2010 Seattle GTEC
Survey Results

Prepared for:

Commute Seattle
and
Washington State
Department of Transportation

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INTRODUCTION

Commute Seattle, a partnership between The Downtown Seattle Association, King County Metro, and the City of Seattle, is a non-profit commuter service organization whose goal is to improve access and mobility to and through Downtown Seattle. Commute Seattle seeks to reduce SOV commuter mode share to 44% by 2015.

In fall 2009, Commute Seattle commissioned Gilmore Research to conduct a survey of businesses with fewer than 100 employees to determine mode share among employees that commute to work Monday through Friday between 6 a.m. and 9 a.m. The sample for the survey was selected to obtain a representative sample of employees in small and medium sized businesses across ten distinct neighborhoods that make up the Seattle Center City. Data from this survey were combined with data collected in 2009 and 2010 by the Washington State Department of Transportation (WSDOT) from all Center City businesses affected by the State of Washington's Commuter Trip Reduction (CTR) Efficiency Act. The survey used questions from Washington State's standard CTR survey to collect information about travel mode to work, vehicle miles traveled and origin of commute trips.

Gilmore Research conducted an analysis of commute behavior for the five neighborhoods that comprise the downtown Seattle Growth and Transportation Efficiency Center (GTEC) and compared it with the commute behavior of employees that work in the Center City, but outside the designated GTEC neighborhoods.

The primary objectives for the study are:

- To understand commute behavior among commuters within the Seattle GTEC area and determine similarities and differences in travel behavior between those working in large (CTR-affected) companies and those working in companies not affected by the CTR guidelines.

- To understand commute behavior among all commuters to the Center City area as well as similarities and differences among downtown employees that work inside and outside the Seattle GTEC.

- To document changes in commute behavior of employees within the downtown Seattle GTEC compared to findings from a similar study conducted in 2008.[1]

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[1] ORC/Opinion Research Northwest. "2008 Downtown Seattle Association Downtown Transportation Alliance and GTEC Survey Summary Report." Revised January 2009.

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METHODOLOGY

Sampling

The 2010 survey collected data from 1,921 employees at non-CTR affected worksites within the entire Center City area including the downtown Seattle GTEC boundaries (see maps in Appendix).

Gilmore Research purchased a list of all businesses in the downtown Seattle area from InfoUSA. Gilmore Research provided InfoUSA with neighborhood boundaries and asked them to append a neighborhood identifier to each piece of sample. In most cases, the business sample included the name, address and telephone number of the business, a contact name, and the approximate number of employees at each location.

The sample was sorted based on neighborhood and business size (1-4, 5-9, 10-19, 20-49, 50-99). Quotas were established for each size cohort to ensure all businesses sizes were represented in the final dataset. The sample for each neighborhood was then randomized prior to data collection and a representative sample was pulled for initial recruitment.

Data Collection

Gilmore Research worked with Commute Seattle to draft a pre-notification letter, signed by the Commute Seattle Executive Director. This letter was sent to all randomly selected businesses with more than four employees to inform business owners about the upcoming survey effort and to encourage their participation.

After the letters were sent out, Gilmore contacted individuals at the selected businesses by phone to verify the name, location and size of the business and to recruit a person inside each organization to distribute and collect the surveys. Coordinators were given the option of distributing hard copies of the survey, distributing electronic surveys in fillable format, or providing a link to a secure website where employees could complete the surveys online. Depending on the option selected coordinators either received a survey packet in the mail with hard copies of the survey instrument, or were sent a packet electronically that included either a survey attachment (fillable format) or a link to the online survey. Packets sent via regular mail included a self-addressed stamped envelope for coordinators to use when returning the completed surveys.

To encourage participation, survey coordinators were entered into a drawing for 20 gift cards valued at $25 for small businesses (5 to 19 employees), or 10 gift cards for medium-sized businesses (20 to 99 employees). During data collection, Gilmore experienced some difficulty gaining cooperation from coordinators at businesses with 50 to 99 employees. For this group, Gilmore dropped the lottery incentive and simply gave each coordinator a $50 gift card in exchange for his or her assistance. Gilmore Research followed up with the on-site coordinator throughout the data collection process via email, phone calls and even some in-person visits to remind them to collect and return the completed surveys.

For the smallest employers (1-4 employees), Gilmore opted to program the surveys into its computer-assisted telephone interviewing (CATI) system and collect the data via telephone interview with as many employees as possible at each location. Quotas were set for number of

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completed interviews within this business size category for each neighborhood. No incentives were offered to these employees or their employers.

All questionnaires were edited for consistency, completeness and accuracy. Paper survey responses were entered into a data file using the data entry mode of Gilmore's CATI software. Once all of the data were entered and verified, data from the paper surveys were combined with data collected via phone and web to create a master data file of responses from employees in non-CTR-affected companies.

WSDOT supplied data for CTR-affected employees to be combined with the non-CTR-affected master data file to provide a complete picture of travel to the Center City. The WSDOT data were collected from CTR-affected companies (those with 100+ employees) in the Center City area in 2009 and 2010. This data included all responses to the state CTR survey included in the Appendix. Thus, it included information for trips made to the Center City area on all days at all hours.

Although the Commuter Trip Reduction Efficiency Act affects only businesses with 100 or more employees, the data WSDOT provided included 537 responses from seven companies with fewer than 100 employees. At WSDOT's direction, the companies shown in Table 1 were treated as CTR-affected companies for purposes of this analysis. All of these companies are located within the Seattle GTEC area.

Table 1
Companies Treated as CTR-affected Despite Having Fewer than 100 Employees

	CTRID	Number of Employees
B-Line LLC	E80316	86
Washington State DHS	E86041	60
U.S. National Park Service	E81943	89
King County Government (Exchange Bldg)	E83089	32
Pacific Northwest Title Company	E84020	86
Daptiv	E85253	85
Merrill Lynch	E86934	99
TOTAL		**537**

Weighting and Analysis

The data collected for Commute Seattle (n=1,921) were then combined with data WSDOT collected from CTR-affected companies in the Center City (n=44,705) and analyses were performed to determine commute mode share, vehicle miles traveled and trip origins.[2]

The combined data file was weighted to ensure data aggregated at the Center City level proportionately represents the following population groups:

- GTEC area employees working for companies that are CTR-affected

- GTEC area employees working for companies that are not CTR-affected

- Employees outside the GTEC area working for CTR-affected companies

- Employees outside the GTEC area working for companies that are not CTR-affected

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[2] For CTR affected worksites that are not doing sample surveys, State of Washington CTR guidelines require a 70% response rate. To encourage this high survey responses rate, if a worksite does not achieve a 70% response rate for a non-baseline survey, the survey results are adjusted using a process called "fill-in." The fill-in process adds in additional drive alone trips for the employees that did not complete surveys, upt to the 70% response rate threshold. However, fill-in was not applied ot the data received from WSDOT. Thus, mode share in this report is calculated based on actual trips reported.

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When developing the Drive Alone Rate (DAR), Gilmore Research followed the protocols set forth in the "Commute Trip Reduction Program Rules 2010" published by the Washington State Department of Transportation.[3] A copy of these rules is included in the Appendix.

Throughout this report statistically significant differences are reported at the 95% level of confidence unless otherwise noted. In tables and graphics "n" is used to denote the unweighted sample size or and "n_w" is used to denote the weighted sample size. Tests for statistical significance were conducted on unweighted data. The maximum margin of error for Center City employees (unweighted) is ± 0.04

Table 2 Confidence Intervals (Precision)			
			Precision
	n	n_w	±
Center City (Net)	**48,536**	**48,536**	**0.04%**
GTEC (Net)	35,899	34,971	0.05%
CTR-affected	17,417	34,775	0.05
Not CTR-affected	1,124	17,554	2.92
Not GTEC (Net)	12,637	13,565	0.09%
CTR-affected	11,840	7,029	0.09
Not CTR-affected	797	6,536	3.47

Confidence intervals are calculated on the unweighted number of survey returns at the 95% level of confidence.

percentage points at the 95% confidence level. The maximum margin of error for employees of businesses in the Seattle GTEC area is ± 0.05 percentage points and the margin of error for employees of Center City businesses located outside the Seattle GTEC is ± 0.09 percentage points (Table 2).

Caveat Regarding Comparisons with 2008 Data

In this report, GTEC results from the 2010 survey are compared to the 2008 GTEC survey.[4]
Direct comparisons of 2010 and 2008 survey results should be treated cautiously because of differences in how data were collected and analyzed between the two survey years. For example, the survey response rate for non-CTR surveys in the 2008 survey was lower than desired, and some very small data samples from the 2008 survey were weighted up very heavily. In the 2010 survey, the response rates were higher and the approach to weighting up responses was modified to avoid applying a very heavy weight to small data sets. In addition, there were some changes in how CTR survey data was processed and analyzed between 2008 and 2009 that impact CTR survey results, and there may have been some differences in CTR worksites included in the GTEC analysis between the two years. Comparing results from the 2008 and 2010 surveys, therefore, should be carried out cautiously.

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[3] Leotta, Kathy and Avinash, Rai J. Commute Trip Reduction Program Rules 2010. Washington State Department of Transportation. September 13, 2010.
[4] ORC/Opinion Research Northwest. "Downtown Seattle Association GTEC Survey Summary Report to WSDOT." Revised January 2009.

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Response Rates

Response rates were calculated based on the number of surveys distributed and the number of valid surveys received. The overall response rate for all surveys was 70%. This includes both the surveys collected by Gilmore Research on behalf of Commute Seattle and those from CTR-affected companies provided by WSDOT.

Table 3
Survey Response Rates

	Surveys Distributed	Surveys Returned	Response Rate
Center City (Net)	**66,386**	**48,536**	**70%**
GTEC (Net)	48,699	35,899	70%
CTR-affected	46,619	34,775	70
Not CTR-affected	2,080	1,124	54
Not GTEC (Net)	17,687	12,637	71%
CTR-affected	16,096	11,840	74%
Not CTR-affected	1,591	797	50

Table 3 shows the response rates for the Center City overall as well as businesses inside and outside the GTEC area and those that are/are not affected by the CTR guidelines. [5]

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[5] The City of Seattle sampled employees rather than attempting a census. The number of surveys returned shown in Table 3 reflects the number of surveys received after applying an expansion factor of 2.03704 to City of Seattle data.

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RESPONDENT PROFILE

Table 4 provides a commuter profile of all survey respondents. As Table 4 shows, between 87% and 92% of respondents worked on any given weekday with fewer respondents working on Mondays and Fridays than on days in the middle of the week. About seven in ten respondents worked all five weekdays (70%). Respondents in the Seattle GTEC area are significantly more like to work all five weekdays than those that work outside the GTEC area (77% and 72% respectively). Additionally, respondents that work for CTR-affected companies are less likely to work on weekends than those working for organizations with fewer than 100 employees.

Respondents commuted 14.4 miles on average. Those working in the GTEC area commuted longer distances on average than those working outside it (14.9 miles and 12.8 miles respectively. Consistent with findings that employees working outside the downtown GTEC have a shorter commute distance and are significantly more likely to walk to work, is the finding that significantly more respondents that work outside the GTEC area live in the Seattle area (60% vs. 54% of those working in the GTEC area).

