2009

COMPREHENSIVE TRANSPORTATION PLAN FOR SONOMA COUNTY

OCTOBER 19, 2009

SCTA
sonoma county transportation authority

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Thanks to the advisory committees.
Dedicated to the memory
of Bob Blanchard.

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CHAPTER 1

INTRODUCTION

The Sonoma County Transportation Authority (SCTA) acts as the countywide planning and programming agency for transportation related issues. The SCTA plays a leading role in transportation by securing funds, providing project oversight, and initiating long term planning.

The SCTA has various legal and administrative requirements to fulfill in the capacity of a countywide transportation agency—some of these requirements are derived from regional agencies such as the Metropolitan Transportation Commission and the Bay Area Air Quality Management District, while others, come directly from the state, or federal government.

The 2009 Comprehensive Transportation Plan (2009 CTP) is the latest countywide planning document approved by the SCTA. It is updated every four years. The purpose of the Plan is primarily to update past transportation planning efforts in order to prioritize transportation needs throughout Sonoma County for the next 25 years.

The importance of maintaining an updated planning document is two-fold. First, the Metropolitan Transportation Commission (MTC) requires local transportation authorities such as the SCTA to establish transportation plans that can feed into the larger Regional Transportation Plan (RTP). The RTP is a federally required, 25-year planning document. Second, the SCTA is responsible for programming numerous state and federal funding sources to transportation projects. In order to meet this requirement, the SCTA needs a policy and planning document to help guide the programming process. If the SCTA does not meet these two requirements it is at risk of losing critical transportation dollars.

The 2009 CTP is a multi-modal plan that updates the 2004 Comprehensive Transportation Plan for Sonoma County and incorporates recent feedback from the public. The public outreach strategy included a countywide poll, six community meetings and a variety of topic specific focus groups and interviews. For more information on the public outreach please see the Public Outreach Report in Appendix B.

The 2009 CTP builds on the efforts of local elected officials and staff from the cities and the County of Sonoma. This update is developed with the understanding that existing transportation funding is inadequate, there is increasing pressure on the existing system, and the impacts on the environment, public health, and safety are growing. A new component

included in the 2009 CTP addresses greenhouse gas emissions and how long range planning for transportation must address emissions reduction in order to meet AB32 and other emission targets.

Overall, the 2009 CTP is meant to refine the goals, objectives, and policies for improving mobility on Sonoma County's streets, highways, and transit system and bicycle/pedestrian facilities, as well as to reduce transportation related impacts. To that end, it provides policy guidance and identifies transportation improvements for development over the next 25 years.

ORGANIZATION OF THE COMPREHENSIVE TRANSPORTATION PLAN

The 2009 CTP is structured to tell the story of Sonoma County's transportation system: its current state, future goals options for the future and how to fund the needs. The 2009 CTP is backed up by numerous appendices that address technical subjects and research on various transportation related topics.

Chapter 2 describes the existing transportation conditions in Sonoma County, including geography, changing demographics of the population, land use and development trends. The existing major transit services are described here, including an overview of paratransit services for the elderly/disabled; proposed future rail services; the highway system, including measures of existing congestion and pavement condition; the recently updated countywide bicycle and pedestrian master plan; air transportation in the county; and the overall system management and operation (for example, intermodal terminals).

Chapter 3 discusses existing and proposed funding sources for transportation in Sonoma County, including federal, state, and local sources. It also notes some potential future funding sources to help pay for the plan.

Chapter 4 describes the transportation system goals, objectives, and policies that were developed for the 2009 CTP Update. They were developed after public meetings and are based on input from both the Citizens Advisory Committee and Technical Advisory Committee. One of the new features of the 2009 CTP is the emphasis on reducing greenhouse gas (GHG) emissions, especially carbon dioxide (CO2). This plan emphasizes CO2 reduction because transportation is the leading cause of CO2 emissions in the County, but plays a relatively minor role in the production of other GHGs. The Sonoma County travel demand model (SCTM 07) was used to test a variety of transportation scenarios, providing quantitative analysis of proposed solutions.

The Appendices following Chapter 4 provide more detailed information for the interested reader on transit services, GHG related issues, the relationship between transportation and land use, planning for safety and for a healthy Sonoma County. Major model assumptions are included in the Appendix, as well as a list of a list of the projects proposed by cities and the County for the plan.

Finally, because transportation planning is complicated and involves the use of many abbreviations, a glossary is provided at the end of the document. The first use of any abbreviation is also spelled out in the document.

NEW INITIATIVES

Since the last CTP update in 2004 the SCTA has implemented 3 major initiatives that bolster our long range planning and foster project delivery.

1. Bicycle and Pedestrian Master Plan

The SCTA recently completed a major update to the 2004 Countywide Bicycle and Pedestrian Master Plan. This is an important document that represents a countywide process of identifying challenges and needs for non-motorized transportation. This information has been incorporated into the Bicycle section of the 2009 CTP.

2. Enhanced Modeling

As part of the 2009 CTP the SCTA's travel demand model has been enhanced and provides greater sensitivity to alternative modes of travel.

3. Traffic Relief Act for Sonoma County—Measure M

Passed by the voters in November 2004, the Traffic Relief Act for Sonoma County (Measure M) provides direct funding for multi-modal transportation throughout the county. Measure M assesses a ¼ cent sales tax to be used to maintain local streets, fix potholes, widen Highway 101, improve interchanges, restore and enhance transit, support development of passenger rail, and build safe bicycle and pedestrian routes. The funds are dedicated towards the specific programs and projects specified in the Traffic Relief Act and the 2007 Strategic Plan.

Measure M provided Sonoma County and its nine cities with a new and reliable fund source for on-going local street maintenance and public transit operational needs. This increase in funding is starting to show significant benefits, as local jurisdictions have increased spending on local road maintenance projects that have improved the quality of roads, sidewalks, and bike lanes.

The infusion of transit funding from Measure M is enabling transit needs to be met by maintaining and expanding local bus and paratransit operations by the county's four transit operators even as State funds are dwindling. The Sonoma Marin Area Rail Transit (SMART) District continues to work towards the completing the initial steps necessary to bring passenger rail to Sonoma County.

The Highway 101 program showed how a local fund source can be leveraged to increase other funding, when SCTA competitively received $238.4 Million of State Infrastructure Bond funding for Highway 101 congestion relief. Measure M continues to fund project development efforts on four major Highway 101 projects in Sonoma County that are now fully funded through construction.

Local jurisdictions have also used Measure M to help fund various phases of local street and bicycle/pedestrian projects indentified in the Expenditure Plan. Although some funding has been spent on construction, most projects are still working towards environmental compliance and preliminary design. Moving forward with these activities will help create other funding opportunities as sponsor's work towards finalizing funding plans.

The Citizens Advisory Committee established under the original ordinance that

created the SCTA serves as an independent oversight body to advise the SCTA on the administration of the Traffic Relief Act for Sonoma County and report to the public via annual audits of the Act.

Overall, Measure M has been a key component of a transportation strategy that is leading to better quality and safer roads; reduced congestion; and increased transit, bike, and pedestrian opportunities.

SONOMA COUNTY TRANSPORTATION AUTHORITY

The Sonoma County Transportation Authority, SCTA, was formed as a result of legislation passed in 1990. Proposition 111 resulted in changes to the way transportation projects are planned and funded. This lead to the formation of Congestion Management Agencies for most of the counties in the State. In November 1990, the SCTA was formed under the Local Transportation Authority and Improvement Act (Public Utilities Code Section 180000) and designated as the Congestion Management Agency for Sonoma County. In 1997, the SCTA relinquished its position as the CMA under new state legislation that made this function optional. The SCTA now serves as the coordinating and advocacy agency for transportation funding for Sonoma County.

SCTA Mission Statement

As a collaborative agency of the cities and County of Sonoma, we work together to maintain and improve our transportation network. We do so by prioritizing, coordinating, and maximizing the funding available to us and by providing comprehensive, countywide planning. Our deliberations and decisions recognize the diverse needs within our county and the environmental and economic aspects of transportation planning.

Membership of the SCTA

The SCTA is governed by a twelve member Board of Directors. Nine of these members are chosen from the Councils of the nine incorporated cities or towns, the remaining three are chosen from the County Board of Supervisors. Officers are elected annually. The Authority holds monthly public meetings of the Board of Directors on the second Monday (except holidays) of each month.

SCTA Committees

The following standing committees advise and give input into various issues for the SCTA:

- Technical Advisory Committee (TAC)
- Citizens Advisory Committee (CAC)
- Countywide Bicycle and Pedestrian Advisory Committee (CBPAC)
- Transit and Paratransit Coordinating Committee (TPCC)

The primary function of the TAC is to advise the SCTA on all technical matters. It is composed of Public Works Directors, Planning Directors and Transit Operators from each jurisdiction in Sonoma County. It also includes representatives from Caltrans, the Bay Area Air Quality Management District, the Metropolitan Transportation Commission, the North Coast Air Quality District, and the Golden Gate Bridge, Highway and Transportation District.

Planning Directors and Transit Operators are also represented in subcommittees. The Planning Advisory Committee and the Transit TAC meet on an ongoing as needed basis.

The CAC is composed of community stakeholders and five members of the public at large, appointed from each supervisorial district. The primary function of the CAC is to oversee implementation of Measure M, review projects, policy statements and decisions, funding programs, and any

other policy matter acted on by the SCTA. The CAC provides input and recommendations for the SCTA's decision making process and has been active in promoting Countywide planning, specifically, the development of this Comprehensive Transportation Plan document.

CAC review of Measure M implementation is intended to provide public oversight and transparency of the project delivery process for the general public.

The CBPAC was formed in July 1993 in response to MTC Resolution No. 875. The CBPAC advises the SCTA on programming decisions for bicycle funds and aides in project coordination. The CBPAC developed a Countywide Bicycle and Pedestrian Master Plan that is available on line at www.sctainfo.org.

The TPCC is composed of one potential transit user over 60 years of age, one who is disabled, one representing the Hispanic community, two representing local social service providers for seniors, two representing social service providers for disabled persons, one representative from each fixed route public transit operator within the county, and a local transportation agency. Each City or Town Council may also appoint one representative. The TPCC assists the SCTA in making funding decisions regarding paratransit and transit programs throughout the county. The TPCC is responsible for making recommendations allocating Section 5310 funds and approval of the Coordinated Claim for Transit.

CHAPTER 2

EXISTING CONDITIONS

Sonoma County has a variety of transportation systems, including local roads, public transit, a railroad right of way, airports, bicycle and pedestrian facilities, and harbors. These are described below, including existing travel characteristics and some relevant description of the population's demographics, in the following sections.

GEOGRAPHY

The County of Sonoma is located in the Northern California "Wine Country," approximately 50 miles north of San Francisco. The County spans an area touching the San Francisco Bay to the Pacific Ocean, with mountain ranges to the north and east. Population settlement patterns and development of the transportation system has largely followed geographical constraints. The main geographical feature in Sonoma County is the Santa Rosa Plain, bordered on the east by the Sonoma and Mayacama Mountains, and on the west by the Coastal Range. The Santa Rosa plain occupies the center of the county in a flat, smooth valley. Two smaller valleys, Sonoma Valley and Petaluma Valley, occupy the southern end of the county. The Russian River, Sonoma County's major waterway, creates a meandering path through the heart of the county and westward to the ocean.

Historically, travel and trade routes have been developed parallel to the north/south orientation of the valleys, since they offered the least resistance. For that reason, even today east-west road development (and travel) is poorer than in the north-south direction. Many roads today follow the routes of former Native American paths, which in turn were created by animal paths over many centuries. Roads were often developed to follow water routes, e.g., the Russian River, or to connect to the ocean.

DEMOGRAPHICS AND DEMOGRAPHIC TRENDS

There have been lively communities in Sonoma County for hundreds of years, but it has been in the past 50 years, with the widespread availability of the automobile, that the population has seen exponential growth.

While Santa Rosa has experienced the greatest increase in population, growth has occurred in most parts of the county. Medical care, educational facilities, and shopping are found primarily in the cities, as are most of the local employers. Housing, particularly

TABLE 2-1. SONOMA COUNTY POPULATION

	US CENSUS			CA DEPARTMENT OF FINANCE
LOCATION	**1980**	**1990**	**2000**	**2008**
Cloverdale	3,989	4,924	6,831	8,577
Cotati	3,346	5,714	6,471	7,532
Healdsburg	7,217	9,469	10,915	11,706
Petaluma	33,834	43,166	54,550	57,418
Rohnert Park	22,965	36,326	42,236	43,062
Santa Rosa	83,320	113,261	147,595	159,981
Sebastopol	5,595	7,008	7,774	7,714
Sonoma	6,054	8,168	9,275	9,943
Windsor	n/a	n/a	22,744	26,564
Unincorporated County	133,361	162,675	50,223*	151,973
Sonoma County Totals	**299,681**	**388,222**	**458,614**	**484,470**

*Note: Unincorporated County Population shows a decrease in 2000 because of the incorporation of the Town of Windsor.

in the unincorporated areas, has a less predictable pattern and is harder to serve through public transportation. Some communities along the ocean are deliberately remote while other housing choices are based on affordability and are in less accessible locations.

There are currently 329,000 licensed drivers in the county, according to DMV records. The average household size is 2.57 persons, which is slightly less than the Bay Area average of 2.69. This is partly a reflection of the older age of the population, who tend to live in smaller households without children. Approximately 13.8% of the County population was 65 or over in 2006, compared to the Bay Area average of 11.7%. The average household income in 2006 was estimated at $89,741, considerably below the Bay Area average of $103,031. More than a quarter of households are considered "lower income," i.e., with an income less than $42,700 in 2007 dollars; the Bay Area as a whole had 23.9% "lower income" households.

AGING POPULATION

One of the important demographic trends that will take place over the next 25 years is the aging of the population, and Sonoma County is no exception. Between 2005 and 2035, the median age, or the age half the population is older than, of county residents is expected to increase from 39.3 to 44.3 years old. Although this seems like a small change, the percentage of population that is 65 or older will go from 13.4% to 27.6% of the total population. In actual numbers, the growth is even more astounding: from approximately 64,000 people today, to 157,000 in 2035.[1] This is an increase of 145%, and could have profound effects on the transportation system. Two examples of this impact are that there may be fewer commute trips made by county residents, but more workers from other surrounding counties may need to fill jobs in Sonoma County, increasing out of county in-commute rate. Another possibility is that the need for paratransit and other transit services for the elderly could increase dramatically.

