

# Transportation

## Why is this important?

Transportation has fundamental and widespread environmental, social, and economic impacts. Within most cities in California and the United States, there are more greenhouse gas emissions associated with transportation than with any other sector, and greenhouse gas inventories in several Bay Area cities such as El Cerrito, Hercules, and San Mateo have shown transportation accounting for 40-60% of emissions within city limits.<sup>20</sup> The U.S. Energy Information Administration reports that transportation accounts for around 30% of greenhouse gas emissions in the United States as a whole.<sup>21</sup> Transportation vehicles are associated with a variety of other air and water pollutants, and streets and highways take up large amounts of land with impermeable pavement, affecting stormwater runoff patterns and the availability of land for other purposes.

From 1980 to 2006, total annual roadway vehicle miles traveled (VMT) in the United States roughly doubled, from around 1.5 trillion to around 3.0 trillion, indicating a drastic shift in transportation behavior in the United States.<sup>22</sup> Unless vehicle efficiency is keeping pace with VMT (and it has not been), higher VMT leads to higher levels of CO<sub>2</sub> and polluting emissions such as particulate matter and nitrous oxide. In contrast to single-occupancy vehicle travel, public transit and car-pooling decrease vehicle miles traveled and emissions per passenger mile traveled, while walking and bicycling create no emissions and require relatively little space for supporting infrastructure. Inaccessibility to transportation can also be a major social and economic barrier, and money spent on transportation, such as on public transit passes or increasingly high-priced gasoline for private vehicles, can be a major economic burden on households. Increasing the accessibility and affordability of transit, and increasing people's ability to walk or bicycle, can decrease these barriers and burdens.

## Defining Sustainability

Sustainable transportation meets society's social and economic needs for mobility in a way that minimizes or eliminates negative environmental impacts.

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<sup>20</sup> Cited from the City of Hercules Greenhouse Gas Inventory Administrative Draft, May 1, 2008.

<sup>21</sup> U.S. Department of Energy, Energy Information Administration, "Distribution of Total U.S. Greenhouse Gas Emissions by End-Use Sector" from *Emissions of Greenhouse Gases Report*, November 28, 2007, accessed 6/25/08 at <http://www.eia.doe.gov/oiaf/1605/ggrpt>.

<sup>22</sup> U.S. Department of Transportation, Bureau of Transportation Statistics, Table 1-33 from National Transportation Statistics 2008, accessed 6/25/08 at [http://www.bts.gov/publications/national\\_transportation\\_statistics/pdf/entire.pdf](http://www.bts.gov/publications/national_transportation_statistics/pdf/entire.pdf).

## Indicator Results

### VMT

- As shown in Table 8, Redwood City’s estimated yearly per capita VMT is 8,455 (total Redwood City VMT was 660,526,000 per year). This per capita figure is slightly lower than the county yearly per capita VMT average of 8,909 and significantly lower than the national yearly per capita VMT average of around 10,067.
- Redwood City’s relatively lower VMT is typical of an urban area, where origins and destinations are generally closer and there are more alternatives to single-occupancy vehicle travel.

**Table 8: Estimated VMT per Capita, Selected Areas**

Area	Miles Per day	Miles Per year
Redwood City <sup>23</sup>	23.2	8,457
San Mateo County <sup>24</sup>	24.4	8,909
The United States <sup>25</sup>	27.6	10,067

Source: MTC and U.S. Bureau of Transportation Statistics, 2007

### Redwood City Residents and Workers Journey to Work Mode Split

Table 9, “Redwood City Residents Journey to Work Mode Split,” contains data about Redwood City *residents* who may work in Redwood City or somewhere else. Table 10, “Redwood City Workers Journey to Work Mode Split,” contains data about Redwood City *workers* who either live and work in Redwood City or commute to work in Redwood City from somewhere else. Highlights of indicator data include the following:

- Around 75.9% of Redwood City residents and 80.0% of Redwood City workers drove to work alone in 2000.
- Redwood City *workers* (which includes those workers who live outside of Redwood City) tend to walk and bicycle to work less, and to drive both alone and in a carpool more, than Redwood City *residents*.
- Railroad mode split for Redwood City residents increased from 1.5% in 1990 to 2.4% in 2000, an increase of around 60%. Likely reasons for this increase are discussed below under the indicator “Train Boardings per Weekday in Redwood City.”
- Bicycle mode split for Redwood City residents increased from 1.1% in 1990 to 1.8% in 2000, an increase of around 60%.

<sup>23</sup> Assuming an estimate of 1,810,000 VMT per day, 660,526,000 VMT per year, a 365 day year, and 2006 U.S. Census Bureau’s 2006 ACS estimate of Redwood City population at 78,122.

<sup>24</sup> Assuming MTC 2007 VMT estimate for San Mateo County of 17,220,200, a 365 day year, and U.S. Census Bureau’s 2006 American Community Survey estimate of San Mateo County population at 705,499.

<sup>25</sup> Assuming U.S. Bureau of Transportation Statistics national 2007 VMT estimate of 3,014,116 million miles, and U.S. Census Bureau’s 2006 American Community Survey national population estimate of 299,398,485.