Table 4
Respondent Commuter Profile

	All Center City Respondents	GTEC			Not GTEC		
		A Total GTEC	**B** CTR-Affected	**C** Not CTR-Affected	**D** Total Not GTEC	**E** CTR-Affected	**F** Not CTR-Affected
Base	n=48,536 n_w=48,536	n=35,899 n_w=34,971	n=34,775 n_w=17,417	n=1,124 n_w=17,554	n=12,637 n_w=13,565	n=11,840 n_w=7,029	n=797 n_w=6,536
Days worked*							
Monday	89.8%	90.4%[D]	93.1%[C]	87.7%	88.4%	88.8%	88.1%
Tuesday	92.2	93.0[D]	95.0[C]	91.0	90.1	90.4	89.7
Wednesday	91.8	92.5[D]	94.6[C]	90.5	90.1	89.7	90.5
Thursday	91.3	91.9[D]	94.1[C]	89.7	89.9	89.6	90.2
Friday	87.3	87.6[D]	90.0[C]	85.1	86.6	85.6	87.7
Saturday	16.0	15.0	9.0	21.0[B]	18.7[A]	13.0	24.8[E]
Sunday	12.0	11.2	6.2	16.1[B]	15.1[A]	10.6	19.9[E]
Work all five weekdays (Mon-Fri)	70.5%	76.7%[D]	82.0%[C]	71.5%	71.7%	72.4%	70.9%
Start work any day (Sun-Sat) **between 6 a.m. and 9 a.m.**	81.5%	82.5%[D]	91.5%[C]	73.6%	79.0%	87.2%[F]	70.3%
Miles one way to work*							
Less than 5	23.2%	21.6%	17.9%	25.2%[B]	27.5%[A]	19.3%	36.5%[E]
5 to 9	26.0	26.8	23.8	29.8[B]	23.8	23.5	24.2
10 to 19	25.6	25.7	28.9[C]	22.5	25.4	29.8[F]	20.6
20 or more	25.2	25.9[D]	29.3[C]	22.5	23.3	27.4[F]	18.7
Average miles to work	*14.4*	*14.9[D]*	*14.8*	*15.1*	*12.8*	*14.2[F]*	*11.4*
Geographic area of residence							
Seattle	55.5%	53.7%	46.2%	61.8%[B]	60.0%[A]	50.6%	70.6%[E]
South (Renton/South King County/Pierce County)	18.1	18.9[D]	20.6[C]	17.0	16.2	20.0[F]	11.9
North (Kirkland/W. Snohomish County)	11.8	11.4	14.5[C]	8.2	12.7[A]	15.3[F]	9.7
Bellevue	4.1	4.5[D]	4.4	4.5	3.1	3.4	2.8
East (Issaquah/East King County)	3.7	4.0[D]	5.3[C]	2.6	3.0	4.2[F]	1.7
West (Kitsap County/Island County)	3.8	4.4[D]	4.8	3.9	2.3	3.2[F]	1.3
Northeast (Redmond/NE King Co./SE Snohomish Co.)	3.0	3.1	4.2[C]	2.0	2.7	3.4[F]	2.0
Total commute trips -- 7 days (trips$_w$)	**233,372**	**168,414**	**83,954**	**84,459**	**64,958**	**32,869**	**32,089**

*   Multiple responses accepted.
**   Excludes reported overnight business trips.
*** Excludes reported miles over 150, reported miles over 10 for those that walk to work three or more times a week and reported miles over 30 for those that bicycle to work three or more times per week.

Note: May not sum to totals due to weighting and rounding.

[AD/BC/EF]**Statistically significant difference between referenced columns.**

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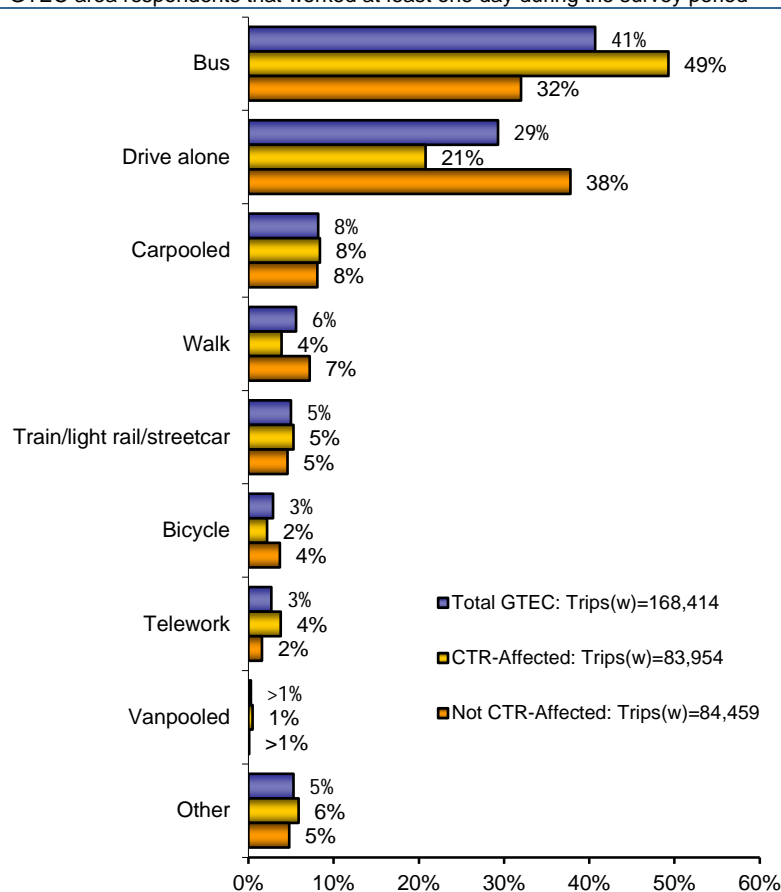
DETAILED FINDINGS

GTEC

Commute mode share is the percentage of all commute trips made using each mode of transportation during the week prior to the survey.

Mode Share

Respondents that work in the downtown Seattle GTEC reported making a total of 168,414 commute trips over the course of the seven-day survey period. As Figure 1 shows, riding the bus was the primary commute mode for GTEC area employees (41%) with driving alone a distant second (29%) and carpooling an extremely distant third.

Employees that work for CTR-affected companies made a significantly greater percentage of trips by bus than those in smaller organizations (49% and 21% respectively). Conversely, respondents that work for businesses that are not CTR-affected, made a significantly greater percentage of drive alone trips (38% and 21% respectively).

Figure 1
Weekly Commute Mode Share – CTR Affected/Not CTR Comparison
GTEC area respondents that worked at least one day during the survey period

Mode	Total GTEC	CTR-Affected	Not CTR-Affected
Bus	41%	49%	32%
Drive alone	29%	21%	38%
Carpooled	8%	8%	8%
Walk	6%	4%	7%
Train/light rail/streetcar	5%	5%	5%
Bicycle	3%	2%	4%
Telework	3%	4%	2%
Vanpooled	>1%	1%	>1%
Other	5%	6%	5%

Total GTEC: Trips(w)=168,414
CTR-Affected: Trips(w)=83,954
Not CTR-Affected: Trips(w)=84,459

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Note: Other modes includes motorcycle/moped, ferry passenger, boarded the ferry with a vehicle, and compressed work week day off. With the exception of ferry passenger (2.3% for those working in the GTEC area), mode share for each of these modes did not exceed 1%.

Base: All commute trips

Trips (w): The number of commute trips after weighting.

May not sum to 100% due to rounding.

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Mode Share Comparison with 2008 Data

A comparison of 2010 mode share with findings from 2008 shows some changes in how respondents travel to work. It is important to point out that for non-CTR worksites, the survey data collection and analysis approaches were revised between 2008 and 2010 so the results for non-CTR affected worksites may not be comparable.

As Table 5 shows, for the overall GTEC bus mode share remained stable at 41%.[6] In 2010, drive alone trips accounted for 29% of all commute trips compared to 32% in 2008 for an overall reduction of 6.3%. Mode share among employees in companies not affected by the CTR rule was relatively stable compared to those in larger organizations. Among employees in non-affected companies, the proportion of trips did not change by more than 2 percentage points between 2008 and 2010 for any given mode. It is important to note that although they might appear small, many of the shifts are significant. For example, the one percentage point increase for teleworking represents a doubling of the number of trips eliminated because employees can work from a remote location.

Changes in commute mode share for employees working in CTR affected were more pronounced than for the GTEC as a whole. For these employees the proportion of commute trips by bus increased by six percentage points or 14.0%. Similarly, drive alone trips accounted for 21% of all trips in 2010 compared to 31% in 2008 for a 32% reduction overall. The use of teleworking as a commute mode doubled over the two year period from 2% to 4%.

Table 5
Changes in Mode Share within the Seattle GTEC 2008 to 2010
GTEC area respondents that worked at least one day during the survey period

	Total		CTR-Affected		Not Affected	
	2008 (n$_w$=33,311)	2010 (n$_w$=34,971)	2008 (n$_w$=22,807)	2010 (n$_w$=17,417)	2008 (n$_w$=16,330)	2010 (n$_w$=17,554)
Bus	41%	41%	43%	49%	33%	32%
Drive alone	32	29	31	21	40	38
Carpool	10	8	11	8	10	8
Walk	5	6	5	4	6	7
Train/light rail/streetcar	3	5	3	5	3	5
Bicycle	2	3	2	2	4	4
Telework	2	3	2	4	1	2
Vanpool	<1	<1	1	<1	<1	<1
Other mode	3	5	2	6	3	5

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Note: Other modes includes motorcycle/moped, ferry passenger, boarded the ferry with a vehicle, and compressed work week day off. With the exception of ferry passenger (2.3% for those working in the GTEC area), mode share for each of these modes did not exceed 1%.

Base: All commute trips (2010 Total trips$_w$ = 168,414; CTR-Affected trips$_w$=83,954; 2010 Not Affected trips$_w$=84,459). Total weighted trips were not published in the 2008 Summary Report.

Note: Comparisons with 2008 data should be viewed with caution per caveat on page 6.

May not sum to 100% due to rounding.

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[6] Comparisons with 2008 data should be viewed with caution per caveat on page 6.

Drive Alone Rate

Drive alone rate is calculated by dividing the number of single occupancy vehicle (SOV) trips into the number of potential trips[7]

For all employees in the GTEC area, the drive alone rate was 30.2%. Employees working for CTR-affected companies had a significantly lower rate than those working in smaller businesses (21.4% and 38.9% respectively).

Table 6 **Drive Alone Rate** GTEC area respondents that worked at least one day during the survey period	Total Trips$_w$	SOV Trips$_w$	Drive Alone Rate
Total GTEC	168,414	50,831	30.2%
CTR-affected	83,954	17,957	21.4%
Not CTR-affected	84,459	32,875	38.9%

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Base: All commute trips

May not sum to totals due to rounding.

Figure 2 provides a comparison of drive alone rates for GTEC area employees in 2008 and 2010. As shown, the drive alone rate for the entire GTEC is 2 percentage points lower than in 2008 (a 6.2% decrease) despite a notable decrease in the drive alone rate for employees in CTR-Affected companies.[8]

Figure 2
Comparison of Drive Alone Rates – 2008 and 2010
GTEC area respondents that worked at least one day during the survey period

Total GTEC: 2010 30%, 2008 32%
CTR-Affected: 2010 21%, 2008 29%
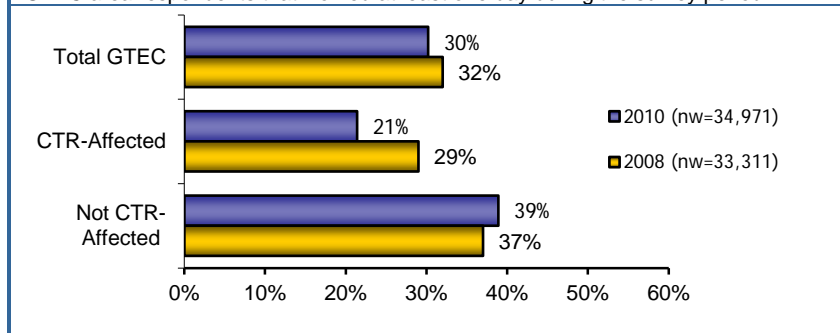Not CTR-Affected: 2010 39%, 2008 37%

2010 (nw=34,971)
2008 (nw=33,311)

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Base: All commute trips

Note: Comparisons with 2008 data should be viewed with caution per caveat on page 6.

May not sum to totals due to rounding.

