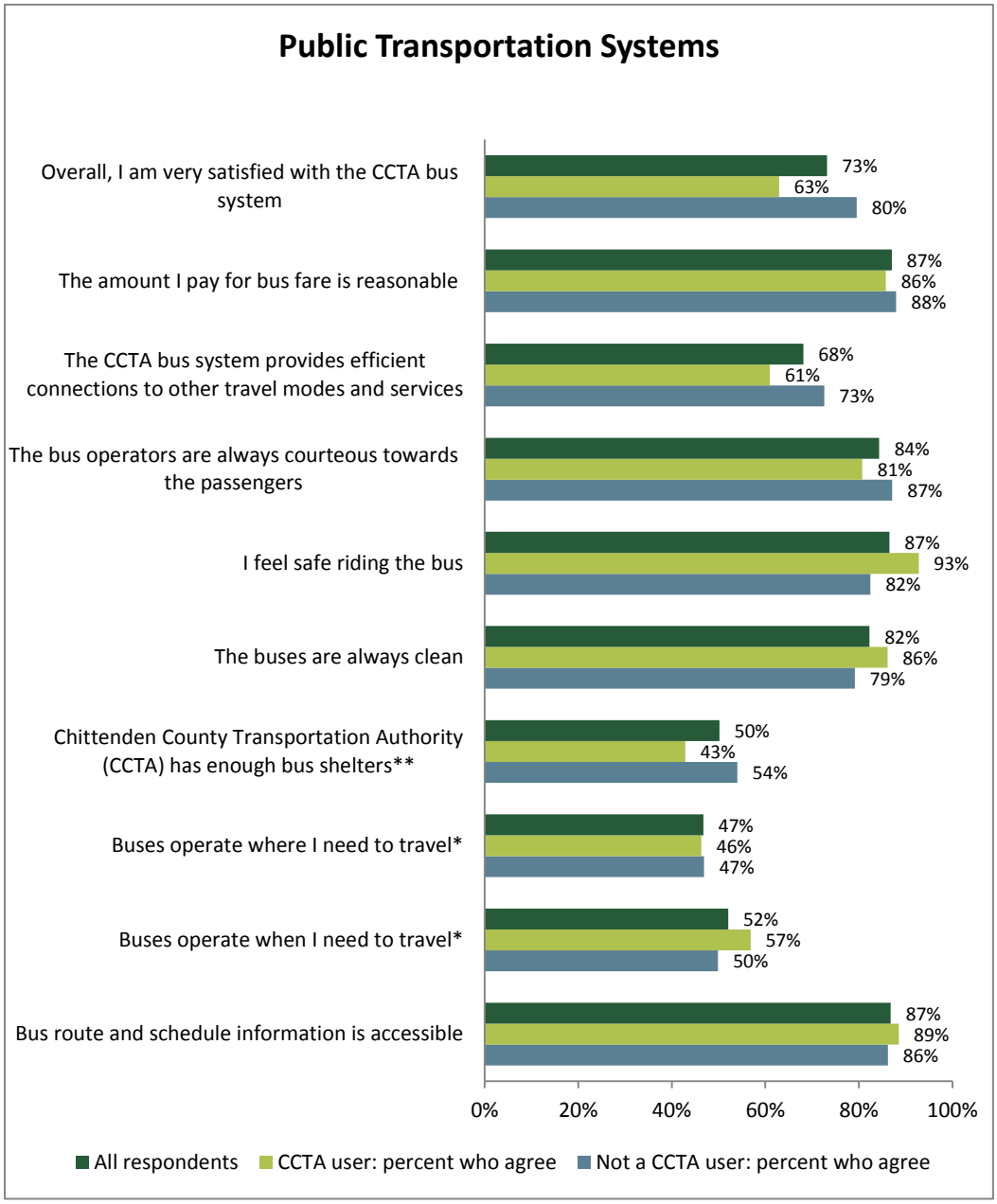


Figure 12: Public Transportation Systems

Fifty-four percent of residents indicate that their overall bicycling experience is pleasant in Chittenden County; far more (80%) feel that way about their overall walking experience. Based on these data, concerns about safety are likely contributing to the lower ratings for the bicycle experience (Figure 13).

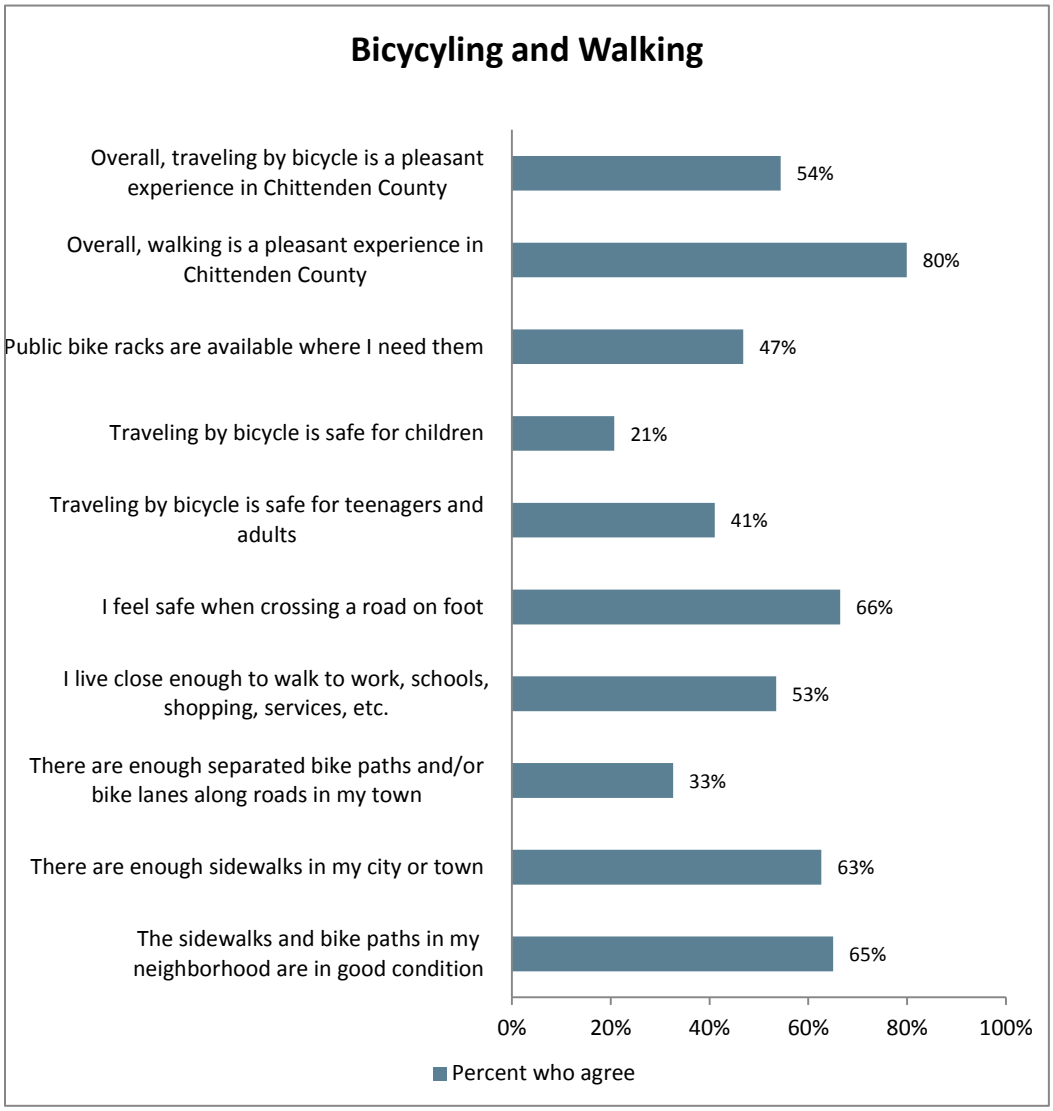


Figure 13: Bicycling and Walking

Although about 61-62% of residents would bike or walk more often if bike paths and sidewalks were provided, the major barrier appears to be proximity because Chittenden County residents are overwhelmingly willing to walk to key destinations such as jobs, schools, and shops if they are close by (Figure 14). In addition 70% of residents would take the bus if the routes and schedule were convenient. Residents tend to rely on their cars (65% indicate that nothing will replace their car as their main mode of transportation), but would potentially be willing to shift modes if the cost of driving were to increase.

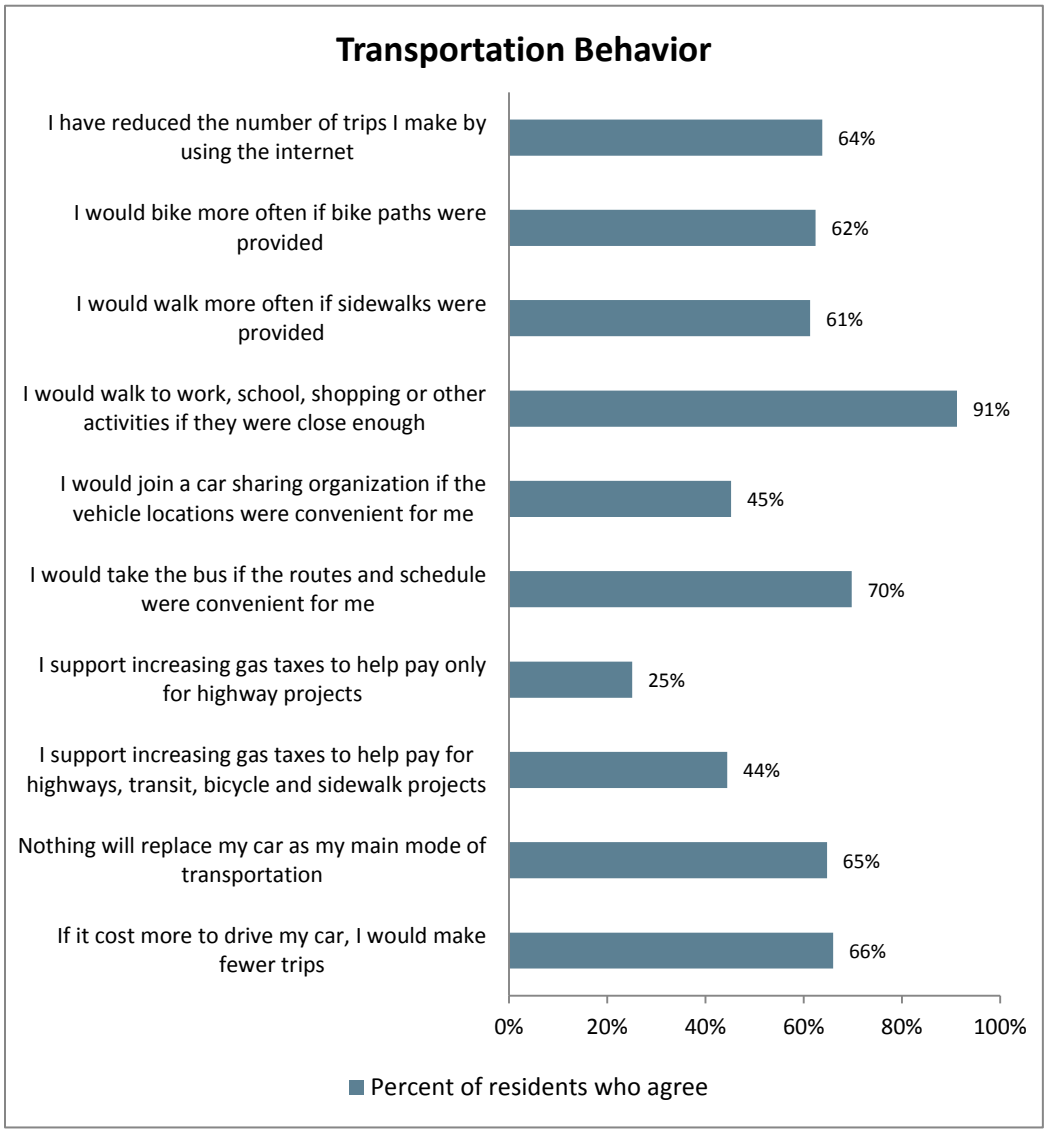


Figure 14: Transportation Behavior

Seventy percent of Chittenden County residents believe that the County's transportation system enhances their life (Figure 15). They also note that noise and emissions from cars, buses, and trucks are an environmental problem (86%) and worry that not enough is being done to address the transportation needs of children, the elderly, the disabled and the low-income population (68%).