**Table 9: Redwood City Residents Journey to Work Mode Split**

	1990 U.S. Census	2000 U.S. Census
Drove alone – car, truck, or van	75.9%	73.9%
Carpooled – car, truck, or van	11.9%	12.7%
Railroad	1.5%	2.4%
Bus	2.1%	2.3%
Bicycle	1.1%	1.8%
Walk	3.4%	2.8%
Worked at Home	2.8%	2.9%
Other	1.3%	1.1%

Source: U.S. Census, 1990 and 2000

**Table 10: Redwood City Workers Journey to Work Mode Split**

	2000 U.S. Census
Drove alone – car, truck, or van	80.0%
Carpooled – car, truck, or van	13.7%
Railroad	1.9%
Bus	1.5%
Bicycle	0.7%
Walk	1.0%
Other	1.2%

Source: U.S. Census, 2000

## Train Boardings per Weekday in Redwood City

The Redwood City CalTrain stop is a major transportation amenity in the City, and is proximate to many of the city's higher density residential areas. The availability of the CalTrain station has facilitated improvements to Redwood City's downtown by both providing access to out of town visitors and providing a transportation link for residents. Trends in ridership at the Redwood City CalTrain station include the following:

- Passenger boardings in Redwood City have increased 153% since 1992, outpacing CalTrain's 60% increase in total passenger boardings since 1992.
- Redwood City's 1,932 average weekday passenger boardings in February 2007 were the highest they have been since passenger counting began in 1992.
- As of June 2008, 80 trains stop per weekday in Redwood City.

Likely reasons for the increase in Caltrain ridership (as well as increased rail mode share, as shown in Table 9) are as follows:

- Increased employment and residential use around the Caltrain station.
- Implementation of employer shuttles between the Redwood City station and major employers in the eastern part of the City.
- Increased feeder bus service.
- Increased congestion along US 101 and I-280.
- Increased frequency of train service.

- Large employer TDM programs (providing transit passes) could be one factor in increased CalTrain ridership.

**Table 11: CalTrain Weekday Passenger Boardings**

	Oct '92	Feb '95	Mar '96	Feb '97	Feb '98	Feb '99	Feb '00	Feb '01	Feb '02	Feb '03	Feb '04	Feb '05	Feb '06	Feb '07
Redwood City	764	778	874	1,142	1,286	1,331	1,597	1,804	1,597	1,356	1,360	1,423	1,870	1,934
CalTrain Total	21,121	20,695	22,138	26,043	27,967	27,591	31,291	35,609	30,961	27,191	25,550	28,393	32,031	33,841

Source: Caltrain, 2007

## Buses and Bus Boardings per Weekday in Redwood City

- As of June 2008, there were 546 total buses passing through Redwood City per day, and an estimated 4,700 total bus boardings per weekday.
- Bus-riding remains an important transit service in the City, with around twice as many bus boardings as train boardings per weekday.

## Miles of Bicycle Facilities

The Caltrans Highway Design Manual identifies 3 major types of bicycle facilities – Class I, II, and III bikeways. A Class I bikeway is a completely separated right-of-way for the exclusive use of bicyclists or both bicyclists and pedestrians. A Class II bikeway is a striped lane of a certain minimum width, designated for the exclusive use of bicyclists on a shared way. A Class III bikeway is signed as a bikeway and is shared between bikes and motor vehicle traffic. Usually, the more bike routes of all types there are in a city, the better conditions are for cycling. Tracking miles of facilities over time shows how bicycling conditions are changing, and Table 12 contains a baseline for miles of bicycling facilities in Redwood City in 2008. Salient points are as follows:

- Redwood City has a total of 24.7 miles of bike routes. Distributed between Class I, II and III routes.
- Total miles of bike routes account for 8.2% of the approximately 300 total street miles in the City.
- According to the General Plan transportation consultant, around 24 additional miles of facilities could be classified as Class III bicycle facilities if proper signage were installed.<sup>26</sup> Though these streets are not technically Class III, they likely offer a similar level of bicycle service.

**Table 12: Miles of Bicycle Facilities by Type in Redwood City**

Class I	8.9 miles
Class II	9.1 miles
Class III	6.7 miles

Source: Fehr and Peers, 2008

<sup>26</sup> This information is from Sam Tabibnia, Fehr and Peers, contactable at s.tabibnia@fehrrandpeers.com, in an email dated 6/19/08.

## Summary of Results

In 2000, around three fourths of Redwood City residents drove alone to work, a slight decrease from 1990 levels. This slight decrease was due to more carpooling, bicycling, or bus and train riding, though fewer people were walking. There has been a general upward trend in use of the Redwood City Caltrain station over the past 10 years, and a strong upsurge in the past 3 years. At the same time, buses remain an important transit service in the City, and about twice as many people ride buses in Redwood City as ride trains. Cycling is also an important mode of travel, and around 8% of streets in Redwood City are classified as bicycle facilities.

## Potential Policy Responses

- Seek to stabilize and reduce VMT by improving the multi-modal transportation system.
- Promote car-pooling to decrease the number of workers commuting alone.
- Continue supporting strong growth in Caltrain ridership at the Redwood City Station, and continue supportive land use strategies such as transit-oriented development and the Downtown Precise Plan.
- Maintain and expand bus service.
- Encourage a jobs-housing balance, local employment of city residents, and proximity between residential units and work places.
- Increase the number of bicycle routes, and consider creating a network of “bicycle boulevards.” A “bicycle boulevard” is a new but increasingly used type of bicycle route where a street is shared between bikes and cars but designed especially for bicycle use.
- Maintain and expand pedestrian facilities through physical and policy improvements.
- Cooperate with other partners to support train ridership, including such efforts as employer shuttles to the Caltrain station, increased bus feeder service, and increased train service.