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[7] Single occupancy trips include all "drive alone" trips plus motorcycle trips where vehicle occupancy equals one. For motorcycles, if vehicle occupancy was not reported or the reported vehicle occupancy was greater than two, one rider is assumed. Potential trips includes trips made using all travel modes plus telework and compressed work week days off.
[8] Comparisons with 2008 data should be viewed with caution per caveat on page 6.
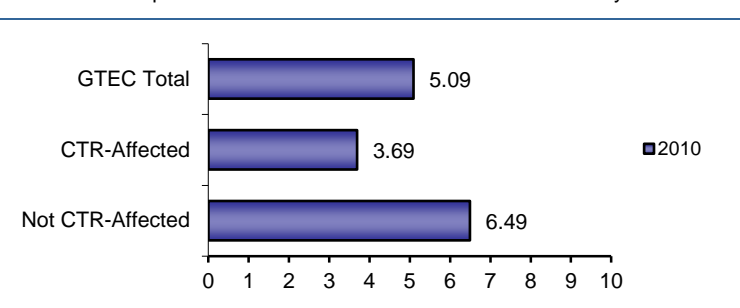
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Vehicle Miles Traveled

Average vehicle miles traveled (VMT) per employee is calculated by multiplying the average number of commute trips occurring in a vehicle by the average number of miles traveled one way among respondents that traveled more than zero miles. The following weights were applied when determining the total number of vehicle trips per employee:

Figure 3
Average Vehicle Miles Traveled Per Employee
GTEC area respondents that traveled more than 0 miles one way to work

1. A trip in a single occupant vehicle (drive alone or motorcycle) = 1 trip

2. A carpool or vanpool trip = 1 trip divided by the number of persons in the vehicle

3. Trips made by all other modes count as zero trips

4. Days when respondents did not work and overnight business trips are excluded from the calculation

The overall average VMT for the GTEC area is 5.09. Respondents working for CTR-affected organizations have a lower average VMT than those working in smaller companies (3.89 and 6.58 miles respectively).
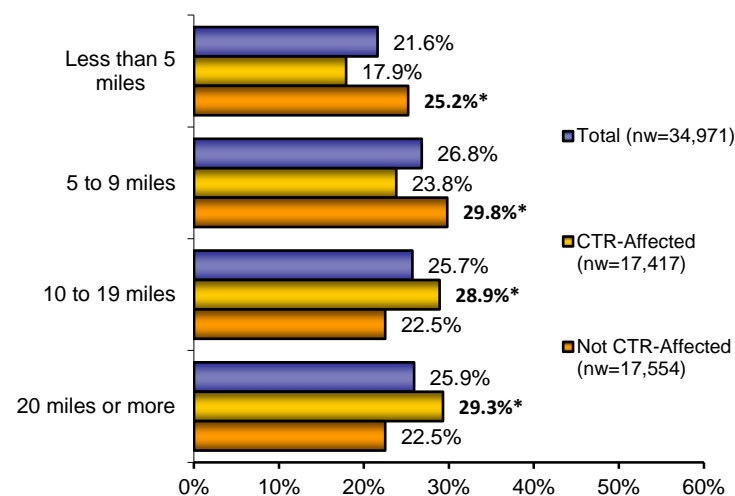
Commute Distance

Overall, GTEC commuters travel 15.3 miles on average to work—a longer distance than the 14.7 miles recorded in 2008.

As Figure 4 shows, employees working for CTR-affected companies were significantly more likely than those working in smaller companies to travel more than ten miles to work. On average, employees in CTR-affected companies commute 15.35 miles compared to an average of 15.29 miles among employees working in not affected companies. In 2008 these averages were 15.91 for employees of CTR-affected companies and 12.61 for those in smaller organizations.

Figure 4
Miles Traveled One Way to Work by CTR Affected/Not Affected Employees
All GTEC area respondents

Less than 5 miles
- 21.6%
- 17.9%
- **25.2%***

5 to 9 miles
- 26.8%
- 23.8%
- **29.8%***

10 to 19 miles
- 25.7%
- **28.9%***
- 22.5%

20 miles or more
- 25.9%
- **29.3%***
- 22.5%

■ Total (nw=34,971)
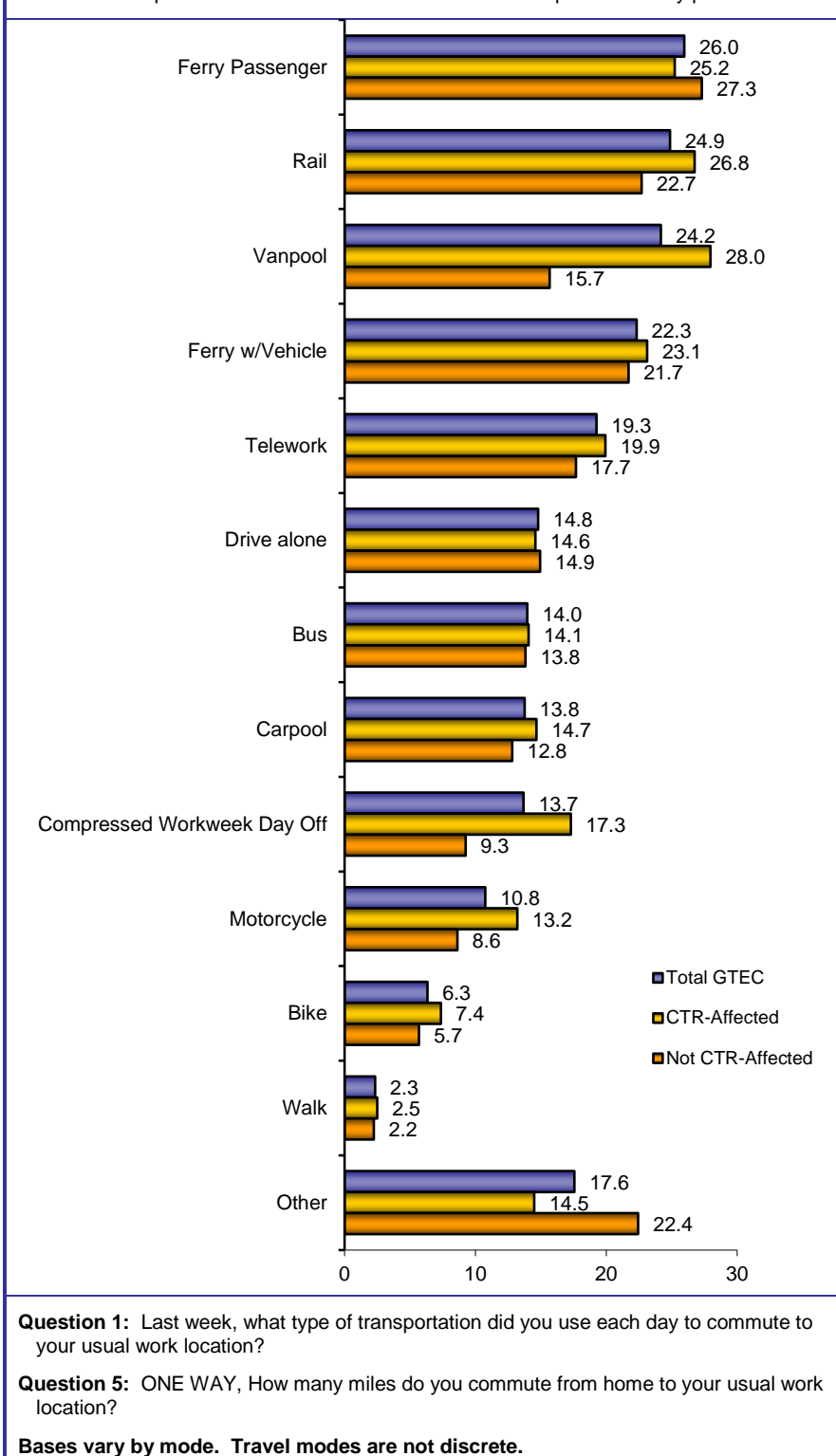■ CTR-Affected (nw=17,417)
■ Not CTR-Affected (nw=17,554)

Question 5: ONE WAY, How many miles do you commute from home to your usual work location?

***Statistically significant difference between CTR Affected/Not Affected**

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When looking at miles traveled one way to work by mode, those that travel as passengers on a ferry travel the farthest distance on average (26.0 miles) followed closely by train/light rail/streetcar commuters (24.9 miles) and respondents that vanpool to work (24.2 miles). Carpool, bus and drive alone commuters all travel about the same distance (13.8 to 14.8 miles on average).

As Figure 5 shows there are some significant differences in distance traveled by mode between those that work in CTR-affected companies and those that do not. Respondents that work for CTR-Affected companies and travel by rail, vanpool, motorcycle or work a compressed work week have longer commutes than those that travel to work in smaller companies via the same mode.

Figure 5
Average Miles to Work One Way by Commute Mode and CTR-Affected/Not Affected
GTEC area respondents that made at least one commute trip in the survey period

Mode	Total GTEC	CTR-Affected	Not CTR-Affected
Ferry Passenger	26.0	25.2	27.3
Rail	24.9	26.8	22.7
Vanpool	24.2	28.0	15.7
Ferry w/Vehicle	22.3	23.1	21.7
Telework	19.3	19.9	17.7
Drive alone	14.8	14.6	14.9
Bus	14.0	14.1	13.8
Carpool	13.8	14.7	12.8
Compressed Workweek Day Off	13.7	17.3	9.3
Motorcycle	10.8	13.2	8.6
Bike	6.3	7.4	5.7
Walk	2.3	2.5	2.2
Other	17.6	14.5	22.4

Question 1: Last week, what type of transportation did you use each day to commute to your usual work location?

Question 5: ONE WAY, How many miles do you commute from home to your usual work location?

Bases vary by mode. Travel modes are not discrete.
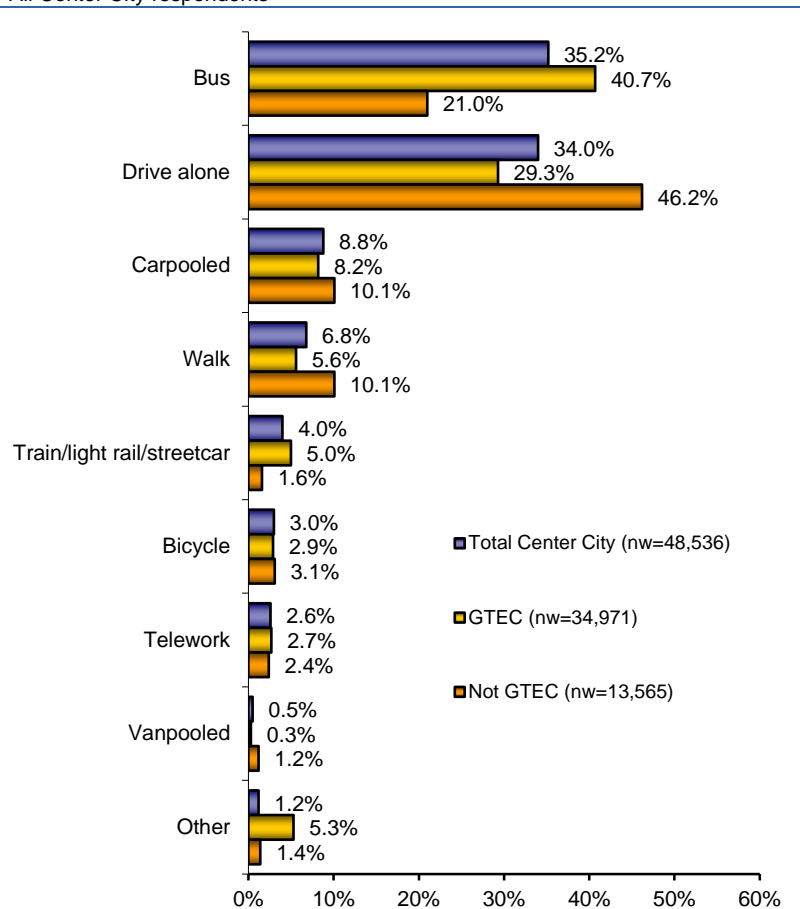
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Center City

Mode Share

Respondents reported making a total of 233,372 commute trips over the course of the seven day survey period. Commute patterns differed greatly between Center City employees that work in the Seattle GTEC area and those that work outside it. As Figure 6 shows, riding the bus was the primary commute mode for Center City employees, just barely edging out bus as the preferred commute mode. There are significant differences in mode share based on whether respondents work inside or outside the GTEC area. Employees working within the GTEC area take the bus significantly more often and drive alone to work significantly less often than employees that work outside the GTEC area.