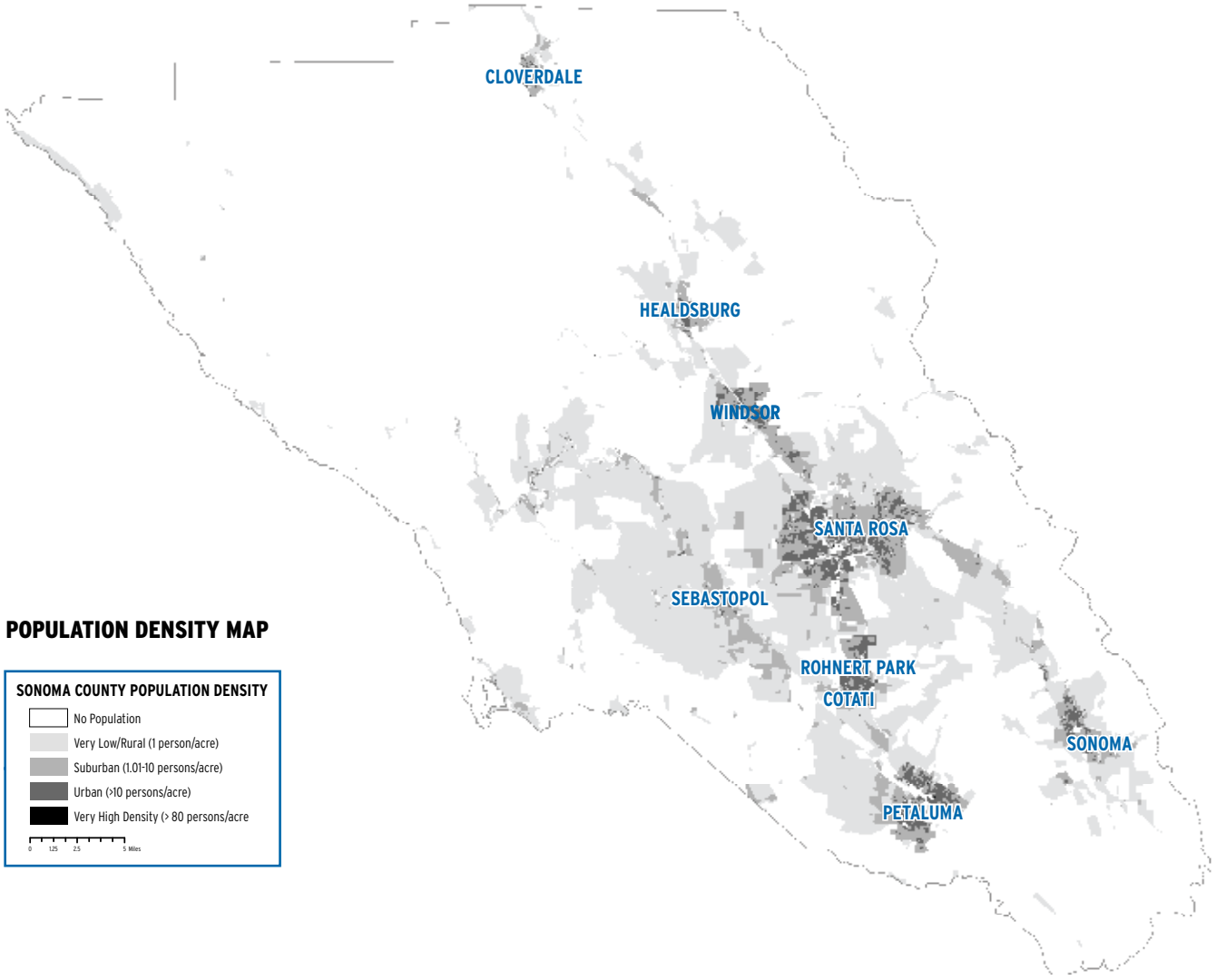
AMERICANS WITH DISABILITIES ACT

The Americans with Disabilities Act (ADA) became law in 1990. This civil rights legislation mandates equal opportunity in employment, transportation, telecommunications, and places of public accommodation for people with disabilities. As a result, pedestrian facilities are required to accommodate wheel chair use, transit must be accessible, and paratransit, or door to door service, must be provided for the elderly and severely disabled.

Paratransit Service

Transit agencies are required to provide complementary paratransit service to persons unable to use the fixed-route system when operating fixed-route

1 All estimates from ABAG's Projections 2007 for Sonoma County.



POPULATION DENSITY MAP

transportation service for the general public. Paratransit service must be comparable to the public transit operator's fixed-route service regarding the following service criteria: comparable response time, similar fares, same geographic area of service, no restriction of trip purpose, equal availability of information, and no constraints on capacity. All bus systems in Sonoma County provide paratransit service per ADA reuqirements.

Santa Rosa currently contracts with MV Transportation (MV) to provide a curb-to-curb paratransit service that will deliver patrons anywhere within the city limits. Transfer arrangements can be made with Whistlestop Wheels or Volunteer Wheels in the event a scheduled trip destination is outside of Santa Rosa city limits.

In Fiscal Year 2007/08, Santa Rosa's paratransit service carried an average 175 passengers per weekday and performed an average 4,030 monthly trips with an average productivity standard of 2.25 passengers per vehicle mile. CityBus has equipped the eleven bus Paratransit fleet with a full video security system ensuring both increased security and levels of responsibility. The phone system utilized for scheduling paratransit trips has been upgraded to the latest technology. Trapeze scheduling software has been installed to allow increased scheduling efficiency in order to enhance time performance.

Petaluma contracts with Petaluma People's Services (PPSC) to provide door-to-door ADA Paratransit Services. PPSC transports approximately 1,650 monthly passengers and averages 2.36 passengers carried per revenue hour. With a seven vehicle paratransit fleet and manageable trip distances, PPSC is able to accommodate most same day requests while enhancing, rather than compromising, productivity. PPSC is able to effectively balance the passenger need and service performance. City staff, PPSC, and MV (Fixed Route Contractor) work closely together to outreach to the community and manage mobility in a coordinated manner. The City of Petaluma is researching scheduling software packages to determine, which would be able to enhance service levels looking toward future years.

Sonoma County paratransit offers countywide intercity service as well as local service within the cities of Windsor, Rohnert Park, Cotati, Sebastopol, Sonoma, and the unincorporated communities located in the Sonoma Valley area and the Russian River area. Cloverdale Transit's route 68, which is operated by the City of Cloverdale, provides a "deviated fixed-route" service. This means that route 68 offers door-to-door paratransit service, upon request, within the Cloverdale city limits by deviating, if necessary, from its normal fixed-route schedule. Route 95, operated under contract by the

Sonoma County contracts with Volunteer Center to provide paratranist service and they operate a combination of lift-equipped vehicles and sedans provided by the County. These complement each other depending on the demand for service. In 2008 Sonoma County Transit employs eighteen (18) full-time and five (5) part-time paid vehicle operators as well as several volunteer drivers.

LAND USES AND DEVELOPMENT TRENDS

Sonoma County has a rich variety of land uses, encompassing approximately one million acres of land. In area, it is the largest county in the nine-county Bay Area Region. Approximately 147,200 acres (14.2% of the total) is devoted to residential uses, and 32,400 acres (3.1%) are used for commercial, industrial, and similar uses, with the remainder largely left to agriculture and open space.

Since 2000, approximately 2,150 residential building permits have been granted each year, representing a significant drop off in the past couple of years. Historically, residential development in Sonoma County has been weighted toward single-family detached (SFD) housing, making up more than 2/3 of the residential permits issued 2000-2007. However, in 2007 there was a small shift toward multi-family units, though it is unclear whether this trend will continue in the future.

The pressure of growth has led to a built environment that presents challenges for transportation planning. Neighborhoods that are isolated geographically or hemmed into cul de sacs require automobile trips and resist integration into the surrounding communities. Also, the rural/suburban quality of Sonoma County is a main attraction to residents and may result in resistance to signs of urbanization, like multi use neighborhoods, and a preference for limited development in rural settings.

Growth is restricted within Urban Growth Boundaries (UGB) established by 8 of 9 cities to prevent sprawl. This tool has been successful in promoting city infill and is helping redevelopment in

TABLE 2-2. TRIP PURPOSE CHART

TRIP PURPOSE	MEAN TRAVEL TIME MINUTES	MEDIAN TRAVEL TIME MINUTES	AVERAGE VEHICLE OCCUPANCY (AVO) PERSONS/VEHICLE
Home-Work (23.3 %)	24.2	17.1	1.09
Home-Other (non-work) (59.5%)	16.8	12.2	1.39
Other-Other (17.2%)	15.6	10.6	1.18

areas that can tolerate higher densities. In addition, Petaluma, Rohnert Park, Sebastopol, Santa Rosa and Cloverdale are all participating in the regional FOCUS effort that directs growth to specific Priority Development Areas (PDAs). PDAs are planned for higher densities and enhanced integration with transit. Please see the Transportation and Land Use research paper in the appendices for more information.

EXISTING TRAVEL CHARACTERISTICS

This section describes existing travel and transportation characteristics for Sonoma County. Trips are normally categorized into several purposes for analytical reasons. Vehicle occupancies are important, because they demonstrate how many vehicles are needed to move a given number of people around. In order to evaluate ridesharing and transit, trips are usually first calculated in terms of person-trips; i.e. two people driving together to work would be one vehicle trip, but two person-trips.

Survey data has been collected by the U.S. Census and the Metropolitan Transportation Commission to determine where people are going, how they get there, and what types of transportation they are using.

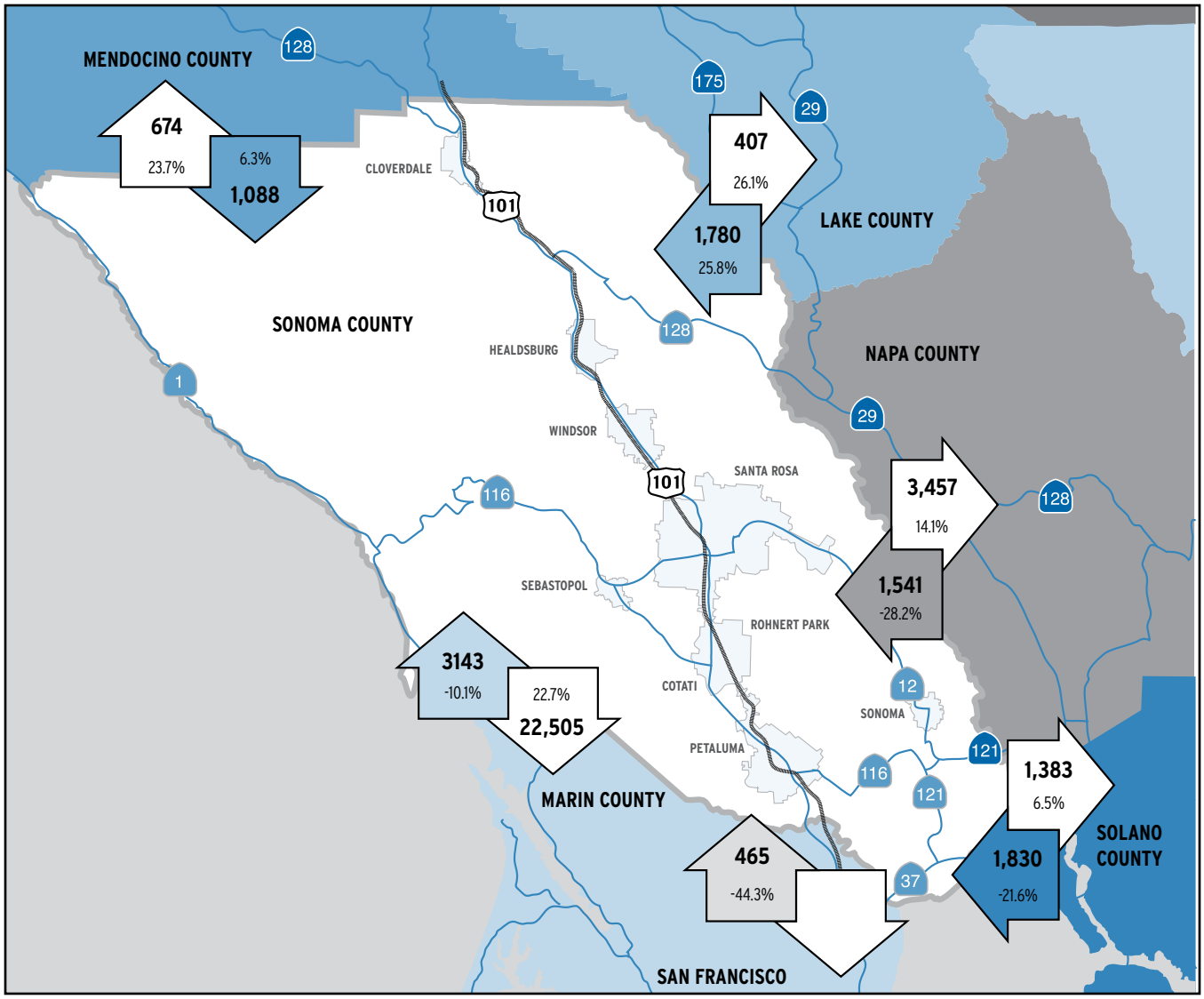
WORKFORCE COMMUTE

Sonoma County's 184,000 households contain a workforce of 238,200 employed residents. There are approximately 223,800 jobs available to these residents. Major employers in the county are generally located within the cities. However, there is a significant intra-county commute between the employees located in the county's cities to employers scattered throughout the county engaged in agriculture, tourism, and retail activities. The difference—14,400—represents the net number of workers who make an "out commute," or who work in other counties. Fewer than 20 percent (19.6 percent) of Sonoma County workers commute to jobs outside the County, a small decrease since 1980. Of these out commuters, 47 percent work in Marin County and 21 percent in San Francisco, both of which are served by the highly congested U.S. 101 corridor. The actual number, as well as the percentage, of trips to San Francisco has dropped since the 1990 Census. The number of residents commuting to Marin has increased by more than 19 percent since 1990. (Census)

This phenomenon is perpetuated by a ripple effect outward from San Francisco of wages and housing costs which lessen with distance from the Bay Areas urban centers. As a result, those who can travel between a higher paying job and lower costing home will often do so, creating a commute that is not fully captured by the jobs/housing data. The illustration below demonstrates the travel between Sonoma and the neighboring counties.