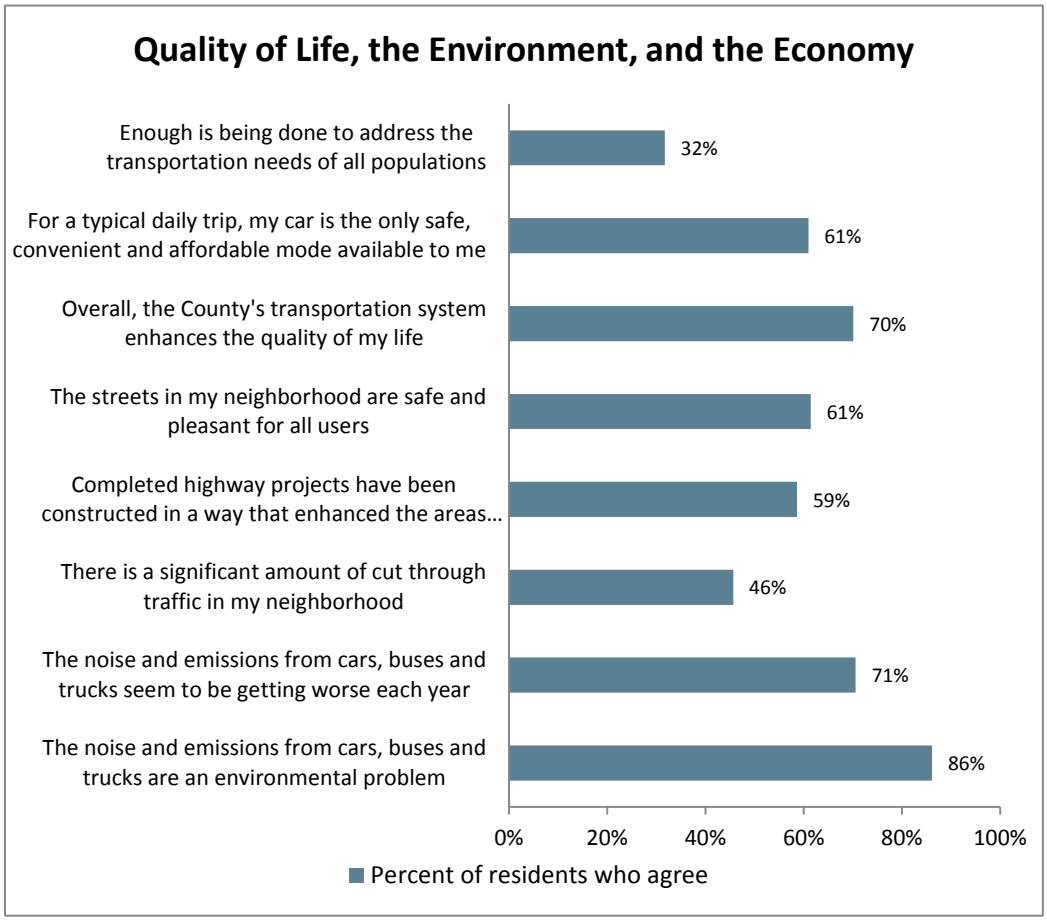


Figure 15: Quality of Life, the Environment, and the Economy

4.3.3 Importance Rating

The second major section of the questionnaire featured importance rating questions about various transportation and infrastructure initiatives. In this section, the answer choices of "Essential" and "Very important" were combined and analyzed as a portion of the total respondents who had an opinion. In other words, the "percent that reported essential or very important" (also referred to as "highly important") with each statement is calculated as:

$$\frac{"Essential" + "Very\ important"}{Total\ respondents - "Don't\ know"}$$

All charts display this "percent of residents that reported essential or very important", unless otherwise noted.

Typically, about 6% of respondents selected "Don't know" for the importance questions. When the percentage is high enough to increase the confidence interval to ±7%, it is noted with an asterisk (*) in the chart.

Most residents consider the highway initiatives mentioned in the survey non-critical (Figure 16). For example, only 29% think that building more freeways is either essential or very important whereas approximately one-third of residents consider new interstate interchanges and the building of more local roads to be "highly important" (defined as essential or very important). Among the set of statements, residents believe that congestion relief is the most important highway initiative.

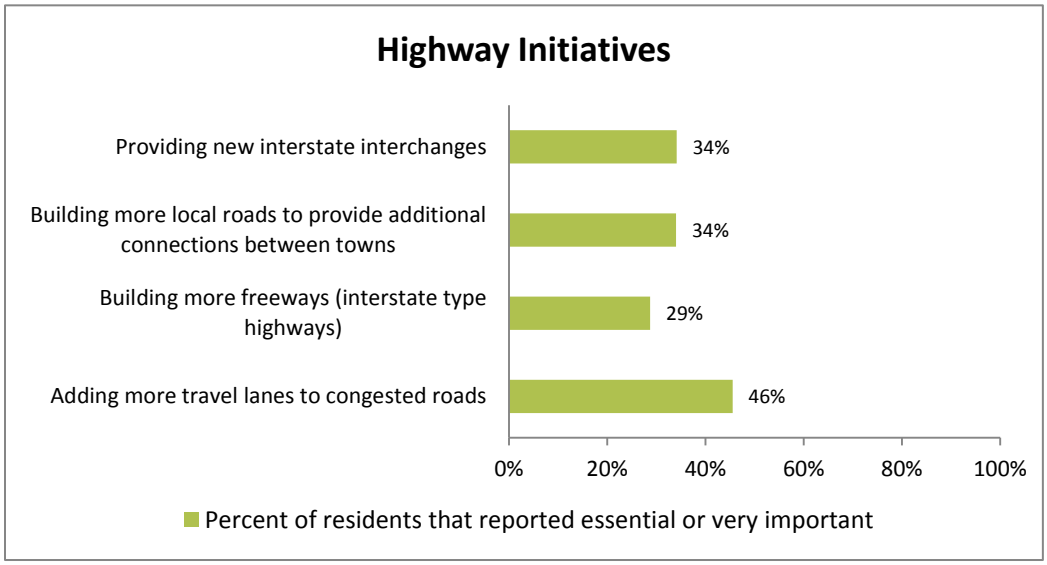


Figure 16: Highway Initiatives

Public transportation expansion generally has more support than highway initiatives. More specifically, 61% of all Chittenden County residents think that offering real-time information about the next bus arrival times is highly important (Figure 17). There is also support for development that increases the density of key locations, providing/expanding express transit service, and increasing the frequency and schedule of current buses.

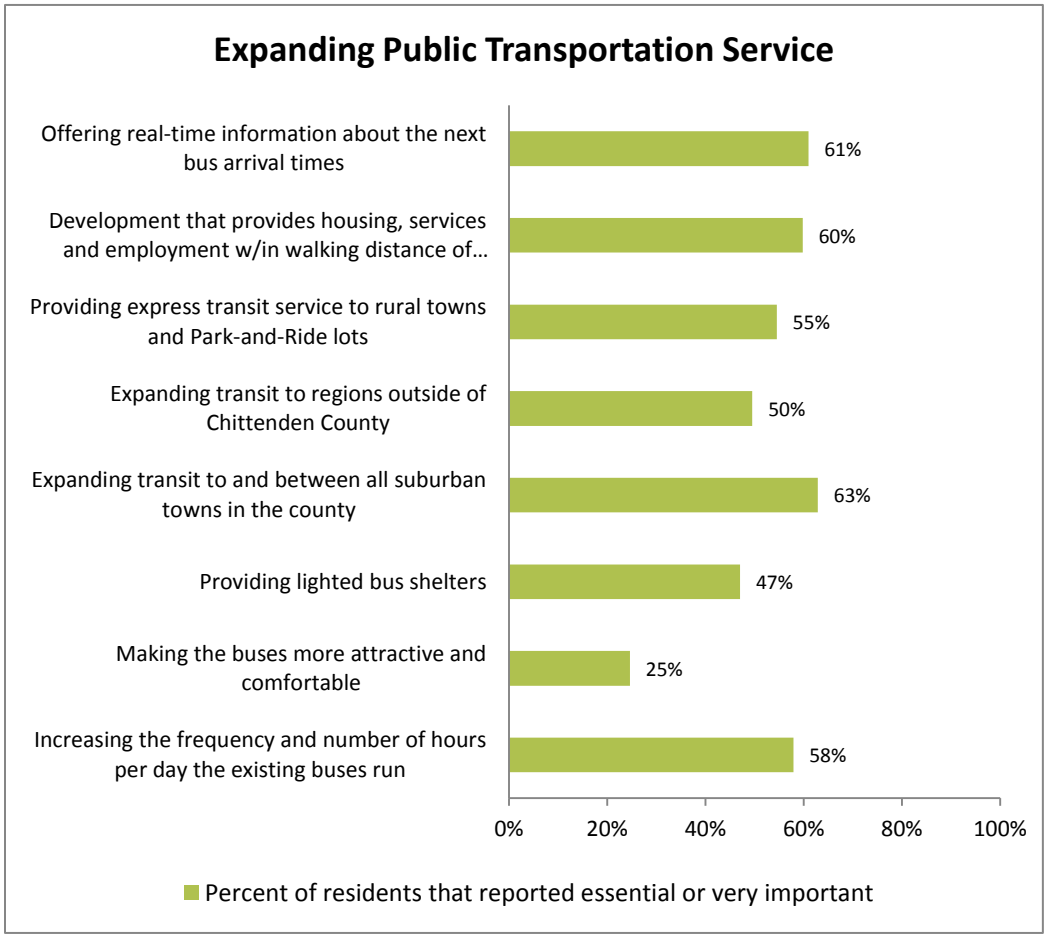


Figure 17: Expanding Public Transportation Service

Support for improved bike and walk facilities is also high, especially for fixing existing sidewalks (74%). Figure 18 also shows that the provision of bike paths that are separated from roadways (70%) gets more support than the provision of new sidewalks altogether (52%).

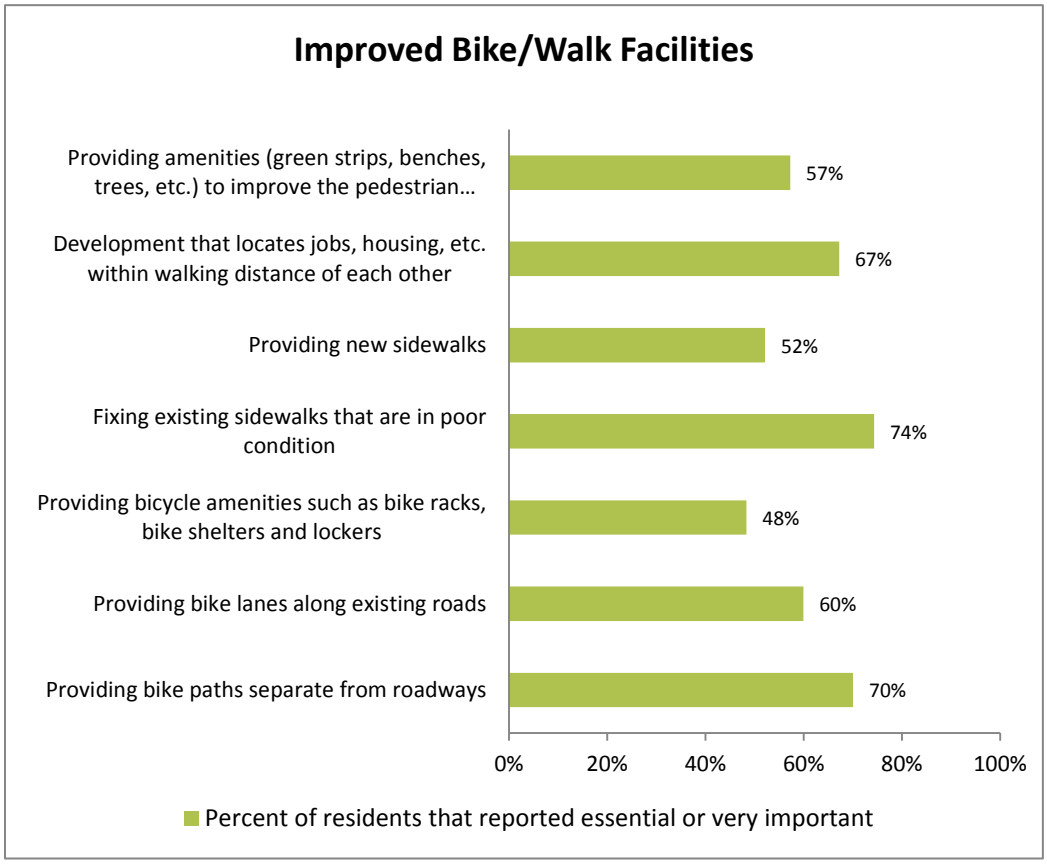


Figure 18: Improved Bik/Walk Facilities

The incentive to encourage alternative transportation modes that gets the most support among Chittenden County residents is helping employers organize and offer services, benefits, and incentives to employees (61%). Figure 19 also shows that more than half of residents consider the provision of a guaranteed ride home (51%) and more Park-and-Ride lots (53%) to be highly important.