Employees that work outside the GTEC area choose to drive alone, carpool or walk to work significantly more often than those working within the GTEC area.

Figure 6
Weekly Commute Mode Share – GTEC/Non-GTEC Comparison
All Center City respondents

Bus	35.2% / 40.7% / 21.0%
Drive alone	34.0% / 29.3% / 46.2%
Carpooled	8.8% / 8.2% / 10.1%
Walk	6.8% / 5.6% / 10.1%
Train/light rail/streetcar	4.0% / 5.0% / 1.6%
Bicycle	3.0% / 2.9% / 3.1%
Telework	2.6% / 2.7% / 2.4%
Vanpooled	0.5% / 0.3% / 1.2%
Other	1.2% / 5.3% / 1.4%

■Total Center City (nw=48,536)

■GTEC (nw=34,971)

■Not GTEC (nw=13,565)

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Note: Other modes includes motorcycle/moped, ferry passenger, boarded the ferry with a vehicle, and compressed work week day off. With the exception of ferry passenger (2.3% for those working in the GTEC area), mode share for each of these modes did not exceed 1%.

Base: All commute trips (GTEC trips$_w$=168,414; Non-GTEC trips$_w$=64,958)

May not sum to 100% due to rounding.

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Mode Share Comparison with 2008 Data

Table 7 provides a comparison of mode share between current findings and those from 2008 for employees in the Center City as a whole as well as by whether the employee works inside or outside the GTEC area. As shown, the overall mode share pattern was very similar between the two years in both the GTEC and non-GTEC areas. In both years bus was the preferred commute mode followed by driving alone and carpooling for the Center City overall and for GTEC area employees although the percentage of total trips made on the bus declined by four percentage points representing a 10% reduction in bus mode share. In both 2008 and 2010 employees of the subarea outside the GTEC most commonly drove alone to work followed by riding the bus or carpooling.[9]

Table 7
Changes in Weekly Mode Share for GTEC and Non-GTEC Areas--2008 to 2010
All Center City respondents

	Total Center City		GTEC		Non-GTEC	
	2008 (n_w=39,137)	**2010** (n_w=48,536)	**2008** (n_w=33,311)	**2010** (n_w=34,971)	**2008** (n_w=5,826)	**2010** (n_w=13,565)
Bus	39%	35%	41%	41%	23%	21%
Drive alone	35	34	32	29	48	46
Carpool	10	9	10	8	11	10
Walk	5	7	5	6	6	10
Train/light rail/streetcar	3	4	3	5	1	2
Bicycle	3	3	2	3	6	3
Telework	2	3	2	3	3	2
Vanpool	1	<1	<1	<1	1	1
Other mode	3	5	3	5	1	4

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Note: Other modes includes motorcycle/moped, ferry passenger, boarded the ferry with a vehicle, and compressed work week day off. With the exception of ferry passenger (2.3% for those working in the GTEC area), mode share for each of these modes did not exceed 1%.

Base: All commute trips (2010 Total trips$_w$ = 168,414; CTR-Affected trips$_w$=83,954; 2010 Not Affected trips$_w$=84,459). Total weighted trips were not published in the 2008 Summary Report.

Note: Comparisons with 2008 data should be viewed with caution per caveat on page 6.

May not sum to 100% due to rounding.

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[9] Comparisons with 2008 data should be viewed with caution per caveat on page 6.

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Drive Alone Rate

Drive alone rate is calculated by dividing the number of single occupancy vehicle (SOV) trips into the number of potential trips[10]

For all employees in the Center City, the drive alone rate was 34.9%. Employees working outside the GTEC area had a significantly higher drive alone rate than those working within the GTEC area (47.0% and 30.1% respectively). Similarly, employees in companies with fewer than 100 employees have a much higher drive alone rate than those working for CTR-affected organizations (43.0% and 26.7% respectively).

Table 8
Single Occupancy Vehicle Rate
All Center City respondents

	Total Trips$_w$	SOV Trips$_w$	Drive Alone Rate
Total Center City	233,372	81,381	34.9%
GTEC	168,414	50,831	30.1%
Not GTEC	64,958	30,550	47.0%
CTR-affected	116,824	31,228	26.7%
Not CTR-affected	116,548	50,153	43.0%

Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Base: All weekday commute trips

May not sum to 100% due to rounding.

Figure 7 provides a comparison of drive alone rates for Center City area employees in 2008 and 2010. As shown, the drive alone rate for the entire Center City increased almost 13% (+4 percentage points). This increase was most pronounced among employees working outside the GTEC area.

Figure 7
Comparison of Drive Alone Rates – 2008 and 2010
Center City respondents that worked at least one day during the survey period
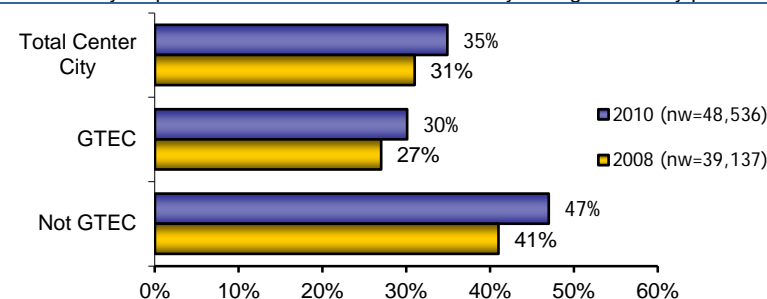
Question 1: Last week, what type of transportation did you use each day to commute TO your usual work location?

Base: All commute trips

May not sum to totals due to rounding.

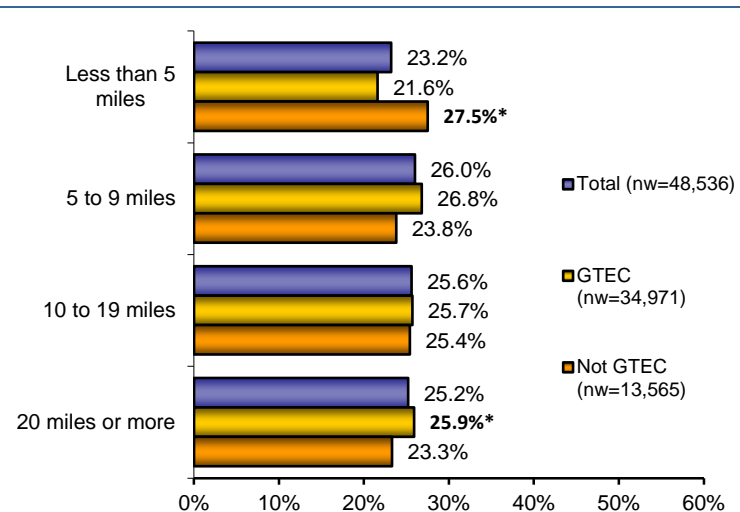[10] Single occupancy trips include all "drive alone" trips plus motorcycle trips where vehicle occupancy equals one. For motorcycles, if vehicle occupancy was not reported or the reported vehicle occupancy was greater than two, one rider is assumed. Potential trips includes trips made using all travel modes plus telework and compressed work week days off.

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Commute Distance

Overall, Center City commuters travel 14.8 miles on average to work—slightly more than the 14.3 mile average recorded in 2008.

As Figure 8 shows, employees working for companies in the GTEC area were significantly more likely than those working outside the GTEC area to travel more than five miles to work. On average, employees in GTEC companies commute 15.3 miles compared to an average of 13.4 miles among employees working in other locations. In 2008 these averages were 14.7 for GTEC employees and 12.0 for those working outside the GTEC area.

Figure 8
Miles Traveled One Way to Work by GTEC/Non-GTEC Location
All Center City respondents

Less than 5 miles	23.2% / 21.6% / **27.5%***
5 to 9 miles	26.0% / 26.8% / 23.8%
10 to 19 miles	25.6% / 25.7% / 25.4%
20 miles or more	25.2% / **25.9%*** / 23.3%

■ Total (nw=48,536)
■ GTEC (nw=34,971)
■ Not GTEC (nw=13,565)

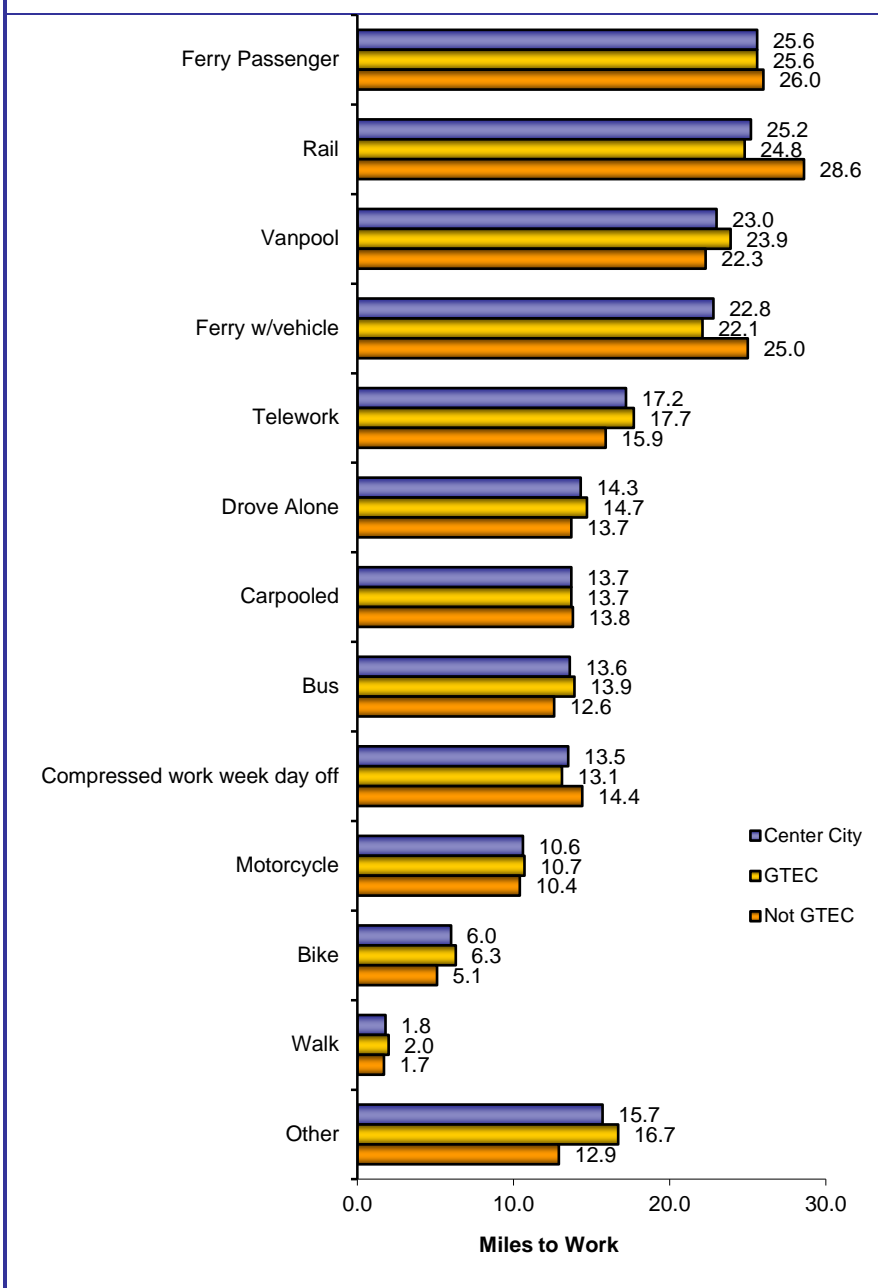**Question 5:** ONE WAY, How many miles do you commute from home to your usual work location?