The number of "in-commuters" (who work in Sonoma County but live in other counties) has risen 50 percent between the 1990 and 2000 censuses, from 9,326

INGRESS/EGRESS MAP Source: U.S. Census Bureau, Metropolitan Transportation Commission



to 14,000 workers.[2] Marin supplies more workers to Sonoma County than any other county (nearly 3,500), although there has been little increase in this figure since 1990. The greatest increase was found in the east-west commute from Solano County, where the in-commuters grew by 111 percent (a numerical increase of more than 1,200 workers). Other counties which, in 2000, supplied more than a thousand workers include: Contra Costa (1,037); Lake (1,415); Mendocino (1,023); and Napa Counties (2,146). (Census)

Just under one-quarter of all weekday trips are for commute purposes). Although modest in number, commute trips have a disproportionate impact on the transportation system's performance for several reasons. Commute trips are usually longer trips than other trips. They tend to be concentrated in a few hours of the day (7-9 a.m. and 4-6 p.m.); and they tend to result in more vehicle trips per person than other trip types.

2 Totals exclude workers report from a commute that would not be possible on a daily basis using ground modes, e.g., someone reporting a home location as Los Angeles or Hawaii.

Travel for Non-Work Purposes

Though the number of homes with school aged children has declined substantially, the morning traffic caused by the school commute is significant. Historically, children walked or biked to school, or rode a school bus. This is no longer true, with a large proportion of students being driving to and from school currently, though there are movements to make walking and biking to school more attractive to children and parents.

TABLE 2-3. TRAVEL TO WORK MODE SHARE IN SONOMA COUNTY

TRAVEL TO WORK	1980	1990	2000	2006
Drive Alone	69.4	74.6	74.7	74.5
Carpool	16.3	13	12.6	12.3
Transit	3.2	2.3	2.4	2.2
Bike/Walk	5.7	4.3	3.9	3.8
Other means	2	0.9	1	0.8
Worked at home	3.4	4.9	5.4	6.4

Source: US Census

Other travel, including trips to medical appointments, shopping, recreation as well as tourism trips that increase weekend traffic are not a routine and are difficult to analyze.

How are people getting around?

Travel in Sonoma County, like the rest of the Bay Area and United States, is heavily oriented towards private passenger vehicles, the majority of which is represented by single occupant vehicle travel. Commute trips, many of which are made during peak, or rush hour, travel periods are representative of travel within the county. In 2006 nearly seventy-five percent of workers drove alone for their commute; 12.3 percent carpooled; 2.2 percent used public transit; 3.8 percent bicycled or walked; and 6.4 percent worked at home. These mode shares have been fairly stable since 1980, although the bicycle/walk and carpool mode shares have dropped slightly, and slight increases in drive alone and work-at-home mode shares have been observed.

TABLE 2-4. FEE PAID REGISTERED VEHICLES IN SONOMA COUNTY

YEAR	REGISTERED VEHICLES	POPULATION	VEHICLES PER PERSON
1950	51,582	103,405	.5
1980	240,204	299,681	.8
2007	428,000	484,470	.9

Source: DMV

The use of alternative travel modes (i.e., those other than driving alone) for inter-county commute trips tends to be higher than for trips made inside the county. Approximately 8.2 percent of inter-county trips are by transit; 10.1 percent are by carpool. Travel to San Francisco represents a large portion of these out of county transit trips (20.2 percent of trips to San Francisco are made using transit).

Motor vehicle ownership in Sonoma County

Motor vehicle ownership in the County tends to be somewhat higher than the Bay Area average. There are also fewer carless, or households without access to a private vehicle, in Sonoma County compared to the Bay Area (5.1% vs. 10.1%); and more households with two or more vehicles (65% vs. 58%). The higher auto ownership rates reflect the County's dependency on personal vehicles for transportation as a result of dispersed land uses, an extensive road network, and the rural nature of much of the county

TABLE 2-5. BUS SERVICES IN SONOMA COUNTY

OPERATOR	NUMBER OF ROUTES OPERATED	NUMBER OF BUSES IN FLEET
Cloverdale	1 (deviated fixed route)	2
Golden Gate Transit	6	60
Healdsburg	1 + on demand	3
Petaluma Transit	5	9
Santa Rosa CityBus	18	33
Sonoma County Transit	22	49
Mendocino Transit Authority	2	2

PUBLIC TRANSIT SERVICES

In Sonoma County, Golden Gate Transit offers regional transit service and commuter routes to and from Marin County and San Francisco. Sonoma County Transit operates inter-city and local routes throughout the county, including all cities along the Highway 101 corridor, the Sonoma Valley to the east, and the city of Sebastopol and Russian River areas to the west. The Mendocino Transit Authority provides inter-county service between Santa Rosa and Ukiah in Mendocino County, and to several communities along the Sonoma/Mendocino Coast.

Several jurisdictions along the Hwy 101 corridor provide local transit service within their communities, including the cities of Santa Rosa, Petaluma, Healdsburg and Cloverdale. Of the local jurisdictions, the City of Santa Rosa's CityBus provides the most comprehensive level of service, with 19 numbered routes.

The Santa Rosa Avenue/Mendocino Avenue corridor in Santa Rosa provides roughly 7,000 trips a day, between Santa Rosa CityBus, Sonoma County Transit and Golden Gate Transit. There are several transit malls in the county providing connection points for the transit services, including future SMART service. The largest of the transit malls, the Santa Rosa Downtown Transit Mall, is estimated to serve 30 routes and over 7,000 passenger trips daily.

SANTA ROSA CITYBUS

The year 2008 marks the City of Santa Rosa's 50th anniversary of assuming control of Santa Rosa transit services, and the establishment of Santa Rosa CityBus.. Since 1958, CityBus has grown from three buses, two routes, and approximately 1,033 riders per day, to eleven times the number of buses (33), nine times the number of routes (18) and ten times the number of daily riders (10,164).

Weekend fixed route ridership is 2,461 per day. Ridership is spread fairly evenly across the current routes. Areas with generally higher ridership include the Roseland (route 12) and Sebastopol Avenue (route 9) routes in the southwest, and along Mendocino (routes 1 and 14) and Santa Rosa (route 5) Avenues. Annual ridership for 1983, the halfway point in the existence of Santa Rosa Transit-CityBus, was 1,020,000 passengers. FY07/08 fixed route ridership was 2,749,706, representing a 170 percent increase in 25 years. CityBus also provides Paratransit through a contract with MV Transportation.

Santa Rosa CityBus passenger demand tends to be spread throughout the day and the rider demographic has historically been transit dependent. Current trends indicate that this may be changing, but passenger surveys have not been conducted since that trend began.

Starting in August 2008 the basic cash fares for CityBus passengers are $1.25 cents for adults, $1.00 for youth, and 60 cents for the elderly (65+) and disabled. Paratransit trips are $2.50. Currently, unlimited transfers between Santa Rosa CityBus routes, as well as any transfers from Golden Gate Transit (GGT) and Sonoma County Transit (SCT) to CityBus are free within a two-hour period. Transfers from CityBus to SCT are also free within the Sonoma County Transit Santa Rosa fare zone within a two-hour period. Santa Rosa CityBus accepts GGT transfers as local fare only at points where GGT and Santa Rosa CityBus intersect (e.g., the Santa Rosa Transit Mall). GGT accepts Santa Rosa CityBus transfers for a $0.10 credit on local travel within Sonoma County.

Over the twenty-five year life of this SCTA planning document, Santa Rosa CityBus has planned for several capital projects that are dependent on formula and discretionary transportation grant funds. Most significant is the need to continue preventative maintenance of the CityBus fleet and facilities. Between 2010 and 2014, 28 (85%) of the current 33-bus fleet will need to be replaced because they will reach the end of their useful life.

As CityBus continues to maintain and replace its infrastructure, it is challenged with meeting long-standing demand for

TABLE 2-6. SANTA ROSA CITYBUS TRANSIT SERVICES

ROUTE NUMBER(S)	ROUTE (ALL ROUTES BEGIN AND END AT TRANSIT MALL)	FREQUENCY (BUSES/HOUR–WEEKDAY)	MAY 2008 DAILY RIDERSHIP* (WEEKDAY/WEEKEND)
1	Mendocino	1-2	714/89
2	Bennett Valley	1-2	656/186
3	West Ninth Street	1-2	578/116
4	Rincon Valley	1	497/120
5	Santa Rosa Avenue	1-2	772/272
6	West Third Street	1-2	428/149
7	Montgomery Village/Rincon Valley	1	405/143
8	Sonoma Avenue	1-2	490/107
9	Sebastopol Road	1-2	1,048/210
10	Coddingtown	1-2	617/182
11	Fulton Road	1-2	567/115
12	Roseland	1-2	875/222
14	County Center	1-2	932/205
15	Stony Point Road	1-2	682/135
16	Oakmont (service changing in 2009)	n/a	n/a
17	Piner Road	1-2	673/192
18	Southeast Circulator	1	231/77
19	Roseland (service commencing 2008)	1-2	n/a
TOTAL			**10,164/2,461**

more service. There is also a new wave of rapidly growing demand to expand CityBus service, driven largely by the increasing cost of fuel and desire of travelers to reduce greenhouse gas emissions. In order to meet these service demands CityBus must increase its fixed route and paratransit bus fleets. Over the twenty-five year life of the 2009 CTP, facility enhancements to accommodate more buses, and technology enhancements to accommodate the technological changes that will inevitably occur over a quarter of a century, will also need to be implemented. All of these projects will require discretionary grant funds for implementation.

The City of Santa Rosa and CityBus have also begun planning for a future that involves higher consumer fuel prices and a greater need to reduce greenhouse gas emissions by investigating the development of two high-frequency bus service corridors to provide additional service in the city. Ultimate build out for these projects could result in full-fledged Bus Rapid Transit (BRT) service. The corridors will run north-south and

east-west and will target 10-15 minute headways as the frequency goal, significantly higher frequency than the existing service levels of 30-45 minute headways. The BRT projects have been proposed through both this plan and the Metropolitan Transportation Commission's regional planning document, T-2035.

PETALUMA TRANSIT

The City of Petaluma initiated fixed-route transit service in 1976. Today, Petaluma Transit provides scheduled service along five separate routes using a fleet of modern, 35-foot low-floor transit coaches. All routes operate on hourly headways, between 6:15 AM and 6:45 PM weekdays, and 10 AM to 4:30 PM Saturdays.

Petaluma staff oversee operations performed in contract with MV Transit. Petaluma recently deployed global positioning equipment on the fixed route fleet and is now able to systematically census on time performance. This can be measured by route, hour of day or driver, which tremendously enhances the ability to effectively manage performance. This is both an effective operations and planning tool that should lead to higher quality service in Petaluma. The City of Petaluma also operates paratransit service through a contract with Petaluma People's Services.

The fixed-route system carries approximately 600 boarding passenger trips per weekday.[3] Roughly a quarter of passenger trips were for commute purposes; the remainder were primarily for school or shopping purposes. Eighty-three percent of passengers said they walked to a bus stop, indicating a very high degree of coverage of land area; six percent transferred from other transit operators (GGT, SCT). Most riders do not have access to a car; only five percent said they would have driven a car had the bus not been available. Youth riders (under 24 years old) make up nearly 43 percent of the rider population.

Petaluma undertook a comprehensive operational evaluation of fixed route services during fiscal year 2008. Subsequently, Routes were realigned in August, 2008 for the purpose of maximizing utilization of the Transit Mall, providing 15 minute frequency at the Transit Mall through the coordination of four separate routes that operate each hour, improving on time performance, enhancing passenger service, increasing ridership and maximizing fare box recovery. The new system design centralizes service at the Transit Mall, while providing both east/west and north/south connections.

SONOMA COUNTY TRANSIT 2007 RIDERSHIP

Average Weekday Passenger Trips = 4,915

Average Saturday Passenger Trips = 1,561

Average Sunday Passenger Trips = 1,097

Total Ridership = 1,387,081

SONOMA COUNTY TRANSIT

Sonoma County Transit's fixed-route system provides countywide service along major travel corridors in rural areas of Sonoma County. The system also links most small towns and communities and all nine incorporated cities in the County including Cloverdale, Healdsburg, Windsor, Santa Rosa, Sebastopol, Rohnert Park, Cotati, Sonoma and Petaluma. SCT's major intercity routes consist of routes 20, 26, 30, 40, 44, 48 and 60. Express and commute intercity bus service is also provided via routes 22, 34, 38, 42, 46, 50 and 62. The fixed-route system is operated with annual State Transportation Development Act (TDA) and State Transit Assistance (STA) funding from the County of Sonoma and funding contributions or reciprocal service agreements from each of the County's nine incorporated cities.

In addition to intercity public transit service, Sonoma County Transit provides local public transit service, under contract, within the Town of Windsor (route 66), and the cities of Sebastopol (route 24), Rohnert Park, Cotati (routes 10, 12, 14) and Sonoma (route 32), respectively. Local service is also provided to the unincorporated Russian River communities of Rio Nido, Guerneville, Monte Rio and Duncan Mills (route 28), and to the unincorporated Sonoma Valley communities of Agua Caliente, Boyes Hot

3 See City of Petaluma, Short Range Transit Plan Final Draft, January 2008, by Moore and Associates. The annual ridership on page 93 (159,400) was divided by a factor of 265 to obtain this estimate.