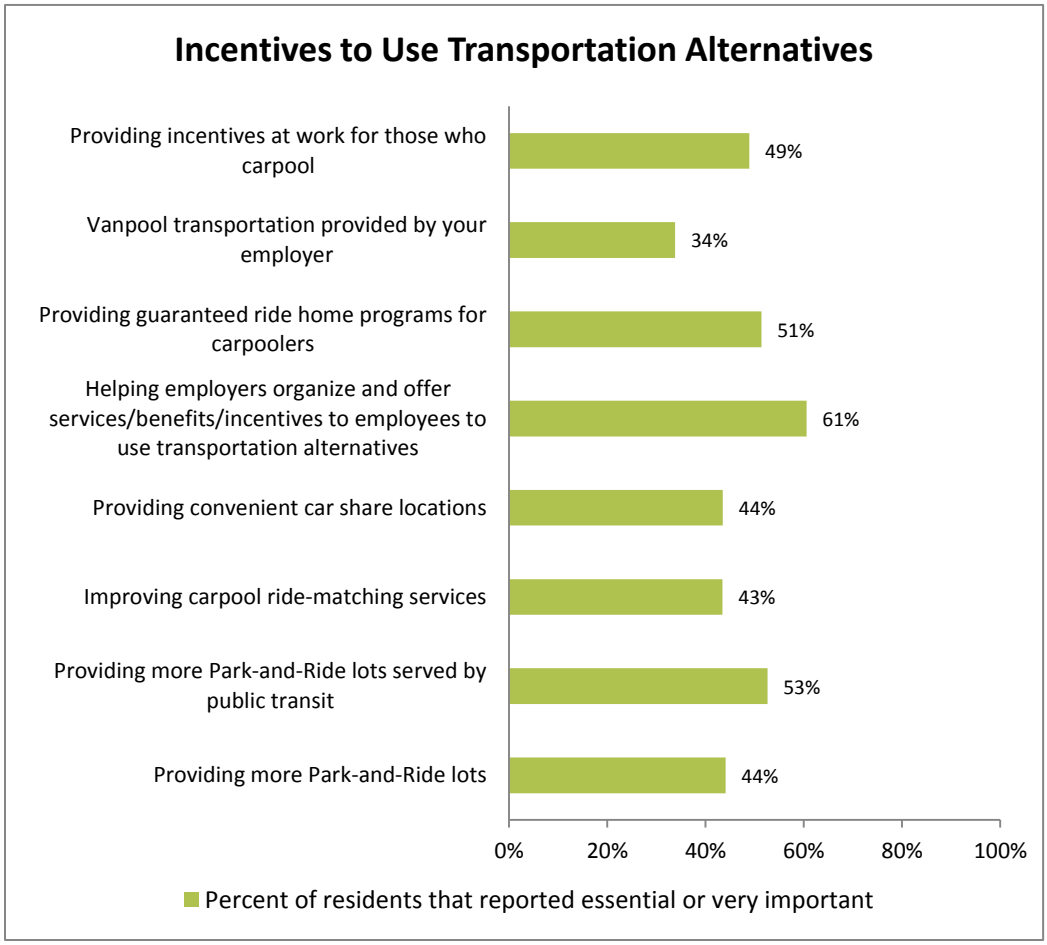


Figure 19: Incentives to Use Transportation Alternatives

Chittenden County residents are most likely to support fixing bridges in poor condition (88%) and repaving existing roads (77%). The bus system needs are not as critical (Figure 20).

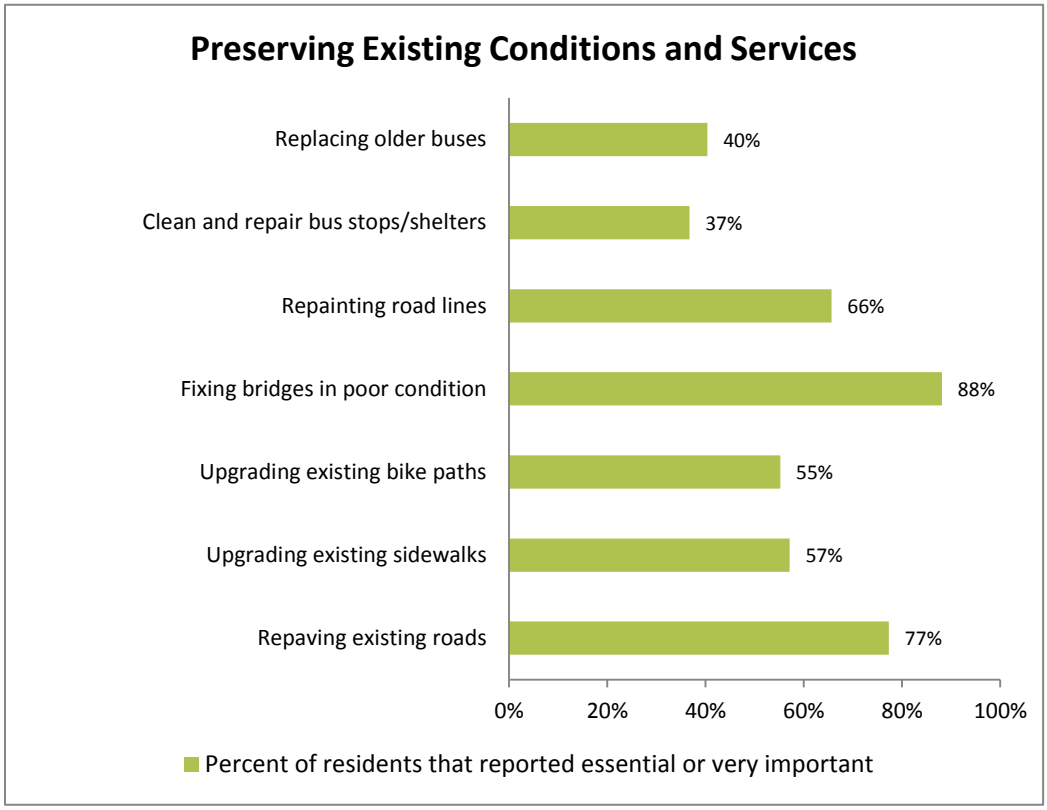


Figure 20: Preserving Existing Conditions and Services

Nearly everyone considers improvements in safety beneficial. Most notably, more than 80% of residents believe that fixing poor bridges and dangerous intersections are either essential or very important (Figure 21). Support for road signage improvements, median installation, and slowing traffic are considerably less.

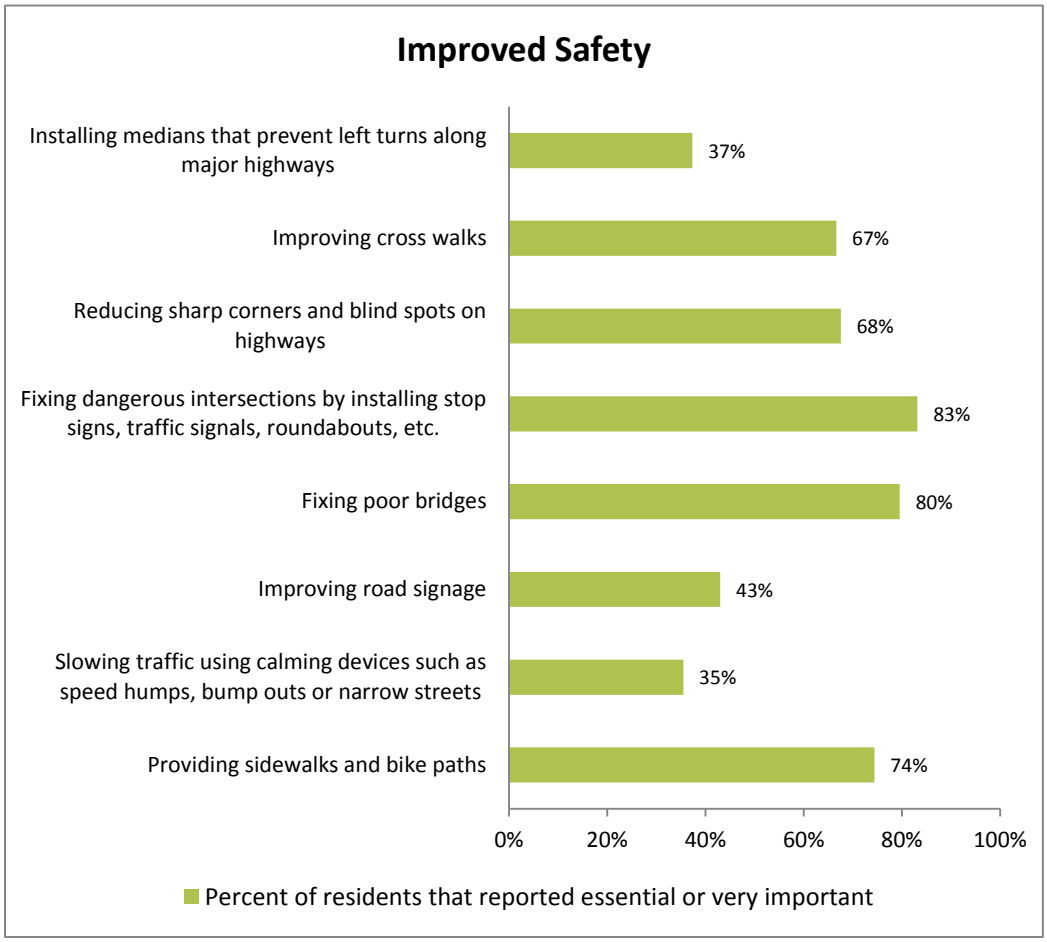


Figure 21: Improved Safety

Figure 22 indicates that improving traffic signal timing and adding turning lanes are the only minor efficient projects that a majority of residents deem to be essential or very important. Roundabout installation is the least supported efficiency project.

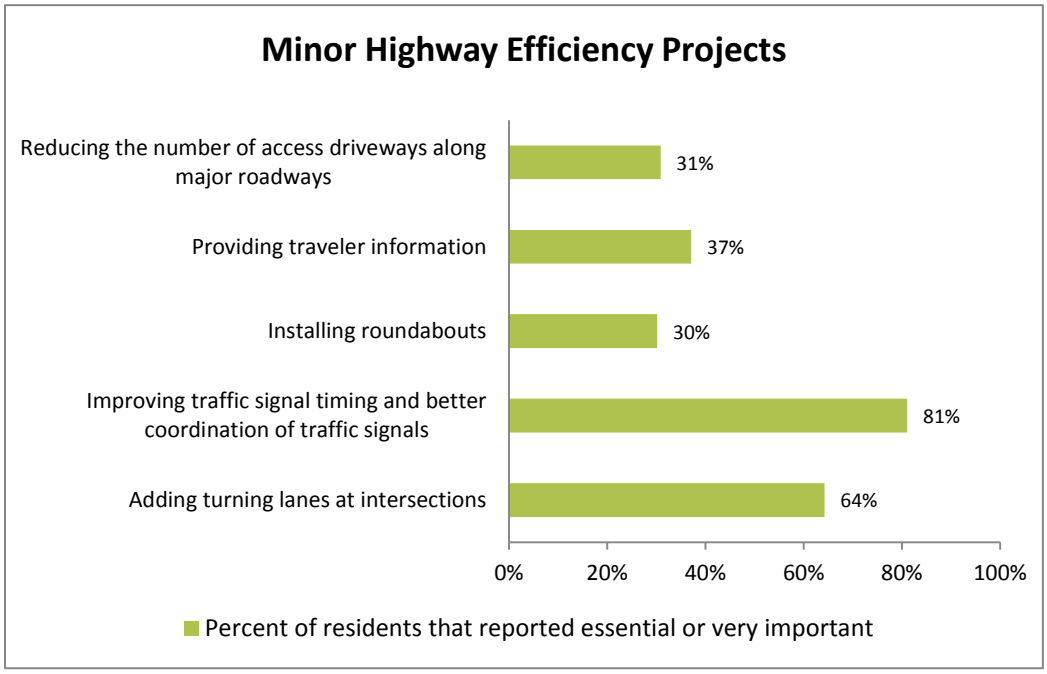


Figure 22: Minor Efficiency Projects

After commenting on these individual statements ("Adding more travel lanes to congested roads", "Providing more Park-and-Ride lots", "Fixing poor bridges", etc.), respondents rated the importance of each topic overall. In addition they were asked to rank at least three priorities from the list of seven topics. These results are displayed in Figure 23 and Figure 24.