***Statistically significant difference**

Bases: Total (n=40,817, n_w=37,129); CTR-Affected (n=39,460, n_w=20,781); Not CTR-Affected (n=1,357, n_w=16,348)

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When looking at miles traveled one way to work by mode, those that travel as passengers on a ferry

travel the farthest distance on average (25.6 miles) followed closely by train/light rail/streetcar commuters (25.2 miles) and respondents that vanpool to work (23.0 miles). Bus, carpool and drive alone, all travel about the same distance (13.6 to 14.3 miles on average).

As Figure 9 shows there are some significant differences in distance traveled by mode between those that work in the GTEC area and those that do not. Respondents that work outside the GTEC area and commute by taking a vehicle on the ferry or by train/light rail/streetcar have a longer distance to commute than those in the GTEC area that travel to work via the same modes.

Figure 9
Average Miles to Work One Way by Commute Mode and GTEC/Non-GTEC Location
All Center City respondents

Legend:
- Center City
- GTEC
- Not GTEC

Mode	Center City	GTEC	Not GTEC
Ferry Passenger	25.6	25.6	26.0
Rail	25.2	24.8	28.6
Vanpool	23.0	23.9	22.3
Ferry w/vehicle	22.8	22.1	25.0
Telework	17.2	17.7	15.9
Drove Alone	14.3	14.7	13.7
Carpooled	13.7	13.7	13.8
Bus	13.6	13.9	12.6
Compressed work week day off	13.5	13.1	14.4
Motorcycle	10.6	10.7	10.4
Bike	6.0	6.3	5.1
Walk	1.8	2.0	1.7
Other	15.7	16.7	12.9

Miles to Work

Question 1: Last week, what type of transportation did you use each day to commute to your usual work location?

Question 5: ONE WAY, How many miles do you commute from home to your usual work location?

Bases vary by mode. Travel modes are not discrete.

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Vehicle Miles Traveled

Average vehicle miles traveled (VMT) per employee is calculated by multiplying the average number of commute trips occurring in a vehicle by the average number of miles traveled one way among respondents that traveled more than zero miles. The following weights are applied when determining the total number of vehicle trips per employee:

Figure 8
Average Vehicle Miles Traveled Per Employee
All Center City respondents that traveled more than 0 miles one way to work

5. A trip in a single occupant vehicle (drive alone or motorcycle) = 1 trip

6. A carpool or vanpool trip = 1 trip divided by the number of persons in the vehicle

7. Trips made by all other modes count as zero trips

8. Days when respondents did not work and overnight business trips are excluded from the calculation
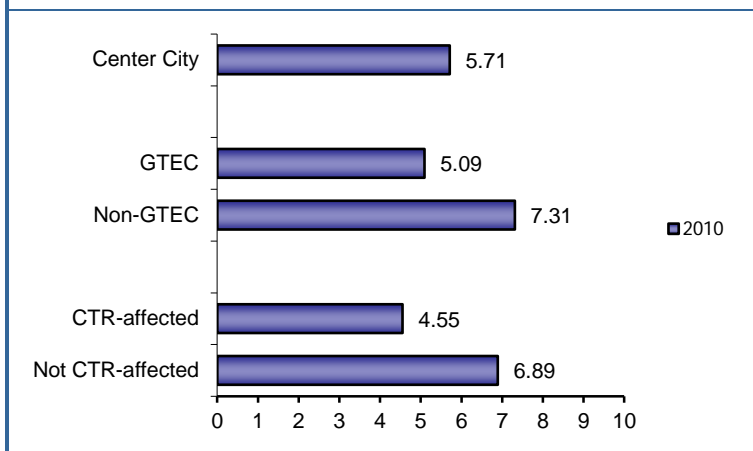
The overall average VMT for the Center City area is 5.71. Respondents working inside the Seattle GTEC area have a lower average VMT than those working outside the GTEC area. Similarly, respondents working for CTR-affected organizations have a lower average VMT than those working in smaller companies (Figure 8).

APPENDIX

Prenotification Letter

COMMUTE SEATTLE
LIVE MORE. DRIVE LESS.

DATE

Dear <contact and title>:

Within the next few weeks, an interviewer from Gilmore Research Group, an experienced professional research firm headquartered in Seattle, Washington, may be calling your office and asking you to allow your employees to participate in a survey about how they commute to work. Your participation will help support our continuing efforts to improve commuter options and access to downtown Seattle.

The survey will only take 2-3 minutes of each employee's time and will provide valuable information to Commute Seattle, a partnership between Downtown Seattle Association, King County Metro and the City of Seattle. It will ask what method of transportation employees used to get to work each day of the preceding week and the zip code they are traveling from.

Participation in this survey is completely voluntary. Responses from your employees will be combined with those from other organizations to give us a complete picture of commute travel to downtown Seattle that will inform decisions about alternative forms of transportation, parking and other travel-related issues.

All survey responses are confidential and your employee's answers will not be associated with your company. If you have any questions you may contact the Gilmore Project Director, Wendy Sears wsears@gilmore-research.com (206. 219.1943).

Thank you in advance for taking part in this research effort.

Sincerely,

Jamie Cheney
Executive Director
Commute Seattle

THE
GILMORE
RESEARCH
GROUP

Recruiting Screener

Hello, this is _____ with the Gilmore Research Group. I am calling on behalf of Commute Seattle. We are asking employers to help with a very short survey on how employees commute to work in the downtown area to support continuing efforts to improve commuter options and access to downtown Seattle. The survey involves having each employee from selected businesses fill out a short form about how they commute to work. Your employees can complete the forms online or can fill out a paper version. It should only take a minute or two for each person to do it. What we need is a contact person at your business who is willing to distribute and collect the surveys. Are you the best person or would you recommend we talk with someone else?

IF NEEDED: Your business was selected at random to represent other businesses of the same size, and it is very important that we include the information from your employees.

☐ Same person   ☐ New person (reintroduce)

Great! First, I just need to verify some information about your business.
Are you located at_____ (**ADDRESS FROM SAMPLE**)

☐ Yes
☐ No => Are you located in the <neighborhood from sample> area?
      ☐   Yes=> May I have your address?

                _____
                _____

      ☐   No=> **THANK AND TERMINATE**

And about how many employees do you have that commute to this office? #_____

☐ 1 – 2   ☐ 5 – 9   ☐ 20 – 49   ☐ 100 – 249   ☐ 500+
☐ 3 – 4   ☐ 10 – 19   ☐ 50 – 99   ☐ 250 – 499

What is your major business activity? **IF NEEDED READ LIST**

☐ Retail   ☐ Restaurant/Food Service
☐ Medical office   ☐ Commercial office
☐ Government   ☐ Personal service (i.e. beauty salon)
☐ Banking   ☐ Childcare/daycare
☐ Other_____

As I mentioned, we have a short form for employee that asks about their commute method each day during the week of October 18 – 24. Since this involves some effort to distribute the forms to each employee and collect them again, we are having a drawing for the people who are handling this in each business. The drawing will be for: **(READ APPROPRIATE ONE)**

    IF LESS THAN 10 EMPLOYEES: 20 gift certificates valued at $25
    IF TEN OR MORE EMPLOYEES: 10 gift certificates valued at $50

Since we are only interviewing a sample of local businesses, your odds are pretty good. Would you be willing to help us get the forms handed out and collected from your employees?

☐ Yes
☐ No – Is there someone else in your business that might be willing to do it?
    ☐ Yes => **GET REFERRAL AND REINTRODUCE**
    ☐ No => **THANK AND TERMINATE**

Would you prefer that we...

☐ Come by and drop them off at your business
☐ Mail them to you
☐ Send you a link to an online survey with a PIN number for each employee or
☐ Send you the survey in an electronic fillable format that you can distribute and collect by email?
      => Email_____(**VERIFY CORRECT SPELLING**)

We will need to collect the forms the week of November 1st. We'll send you a postage paid self-addressed envelope for you to mail everyone's forms back to us as well as directions for submitting the surveys electronically. Thank you so much for agreeing to do this. Is there anything else that we can do to make this easier for you?

Let me make sure I have your correct name and phone number:

Name_____ **(VERIFY CORRECT SPELLING)**
Phone_____
Fax _____

We will get this information out to you soon with detailed instructions and contact information in case you have questions.

Commute Seattle Questionnaire

COMMUTE SEATTLE

LIVE MORE. DRIVE LESS.

Downtown Seattle Commuter Survey

DEAR DOWNTOWN SEATTLE EMPLOYEE: Commute Seattle, in partnership with the Downtown Seattle Association, King County Metro and the City of Seattle, is working with Gilmore Research to conduct a survey of employees in downtown Seattle to understand how you commute to work. Your participation will help support our continuing efforts to improve commuter options and access to downtown Seattle. Please take a few minutes to fill out this questionnaire. Mark your answers clearly and neatly in the boxes like this: (☑Yes ☐No)

1) **Last week, what type of transportation did you use each day to commute TO your usual work location?**
   - *Fill in ONLY ONE type of transportation per day*
   - *If you used more than one type, fill in the type used for the LONGEST DISTANCE*
   - *Fill in "Carpooled" only if at least one other person age 16 or older was in the vehicle*
   - *Fill in "Teleworked" if you eliminated a commute trip by working at home, at a Telework Center or at a Satellite Office less than one-half as far from home as your usual work location. If you teleworked part of the day and then went to your usual work location, fill in how you got to your usual work location that day.*

	M	T	W	T	F	S	S
Drove alone (or with children under 16)	☐	☐	☐	☐	☐	☐	☐
Carpooled (2 or more people)	☐	☐	☐	☐	☐	☐	☐
Vanpooled	☐	☐	☐	☐	☐	☐	☐
Motorcycle/Moped	☐	☐	☐	☐	☐	☐	☐
Took the bus	☐	☐	☐	☐	☐	☐	☐
Rode the train/light rail/streetcar	☐	☐	☐	☐	☐	☐	☐
Rode a bicycle	☐	☐	☐	☐	☐	☐	☐
Walked	☐	☐	☐	☐	☐	☐	☐
Teleworked	☐	☐	☐	☐	☐	☐	☐
Compressed workweek day off	☐	☐	☐	☐	☐	☐	☐
Overnight business trip	☐	☐	☐	☐	☐	☐	☐
Did not work (day off, sick, etc.)	☐	☐	☐	☐	☐	☐	☐
Boarded ferry with car/van/bus	☐	☐	☐	☐	☐	☐	☐
Used ferry as walk-on passenger	☐	☐	☐	☐	☐	☐	☐
Other:	☐	☐	☐	☐	☐	☐	☐

2) **If you used a carpool or vanpool as part of your commute, or if you ride a motorcycle, how many people (age 16 or older) are usually in the vehicle, including yourself?**

   _____ **Number** of people in carpool/vanpool or on motorcycle

3) **Was last week a typical week for commuting?** ☐ Yes ☐ No

4) **Last week were you scheduled to begin work between 6 a.m. and 9 a.m.? If you were not assigned starting times, did you begin work sometime between 6 a.m. and 9 a.m.?**

   ☐ Yes, started work between 6 a.m. and 9 a.m.
   ☐ No, did not start work between 6 a.m. and 9 a.m.

5) **ONE WAY, how many miles do you commute from home TO your usual work location?**
   - *DO NOT use roundtrip or weekly distance*
   - *Include miles for errands or stops made daily on the way to work*
   - *If you telework, report the miles from your residence to your worksite*
   - *Round off the distance traveled to the nearest mile*

   ___ Miles you commute one way

6) **What is the zip code where you live?** _____

THE GILMORE RESEARCH GROUP

State of Washington CTR Survey

State of Washington — **January 2009 - December 2010**

Commute Trip Reduction

Employee Questionnaire

MARKING DIRECTIONS
- Use a No. 2 pencil.
- Fill in the circle completely.
- Erase cleanly any marks you wish to change.
- Do not make any stray marks on this form.

CORRECT MARK   INCORRECT MARKS

ALL QUESTIONS REFER TO WORK FOR THIS EMPLOYER ONLY.