TABLE 2-7. SONOMA COUNTY TRANSIT SERVICES

ROUTE #	ROUTE COVERAGE AREA	OPERATES	AVERAGE HEADWAYS	WEEKDAY TRIP LENGTHS
10	Cotati, Rohnert Park, Sonoma State University	Daily	45 minutes	32 minutes
12/14	Northern Rohnert Park	Daily	45 minutes	34-47 minutes
20	Russian River Area, Forestville, Sebastopol, Santa Rosa	Daily	1.3 hours	34 minutes-2.2 hours
Exp 22	Sebastopol, Santa Rosa	Mon-Fri	1.7 hours	22-27 minutes
Local 24	Sebastopol	Mon-Sat	50 min	19-35 minutes
26	Sebastopol, Rohnert Park, Cotati, SSU	Mon-Fri	2.7 hours	30-35 minutes
Local 28	Guerneville, Monte Rio	Mon-Fri	1.3 hours	26-39 minutes
Coast 29	Sonoma Coast, Santa Rosa, Rio Nido	Sat & Sun	2.6 hours	25 minutes-2.6 hours
30	Santa Rosa, Sonoma Valley	Daily	1.4 hours	59 minutes-1.8 hours
Local 32	Sonoma Valley	Mon-Sat	50 minutes	25-52 minutes
Exp 34	Santa Rosa, Sonoma	Mon-Fri	Limited am & pm	Commute trips
38	Sonoma Valley/ San Rafael	Mon-Fri	Limited am & pm	Commute trips
40	Sonoma, Petaluma	Mon-Fri	1.6 hours	35-45 minutes
Local 42	Santa Rosa, Industry West Business Park	Mon-Fri	1.2 hours	20-26 minutes
44/48	Petaluma JC, SSU, Santa Rosa	Daily	50 minutes	41 minutes-1.9 hours
Exp 46	Santa Rosa, Sonoma State University	Mon-Fri	2.3 hours	17-31 minutes
50	Sebastopol/Rohnert Park	Mon-Fri	Limited am & pm	Commute trips
60	Cloverdale, Healdsburg, Windsor, Santa Rosa	Daily	50 minutes	48 minutes-1.7 hours
62	Santa Rosa, County Airport	Mon-Fri	1.5 hours	27-54 minutes
Local 66	Windsor	Mon-Sat	50 min	35 minutes
68	Cloverdale Local	Mon-Fri	1.1 hours	Commute trips

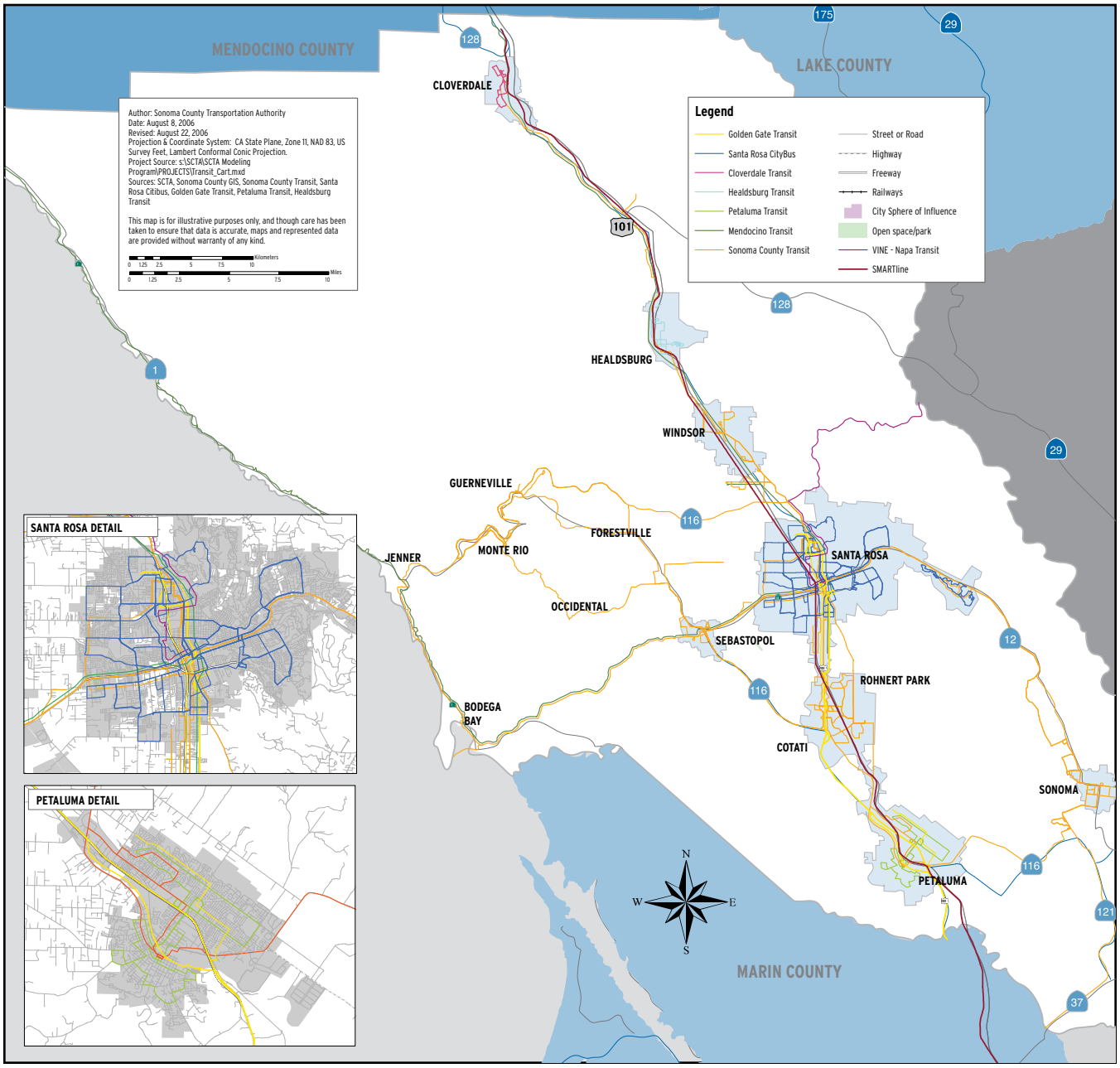
Springs, El Verano and Temelec (route 32). Summer weekend intercity service is provided to the unincorporated Sonoma Coast communities of Freestone, Bodega, Bodega Bay, and Jenner (route 29).

Sonoma County Transit operates twenty-one routes Monday through Friday between 5:00 a.m and 11:21 p.m. Weekend service (including route 29) consists of thirteen routes operating on Saturday and nine on Sunday between approximately 7:02 a.m. and 9:34 p.m. Route 29 operates on weekends between the months of July and September only. No service is provided by Sonoma County Transit on seven major holidays including New Years Day, Easter Sunday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. On Martin Luther King, Jr. Day, Presidents Day and the Friday following Thanksgiving Day, most routes run according to their Saturday schedules. On other selected holidays, SCT provides only limited service with intercity routes 20 and 30, which provides major east and west service.

Three bus routes, routes 44, 48, and 60, carry more than half of the passengers. Sonoma County Transit ridership has been increasing steadily since service began in July of 1980. Weekday ridership in fall 1984 was 3,500 passengers, representing a 57 percent increase in 21 years to 4,915 in 2007.

SCT passenger demand tends to be spread throughout the day, without the heavy commuter component that Golden Gate Transit serves, therefore, its peak hour service is not as frequent. Most SCT riders

TRANSIT SERVICES MAP Sonoma County Bus Routes



do not have a car available for their trip, and a passenger profile survey indicated that half of riders were 24 years old or younger, and 13 percent were 60 or over.

Sonoma County Transit pays its operations contractor, Veolia, on an "in-service" hourly basis. Veolia is paid a flat rate from the time a bus leaves the yard for revenue service to the time it returns to the yard from revenue service. SCT staff review paid in-service hour amounts each time schedules are revised or service is altered. Sonoma County Transit operated 105,675 in-service hours during fiscal year 2007. Including service provided under contract by Cloverdale Transit (route 68) and the Mendocino Transit Authority (route 95), total in-service hours operated during fiscal year 2007 was 109,133.

Under contract with Sonoma County Transit, Cloverdale Transit provides weekday local public transit service within

TABLE 2-8. GOLDEN GATE TRANSIT SERVICES, OCTOBER 2007

ROUTE	ROUTE	PEAK HOUR FREQUENCY (BUSES/HOUR)*	BUS TRIPS PER DAY	AVERAGE DAILY RIDERSHIP WEEKDAY/SAT./SUN.**
72	Santa Rosa-San Francisco Commute	4	19	572/–/ -
72X	Santa Rosa-San Francisco Express Commute	1	6	184/–/ -
73	Santa Rosa-Petaluma-San Francisco Express	2	8	235/–/ -
74	Santa Rosa-San Francisco Commute	2	10	274/–/ -
75	Santa Rosa-Marin Civic Center Commute	2	8	162
76	Rohnert Park-San Francisco Commute	4	14	416/–/ -
80	Santa Rosa-San Francisco Basic Service	1	37-38	2,215/2,563/2,336***
Total			**102**	**4,058/2,563/2,336**

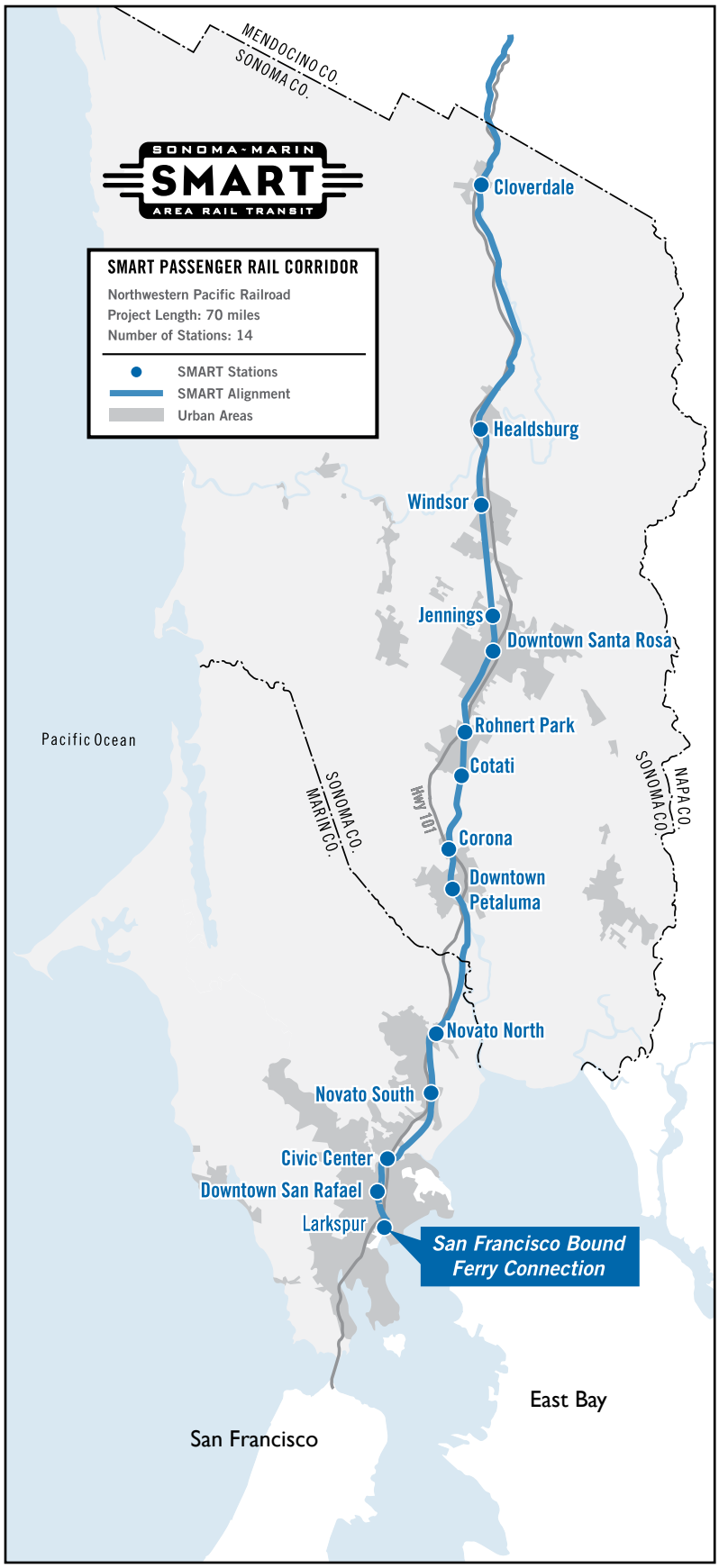
Source: Golden Gate Transit, RFP 2008-D-4, Regional Bus and Ferry Customer Survey, 2/15/2008.

* In peak hour, typically 5-6 AM southbound and 4-5 PM northbound.
** A dash ("–") indicates no services operated on the day in question.
*** Includes a significant number of riders traveling between Marin and San Francisco Counties.

the City of Cloverdale (route 68). Also under contract with SCT, the Mendocino Transit Authority (MTA) provides inter-county public transit service along the Sonoma Coast between Mendocino County and Sonoma County. MTA's route 95 provides service 7-days per week between the coastal communities of Point Arena, Anchor Bay and Gualala in Mendocino County, and between Sea Ranch, Stewarts Point, Fort Ross, Jenner, Bodega Bay, Bodega, Freestone, Sebastopol, downtown Santa Rosa, Coddingtown Mall, and the Charles M. Schulz–Sonoma County Airport in Sonoma County.

Mendocino Transit Authority's route 65 also provides service 7-days per week along the Highway 101 corridor between Mendocino, Casper, Fort Bragg, Willits, Ukiah, and Hopland in Mendocino County, and between the Sonoma County Airport and downtown Santa Rosa in Sonoma County. As with route 95, this route provides one round-trip daily, originating in Mendocino County in the morning and in Sonoma County in the afternoon. Route 65 is subsidized solely by MTA.

In addition, the County of Sonoma contributes funding to the Golden Gate Bridge Highway and Transportation District/Golden Gate Transit to provide public transit service within and outside of Sonoma County. The County and each of the County's nine incorporated cities annually contribute a portion of their TDA/STA funds to support operation of the Golden Gate Transit fixed-route system. Golden Gate Transit operates several inter-county weekday commute period express routes (routes



72, 73, 74, 75, 76) in addition to one inter-county line-haul route operated 7-days per week (route 80) that provide regional public transit service between Santa Rosa, Rohnert Park, Cotati, Petaluma, Marin County and the downtown San Francisco financial district.

OTHER TRANSIT SERVICE

Mendocino Transit Authority (MTA) also operates infrequent service along Highway 1 and into Santa Rosa. Route 65 operates from Mendocino, via Fort Bragg and Willits, to Santa Rosa via U.S. 101. Route 95 operates from Point Arena to Santa Rosa via Highway 1, with stops in Bodega Bay and Sebastopol.

Golden Gate Transit (GGT) primarily provides regional inter-county transit service. GGT operated seven transit routes in 2007. The basic route offers all-day service between Santa Rosa and San Francisco (Route 80). The other routes are commuter routes which offer only peak hour and peak direction service during morning and evening commute periods. Peak direction is defined as toward San Francisco in the morning and from San Francisco in the afternoon. These buses offer fast, express service with relatively few stops. There are few transfers from bus to bus on this system; most people either walk or drive to a Golden Gate Transit stop.

Total transit ridership in Sonoma County for the two systems combined is approximately 9,600 boarding trips/day (this includes trip with at least one end in Sonoma County). This represents approximately 0.5 percent of all trips made on an average weekday, although the percentage of commuter trips made by transit is higher, as noted earlier.

SONOMA-MARIN RAIL TRANSIT (SMART)

The State Legislature established the Sonoma-Marin Area Rail Transit (SMART) District in January 2003 to plan, construct, and operate a commuter rail line in Marin and Sonoma Counties.