Across both question formats (importance rating and ranking), residents are most supportive of preserving the condition of existing infrastructure and services: 89% considered this topic very important or essential whereas 67% of residents indicated it was one of their top three priorities (36% indicated it was the top choice overall, which was twice as many residents as the next top choice). Improving safety and bike/walk facilities also received high marks, while highway initiatives and minor highway efficiency projects received the least amount of support.

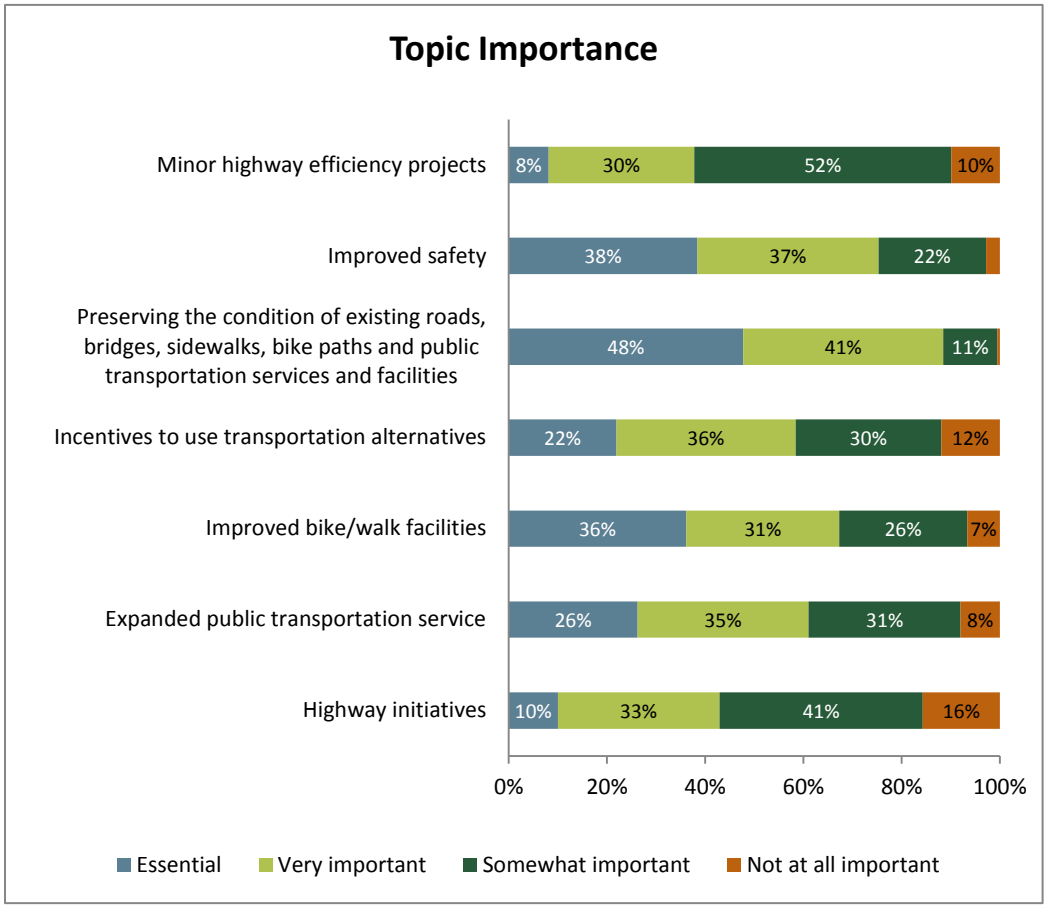


Figure 23: Topic Importance

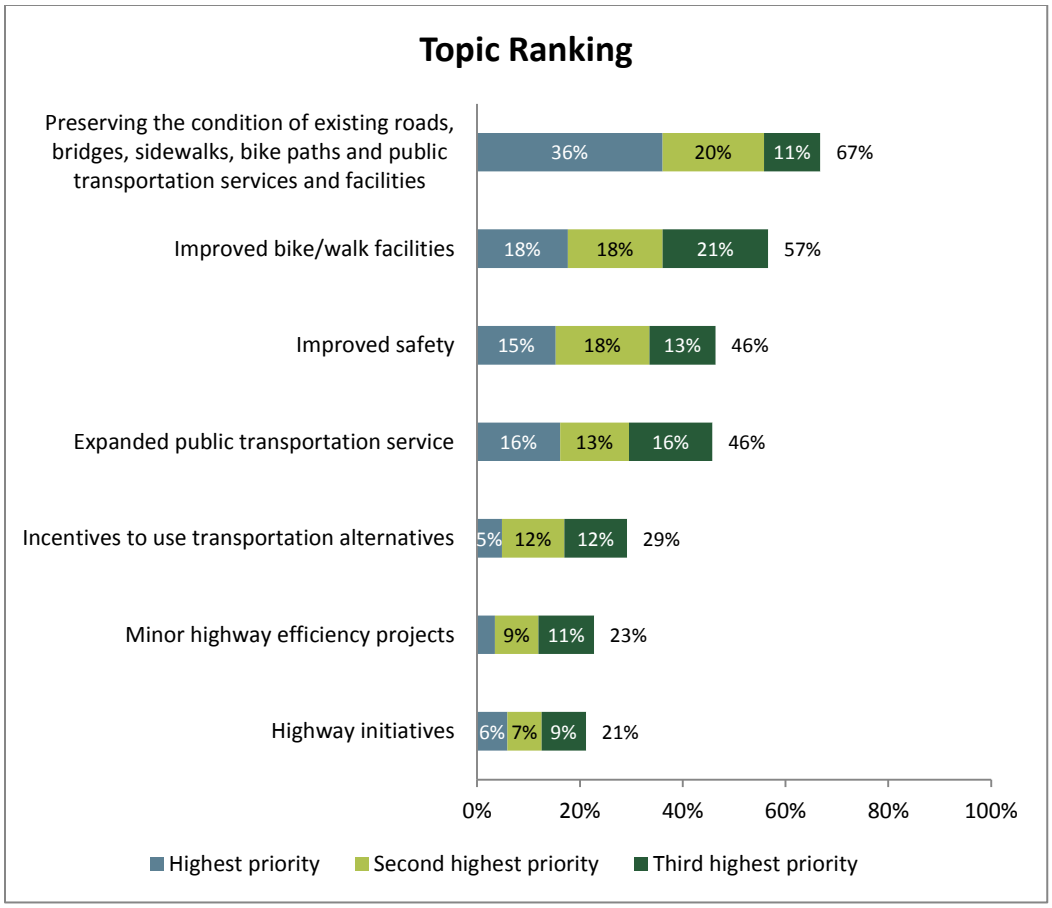


Figure 24: Topic Ranking

Results of the survey's last section, demographics, are included in this report's appendix.

4.4 Year-by-Year Comparisons

In order to analyze trends over time, RSG merged the three datasets together and included attitude statements that were asked in 2012 and at least one prior year (2006 or 2000). Some variables met this criterion but were excluded because the statement wording changed from one year to the next. For example, the 2006 statement "Encouraging employers to pay employees subsidies to carpool/vanpool/take the bus" was replaced with "Helping employers organize and offer services/benefits/incentives to employees to use transportation alternatives (such as transit subsidies, parking cash-out, car-sharing memberships)". RSG felt that wording differences of this magnitude meant that comparisons across years were difficult, if not inaccurate.

Next, RSG calculated a margin of error for each proportion:

$$\pm z_{1-\frac{\alpha}{2}} * \sqrt{\frac{p * (1-p)}{n}}$$

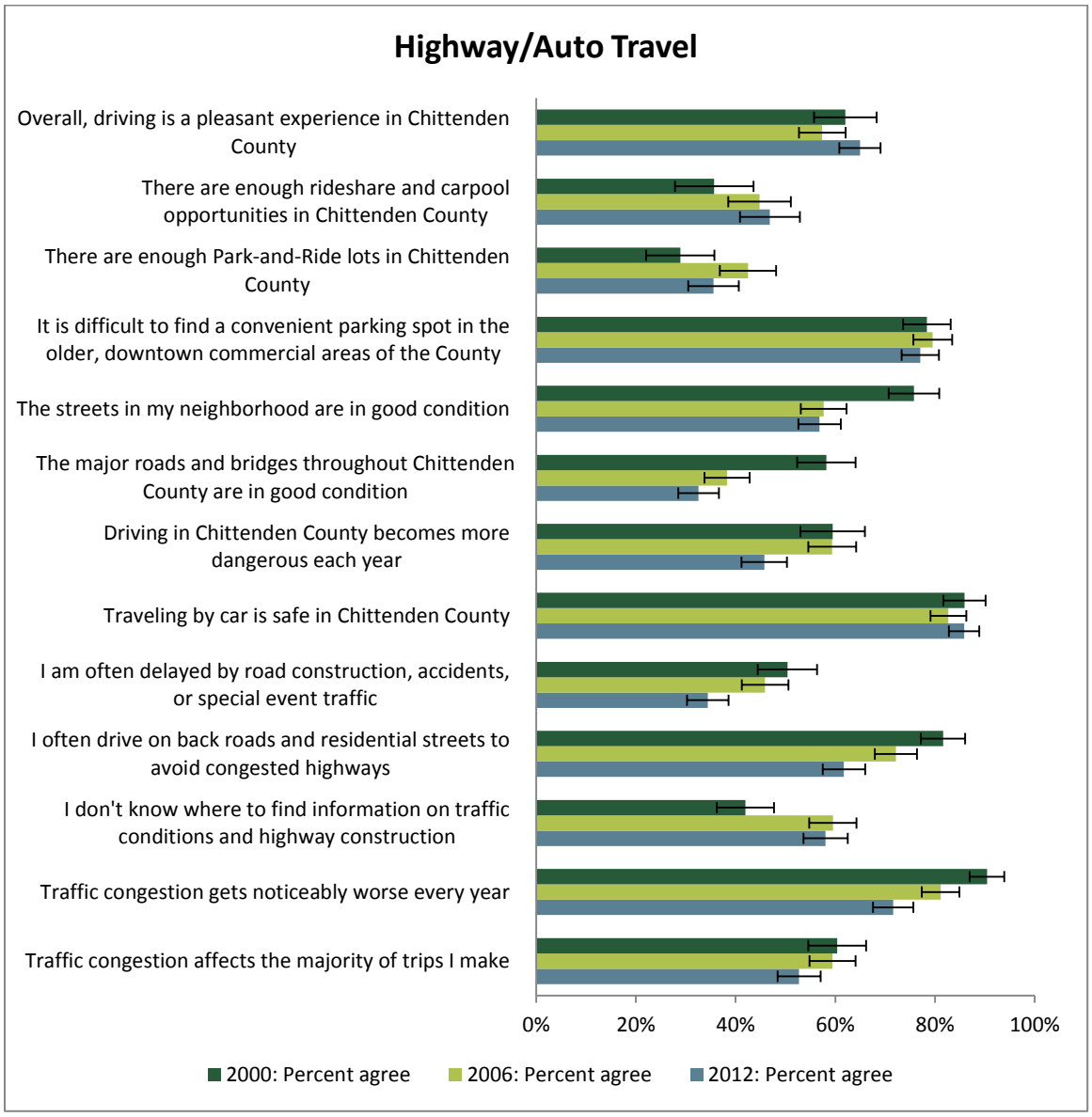
Where $z_{1-\frac{\alpha}{2}}$ is "z-score" associated with a 95% confidence level; p is the proportion of residents that agree with a statement; and n is the unweighted sample size. For example, 52.7% of residents agreed or strongly agreed with the statement "Traffic congestion affects the majority of trips I make". The margin of error for this estimate is 4.34%:

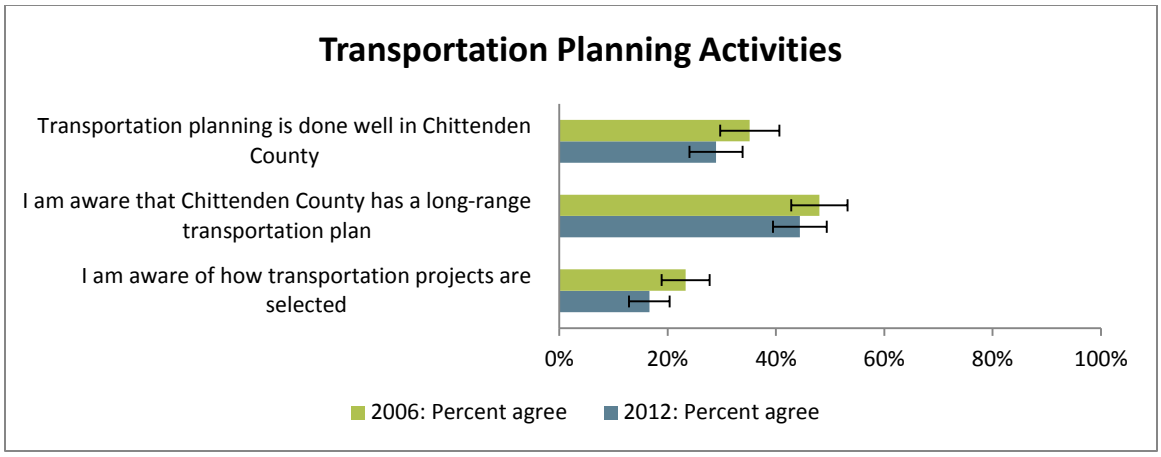
$$\pm 1.96 * \sqrt{\frac{0.527 * (1 - 0.527)}{508}} = \pm \mathbf{4.34}\%$$

This margin of error was used to construct a 95% confidence interval, which is displayed as "error bars" on the following charts. The interpretation is that "our survey data indicate that 52.7% of the sample agrees that traffic congestion affects the majority of trips that they make. We can be 95% sure that the true population's level of agreement is actually between 48.36% and 57.04%."

For most statements, responses are not significantly different from year to year whereas in some cases one or all of the responses may be significantly different from each other. All attitudinal statements and importance rating charts are included in this section. Note that "Percent highly important" is the percentage of residents who believe an item is either essential or very important. Also note that in the case of importance ratings, the 2000 scales, as previously mentioned, are different; therefore, comparisons can only be reasonably made between 2006 and 2012.

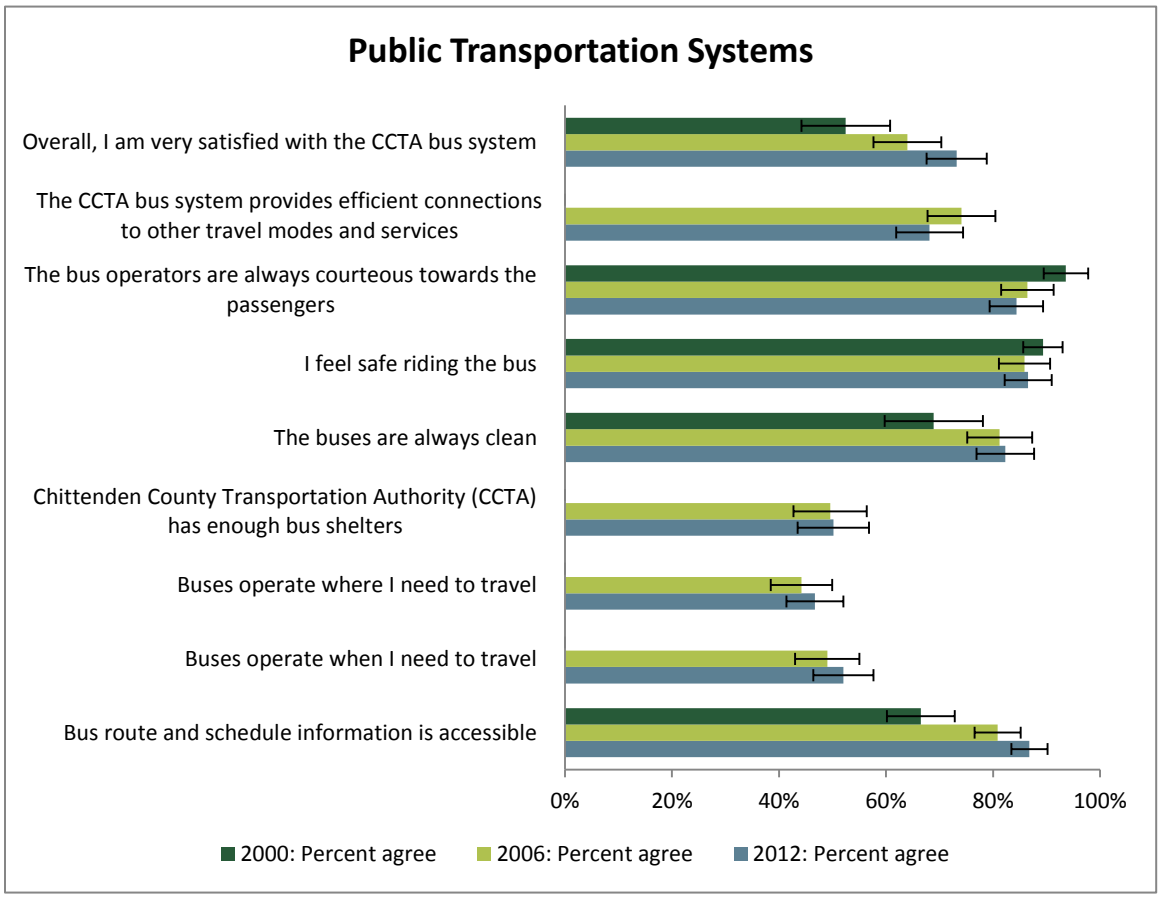
4.4.1 Opinion


Highway/Auto Travel
Overall, driving is a pleasant experience in Chittenden County
There are enough rideshare and carpool opportunities in Chittenden County
There are enough Park-and-Ride lots in Chittenden County
It is difficult to find a convenient parking spot in the older, downtown commercial areas of the County
The streets in my neighborhood are in good condition
The major roads and bridges throughout Chittenden County are in good condition
Driving in Chittenden County becomes more dangerous each year
Traveling by car is safe in Chittenden County
I am often delayed by road construction, accidents, or special event traffic
I often drive on back roads and residential streets to avoid congested highways
I don't know where to find information on traffic conditions and highway construction
Traffic congestion gets noticeably worse every year
Traffic congestion affects the majority of trips I make
0%
20%
40%
60%
80%
100%
2000: Percent agree
2006: Percent agree
2012: Percent agree



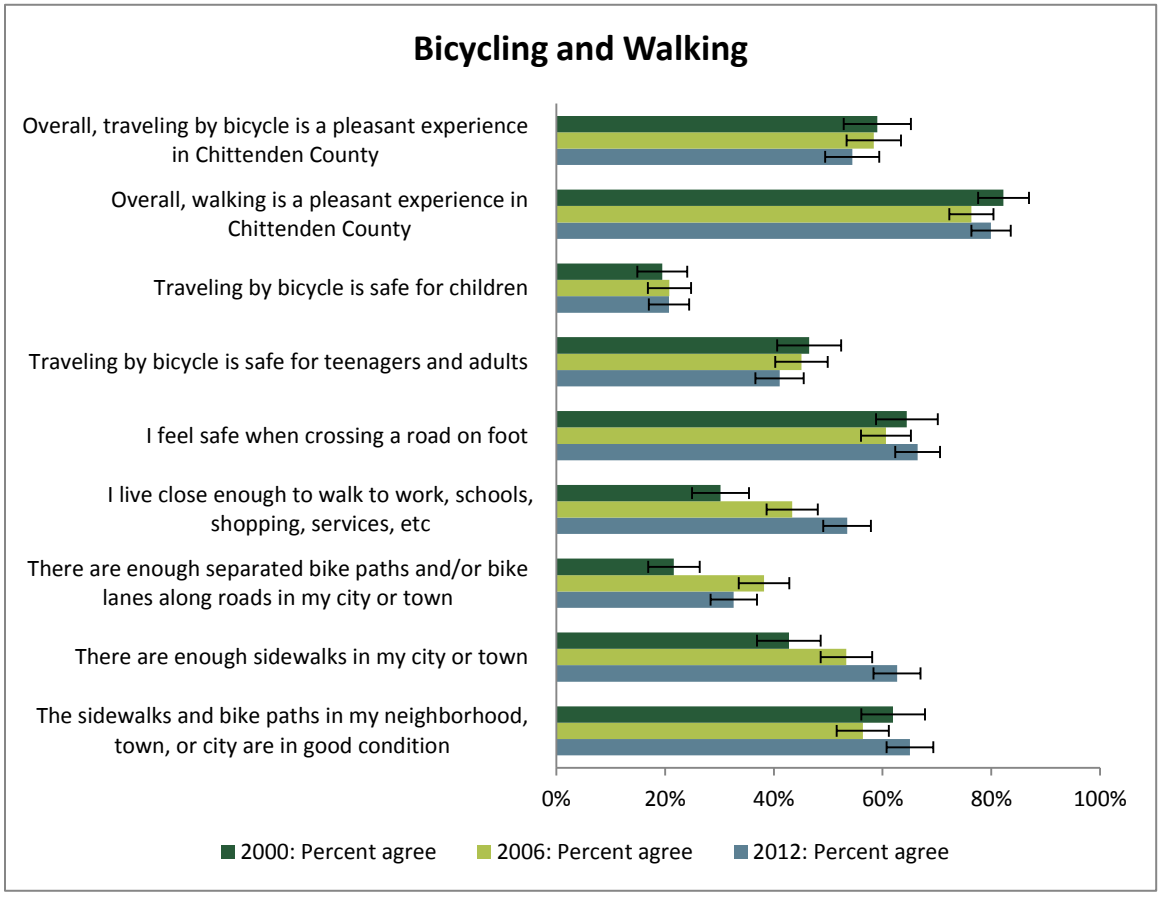
The percent of residents who selected "Don't know" for the above table

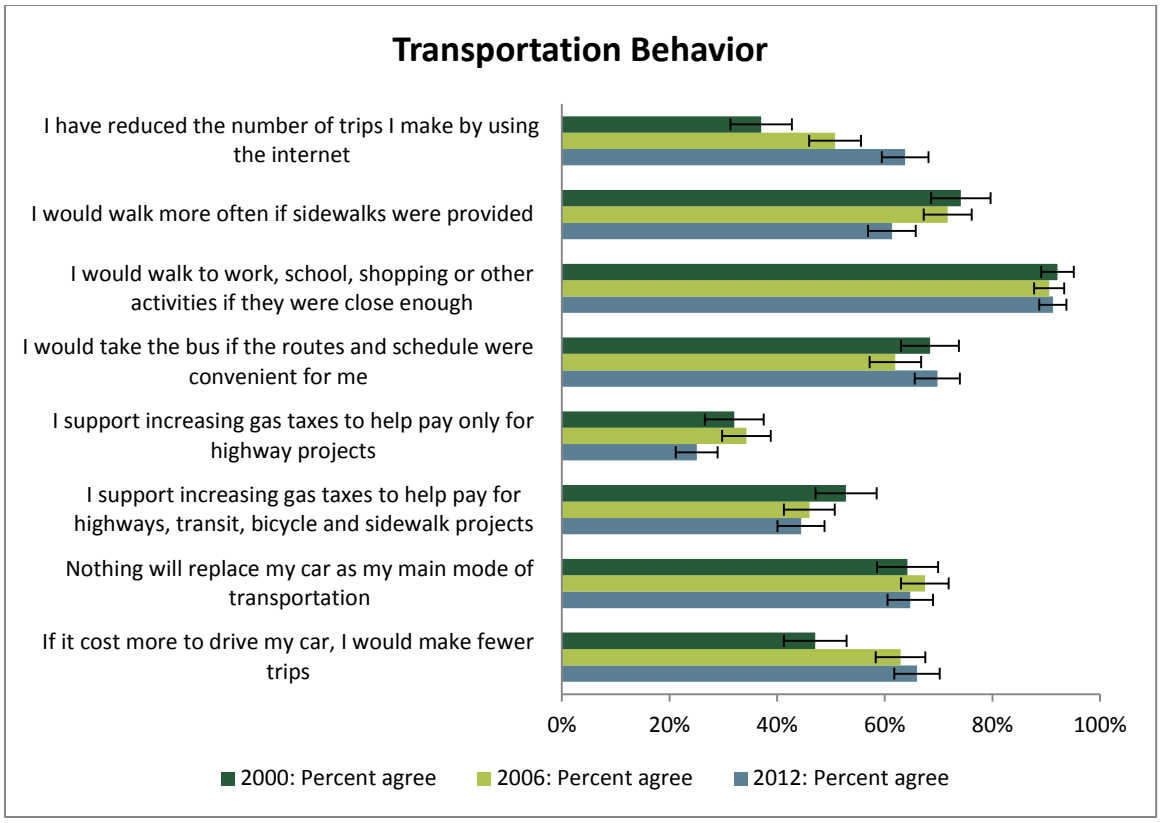
	2006	2012
Transportation planning is done well in Chittenden County	34%	36%
I am aware that Chittenden County has a long-range transportation plan	21%	22%
I am aware of how transportation projects are selected	21%	22%