1. Which of the following best describes your employment status?
- ○ Full-time (35 hours or more each week)
- ○ Part-time (20 to 34 hours each week)
- ○ Part-time (less than 20 hours each week)

2. Is your position with this employer intended to last 12 months or more?   ○ Yes   ○ No

3. Last week, which days were you scheduled to begin work between 6 and 9 a.m.? *(Mark all that apply.)*
○ Monday ○ Tuesday ○ Wednesday ○ Thursday ○ Friday ○ Saturday ○ Sunday ○ None

4a. Last week, what type of transportation did you use each day to commute TO your usual work location?

- Fill in **ONLY ONE** type of transportation per day.
- If you used more than one type, fill in the type used for the **LONGEST DISTANCE**.
- Fill in "Carpooled" only if at least one other person age 16 or older was in the vehicle.
- Fill in "Teleworked" if you eliminated a commute trip by working at home, at a Telework Center or at a Satellite Office less than one-half as far from home as your usual work location. If you teleworked part of the day and then went to your usual work location, fill in how you got to your usual work location that day.

M	T	W	Th	F	Sa	Su	
M	T	W	Th	F	Sa	Su	Drove alone (or with children under 16)
M	T	W	Th	F	Sa	Su	Carpooled (2 or more people)
M	T	W	Th	F	Sa	Su	Vanpooled
M	T	W	Th	F	Sa	Su	Motorcycle/Moped
M	T	W	Th	F	Sa	Su	Took the bus
M	T	W	Th	F	Sa	Su	Rode the train/light rail/streetcar
M	T	W	Th	F	Sa	Su	Rode a bicycle
M	T	W	Th	F	Sa	Su	Walked
M	T	W	Th	F	Sa	Su	Teleworked
M	T	W	Th	F	Sa	Su	Compressed workweek day off
M	T	W	Th	F	Sa	Su	Overnight business trip
M	T	W	Th	F	Sa	Su	Did not work (day off, sick, etc.)
M	T	W	Th	F	Sa	Su	Boarded ferry with car/van/bus
M	T	W	Th	F	Sa	Su	Used ferry as walk-on passenger
M	T	W	Th	F	Sa	Su	Other: _____

4b. If you used a carpool or vanpool as part of your commute, or if you ride a motorcycle, how many people (age 16 or older) are usually in the vehicle, including yourself?

- ○ One person
- ○ Two people
- ○ Three people
- ○ Four people
- ○ Five people
- ○ Six people
- ○ Seven people
- ○ Eight people
- ○ Nine people
- ○ Ten people
- ○ Eleven people
- ○ Twelve people
- ○ Thirteen people
- ○ Fourteen people
- ○ Fifteen or more people

4c. Was last week a typical week for commuting?   ○ Yes   ○ No

5. Which of the following most fits your normal work schedule?
- ○ 5 days a week
- ○ 4 days a week (4/10s)
- ○ 3 days a week
- ○ 9 days in 2 weeks (9/80)
- ○ 7 days in 2 weeks
- ○ Other: _____

6a. On average, do you telework at least one full day in two weeks? *Mark "Yes" if you work a full day at home or at a Telework Center or Satellite Office less than one-half as far from home as your usual work location, and do not go to your usual work location that day.*

- ○ Yes *(go to question 6b below)*
- ○ No *(go to question 7a on the other side)*

6b. How many days did you telework in the last two weeks?
- ○ no days
- ○ 1 day
- ○ 2 days
- ○ 3 days
- ○ 4 days
- ○ 5 days
- ○ 6 days
- ○ 7 days
- ○ 8 days
- ○ 9 days
- ○ 10 days

Continued on Reverse

○○○○○○○○○○○○○○○○○○○○○○○○   **SERIAL #**

DO NOT WRITE IN THIS AREA

THE GILMORE RESEARCH GROUP

7a. ONE WAY, how many miles do you commute from home TO your usual work location?

- DO NOT use roundtrip or weekly distance.
- Include miles for errands or stops made daily on the way to work.
- If you telework, report the miles from your residence to your worksite.
- Round off the distance traveled to the nearest mile.
- Write numbers in the boxes and fill in the corresponding circles.
- The example is for someone who lives 8 miles from work.

Example: 008

7b. Last week did you ride a ferry as part of your commute?

○ Yes   ○ No

7c. Last week did you use a park-and-ride lot as part of your commute?

○ Yes   ○ No

7d. Last week did you pay for parking at work?

- Answer YES whether you paid by the day, or prepaid by the week, month, or year, or whether your employer reimbursed part of your parking cost.

○ Yes   ○ No

8. What is your home zip code? (Write numbers in the boxes and fill in corresponding circles.)

SCANTRON Mark Reflex® EM-255322-3:654321   HR06

9. If you drive alone to work, which of the following would most encourage you to try using an alternative to driving alone? Mark the three most important to you.

○ a. An employer-provided car for work purposes during work hours
○ b. Transportation during lunch or breaks for personal errands
○ c. An immediate ride home in case of an emergency (guaranteed ride home)
○ d. A more flexible work schedule to meet carpools, vanpools, the bus, etc.
○ e. A financial incentive (allowance/subsidy) for using an alternative to driving alone
○ f. A financial subsidy for giving up your parking space
○ g. Priority, reserved, or discounted parking for carpools and vanpools
○ h. Personalized help forming a carpool or vanpool
○ i. Secured, covered parking for your bicycle
○ j. Lockers and showers for walkers and bicyclists
○ k. On-site childcare, banking, dry cleaning, fitness center or other services
○ l. On-site food service or kitchen facility
○ m. Personalized help finding bus times and routes
○ n. More frequent bus service at the worksite
○ o. More information about commute alternatives
○ p. Opportunity to work at home (telework)
○ q. Improved security at park-and-ride lots
○ r. More spaces at park-and-ride lots
○ s. Other: _____

10. How likely would you be to try the following ways of getting to work?

	do now	likely	not likely	not an option
carpool	○	○	○	○
vanpool	○	○	○	○
bus	○	○	○	○
train	○	○	○	○
bicycle	○	○	○	○
walking	○	○	○	○
telework	○	○	○	○
a compressed work week	○	○	○	○

Answer question 11 only if you rode transit (either bus or train), or a ferry as a walk-on passenger, at least once last week.

11. Last week, how many one-way transit or walk-on ferry rides did you take on each listed below (for any purpose, not just getting to and from work)? If you transferred between buses within the same system, count only one (1) ride on that system. If you transferred to another system, count a ride on each. Do not count ferry rides where you boarded with a motor vehicle. Write numbers in the boxes and fill in the corresponding circles.

King County Metro	Sound Transit	Community Transit	Pierce Transit	Kitsap Transit	Intercity Transit	Everett Transit	Island Transit	Ferry as walk-on	Other

Thank you for completing the survey!

THE GILMORE RESEARCH GROUP

Geographic Areas

Respondents were asked to provide the zip code where they live. Commute Seattle then grouped the reported zip codes into geographic areas to gain a better understanding of travel behaviors. The zip codes in each grouping are shown in the table below:

Table A-1
Zip Codes within Geographic Areas of Residence
All respondents

Seattle	North	North	East	South	South	West	Out of State
98101	98011	98277	99118	98158	98499	98325	97223
98102	98012	98279	99122	98166	98501	98329	97224
98103	98020	98282	99125	98168	98502	98332	97236
98104	98021	98284	99202	98178	98503	98335	97267
98105	98026	29292	99203	98188	98504	98337	97462
98106	98028		99205	98198	98506	98339	97601
98107	98033	**Northeast**	99206	98321	98507	98340	97701
98108	98034	98014	99207	98323	98509	98342	97845
98109	98036	98019	99208	98327	98512	98345	
98111	98037	98052	99212	98328	98513	98346	
98112	98041	98053	99216	98333	98516	98353	
98113	98043	98072	99217	98338	98520	98358	
98114	98046	98074	99218	98349	98524	98359	
98115	98082	98077	99223	98354	98531	98362	
98116	98086	98272	99224	98360	98532	98363	
98117	98087	98290	99336	98361	98537	98365	
98118	98201	98294	99350	98371	98541	98366	
98119	98202	98296	99353	98372	98544	98367	
98121	98203		99362	98373	98546	98368	
98122	98204	**East**	99403	98374	98550	98370	
98124	98205	98024		98375	98558	98376	
98125	98206	98027	**South**	98377	98569	98380	
98126	98208	98029	98001	98385	98579	98382	
98127	98213	98040	98002	98387	98580	98383	
98133	98221	98045	98003	98388	98584	98384	
98134	98223	98050	98010	98390	98589	98392	
98136	98225	98065	98022	98391	98592	98393	
98138	98226	98068	98023	98401	98597	98394	
98139	98229	98075	98025	98402	98604	98528	
98144	98230	98801	98030	98403	98607	98588	
98145	98232	98802	98031	98404	98611		
98155	98233	98816	98032	98405	98625	**Out of State**	
98161	98236	98823	98035	98406	98626	83709	
98164	98239	98826	98038	98407	98638	83814	
98165	98247	98855	98042	98408	98642	83815	
98174	98248	98901	98047	98409	98661	83854	
98175	98249	98902	98051	98416	98662	92103	
98177	98250	98908	98055	98418	98672	97005	
98185	98251	98925	98056	98422	98682	97006	
98199	98252	98296	98057	98424	98684	97008	
98316	98253	98930	98058	98433	98685	97013	
	98256	98942	98059	98443	98922	97060	
Bellevue	98257	99004	98062	98444		97068	
98004	98258	99012	98063	98445	**West**	97070	
98005	98260	99016	98064	98446	98013	97108	
98006	98261	99019	98071	98447	98061	97140	
98007	98264	99021	98090	98464	98070	97143	
98008	98270	99022	98092	98465	98110	97144	
98009	98271	99025	98093	98466	98310	97203	
98015	98273	99027	98146	98467	98311	97212	
98039	98274	99037	98148	98498	98312	97217	

Q6. What is the zip code where you live?

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Weights

Table A-2 shows the weights that were derived for this study. The total number of employees in the Center City and within each neighborhood was calculated from two sources: A database listing all companies with fewer than 100 employees purchased from InfoUSA and data provided by the Washington State Department of Transportation (WSDOT) for companies with 100 or more employees. Using this information, Gilmore determined the percentage of employees in CTR-affected and non-affected businesses in the Center City overall and within each neighborhood. Responses from completed surveys were then weighted by the factors shown in Table A-1 to ensure proportionate representation based on business size.

As shown in the table, the City of Seattle was treated differently from other businesses because it distributed surveys to only 2,700 of its 5,500 employees. Because the City of Seattle sampled employees rather than attempting a census, responses from employees in this organization had to be factored up first to represent all employees in the City of Seattle (factor of 2.03704) and then weighted to align them with the actual distribution of CTR-affected and non-affected businesses in the Center City and the Commercial Core neighborhood. The City of Seattle is a subset of the CTR-Affected companies shown in Table A-1.