TABLE 2-9. SONOMA COUNTY CENTERLINE MILEAGE OF PUBLIC ROADS, 2004

OWNER/MAINTENANCE RESPONSIBILITY	MILES	PERCENT
County of Sonoma	1,387	52
Cities	943	35
Caltrans (State)	235	9
State Parks Department	92	3
Federal Agencies	20	1
Total Maintained Mileage	**2,677**	**100**

Source: California Department of Transportation, Transportation System Information Program, http://www.dot.ca.gov/

TABLE 2-10. SONOMA COUNTY ANNUAL VEHICLE-MILES OF TRAVEL ON STATE AND NON-STATE HIGHWAYS, 2006

FACILITY	ANNUAL VEHICLE MILES	PERCENT
State Highway System	2.14 Billion	55%
Local and Other	1.78 Billion	45%
Total	**3.92 Billion**	**100%**

Source: Caltrans, "California Motor Vehicle Stock, Travel and Fuel Forecasts," Appendix B, December 2006.

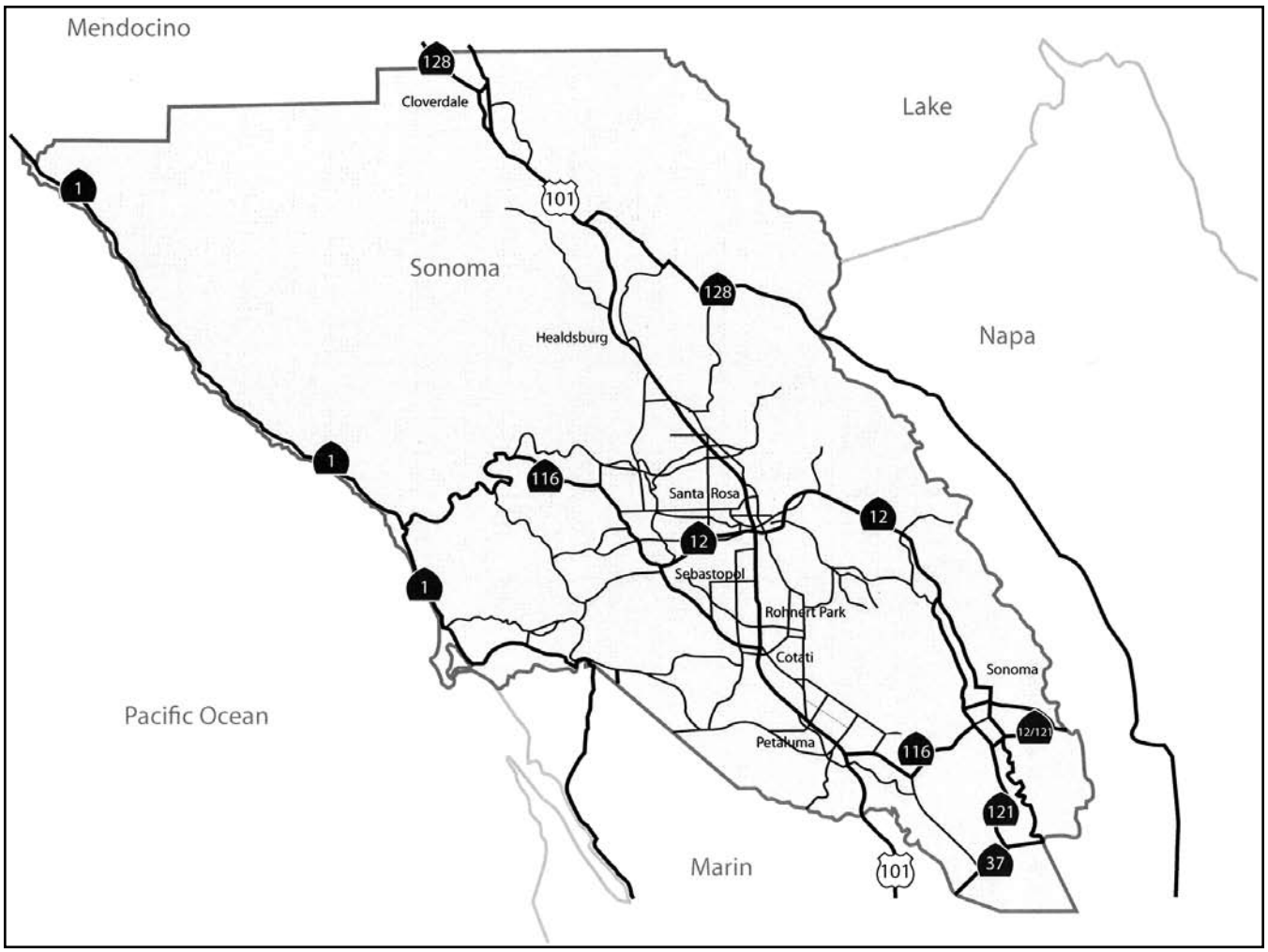
The SMART Commission is made up of elected officials from both counties and representatives from the Golden Gate Bridge District. The proposed project includes building and operating a 14-station, 70-mile passenger rail line from Larkspur to Cloverdale using the publicly owned right of way of the former Northwestern Pacific (NWP) Railroad line, and a Class I multi-use pedestrian and bicycle path parallel to much of the line. Stations in Sonoma County would include (from south to north): Petaluma Downtown, Petaluma Corona Road, Cotati, Rohnert Park, Santa Rosa Downtown, Santa Rosa Jennings Avenue, Windsor, Healdsburg, and Cloverdale. A maintenance facility for the entire line would be constructed in southern Windsor.

SMART is also proposing weekend service, with four roundtrips per day on Saturdays, Sundays and holidays. The use of new "light" self-powered diesel trains that have become available in the U.S. is being considered. SMART is also considering alternative locations for the South Novato station.

Service is expected to provide trains every 30 minutes from approximately 6-10AM and 4-7 PM, with a single mid-day train making a roundtrip. The service is expected to carry approximately 5,300 boarding trips per weekday at service start-up with connections made to bus transit, bicycle/pedestrian facilities, and key destinations.

When SMART secures a voter approved sales tax increase to fund operations, passenger service will provide the backbone of an integrated transportation system that optimizes bus, bike, pedestrian and automobile transportation. SMART will serve a variety of train riders: home/work commuters during the weekdays, retired people visiting relatives and making shopping trips, tourists visiting the wine country during the weekends, and young people traveling to school, shop-

IMPORTANT COUNTY AND CALTRANS STREETS AND HIGHWAYS.



ping, and recreating. The SMART train will provide an important alternative to the car as the cost of driving continues to escalate and reducing GHG emissions becomes increasingly imperative.

HIGHWAY AND ROADWAY SYSTEM

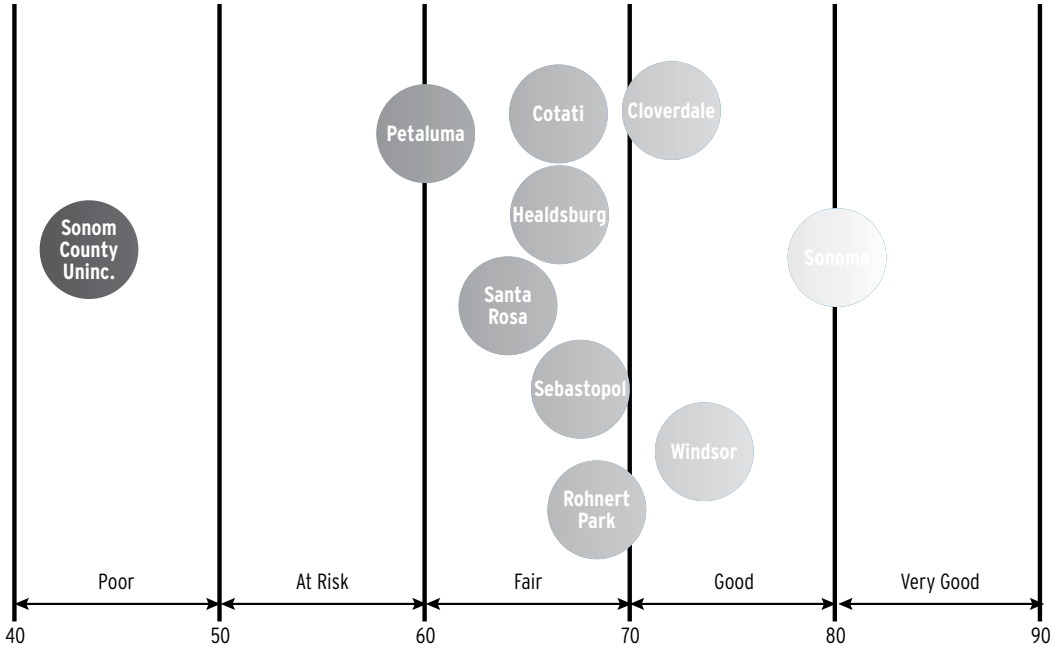
Sonoma County streets and highways would stretch all the way to New York if laid end-to-end. The system has more resemblance to a rural county in certain aspects than it does to Bay Area counties. In most Bay Area counties, cities own approximately two-thirds of the mileage, and the county only a quarter. In Sonoma County, this formula is reversed, with the County of Sonoma responsible for owning and maintaining over half of the roadway system, due to large unincorporated areas with low-density urban development.

There are approximately 2,677 centerline[4] miles of publicly owned and maintained roadways in Sonoma County, as shown in the table on page 21. The reconstruction value of this infrastructure was estimated at $2.3 billion in 2004,[5] excluding state highways. The California State Department of Transportation (Caltrans) owns and maintains more than 235 centerline miles of highway, with more than three-quarters of it in the rural portions of the county. The State highways are

4 Centerline miles are the number of unduplicated route miles of street or highway, ignoring the number of lanes.

5 Sonoma County Transportation Authority (SCTA), 2004 Countywide Transportation Plan for Sonoma County, June 14, 2004, page 46.

PAVEMENT CONDITION INDEX FOR SONOMA COUNTY JURISDICTIONS



among the most heavily traveled routes (e.g., U.S. 101), and because of this, carry half or more of the daily vehicle miles traveled (VMT) in Sonoma County.

Condition of Roads

Physically, Sonoma County's unincorporated and municipal road system suffers from a number of problems:

- Restricted maintenance budgets over the past 25 years have resulted in poor pavement conditions. For example, Sonoma County's roads average a Pavement Condition Index (PCI) of 44 in unincorporated areas, whereas a PCI of 80 is considered optimum.[6] This is the lowest of any county in the Bay Area, and the County has one of the largest deferred maintenance backlogs in the Bay Area.
- Many roads, especially in rural areas or older urban areas, lack standard shoulders or pedestrian walking areas to enhance the safety and pleasure of walking and cycling.
- Roads (including state highways and freeways) have been subject to serious flooding problems in the past 20 years. Some bridges are obsolete and do not meet 100 or even 50 year flood levels.
- Portions of some roads do not meet current safe sight stopping distance standards.

The most recent pavement condition data compiled by MTC is shown for each Sonoma County jurisdiction in the figure above. A critical point is that although pavements deteriorate only 40 percent in quality in the first 75 percent of their life, this deterioration subsequently accelerates rapidly, resulting in another 40 percent drop in quality in the next 12 percent of life. A single dollar spent on renovation when the pavement is still in 'fair' condition can save five dollars in maintenance cost over spending maintenance funds when the pavement has already deteriorated to 'very poor' quality.

EXISTING CONGESTION LOCATIONS

U.S. 101 is the county's principal freeway and the primary north-south trunk highway linking the county to Marin

6 Metropolitan Transportation Commission. Bay Area Transportation: State of the System 2006, page 67.

County and San Francisco to the south and Mendocino County to the north. Much of U.S. 101 is a typical rural freeway constructed to comparatively low standards in the 1950s and 1960s (compared to existing practice) in order to reduce costs. Much of the freeway is at-grade with two lane overpasses that use hook[7] on and off-ramps. The median width permits future expansion of the freeway to six lanes, as was completed in southern Santa Rosa between Wilfred Avenue and State Highway 12 in November 2002. The highway is currently four lanes for most of its length and does not meet freeway standards at the southern border of the county (frequently known as the Marin-Sonoma Narrows).[8] There are currently plans for widening the remainder of US 101 in phases, with the next phase from Steele Lane in Santa Rosa north to Windsor.

Freeways

MTC/Caltrans freeway congestion monitoring data for 2006 indicates that freeway congestion, measured in vehicle hours of delay, increased 75% between 2002 and 2006, and 45% between 2004 and 2006. In 2007 it increased another three percent, to 7,900 vehicle hours of delay. By way of contrast, the remainder of the Bay Area (eight counties) had less than a 15% increase in delay between 2004 and 2006. It is also noteworthy that the duration of congestion—from the time it starts until the time it ends—has also increased dramatically. Some segments of US 101 now begin experiencing congestion in the early- to mid-afternoon. Southbound Highway 101 in south Petaluma becomes congested by 5:30 AM.

The individual freeway sections of U.S. 101 experiencing the most recurring congestion on weekdays are shown in Table 10. A new addition to this list is Highway 37 near its intersection with Highway 121, where the four lane expressway ends. In fact, this location represented the fourth worst congested area (measured by vehicle hours of delay) in the county in 2007. Freeway congestion is defined as conditions where vehicle speeds regularly drop below 35 mph for at least 15 minutes each weekday.

State Highway 12 experiences recurring congestion only near U.S. 101 and its two end points in Santa Rosa (Fulton Road and Farmers Lane); for that reason, it is not regularly monitored by Caltrans. Due to budget constraints, Caltrans does not currently monitor freeway-to-freeway travel times (speeds).

Overall, Caltrans estimated that in the year 2007, there were 7,900 vehicle-hours of delay each weekday on Sonoma County freeways. Using the rates used in the Texas Transportation Institute's 2007 Urban Mobility Report (September 2007), this would represent approximately $38 million dollars per year of delay-related congestion costs for weekday freeway traffic alone.

Weekday Traffic Congestion on Arterials

State Highway 12 links Sebastopol, Santa Rosa, the Sonoma Valley, and Napa County. It also provides an important connection to the Interstate 80 corridor, including a link for interstate trucking. Within Santa Rosa, between Fulton Road on the west to Farmers Lane on the east, State Highway 12 is developed to freeway standards. The two lane sections in Sebastopol and in the Sonoma Valley are severely congested on both weekdays and weekends. The congestion is particularly bad during summer months, because of a variety of uses (wineries, special events, the Infineon Raceway, and so on) that attract large numbers of day and overnight visitors. Although Arnold Drive provides an alternative route for much of the Sonoma Valley, most visitor traffic tends to stay on the state highway. State Highway 12 is also congested at its western terminus in Sebastopol, where it joins State Highway 116.