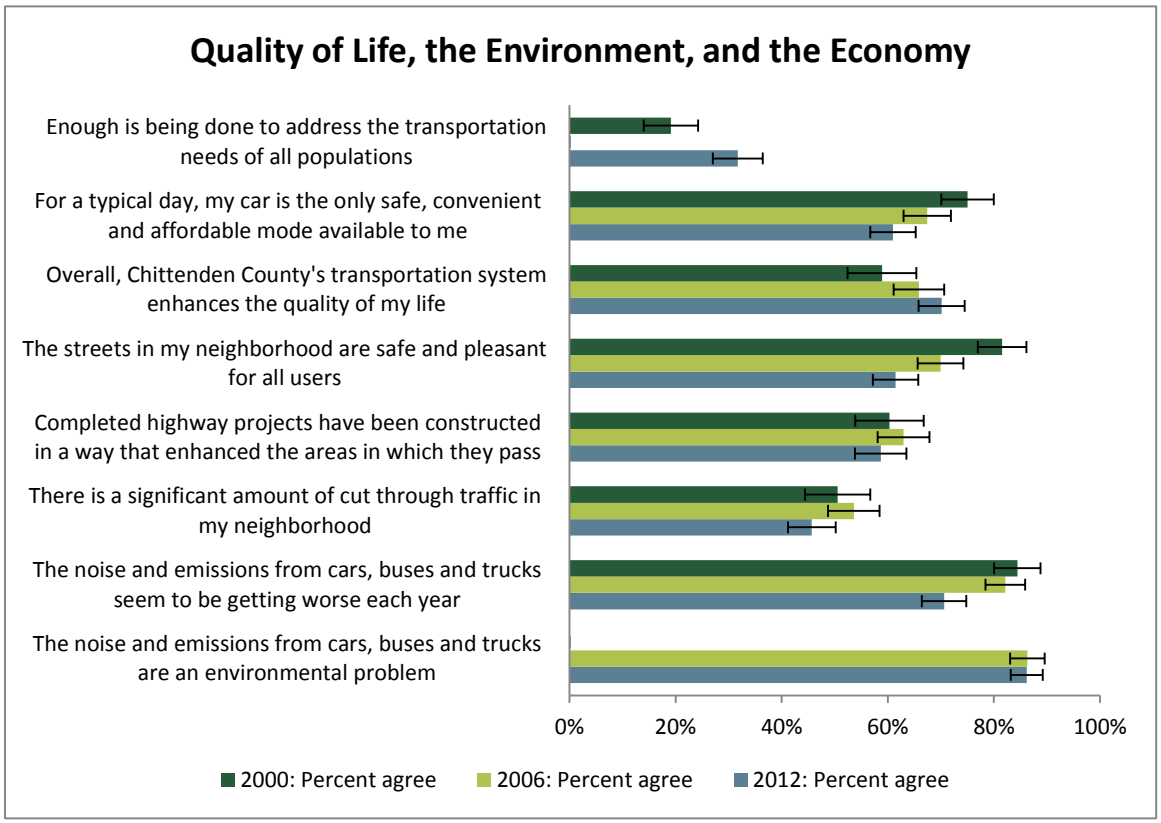


The percent of residents who selected "Don't know" for the above table

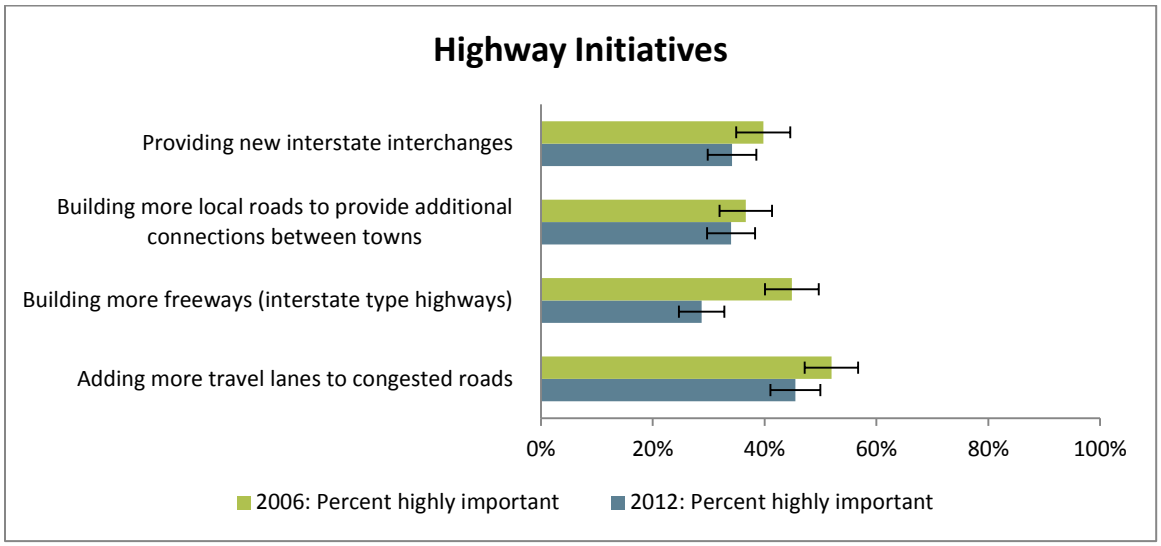
	2006	2012
Overall, I am very satisfied with the CCTA bus system	45%	46%
The CCTA bus system provides efficient connections to other travel modes and services	51%	52%
The bus operators are always courteous towards the passengers	50%	53%
I feel safe riding the bus	47%	48%
The buses are always clean	57%	55%
Chittenden County Transportation Authority (CCTA) has enough bus shelters	46%	49%
Buses operate where I need to travel	31%	29%
Buses operate when I need to travel	35%	35%
Bus route and schedule information is accessible	23%	20%

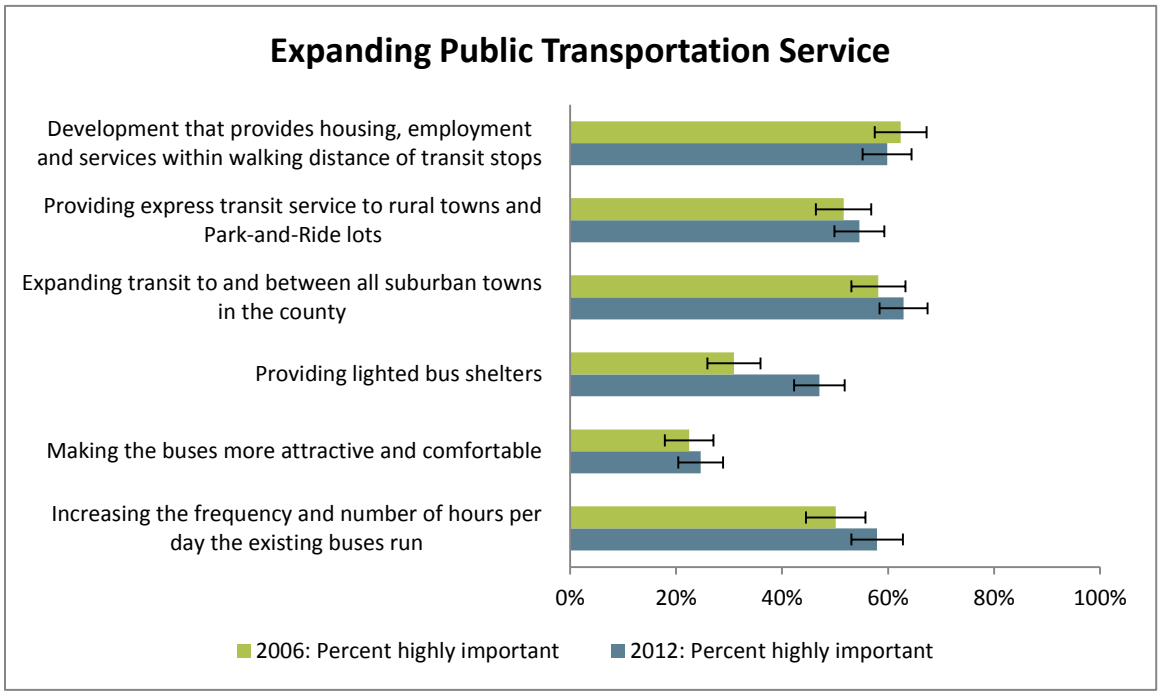


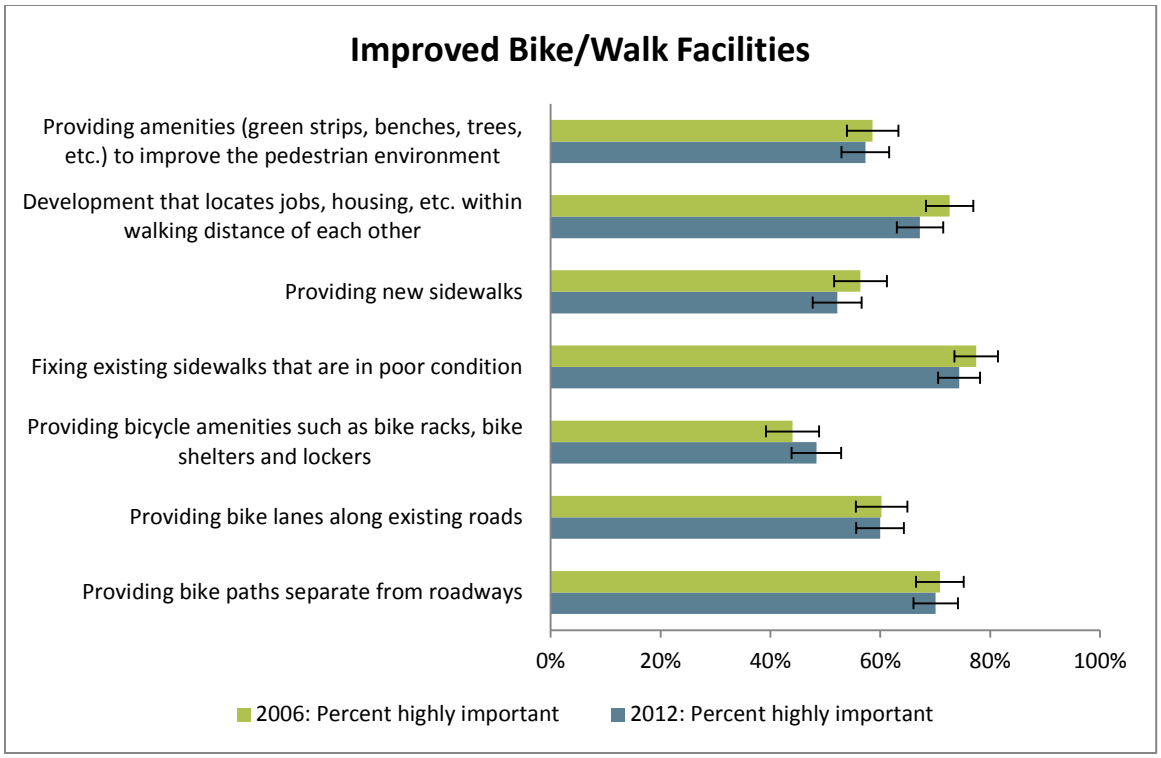

Transportation Behavior
I have reduced the number of trips I make by using the internet
I would walk more often if sidewalks were provided
I would walk to work, school, shopping or other activities if they were close enough
I would take the bus if the routes and schedule were convenient for me
I support increasing gas taxes to help pay only for highway projects
I support increasing gas taxes to help pay for highways, transit, bicycle and sidewalk projects
Nothing will replace my car as my main mode of transportation
If it cost more to drive my car, I would make fewer trips
0%
20%
40%
60%
80%
100%
2000: Percent agree
2006: Percent agree
2012: Percent agree