Table A-2
Weights Applied to Center City Aggregated Data & Neighborhood Data

	Estimated Number of Employees (InfoUSA/WSDOT)	Percentage of Employees (InfoUSA/WSDOT)	Valid Surveys Received*	Percentage Valid Surveys	Weight
CTR-Affected	73,566	47%	42,863	92%	0.5097749
City of Seattle	5,500	4%	1,842	4%	0.8868637
Non-Affected	77,914	50%	1,921	4%	12.046808
Total	**156,980**	**100%**	**46,626**	**100%**	
Belltown					
CTR-Affected	3,031	22%	2,208	91%	0.2461351
Non-Affected	10,449	78%	209	9%	8.9642756
Total	**13,480**	**100%**	**2,417**	**100%**	
Capitol Hill					
CTR-Affected	0	0%	0	0%	N/A
Non-Affected	2,006	100%	128	9%	1.0000000
Total	**2,006**	**100%**	**128**	**100%**	
Chinatown – International District					
CTR-Affected	5,011	57%	2,848	97%	0.5918489
Non-Affected	3,750	43%	99	3%	12.7415578
Total	**8,761**	**100%**	**2,947**	**100%**	
Commercial Core					
CTR-Affected	34,196	47%	20,132	90%	0.5164113
City of Seattle*	5,500	7%	1,842	8	0.9077795
Non-Affected	33,795	46%	369	2%	27.8441146
Total	**73,491**	**100%**	**22,343**	**100%**	
Denny Triangle					
CTR-Affected	6,135	57%	4,118	97%	0.5878973
Non-Affected	4,635	43%	132	3%	13.8563560
Total	**10,770**	**100%**	**4,250**	**100%**	
First Hill					
CTR-Affected	9,707	70%	4,352	97%	0.8133754
Non-Affected	4,226	30%	127	3%	0.74466321
Total	**13,933**	**100%**	**4,479**	**100%**	
Pike/Pine					
CTR-Affected	1,191	46%	183	52%	0.8897728
Non-Affected	1,391	54%	170	48%	1.1186563
Total	**2,582**	**100%**	**353**	**100%**	
Pioneer Square					
CTR-Affected	2,458	37%	1,717	84%	0.4404821
Non-Affected	4,146	63%	315	16%	4.0498169
Total	**6,604**	**100%**	**2,032**	**100%**	
South Lake Union					
CTR-Affected	8,770	61%	5,411	97%	0.6300366
Non-Affected	5,564	39%	161	3%	13.4339879
Total	**14,334**	**100%**	**5,572**	**100%**	
Uptown					
CTR-Affected	3,067	28%	1,894	90%	0.3093454
Non-Affected	7,952	72%	211	10%	7.1995248
Total	**11,019**	**100%**	**2,105**	**100%**	

* Valid surveys are the number of completed surveys received after eliminating surveys that were blank or largely incomplete
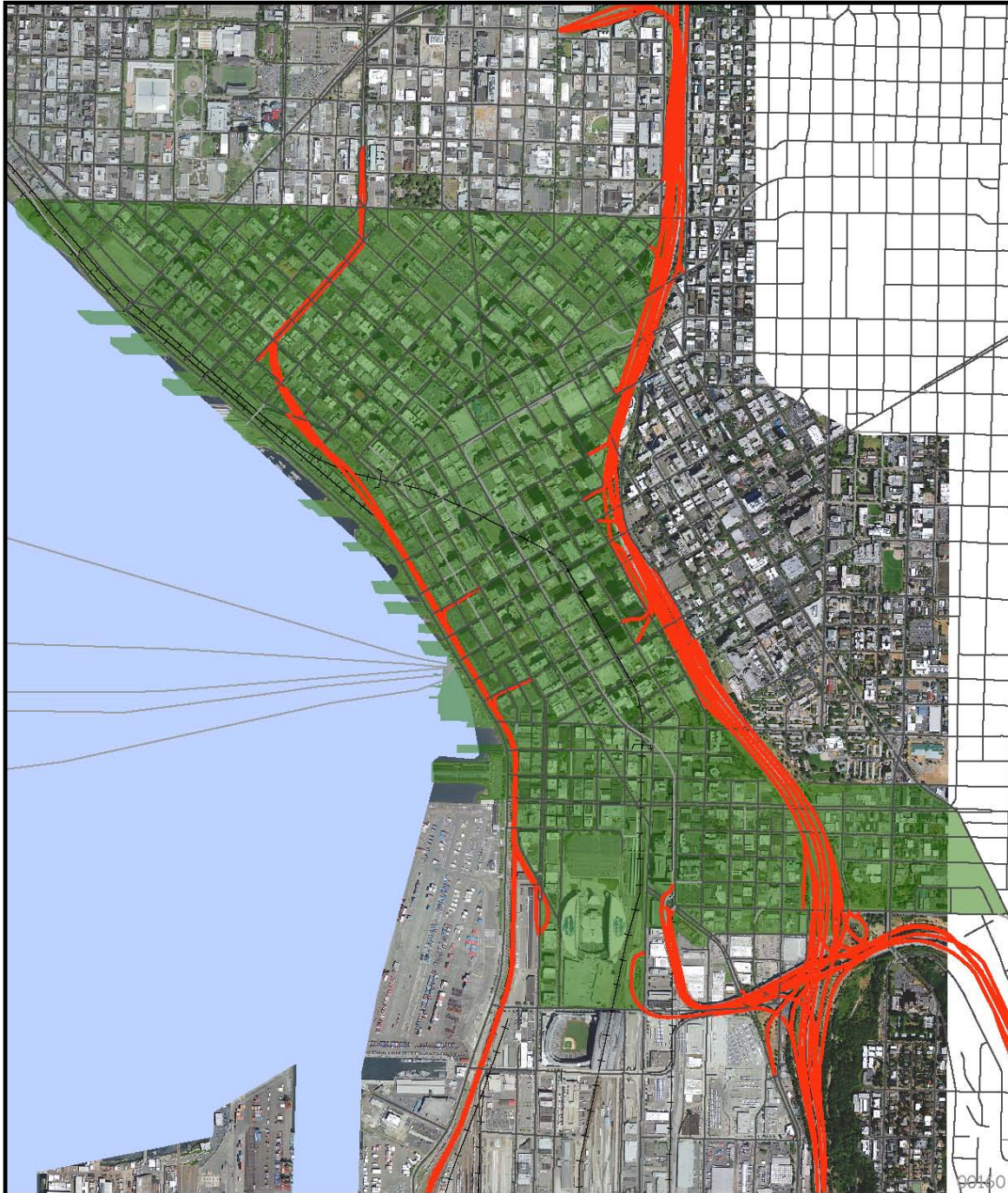
Percentages may not sum to 100% due to rounding.

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Map of Downtown Neighborhoods

Center City Seattle's 10 Neighborhoods
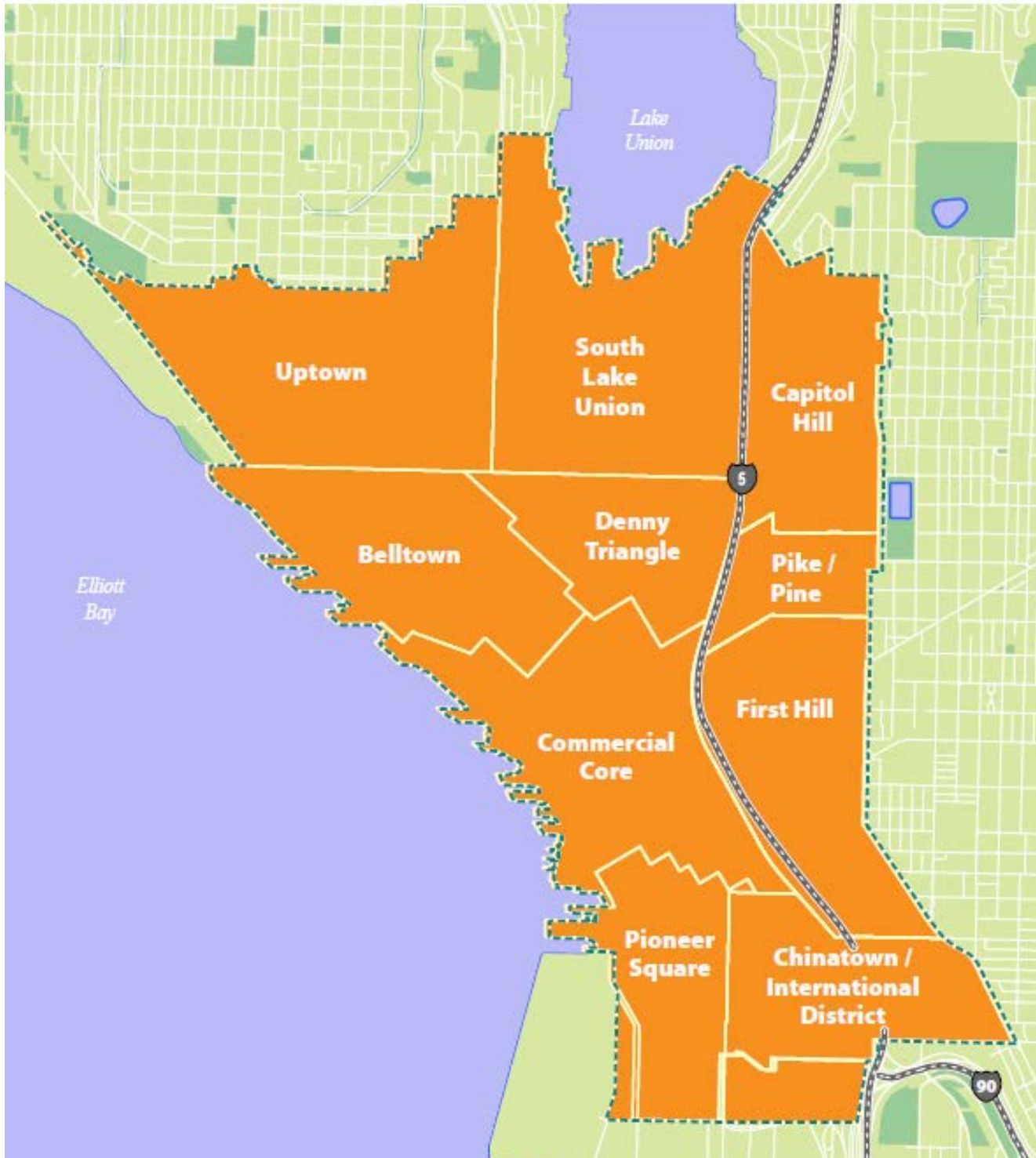
Map of Seattle's GTEC Boundary

Seattle DUC Growth and Transportation Efficiency Center (GTEC)
2007 - 2009

WSDOT Commute Trip Reduction Program Rules 2010

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Commute
Trip
Reduction

Program Rules 20010

Kathy Leotta, Avinash J. Rai

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COMMUTE TRIP REDUCTION

PROGRAM RULES

20010

Revised by:

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Updated on 9/13/2010

Overview

This document describes the methods used to calculate drive alone rates (DAR or SOV Rate) and Vehicle Miles Travelled Per Employee (VMT). Additional business rules and/or formulae that have been implemented in the CTR Processing and Reporting System as applicable to the Commute Trip Reduction Program have also been added.

Employee Response Rate

Employee Response Rate is defined as the proportion of survey responses returned by employees to the surveys distributed by the worksite to its employees. The number of surveys returned (Surveys Returned Count) is the actual number of surveys(responses) as determined by the CTR System. This number includes responses that may be deemed invalid by the CTR System after application of business rules validating responses. The number of surveys distributed (Surveys Distributed Count) is obtained from the survey header sheet

Employee Response Rate = Surveys Returned Count / Surveys Distributed Count

Drove Alone Rate

Drove Alone Rate is the proportion of all trips made by respondents that are considered 'drove alone' trips to all trips that are considered "potential trips".

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Drove Alone Trips

A trip is considered a "drive alone" trip when, on the survey:

(i) A respondent chooses 'drove alone' as a mode of transport to his/her work location for one day

(ii) A respondent chooses 'motorcycle' as a mode of transport to his/her work location for one day, but does not provide an occupancy for the vehicle, i.e. does not satisfactorily answer the question that pertains to the number of people that are usually in the vehicle, in the scenario that the respondent has used a carpool, vanpool or motorcycle as a mode of transport to place of employment.

Potential Trip

A trip is considered a "potential" trip when, on the survey:

A respondent chooses any of the following modes of transport to his/her work location for one day:

- Drove Alone
- Carpool
- Vanpool
- Motorcycle
- Bus
- Used ferry as walk-on passenger
- Boarded ferry with car/van/bus
- Teleworked
- Compressed Work Week (CWW) / Day Off
- Walked
- Rail
- Bicycle
- Other

A respondent is

Base drive alone rate for worksites with 70% or greater employee response rate:

Question 4a. Last week, what type of transportation did you use each day to commute TO your usual work location?