7 'Hook ramps' are ramps that exit (or enter) the freeway from a paralleling street, using a ramp curved at (approximately) a 90-degree angle. Because hook ramps are often forced into tight situations, they frequently have less than desirable geometrics.

8 This section, from north of Atherton Avenue in Novato to south of the Petaluma Boulevard south ramps, is classified as an expressway. It lacks access control, i.e., intersections and private property driveways access directly onto 101 at several locations.

Petrified Forest Road suffers from some weekend delays, because it is two lanes with few passing opportunities, and there are a moderate number of heavy vehicles that slow other vehicles on the mountainous grades. This route is a popular connection between northern Napa County and Sonoma County.

Main Street, in the unincorporated community of Penngrove, suffers considerable peak period weekday traffic congestion due to drivers avoiding congestion on U.S. 101, and new development in northeast Petaluma and east Rohnert Park. Arnold Drive, River Road, Old Redwood Highway, Bodega Highway, Lakeville Highway, and Petaluma Hill Road have heavy weekday traffic. Todd Road, Llano Road, Crane Canyon Road experience congested conditions on weekdays and many roads within incorporated cities also experience severe congestion. While some other local roads may need safety or physical improvements, they have adequate levels of service.

Weekend Traffic Congestion

State Highway 116 connects the coastal city of Jenner (at Highway 1), Forestville, Sebastopol, Petaluma, and the Sonoma Valley and is a two-lane road with varying widths. Congestion is most severe on weekends due to recreational traffic, particularly in Guerneville and Sebastopol. Other State highways with substantial weekend traffic are State Highway 121 (between Highway 37 and the Napa County line), Highway 37, and Highway 1. There are relatively few quantitative measures available for weekend traffic congestion.

Highway 1 north of Jenner experiences heavy weekend traffic as a result of steep, winding grades; the presence of heavy vehicles (including RVs); presence of coastal development (e.g., Sea Ranch, Gualala) and tourist attractions (e.g., beaches). Many "sightseeing" trips use this scenic road. River Road, Alexander Valley Road, Dutcher Creek Road, Bohemian Highway, Westside Road, Fort Ross Road, and Lakeville Road also experience varying degrees of weekend congestion from visitor traffic, sometimes related to holiday or seasonal periods. Some shopping areas, e.g., Santa Rosa Avenue, experience heavy weekend traffic due to a large number of retail centers concentrated in a fairly small area.

BICYCLIST AND PEDESTRIAN SYSTEM

Description of Existing System

With its moderate climate, diverse scenic vistas, and swaths of gentle terrain, Sonoma County is in general an ideal place to bicycle and walk. Additionally, while each of Sonoma County's cities have unique constraints, all of the cities are of such a scale as to make many desired destinations within reasonable distances for bicyclist and/or pedestrian access. Likewise the distances between most cities are feasible for many bicycle commute and recreational trips. The bicycle and pedestrian infrastructure, however, is currently incomplete. For example, the Metropolitan Transportation Commission (MTC) currently estimates that 214 miles of the 273 miles identified as on the Regional Bikeway Network in Sonoma County are as yet un-built. There exist many challenges and opportunities for both pedestrians and bicyclists.

Relatively few people use bicycling or walking as their primary mode of transportation, although nearly "everyone is a pedestrian" during at least part of their day. Mode share statistics are imperfect in capturing the extent of walking and bicycling, however the best source in providing a benchmark of use is the US Census.

During the last several decades, and increasingly in recent years, interest has grown in creating a transportation system that fully integrates bicycling and walking. The "complete street" concept requires that transportation agencies routinely accommodate safe access for all users when investing in road improvements, i.e., designing and operating the right-of-way for pedestrians, bicyclists, motorists and transit riders of all ages

and abilities. There is more information included on Complete Streets in Appendix C-iii. While much remains to be done, steady progress has been made by Sonoma County and its cities to upgrade and add facilities that foster bicycle and pedestrian travel. Class I pathways, Class II striped bike lanes, Class III signed bicycle routes, multi-use trails, pathways and sidewalks have been added in rural, suburban and urban settings.

THE PEDESTRIAN SYSTEM

Across the County, common patterns are evident regarding the pedestrian system. Historic downtown core areas developed before the automobile era retain much of their walkability, where a variety of destinations are reachable by foot from residences. Sonoma, Sebastopol, Petaluma, Cotati, Santa Rosa, Windsor, Healdsburg and Cloverdale all have such long-established central areas. For the most part sidewalks have been in place for many decades in these areas. Rohnert Park was developed after automobile ownership became common and its neighborhoods provide pedestrian access to schools and parks but are more limited in its bike/ped access to other destinations.

Sidewalks are also in place in almost all of the most recently developed residential, civic, and business developments. System gaps are frequently found in locations between the older and newer development. Many times such gap closures have needed to await development, or re-development, of adjacent parcels, at which time sidewalks are made a permit condition. Discontinuous sidewalk systems are also prevalent in the County's unincorporated towns. Additionally, most rural roads lack sidewalks. Sometimes there is a shoulder area to walk on; other times not.

Another common thread is that the most daunting barriers to safe pedestrian travel tend to be where vehicular travel has been expedited. Freeways, particularly Highway 101, which passes through seven of the County's nine cities, present a major barrier. Traversing on-ramps and off-ramps, and traveling under or over freeways on foot can be an unpleasant experience for many. Likewise, crossing high-speed and/or multiple-lane principal arterials is a challenge many would-be pedestrians find too difficult. In the cities, various approaches are being used to address this issue by redesigning roadway facilities. A number of cities have added bulb-outs to slow traffic and shorten the distances pedestrians must travel from curb to curb. Others are redesigning roads to calm traffic speeds and add human scale to roadways and crossings. Various signal and warning devices have been implemented, and strategies including medians, and pavement treatments have been employed. In the case of Highway 101, its current re-construction has created opportunities to upgrade pedestrian accommodations.

Connectivity to public transit can sometimes be a challenge. The ability to utilize public transit allows many people to complete trips without use of automobiles, or shorten the automobile leg of trips. Convenient access to bus stops, bus shelters, and complementary amenities such as seating and lighting encourage public transit utilization by pedestrians. Operation of the SMART train will provide new opportunities for pedestrians and bicyclists to connect to public transit. The SMART Trail paralleling the railroad alignment will facilitate bicycle and pedestrian access to this transit mode, as well as independent travel north to south across the County.

Relevant to the discussion of the pedestrian system is that people who use wheel chairs are by definition also pedestrians. As new pedestrian facilities are built and older ones are upgraded, they must be constructed to be accessible per the regulations of the Americans with Disabilities Act of 1990. Curb ramps and accessible user devices are some of the accommodations routinely installed.

A comprehensive pedestrian system is comprised of more than just walking surfaces. Many cities have added amenities such as landscaping, tree plantings, lighting and street furniture to create

pedestrian friendly environments. Design standards are being used to create pedestrian areas that are welcoming and feel safe. Land-use is critical to the viability of a pedestrian system, with pedestrian facilities designed to provide access to attractors like schools, offices, eating establishments, retail sites, and transit routes. As to walking distances, what might be a reasonable distance for one person might not be reasonable for another. What is clear is that people will walk more if they feel safe and comfortable, and can experience interesting and pleasant surroundings.

Safety and education related pedestrian activity are also important. Law enforcement programs, for example those enforcing pedestrian cross-walk rights and curbing red-light running, are supportive of pedestrian safety. Other programs encourage children to walk to their schools and/or learn safe walking practices.

THE BICYCLE SYSTEM

Throughout Sonoma County, Class I, II and III bicycle facilities have been, and are being implemented. A Class I Bikeway (Bike Path) provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow by motorisrts minimized. (such as the Joe Rodota Trail); a Class II Bikeway (Bike Lane) provides a striped lane for one-way bicycle travel on a street or highway, with the lane designated with striping and signage and/or pavement markings; and a Class III Bikeway (Bike Route) provides for shared use with pedestrian or motor vehicle traffic, with the route indicated just with signage. Additionally there are unpaved recreational trails.

Building facilities for bicyclists require standards to be met in that a range of users must be considered. For example, whereas an experienced rider or bicycle commuter might prefer the shortest and fastest on-road route, such a route might be completely inappropriate for a young or inexperienced rider. In building the system, various facilities for various users must be considered and implemented.

Off-Road Facilities

Across the County, there have been, and are, opportunities to use public rights of way to establish trails. Many of the Class I facilities have been, or will be, constructed along creek alignments owned by cities or the County (e.g., Sonoma County Water Agency) and along prior or existing railroad rights-of-way. Rohnert Park, for example, has built over seven miles of Class I facilities, mostly along creeks. Additional opportunities might exist along pipeline and other utility easements.

Prominent as an example of a railroad right-of-way use, is the proposed multi-use/Class I trail adjacent the Northwestern Pacific Railroad (NWPR)/Sonoma Marin Area Rail Transit (SMART) rail line. This facility would extend 70 miles north to south for nearly the length of the County and beyond into Marin County. With access to all fourteen SMART stations, the facility will serve both commuter and recreational bicyclists and pedestrians; joggers and other users. SMART's environmental studies predict use by 7,000 to 10,000 people a day. SMART's funding plan calls for construction in stages, with two-thirds of the pathway to be completed in conjunction with development of the rail project (by 2014)..Local cities and counties will be asked to help complete some of the short segments that fall on city streets and that are part of local bicycle/pedestrian master plans. In Windsor and Healdsburg, Class I facilities have already been constructed along parts of this right-of-way. All jurisdictions through which this rail corridor passes have prioritized this facility in their plans.

The major existing Class I facility in the County is the Joe Rodota Trail (3 miles) leading east to west from Santa Rosa to Sebastopol. It links to the West County Trail, a Class I facility, which currently extends to Forestville (with County plans to extend it further along Mirabel Road and to the Prince Memorial greenway that extends into downtown Santa

Rosa). Traversing scenic areas of the West County, mostly in alignments that were formerly rail lines, these two multi-use trails are utilized by commuters, and recreational users of all ages. The alignment of the proposed SMART trail would intersect the Joe Rodota Trail.

In addition to the facilities utilizing public rights-of-way, others have been, and will be, constructed as part of private development.

On-Road Facilities

Because of a focus on building infrastructure for automobiles, today the County's roadway system presents many barriers for bicyclists. The safety of such travel is a major concern. Many roads are narrow, not having been constructed to accommodate current traffic volumes, as well as bicycle and/or foot traffic, and in many urbanized locations parking as well. Additionally as noted for pedestrians, freeways and high-speed and/or multiple-lane arterials present challenges for the on-the-road bicyclist.

The problem being addressed incrementally by jurisdictions is the inadequacy of almost all of the older roadways. While many have been upgraded, many provide insufficient width to safely accommodate bicyclists. Examples in rural areas abound, where shoulder widths are sub-standard, and along some roadways virtually non-existent. Cities and the County are now in a position of needing to retrofit roadways for the use of bicyclists. Sometimes roads are widened to include room for bicyclists and sometimes roads are redesigned to create environments more friendly to bicyclists. Gap closures, particularly those on facilities with high demand and those that are part of the regional network, are in general given priority for improvement.

Implementations can be costly, especially when accommodations may mean the need to acquire additional right-of-way; engineer and construct drainage, culverts and bridges; relocate utilities; and take projects through the public review, approval and environmental clearance processes. Sometimes proposals become controversial, such as when parking must be removed to add bicycle lanes. The range of objectives, which at times can compete, make solutions difficult to devise. The needs of pedestrians, bicyclists, motorists, people who use wheelchairs and other mobility aids, transit and emergency vehicle operators all must be considered in designing new facilities and retrofitting older ones.

TABLE 2-11. BICYCLE FACILITIES BY CLASS Total Existing Miles Indicated, with some Examples

	I	II	III
Cloverdale	1.72	4.69	0.23
Healdsburg	0.55	10.25	4.73
Windsor	2.68	7.67	-0
Santa Rosa	23.00	54.00	33.00
Cotati	1.63	2.85	-0
Rohnert Park	7.10	9.90	4.60
Petaluma	19.0	20.30	0.90
Sebastopol	1.23	-0	-0
Sonoma	3.91	0.97	-0
County	16.77	13.86	1.45
TOTAL	**77.59**	**119.48**	**44.91**

As with the pedestrian system, the bicycle system includes more than bicycling surfaces. Bicyclists need an integrated support system of helpful signage, signal detectors, bike racks for temporary parking at destinations, secure longer-term parking/storage at work and school sites, and facilities that include restrooms, showers and clothes storage. In many cases, the lack of such support facilities presents a major deterrent for bicycle use. Additionally, connectivity to public transit is important. Sufficient bicycle carrying capacity on buses, and bicycle racks at bus stops, are needed to make such trips a reliable option. Currently all the public transit operators have policies and equipment to allow bicycle transport. Only some bus stops have bicycle racks.

Safety and education programs, such as those sponsored by the Sonoma County

TABLE 2-12. PROPOSED MILES OF BICYCLE FACILITIES FOR EACH ENTITY BY CLASS with Estimated Total Implementation Costs in 2008 dollars

ENTITY	CLASS			ESTIMATED COST*
	I	II	III	
Cloverdale	7.36	4.67	3.48	$4,461,592
Healdsburg	3.30	0.98	3.50	$10,560,500
Windsor	9.48	11.15	7.88	$5,946,125
Santa Rosa	52.60	69.10	121.80	To be determined as part of planning effort underway
Cotati	0.70	2.70	1.30	$3,135,212
Rohnert Park	12.91	8.76	8.80	$7,851,775
Petaluma	24.10	45.10	24.40	$23,073,000 Plus the Ring Trail $2,450,000
Sebastopol	0.06	9.54	2.84	$840,587
Sonoma	0.62	6.31	5.18	$904,220
County	197.00	378.00	211.00	$248,775,575

* Mileage & cost estimates are based on final and draft lists of the Countywide Bicycle & Pedestrian Master Plan for all but Petaluma & Santa Rosa. Estimates for those entities were provided by staff.

Bicycle Coalition, and law enforcement efforts aimed at correcting motorist, pedestrian and bicyclist behavior, are important supports to maintaining safety for bicyclists. Safe Routes to Schools programs, bicycle "rodeos," and Bike to Work days are other examples. SCTA supports Safe Routes to Schools and Bike to Work Day initiatives through Measure M funding. Facilitating the ability of school children to walk and bicycle to school is important as a means of increasing childhood health, as well as fostering behaviors that curb local traffic congestion and vehicle emissions. Employer incentive programs also provide support for electing bicycling or walking as an alternative to driving.