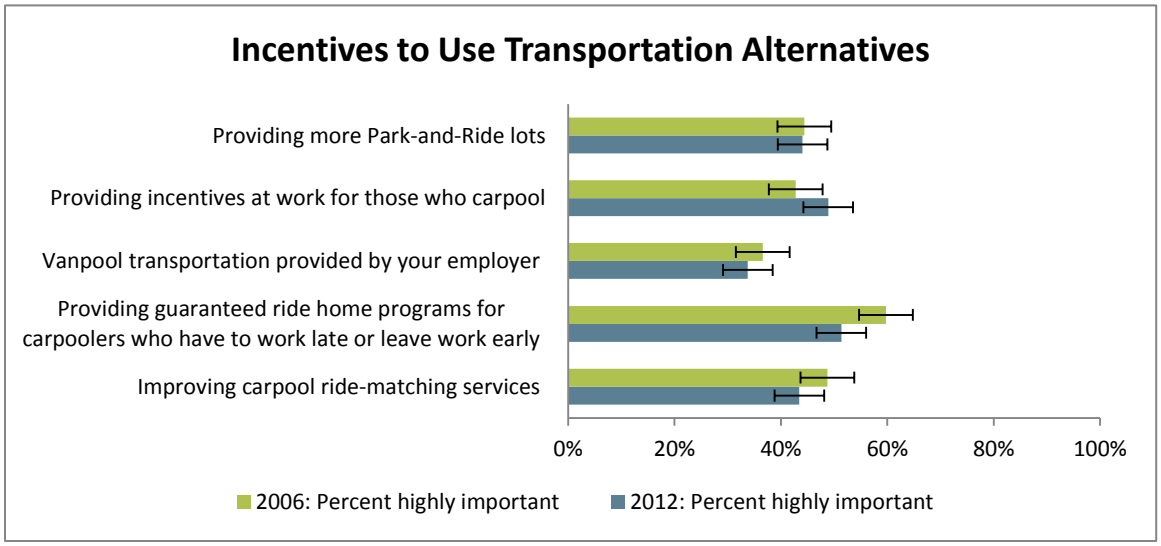

Quality of Life, the Environment, and the Economy
Enough is being done to address the transportation needs of all populations
For a typical day, my car is the only safe, convenient and affordable mode available to me
Overall, Chittenden County's transportation system enhances the quality of my life
The streets in my neighborhood are safe and pleasant for all users
Completed highway projects have been constructed in a way that enhanced the areas in which they pass
There is a significant amount of cut through traffic in my neighborhood
The noise and emissions from cars, buses and trucks seem to be getting worse each year
The noise and emissions from cars, buses and trucks are an environmental problem
0%
20%
40%
60%
80%
100%
2000: Percent agree
2006: Percent agree
2012: Percent agree