Drive Alone Rate = Trips_A / Trips_P

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Drive Alone Rate is calculated for all valid survey responses (Monday through Sunday):

Where,

Trips_A = $\sum$ Drive Alone + $\sum$ Motorcycle/Moped Trips Where Occupancy 1 or Occupancy Not Indicated

Trips_P = $\sum$ All Trip Modes – ($\sum$ Overnight Trip + $\sum$ Did Not Work)

Note: "All Trip Modes" includes drove alone, carpool, vanpool, motorcycle/moped, took the bus, rode the train, bicycled, walked, teleworked, compressed workweek day off, Boarded ferry with car/van/bus, Used ferry as walk-on passenger, Other.

Drive alone rate with "fill-in" - for worksites with less than 70% employee response rate:

The drive alone calculation with fill-in = all "trips" between the actual response rate up to 70 percent count as 1 full trip.

For example, if 100 employees but response only 50%, 20% additional are assumed to be drive alone. That is, additional "phantom" survey responses needed to meet 70% minimum would have responded drive alone for five days in a week). These additional "phantom" drive alone trips are called Additional Drive Alone Trips.

Additional Drive Alone Trips ("Fill-In")

Additional Drive Alone Trips is defined as:

Additional Drive Alone Trips = 5 * ((0.7 * Surveys Distributed) – Surveys Returned)

Thus,

Drive Alone Rate with Fill-In: = (Trips_A + Additional Drive Alone Trips) / (Trips_P + Additional Drive Alone Trips)

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VMT per Employee Rate

Base VMT per employee rate for worksites with 70% or greater return rate:

VMT Per Employee = (VMT_Trips / TRIPS_P) * (MILES_X / MILES_N)

Where:

VMT_Trips = Sum of all drive alone, carpool, vanpool, and motorcycle trips for all employees for all days of the week. Except for drive alone trips, these are all vehicle trips weighted by occupancy. So a two-person carpool is ½ trip. A ten person vanpool is 1/10 trip. If respondent indicates carpool but not occupancy, assume occupancy of 2. If respondent indicates motorcycle but not occupancy, assume 1. If respondent indicates vanpool but not occupancy, assume 7.

TRIPS_P = $\sum$ All Trip Modes – ($\sum$Overnight Trip + $\sum$Did Not Work)

Note: "All Trip Modes" includes drove alone, carpool, vanpool, motorcycle/moped, took the bus, rode the train, bicycled, walked, teleworked, compressed workweek day off, Boarded ferry with car/van/bus, Used ferry as walk-on passenger, Other

VMT_Trips / **TRIPS_P** = Average of all trips to a worksite occurring in a vehicle.

MILES_X = Sum of all one-way miles traveled regardless of mode for all employees (sum of responses to question 7a in survey). However, responses with VMT greater than 150 miles should be screened out as "suspected errors" and not included in the Miles_X calculation, with the exceptions in the table below.

MILES_N = Sum of all people who have traveled more than 0 miles. E.g., if 90 survey respondents traveled 1 mile or more to work, then Miles_N = 90. However, responses with

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VMT greater than 150 miles should be screened out as "suspected errors" and not included in the Miles_N calculation, with the exceptions in the table below.

Mode	If Mode Choice This Many Times or More in Week...	Screen out from Miles_X and Miles_N If One-Way Miles:
All modes except if the modes below satisfy conditions in table.	Any	Greater than 150
Walk	3	Greater than 10
Bike	3	Greater than 30

Miles_X / Miles_N = Average one-way miles traveled by workers to that worksite.

VMT Per employee rate with "fill-in" - for worksites with less than 70% return rate:

For VMT with "fill-in", Miles_X and Miles_N are the same as above. VMT_Trips and TRIPS_P are both increased to reflect the additional drive alone trips added to meet the 70% return rate minimum (assumed additional "phantom" survey responses needed to meet 70% minimum would have responded drive alone for five days in a week).

Additional "Phantom" Drive Alone survey responses ("Additional Drive Alone Trips") is calculated as :

Additional Drive Alone Trips = 5 * ((0.7 * Surveys Distributed) – SurveysReturned)

Thus,

VMT_Trips with additional drive alone trips = VMT_Trips + Additional Drive Alone Trips

and,

TRIPS_P with additional drive alone trips = TRIPS_P + Additional Drive Alone Trips.

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GHG Emissions

Average Annual GHG Emissions from survey respondents who drive alone, carpooled, vanpooled, or motorcycled (metric tons CO2e) *without* fill-in = {Average GHG emissions (CO2e) per vehicle mile} * {Two Way Average Annual Commute VMT For Survey Respondents Without Fill-In} * 0.001

GnF = $AvG * BnF * 0.001$
GwF = $AvG * BwF * 0.001$

BnF = $AW * VMTnF * R * 100$
BwF = $AW * VMTwF * R * 100$

Where,

BnF → Two Way Average Annual Commute VMT for Survey Respondents without Fill-In
BwF → Two Way Average Annual Commute VMT for Survey Respondents with Fill-In

R → Total Number of Survey Respondents (calculated from Survey Data)
AW → Average Weekly Work Days Per Survey Respondent

And,

T → Total Employees (from Header)
$VMTnF$ → VMT/Employee without Fill-In (rounded to one decimal place)
$VMTwF$ → VMT/Employee with Fill-In (rounded to one decimal place)

Constants:

L → Light Duty Vehicle Assumed Fleet Economy = 20.3
F → Factor to convert CO2 to CO2e = 0.971
KC → Kg CO2 per gallon of gasoline = 8.81

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M → Future Adjustment Factor = 1

<u>Derived Constants</u>

AW → Average Weekly Work Days Per Survey Respondent = TRIPS_P / R (rounded to one decimal place)

KG → KC / F

AvG = (1 / L) * KG

AnG = (GnF * T) / R

Where,

KG → Kg GHG emissions (CO2e) per gallon of gasoline

AvG → Average GHG Emissions (CO2e) per vehicle mile

AnG → Estimated annual GHG emissions from all employees (based on employee rate without fill-in applied)

AwG → Estimated annual GHG emissions from all employees (based on employee rate WITH fill-in applied)

Annual Transit Passenger Miles

Transit passenger miles can be used to calculate greenhouse gas emissions from transit. However, emissions attributable to transit vary widely from transit route to transit route, depending on the efficiency/energy source of vehicles and transit vehicle passenger load. Very roughly speaking, GHG emissions per transit passenger mile ranges from a high of about 0.9 pounds CO2e emissions/passenger mile for a standard bus that is relatively empty, to a low of about 0.2 pounds CO2e emissions/passenger mile for a well-utilized bus. Train and light rail emissions can vary widely depending on the energy source, passenger loads, etc. Employers may contact their local transit agencies for more information on GHG emissions for their transit trips, as local transit agencies may have more precise estimates of CO2e emissions/passenger mile for all transit routes in the agency, or for specific routes.

The following results are obtained from data surveyed:

BAPMs   = $100 * \sum OwBPM$

BAPMt   = $BAPMs * (T / R)$

RAPMs   = $100 * \sum OwTPM$

RAPMt   = $RAPMs * (T / R)$

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FAPMs	=	$100 * \sum OwFPM$
FAPMt	=	$FAPMs * (T/R)$

Note: The value 100 used in the determination of **BAPMs**, **RAPMs**, and **FAPMs** is obtained by multiplying 50 (number of survey weeks in a year) and 2 (since we require two-way miles)

BAPMs	→	Bus Annual Passenger Miles (Surveyed Employees)
BAPMt	→	Bus Annual Passenger Miles (Estimated for Total Employment)
RAPMs	→	Train/Light Rail/Streetcar Annual Passenger Miles (Surveyed Employees)
RAPMt	→	Train/Light Rail/Streetcar Annual Passenger Miles (Estimated for Total Employment)
FAPMs	→	Ferry Annual Passenger Miles (Surveyed Employees)
FAPMt	→	Ferry Annual Passenger Miles (Estimated for Total Employment)
T	→	Total Employees (from Header)
R	→	Total Number of Survey Respondents (calculated from Survey Data)

TwVMT	=	$2 * VMT\_Trips * Miles\_X$
TdVMT	=	$TwVMT / Trips\_P$

Note: If TwVMT is zero, then TdVMT is set to zero.

TaVMT	=	$TwVMT * 50$
OwBPM	=	$Count\_Bus * Miles\_X$
OwTPM	=	$Count\_Train * Miles\_X$
OwFPM	=	$Count\_Ferry * Miles\_X$

Where,

TwVMT	→	Two Way Total Weekly VMT for Survey Respondents
TdVMT	→	Two Way Average Workday VMT for Survey Respondents
TaVMT**	→	Two Way Average Annual VMT for Survey Respondents
OwBPM	→	One-way Weekly Bus Passenger Miles
OwTPM	→	One-way Weekly Train Passenger Miles
OwFPM	→	One-way Weekly Ferry Passenger Miles

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VMT_Trips   →   VMT_Trips is called "Vehicle Trips" in the system, which is per response.

Miles_X   →   Miles_X (Consider only "valid" values as outlined previously)

Count_Bus   →   Number of Bus Trips taken during survey week per respondent

Count_Ferry →   Number of Bus Trips taken during survey week per respondent (includes "Ferry As Walk On" and "Boarded Ferry")

Count_Train →   Number of Train Trips taken during survey week per respondent

Trips_P   →   Potential Trips

**Note that values (when necessary) are multiplied weekly by 50 since surveys are not conducted during holiday weeks

Sampling Worksites[1]

Fill-in calculation is used to estimate Drive Alone Rates, VMT, and Vehicle Trips for employers that have fewer than 70 percent of surveys returned. However employers at some worksites conduct surveys via "sampling" which means the number of employees surveyed does not need to meet the minimum Response Rate of 70% that is required to avoid application of a Fill-in penalty. These worksites are called "Sampling Worksites."

Because sampling worksites are taking a sample that should be representative of the larger population of employees, some data pertaining to the worksite will need to be 'factored up', to represent the whole worksite and not limited to the subset of employees that were surveyed. Data that needs to be factored up includes:

(a) Surveys distributed
(b) Actual surveys returned
(c) Surveys returned
(d) Weekly trips by all modes (with and without fill-in applied).

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[1] Portions relating to Sampling are courtesy Minnesota Center for Survey Research at the University of Minnesota

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The factoring up value ("Sampled Site Factor") is determined as follows:

Sampled Site Factor	→	**Total Affected Employees / Surveys Distributed**

A sampling worksite will have fill-In applied according to the sampling worksite fill-in formula if the number of surveys returned is less than the "**Minimum Sampling Threshold**" **(S)** - which is the minimum number of surveys that have been returned to avoid application of Fill-In. If the worksite is smaller than ETC, it will still need to meet the 70% response rate threshold, and fill-in applied as normally.   This threshold is determined by the following rule:

If (T < ECT)

Then,

$$S = 0.7 * T$$

(Fill-in applied as normal.)

Else,

$$S = \frac{P * (1 - P)}{(A^2 / Z^2) + ((P * (1 - P)) / T)}$$

(Fill-in applied according to sampling worksite formula, see below.)

Where:

S	→	Minimum Sample Size (Sample Threshold)
T	→	Total Employees (from Header)

Constants:

A	→	Accuracy Desired – "Sampling Error" in percentage	= 0.03 (i.e. 3%)
Z	→	The number of standard deviations of the sampling distribution that correspond to the desired confidence level (Z-Score). E.g. 1.96 = 95% confidence level; 1.64 = 90% confidence level.	= 1.96
P	→	Variability	= 0.5
ECT	→	Minimum number of employees at worksite required for application of sampling fill-in formula (Employee Count Threshold)	= 458

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Thus, for the constants used above, S is the minimum sample size desired for selected population sizes for accuracy level of + or – 3% at the 95% confidence level i.e. There is a 95% probability that the survey responses will not vary more than + or – 3%.

S is derived from the following determination of Sampling Error (A):

$$A^2 = \frac{[(P-P^2) - S((P-P^2)/T)] * Z^2}{S}$$

If actual surveys returned are lower than the minimum sample size threshold (S), then weekly drive alone trips will be increased.

Additional fill-in drive alone trips for sampling worksites:

Sampling Worksite Additional Drive Alone Trips = 5 * (Minimum Sample Size Threshold (S) - Actual Surveys Returned)

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