Maintenance of existing non-motorized facilities is also crucial. Roadside sweeping and debris removal, pothole repair, tree trimming, and the monitoring and maintenance of roadway shoulders, sidewalks, trails and signs are all examples of essential maintenance program tasks.

Physical Conditions

Above is a listing of the total miles of the existing bicycle system by Class for each entity.

CHALLENGES

Proposed Improvements

Sonoma County and all its cities have engaged in recent planning for bicycle and pedestrian improvements. Most entities now have lists of high, medium and low priority projects proposed for implementation over the next several decades. The list is long. The chart above provides the number of miles of proposed bicycle facilities by type (Class I, II or III) per entity and provides estimated costs (complete lists may be found in Appendix A-iv).

With Sonoma County's expanse and volume of road miles, it is not surprising that the County's share of proposed miles of improvements, as well as the

associated costs, are high compared to the cities. The County has proposed about 280 miles of high priority on-road bicycle projects for about $100,000,000. Add to that about 120 miles of off-road Class I projects for about $50,000,000 and the County's estimate for building just the highest priority projects reaches approximately $150,000,000.

One goal of the recent countywide planning undertaken by SCTA was to identify a primary regional network of bicycle facilities. Frequently these projects are of highest priority, for they serve to close the gaps in regional and interregional connectivity. For purposes of transportation, as well as for much of the County's recreational riding, a completed primary system of facilities linking communities, and providing routes through them, is a priority.

Pedestrian improvements are also proposed in all of the jurisdictions. A complete inventory of sidewalk facilities is not available, but sidewalk gap closure projects are a high priority for improvement, as are crossings that have been judged to be sub-standard and in locations where there is high demand. Creating environments that are more friendly for walkers is desired in many areas. In Sebastopol, for example, the Street Smart Sebastopol program is incrementally building crosswalks that increase pedestrians' safety and walking pleasure (the complete proposed projects lists can be found in Appendix A-ii)

AIR TRANSPORTATION

There are six public-use airports in Sonoma County: two are privately owned (Sonoma Skypark and Sonoma Valley), three are owned by cities (Cloverdale, Healdsburg, and Petaluma airports), and one is owned by the County of Sonoma—the Charles M. Schulz Sonoma County Airport (STS). All of these airports have general aviation activity consisting of single- and twin-engine piston-powered aircraft. Twin-engine turboprop and jet powered aircraft use the Sonoma County Airport, and to a lesser extent, the Petaluma Airport. There are approximately 850 aircraft based in Sonoma County.

STS is the only airport with commercial air passenger service. In addition, it has been designated a firebase by CalFire, which uses aerial tankers and helicopters in forest fire suppression operations when needed. It also has nearly half of all take-offs and landings of aircraft Until 2001, there was scheduled airline service feeding major hub airports, San Francisco (SFO) and for a period of time, San Jose (SJC). For a brief period in the 1980s jet service was provided to LAX. The peak of air passenger service was 130,000 boarding passengers in 1990, and in the final year of "hub" service, 2001, there were 50,000 passengers.

In 2007, Horizon Airlines (an affiliate of Alaska Airlines) resumed service by providing non-stop service to LAX three times a day, and Portland, and Seattle, and Las Vegas each once a day.

Airport goals, policies, and institutional roles are set forth in the Air Transportation Element of the County's Draft General Plan 2020. This document includes background material, air transportation demand and the County Airport System, compatibility with surrounding communities, air transportation policies, and implementing programs.

WATER TRANSPORTATION

Sonoma County has three significant harbors: Port Sonoma, Petaluma, and Bodega Bay. All of these serve primarily pleasure craft and some commercial fishing fleets at present. However, there is potential for future ferry service between Port Sonoma and San Francisco. The Petaluma River is considered navigable for boat traffic as far north as the East Washington Street Bridge.

FREIGHT RAILROAD TRANSPORTATION

During the 1980s and 1990s, rail transportation in Sonoma County underwent a number of significant changes. This line

had been owned by the Northwestern Pacific Railroad (NWPRR) and had provided service to Sonoma County since the 1870s. The NWPRR was owned by the Southern Pacific Railroad, a private corporation, which filed for abandonment of the line in the early 1980s, and then sold it to the Northwestern Pacific Railroad Authority (NWPRA), a joint powers public agency, in 1984. The NWPRA was then dissolved, and today the line is owned by two public entities: the North Coast Railroad Authority (NCRA) owns the line north of Healdsburg to Eureka, and the Sonoma-Marin Rail Transit (SMART) District. NCRA has a perpetual easement to operate freight service over the SMART tracks between Healdsburg and Lombard (Napa County via Novato), and SMART has a perpetual easement to operate passenger services between Healdsburg and Cloverdale on the NCRA tracks.

Despite the presence of the physical facility, there is no passenger or freight railroad service currently operated on this line. Rail passenger service was discontinued in the mid-1950s, and rail freight service operated intermittently until the 1990s. The line re-opened briefly in 2001, but then was closed by the Federal Railroad Administration due to a failure to meet safe track standards.[9]

The NWP mainline generally parallels U.S. 101 and Highway 37. Prior to discontinuance of freight services, an interchange of freight cars between railroads was made at Schellville Junction, where a connection was made to the Union Pacific (formerly Southern Pacific) Railroad. Currently, this interchange takes place somewhat farther east, at Lombard/Napa Junction. The NWP line continues to north of Eureka, but is inoperable due to storm damage and poor maintenance.

In July 2007, NCRA released an Initial Environmental Study and Notice of Preparation to prepare a DEIR to resume freight rail service between Willits (Mendocino County) and Lombard, approximately 142 miles. The proposed project includes general railroad freight service and the potential for hauling solid waste. The initial service is expected to consist of three round trips per week. The number of cars per train is estimated to the 15. Because the NCRA anticipates growth in the future, the EIR is studying a scenario in which three roundtrips per day operate, two between Cloverdale and Lombard, and one between Santa Rosa and Lombard. It is anticipated these trains would operate outside of SMART's primary operating hours (6-10 AM and 4-7 PM) in order to avoid conflicts with faster passenger trains on the single-track line.

US 101 is the primary route that would benefit from diversion of freight from truck to rail. The DEIR estimates that up to 400 truck trips would be removed in the loaded direction between Novato and Santa Rosa, 340 per day between Santa Rosa and Redwood Valley (near Ukiah). This is a beneficial impact for the North Bay's transportation system for both congestion relief, pavement wear and emissions. The Highway Capacity Manual 2000 estimates that each truck is equivalent to 1.5 passenger cars in flat terrain and 2.5 passenger cars in rolling terrain. For long upgrades of approximately three percent (e.g., the Cotati grade), with five to six percent trucks in the traffic stream, each truck uses the same amount of highway capacity as three passenger cars.

SYSTEMS MANAGEMENT AND OPERATION

Systems management and operation is a relatively new term that encompasses a collection of different activities and programs. It recognizes that the existing transportation system represents a major investment of resources over many decades, and seeks to manage and optimize its value as an "asset" in the most productive way. It seeks to operate the system in a safe and efficient manner as an integrated, intermodal system to serve the mobility needs of people and freight, and to thereby foster economic growth and development. The idea was

9 "Last Chance for the NWP?" by Dick Spotswood, The Headlight (publication of the Northwestern Pacific Railroad Historical Society," spring 2003.

formalized when it was included in the Federal "TEA-21" transportation legislation. The term includes improvements to the transportation system such as:

- Traffic detection and surveillance
- Arterial management
- Freeway management
- Demand management
- Work zone management
- Emergency management
- Electronic toll collection
- Automated enforcement
- Traffic incident management
- Roadway weather management
- Traveler information services
- Commercial vehicle operations
- Traffic control
- Freight management
- Coordination of highway, rail, transit, bicycle, and pedestrian operations

Many of these activities are not new, and in fact are several decades old in some cases, but they are related and covered under the umbrella term of systems management and operations. Activities in Sonoma County already include the following of them:

Freeway Management

Two key features of this activity are a Freeway Service Patrol (FSP), already implemented on US 101 from the county line north through Santa Rosa; and a performance monitoring system (PeMS). The FSP trucks can be seen along the freeway during peak hours, and are intended to provide a "rapid response" to any incident on the freeway. They can quickly remove stalls from blocking lanes, assist with towing vehicles in accidents, and provide on the spot service as needed. This can have a measurable impact on reducing delays, since studies have shown that for every minute of lane blockage, three minutes of congestion is created. During January 2008, these trucks provided almost 300 "assists" to motorists, or an average of 10 per day. FSP trucks are available during weekday peak hours, typically 6:30-9:30 AM and 3:30-6:30 PM, although service is available in the Marin/Sonoma Narrows as early as 5:30 AM. The service is provided free to motorists and has a greater than 95% approval rating among motorists.

The PeMS system includes embedded wire "loops" buried in the pavement that detect the number and speed of vehicles on each freeway lane. This information is transmitted to a traffic management center at Caltrans District office in Oakland. The loop information can be used to identify lane blockages or other problems and provide planning data on vehicle flows and congestion duration. The data are also fed directly to the 511 system (see next topic) to assist in traveler information planning. The loops presently end near Hopper Avenue in Santa Rosa, but will be expanded in the future. The loop data may also be used in the future to:

- Determine freeway ramp metering rates
- Activate closed-circuit TV cameras
- Provide information for changeable message signs that can alert drivers of incidents, average travel times, hazardous weather conditions (road flooding, fog, etc.)

511 System

The 511 system is a collection of traveler information systems operated by the MTC. It offers everything from telephone information on real-time traffic conditions and drive times, to transit schedules and carpool matching information. Information is available in web-based format (www.511.org) or via telephone (by dialing 511).

Travel Demand Management (TDM)

Travel demand management is a collection of methods and activities intended to reduce the demand for travel, especially during congested peak hours and/or in

TABLE 2-13. EXISTING PARK & RIDE LOTS

COMMUNITY	LOCATION	TRANSIT	AUTO SPACES	BIKE PKG	LIGHTING
Boyes Hot Springs	Route 12 at Thomson Avenue	GGT, SCT	10	No	Yes
Cloverdale	Asti Road and Citrus Fair Dr	SCT	90	Yes	Yes
Cotati	St Joseph Way at Route 116/ Old Redwood Hwy & U.S. 101	GGT, SCT	166	Yes	Yes
Cotati	Redwood Dr and Route 116	GGT, SCT	83	No	Yes
Fulton	River Road and U.S. 101 (@ PG&E Substn.)	SCT	20	No	Yes
Geyserville	Route 128 and Remmel Road	SCT	16	No	Yes
Guerneville	Route 116 at Mill Street	SCT	60	Yes	Yes
Healdsburg	Healdsburg Ave at Grant Ave, near U.S. 101	SCT	70	Yes	Yes
Occidental	Bohemian Hwy and Graton Road	SCT	25	Yes	Yes
Petaluma	North Petaluma Blvd at Gossage Avenue	GGT, SCT	22	Yes	No
Petaluma	U.S. 101/Route 116E at Lakeville Street	PT, GGT, SCT	135	Yes	Yes
Petaluma	South Petaluma Blvd near U.S. 101	GGT	40	No	No
Petaluma	Washington Street and Payran Street	GGT, SCT	600	Yes	Yes
Penngrove	Old Redwood Hwy at Main Street	GGT, SCT	30	Yes	Yes
Rohnert Park	Roberts Lake Road at Golf Course Drive	GGT, SCT	170	Yes	Yes
Rohnert Park	U.S. 101 at Rohnert Park Expwy soutbound	GGT, SCT	304	Yes	Yes
Rohnert Park	U.S. 101 at Rohnert Park Expwy northbound	GGT, SCT	180	Yes	Yes
Santa Rosa	Piner Road & Industrial Way; park in back	SRCB, GGT, SCT	214	Yes	Yes
Santa Rosa	Route 12 at Brookwood Ave (under fwy.)	SRCB, GGT	179	Yes	Yes
Schellville	Petaluma Ave at Burnett Street	GGT, SCT	47	No	Yes
Sebastopol	Route 121 at Route 116	GGT	40	Yes	Yes
Windsor	Old Redwood Hwy and Starr Road	SCT	40	Yes	Yes
Windsor	Windsor Road/Windsor River Road	SCT	94	Yes	Yes

Transit Abbreviations: GGT = Golden Gate Transit, SCT = Sonoma County Transit, PT = Petaluma Transit, SRCB = Santa Rosa City Bus
Source: www.rideshare.511.org

congested corridors. Among some of the current activities in the County are:

Sonoma County Transit Marketing: As the only 100% natural gas powered transit system in the San Francisco Bay Area, Sonoma County Transit will continue to market itself as the "The Clean Air Alternative," a promotion that began in 2006 to promote transit usage and the benefits of SCT's alternative fuel transit fleet. The ongoing "Try Transit" promotion is more generic and encourages the public to investigate the County's various transit offerings as an auto alternative. Enhanced marketing efforts that began in 2005 have resulted in a 5% ridership increase during FY 2006 and a projected 6% ridership increase for FY 2007. Major marketing efforts have included newspaper ads, two Highway 101 billboards, ongoing development of new Rider's Guides and a one-year commitment to television commercials on nine Sonoma County cable stations.

Santa Rosa–Voluntary Trip Reduction Program: Maintenance and expansion of a comprehensive incentive program to reduce single-occupied vehicles commuting into and out of the Santa Rosa city limits. The incentives include a

Guaranteed Ride Home, bus pass subsidies and incentives for commuters who walk, carpool or bicycle to work.

Santa Rosa–Student/Youth Pass Subsidy: This program provides a subsidy for Student/Youth monthly transit passes. The subsidy helps to attract and keep student/youth passengers.

Santa Rosa–Free Ride Program: This program provides funds marketing materials to promote the Free Ride Program, the direct purchase of incentives, and bus pass subsidies to encourage employees at participating employment sites to take public transit instead of their cars to/from work.

Petaluma Transit / Bike Marketing Program: This project is intended to be an ongoing marketing program that promotes alternate transportation, clean air, and congestion management activities. This program will facilitate and promote Petaluma Transit's "Walk, Bike, and Bus" campaign. The City's goal in this project is to promote bicycling and walking in conjunction with public transportation as a viable means of reducing traffic congestion, improving air quality, and promoting a healthy lifestyle in Petaluma and Sonoma County.

Current state law prohibits local governments from requiring TDM actions from existing employers. This means that all activities related to existing employers must either be voluntary or promotional in nature.