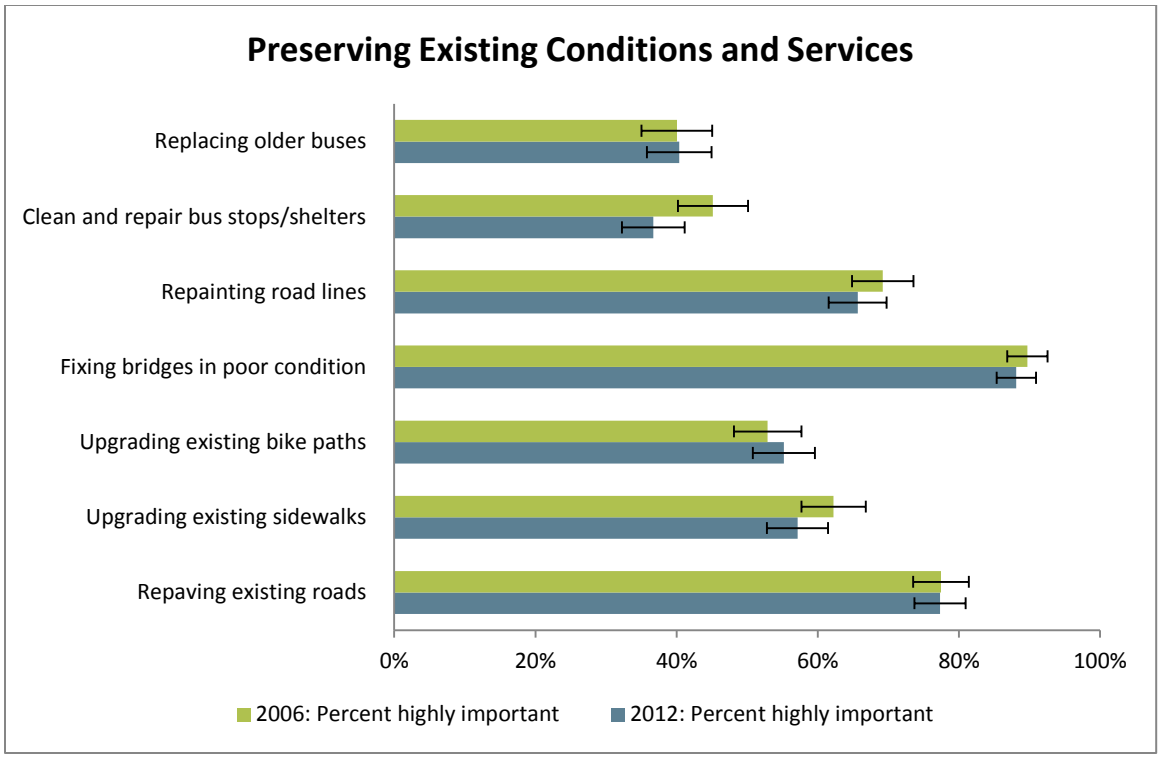
4.4.2 Importance Rating

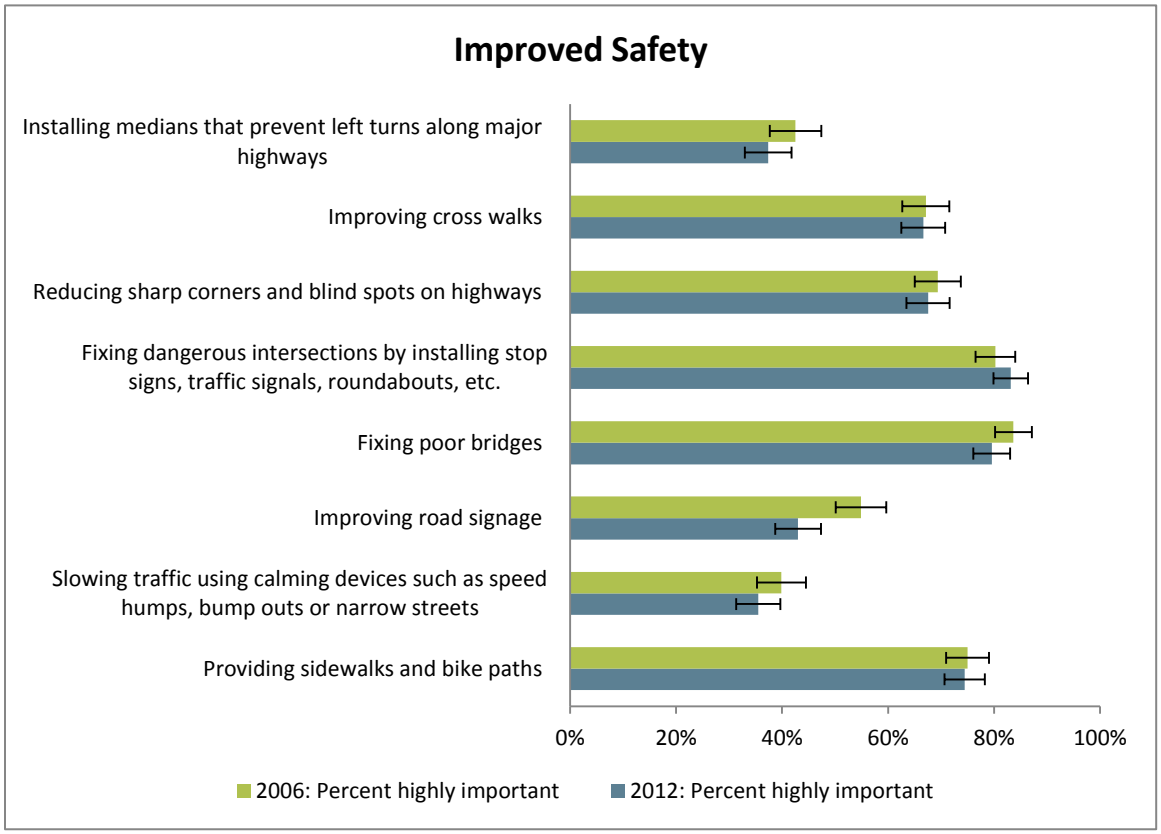


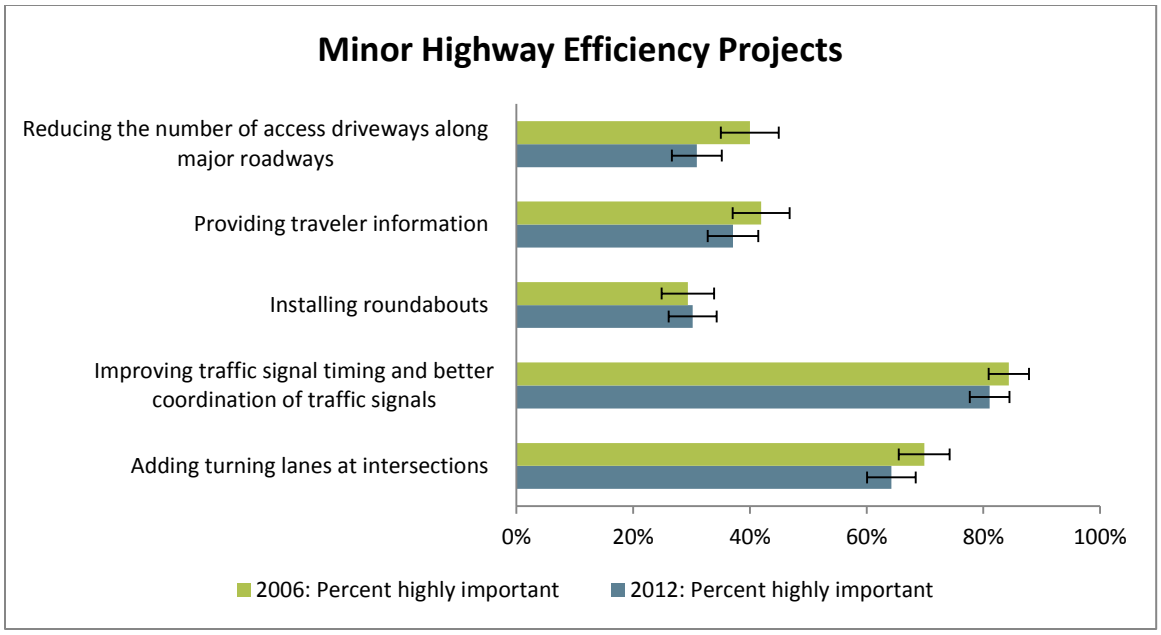


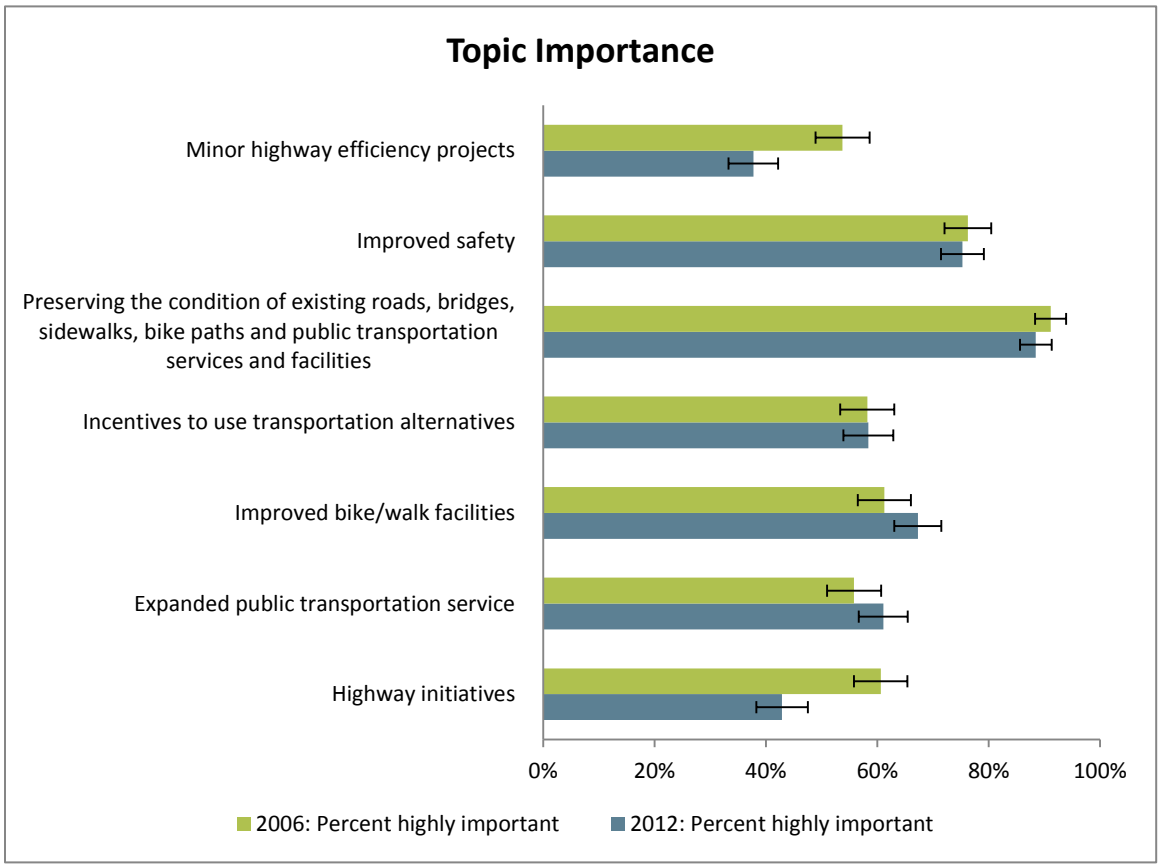

Improved Bike/Walk Facilities
Providing amenities (green strips, benches, trees, etc.) to improve the pedestrian environment
Development that locates jobs, housing, etc. within walking distance of each other
Providing new sidewalks
Fixing existing sidewalks that are in poor condition
Providing bicycle amenities such as bike racks, bike shelters and lockers
Providing bike lanes along existing roads
Providing bike paths separate from roadways
0%
20%
40%
60%
80%
100%
2006: Percent highly important
2012: Percent highly important


Incentives to Use Transportation Alternatives
Providing more Park-and-Ride lots
Providing incentives at work for those who carpool
Vanpool transportation provided by your employer
Providing guaranteed ride home programs for carpoolers who have to work late or leave work early
Improving carpool ride-matching services
0%
20%
40%
60%
80%
100%
2006: Percent highly important
2012: Percent highly important


Preserving Existing Conditions and Services
Replacing older buses
Clean and repair bus stops/shelters
Repainting road lines
Fixing bridges in poor condition
Upgrading existing bike paths
Upgrading existing sidewalks
Repaving existing roads
0%
20%
40%
60%
80%
100%
2006: Percent highly important
2012: Percent highly important


Improved Safety
Installing medians that prevent left turns along major highways
Improving cross walks
Reducing sharp corners and blind spots on highways
Fixing dangerous intersections by installing stop signs, traffic signals, roundabouts, etc.
Fixing poor bridges
Improving road signage
Slowing traffic using calming devices such as speed humps, bump outs or narrow streets
Providing sidewalks and bike paths
0%
20%
40%
60%
80%
100%
2006: Percent highly important
2012: Percent highly important


Minor Highway Efficiency Projects
Reducing the number of access driveways along major roadways
Providing traveler information
Installing roundabouts
Improving traffic signal timing and better coordination of traffic signals
Adding turning lanes at intersections
0%
20%
40%
60%
80%
100%
2006: Percent highly important
2012: Percent highly important


Topic Importance
Minor highway efficiency projects
Improved safety
Preserving the condition of existing roads, bridges, sidewalks, bike paths and public transportation services and facilities
Incentives to use transportation alternatives
Improved bike/walk facilities
Expanded public transportation service
Highway initiatives
0%
20%
40%
60%
80%
100%
2006: Percent highly important
2012: Percent highly important

4.5 Demographics

At the conclusion of the survey, respondents were asked to provide demographic information. Unweighted responses to several of those questions are presented below.

Employment status BY Year of survey

	2000		2006		2012		Total	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Full-time worker	252	77.5%	273	61.6%	297	57.7%	822	64.1%
Part-time worker	32	9.8%	52	11.7%	69	13.4%	153	11.9%
Unemployed	5	1.5%	8	1.8%	13	2.5%	26	2.0%
Student	17	5.2%	9	2.0%	9	1.7%	35	2.7%
Homemaker	5	1.5%	18	4.1%	13	2.5%	36	2.8%
Retired	14	4.3%	83	18.7%	114	22.1%	211	16.4%
Total	325	100.0%	443	100.0%	515	100.0%	1283	100.0%

Job description BY Year of survey

	2000		2006		2012		Total	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Clerical/Secretarial	15	5.3%	29	9.2%	29	7.6%	73	7.5%
Executive/Managerial	48	16.9%	58	18.5%	66	17.4%	172	17.6%
Professional/Technical	162	57.0%	141	44.9%	180	47.4%	483	49.4%
Mechanical/Maintenance	9	3.2%	20	6.4%	13	3.4%	42	4.3%
Teacher/Professor	15	5.3%	31	9.9%	54	14.2%	100	10.2%
Retail/Service	11	3.9%	22	7.0%	30	7.9%	63	6.4%
Sales/Buyer	10	3.5%	13	4.1%	8	2.1%	31	3.2%
Manufacturing	14	4.9%	0	.0%	0	.0%	14	1.4%
Total	284	100.0%	314	100.0%	380	100.0%	978	100.0%

Job can be done at home BY Year of survey

	2000		2006		2012		Total	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Yes	83	25.3%	132	31.1%	107	27.2%	322	28.1%
No	245	74.7%	293	68.9%	287	72.8%	825	71.9%
Total	328	100.0%	425	100.0%	394	100.0%	1147	100.0%

Annual household income BY Year of survey

	2000		2006		2012		Total	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Less than $10,000			9	2.2%	13	2.8%	22	2.5%
$10,000 to $19,999			24	5.9%	22	4.7%	46	5.2%
$20,000 to $29,999			43	10.6%	23	4.9%	66	7.5%
$30,000 to $39,999			43	10.6%	42	8.9%	85	9.7%
$40,000 to $49,000			40	9.9%	41	8.7%	81	9.2%
$50,000 to $74,999			89	22.0%	120	25.4%	209	23.8%
$75,000 to $99,999			63	15.6%	84	17.8%	147	16.8%
$100,000 to $149,999			58	14.3%	80	16.9%	138	15.7%
$150,000 or more			36	8.9%	47	10.0%	83	9.5%
Total			405	100.0%	472	100.0%	877	100.0%

Work benefits

	Not offered	Offered, but I don't use	Offered, and I use	I don't know	Total
Telecommuting	66.6%	8.7%	14.6%	10.1%	100.0%
Flextime	51.8%	8.7%	27.6%	11.8%	100.0%
Compressed work week	68.6%	5.6%	11.9%	13.8%	100.0%
Free or subsidized parking	29.5%	5.6%	56.3%	8.6%	100.0%
Free or subsidized transit or shuttle use	69.0%	10.1%	8.7%	12.3%	100.0%
Carpool incentives or carpool matching	65.8%	12.9%	3.9%	17.4%	100.0%

4.6 Concluding Observations

4.6.1 Current Attitudes and Themes

The overall satisfaction with most aspects of transportation is quite high. Notably:

- 65% of residents believe that driving is a pleasant experience in Chittenden County
- 63% of residents who have ridden the CCTA bus in the past month are satisfied with the overall experience
- 54% of all residents consider biking to be a pleasant experience; 80% consider walking to be pleasant
- 80% of all residents think that walking in Chittenden County is a pleasant experience
- 70% of all residents agreed with the statement: “Overall, Chittenden County's transportation system enhances the quality of my life by allowing me to travel to work and other daily activities in a safe and efficient manner”

As was the case in prior years, residents emphasize the importance of preserving existing infrastructure and improving safety. In fact, only 0.5% of residents consider preservation of existing transportation infrastructure and services to be “Not at all important”. Likewise, only 2.8% of residents consider improvements in safety to be “Not at all important”.

Residents also expressed their general sentiments in an open-end text box at the conclusion of the survey. Frequent topics included: bus service, safety, road capacity, travel conditions, bicycling and walking, and specific problem areas/intersections/roadways. The comments are visually summarized in Figure 25, where word size corresponds to the frequency with which it appeared.

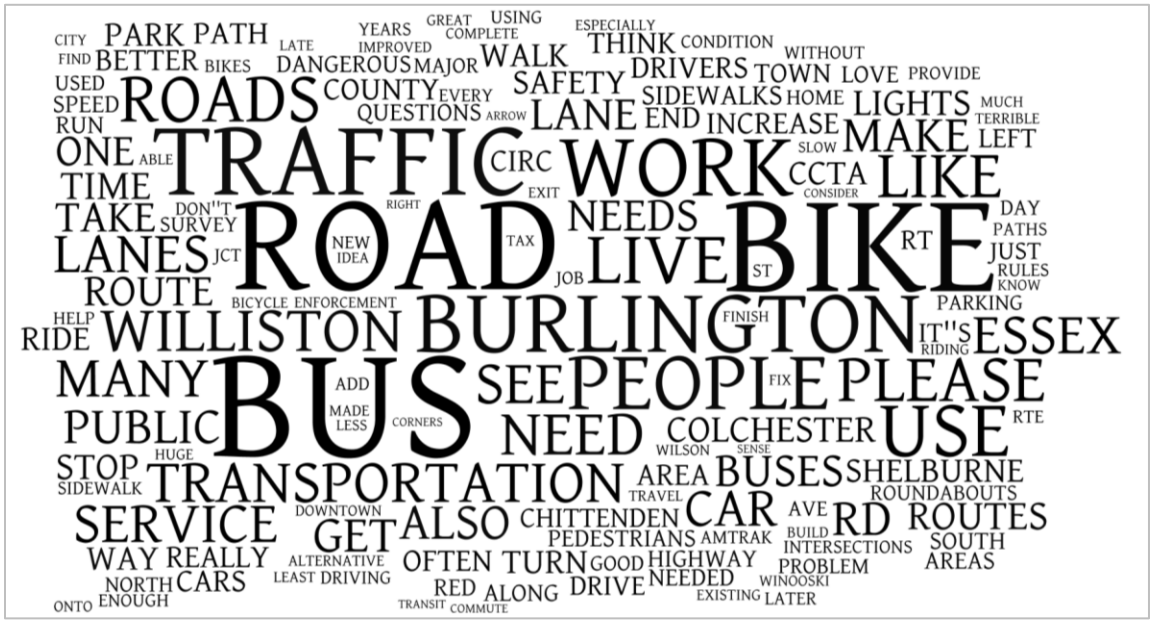


Figure 25: Open-end Comment Visualization

4.6.2 Trends

In general, attitudes and opinions about transportation topics have been fairly steady over the past 12 years. If changes have occurred, they tend to be relatively small; in fact, most are not statistically significant. However, there are some trends that have emerged. For example the following reveal statistically significant changes over time:

- Fewer residents are agreeing with the statement "traffic congestion gets noticeably worse every year" over time. In other words, their perception is that traffic congestion is lessening. Additionally, residents have been less likely to drive on back roads to avoid congestion in recent years.
- Residents are increasingly agreeing with the statement "I live close enough to walk to work, schools, shopping, services, etc." Likewise, there is a positive trend in terms of residents feeling as though there are enough sidewalks in their areas.
- Internet use is increasingly reducing the total number of trips that residents of Chittenden County make.
- Fewer residents consider their neighborhood streets to be safe and pleasant for all users but by contrast, fewer feel that vehicular noise and emissions are getting worse.
- In 2012, residents were much less likely to support building more freeways.
- Residents are decreasingly finding minor highway efficiency projects and highway initiatives to be highly important.