Arterial Management and Intelligent Transportation Systems

Many traffic signals today are activated by the presence of traffic and so can respond to changing traffic conditions at individual intersections. Sometimes signals are also coordinated or synchronized to improve traffic flow and reduce delay. Arterial management takes this a step further, and attempts to look at all signals in a corridor and provide flexible and adaptive traffic controls best suited to the traffic conditions on a minute-by-minute basis. The intent is to reduce delays and the number of stops experienced by motorists. Santa Rosa has installed a pilot system along College Avenue, and has found it results in significant improvements in traffic flow. Based on this success, it intends to expand the coverage of the system to other arterials in the future.

Park and Ride Lots

There are 21 official park and ride lots in Sonoma County that provide locations where motorists and cyclists can park their vehicle to either use transit or form a carpool. On page 31, there is a list of the lots, transit providers serving the site, the number of spaces, bicycle parking, and lighting. These lots are owned by a variety of entities, including cities, the County, and Caltrans. There may be informal locations (such as street or shopping center parking) where park and ride activities also take place, but these are not shown in the table.

CHAPTER 3

FUNDING OPTIONS & CONSTRAINTS

This chapter provides an overview of transportation funding and detail for identified sources traditionally available for transportation projects. The SCTA recognizes the need to implement projects and programs well beyond the historical range of transportation projects in order to meet new and existing goals, particularly those of emission reduction. This imperative is beginning to be addressed at all levels of government and is anticipated to translate into additional resources at the local level, yet, as of this writing, the exact type and timing of new resources is unknown.

For purposes of planning, the 2009 CTP assumes a level of funding will be made available over the life of the plan based on knowledge of existing transportation fundingsources, assumptions about growth in those available revenues and, to a limited degree, potential new sources. The 2009 CTP is constrained by that estimate and the prioritized list of projects must fit within the forecasted funding in order to present a reasonable assessment of what can be accomplished over the life of the plan. Existing and projected revenues will not meet all of our needs, but the SCTA has a long-standing history of supporting efforts at the local, State and federal level to maximize efficiencies related to providing transportation improvements as well as efforts to increase funding for transportation

In transportation, difficult funding challenges constantly arise when decision-makers are faced with having to choose between system maintenance and rehabilitation versus system expansion. An added complexity is that project sponsors must try to match up the requirements of the various fund sources with the projects of greatest importance.

The system of funding transportation is complicated and cumbersome due in large part to ever evolving policies and priorities that seek to meet the demands of varying interests and concerns as it relates to transportation improvements. This has sometimes led to restricting funds to specific kinds of projects (e.g., safety or bridge rehabilitation) or specific modes of travel. Some key points to keep in mind about existing transportation funds include:

- Funds are often dedicated to specific uses, e.g., gas tax funds cannot be used to pay for the operation of a new bus route.
- Some funds are automatically apportioned through formulas to various recipients, whereas some are discretionary with respect

to the recipient or the types of projects they can be spent on.

- Most funding mechanisms do not automatically change due to inflation in prices and thus often do not keep up with the cost of doing business. For example, the prices of materials used in highway construction—steel, concrete, and asphalt—have risen dramatically without a corresponding increase in gas tax revenues. Fuel prices have spiked, yet transit operators must try to run the same routes on the same budgets.
- Virtually all funding sources for transportation are "matching programs" in that they will not fully fund a project and require contributions from other sources. This process, known as leveraging, means that local funds can be substantially expanded when combined with state and federal funds. For example, a program with a 25% local match means that every dollar of local money equals three dollars of other money can be obtained. SCTA's policy has been to try to maximize the leveraging of federal, state, and regional funds wherever possible, to benefit the people of Sonoma County. The downside to this overarching approach is that projects end up being funded by numerous sources and if one of those were to decline or become unavailable the whole project is put at risk.
- As the transportation system ages, it grows more costly to maintain. Deferred maintenance often leads to short term savings, but longer term increases in costs.

The emphasis in this chapter is on funding, rather than finance, of transportation. Funding refers to the sources of revenue for transportation construction, operation, and maintenance. These include taxes, user fees, tolls, and similar sources. Finance refers to a method of paying for projects (usually capital improvements) and spreading the cost over a period of time beyond construction, in the same way that a homeowner who cannot afford to purchase a home for cash may spread out the cost of a house over 30 year mortgage.[1]

MAJOR REVENUE SOURCES

The SCTA has oversight over the distribution of nearly all discretionary State and federal funding for transportation in Sonoma County. Most of these funds come to the SCTA through MTC or directly from the State and federal governments. Measure M, a quarter cent sales tax, is administered directly by the SCTA. Measure M funds have been instrumental in enabling SCTA to leverage other fund sources, most notably over $165 million in Corridor Mobility Improvement Account (CMIA) funds through the State of California. As the State continues to face financial struggles, the SCTA must be nimble in its financial and project management to ensure maximum benefit is received from limited dollars and that the expectations approved by voters in Measure M can be met.

Most of the money used for transportation projects is generated from the users that pay fuel, sales and other taxes and fees. These tax dollars flow into federal, State and local funding pots. The federal funds are used primarily for capital projects such as new highway lanes, bus purchases and local road maintenance. State funds go to capital projects, transit operations and cover maintenance and operations of the state highway system. Local funds are used for capital, operations and maintenance for all transportation modes, as well as to match federal and state grants.

CURRENT FUNDING PROGRAMS

Federal Taxes and Funding Programs

The federal government imposes several taxes on surface transportation modes. Most drivers are aware of the 18.4 cent per gallon gasoline tax every

1 The National Transportation Infrastructure Financing Commission, created by SAFETEA-LU, also makes this distinction, and uses the two terms in the identical way as here.

time they fill up at the pump. Additional sources of revenues come from truck weight fees and tires. There are three key issues with the federal gas tax:

- California is a 'donor' state and historically has not gotten back all that it pays in gas taxes. Although this has improved in recent years, it means Californians' taxes are paying for highways in other states, especially large rural ones. The most recent federal transportation bill guaranteed that 92% of revenue any state paid would be returned to it, but that still translates into a significant funding loss to the state.
- As a tax on the gallons sold, the gas tax is not responsive to inflation. With recent spikes in gas prices, and the resulting decrease in the number of gallons sold, this has meant a reduction in the revenue collected.
- In the longer term, vehicles are expected to become more fuel efficient, with alternative fuels playing a larger role in the vehicle fleet. Although this is a positive for the environment, it will mean less funding for transportation needs in the future. Given that, other types of revenue generating mechanisms will have to be considered on a national level, e.g., a direct charge for vehicle miles traveled, rather than on gallons of fuel purchased. In the near term, the SCTA should advocate and lobby to restore the purchasing power of the Federal fuel excise tax, then index this tax to either the CPI or the cost of gasoline.

Surface Transportation Program / Congestion Mitigation Air Quality (STP/CMAQ)

STP and CMAQ are flexible funds because they are not restricted to particular modes. STP is the most flexible and can be used on most types of transportation projects while CMAQ funds are limited to the implementation of projects that improve air quality. The majority of federal transportation funding is used for capital projects, such as new highway and rail construction, and for specific projects earmarked by Congress.

Eligible uses for STP funds include:

- Roadway or transit rehabilitation
- Operational improvements
- Transit facilities
- Intermodal Port facilities

Eligible uses for CMAQ funds include:

- Bicycle paths
- Transit
- Park and Ride lots
- Signal Coordination

Transportation Enhancement Program (TE)

The Transportation Enhancement program (TE) is meant to provide capital improvements that go above and beyond normal road or transit projects. Eligible uses for TE funds include:

- Bicycle paths
- Pedestrian paths
- Rehabilitation of historic facilities linked to transportation

State Taxes and Funding Programs

California's major source of transportation funding is derived from fuel sales, in two ways. The first method is through the 18 cent/gallon motor fuel tax on gasoline and diesel collected pursuant to Sections 2104 through 2107 of the Streets and Highways Code. This amount is actually less than the 31 cents/gallon state tax paid in other states[2], although most other states do not apply sales taxes to fuel purchases (see below). A portion of this revenue is transferred to local governments on a formula basis, but is restricted to the planning, operation, maintenance, and construction of roads. Funds are distributed using a formula based on population, vehicle registration, and road

2 Source: American Petroleum Institute, accessed on 9/2/08. http://www.api.org/statistics/fueltaxes/upload/July_2008_Notes.pdf

miles. Most jurisdictions use this money for road maintenance purposes. Like the federal fuel tax, it is not automatically responsive to inflation, and the last time this tax was increased was 17 years ago, when voters passed Proposition 111.

The second source is from the retail sales tax on gasoline. Proposition 42 required that these funds normally be reserved for transportation purposes. However, a provision allowing funds to be diverted for other purposes in fiscal emergencies has been invoked in recent years, drastically limiting the funding available for transportation.

State Transportation Improvement Program (STIP)

STIP funds may be used for capacity increasing capital transportation projects, transit capital projects and road rehabilitation. The SCTA programs (i.e., allocates funds to projects by year) STIP funds every two years. As one of the only fund sources available for capacity increasing projects, the SCTA has traditionally used STIP funds to help pay for Highway 101 improvements.

Funding for the STIP has become much more volatile in the past few years due to the shift away from the State and federal gas tax. Instead, it is now more reliant on the State General Fund and thus subject to annual budget negotiations. This has made long term planning of transportation improvement projects much more difficult, since even the construction phase of a major transportation project is likely to last several years.

State Transit Assistance (STA)

These funds may be used for transit capital projects and transit operations and are claimed directly by public transit operators. Funds are appropriated from the State's General Fund, which is subject to annual review.

Transit Development Act (TDA)

TDA funds are the largest single source for transit operating and capital. These funds are generated by a ¼ cent retail sales tax, and are generally returned to the jurisdiction where the retail transaction took place. As described below, a portion of this tax is dedicated for bicycle and pedestrian programs.

TDA Article 3 Program

Each year the SCTA reviews and adopts a program of projects for bicycles and pedestrians to be funded through the TDA Article 3 program. These funds are generated as part of the sales tax and represent approximately 2% of the total TDA funds received in the county.

REGIONAL AND LOCAL FUNDING PROGRAMS

Transportation Funds for Clean Air (TFCA)

The SCTA is the program manager for the TFCA funds that come into Sonoma County. These funds are generated through a four-dollar surcharge on vehicle registrations within the Bay Area Air Quality Management District. The Air District covers the southern half of the county (Windsor south). These funds can only be used on specific projects deemed eligible by the Air District. Each year the SCTA approves a program of projects and submits it to the Air District for approval.

Measure M

The Traffic Relief Act for Sonoma County (Measure M) provides for a ¼ cent sales tax to be used to maintain local streets, fix potholes, accelerate widening Highway 101, improve interchanges, restore and enhance transit, support development of passenger rail, and build safe bicycle and pedestrian routes. Passed in 2004, the expenditure plan funds specific projects (including both capital and operations) until it expires in 2024. Measure M generates approximately $19 million annually in 2008 dollars.

Specialized Funding Sources

In addition to the programs described here, smaller, more specialized programs are available to local jurisdictions for specific projects. The State, with the passage of Proposition 116, provides funding for specified rail projects with a local match and demonstration of ability to operate. The State and federal governments offer grants through the Office of Traffic Safety and the Safe Routes to School program that are targeted to small scale safety oriented projects. Local jurisdictions also fund transportation projects through Community Development grants and development mitigation fees as well as from their own general funds. The SCTA has also programmed funds to special projects through regional programs including Transportation for Livable Communities, the Regional Bicycle & Pedestrian Program, and Lifeline Transit.

Traffic Impact Fees

These are funds collected by local government on new development, typically on a formula basis to pay for a specific list of capital improvement projects that would benefit the new development. The fees are typically paid when building permits are issued. The fee is usually based upon the number of vehicle trips projected to be generated by the new development. Use of the fees is restricted by State legislation (AB 1600), e.g., fees on new development may not be used primarily to correct existing traffic deficiencies. Although Sonoma County has several traffic impact fee areas, SCTA does not currently collect impact fees. There has been some discussion of creating a regional or multi-jurisdictional traffic impact fee to pay for regional improvements; there is precedent for doing this in other California counties.

Developer Dedications

Virtually all local governments with land use authority require major projects to provide on-site and street frontage improvements to their developments. Developers may also provide negotiated dedications of land or other transportation improvements.

Tolls

There are no toll facilities in Sonoma County. The Golden Gate Bridge, Highway and Transportation District (GGBH&TD) currently collects tolls for all vehicles crossing the Golden Gate Bridge. Funds are allocated by the District to for the operation and maintenance of the Golden Gate Bridge, as well as the Golden Gate Transit system (which includes buses and ferries). The Bridge District Board has three representatives from Sonoma County (out of 19 total). The Bay Area Toll Authority collects tolls on all the other bridges in the Bay Area.

MTC is considering a proposal to create a Bay Area-wide network of High Occupancy Toll lanes, or "HOT" lanes, whereby HOV lanes could be used free by carpools, but for a charge by single occupant vehicles. Such a program has been successfully operated in San Diego (I-15 North) for many years, with the toll fluctuating depending on congestion levels and the related travel time savings for solo drivers in using the HOT lane. This proposal will require special enabling legislation.

Public-Private Partnerships (PPP)

Public private partnerships (PPP or P3) are institutional arrangements in which a service traditionally provided by the public sector is instead operated through a partnership of government and one or more private sector companies. Transportation PPPs have taken a variety of forms, with the common characteristic that the transportation facility must be a direct revenue generator, whether it is a toll road or bridge, airport, or transit line. The most common models are leasing a public asset (including land) to a private entity, or selling the private entity as a concession the right to design-finance-build-operate-maintain (DFBOM) a new facility. This distinguishes PPPs from traditional arrangements in which the public sector purchases goods or services

LEVEL	REVENUES CONTROLLED	AGENCY	RELATED DOCUMENTS
State	State Transportation Improvement Program (STIP)	CTC	STIP Policy Resolutions Regional Transportation Plan (RTP) Guidelines
Regional (Bay Area)	RTIP & CMAQ Transportation Development Act (TDA) State Transit Assistance (STA) revenues	MTC	RTP Policy Resolutions Comprehensive Plan Guidelines County Transportation Plans
SCTA	Measure M County RTIP Allocation County STP/CMAQ Allocation Transportation Fund for Clean Air (TFCA) Funds	SCTA	Measure M Strategic Plan Comprehensive Transportation Plan

but normally does not provide most of the assets needed to complete the work.

Transit Fares

Transit fares currently pay for a portion of the operating and maintenance costs of all transit systems. The so-called "fare box recovery"—the percent of operating and maintenance costs recovered from rider fares—is typically 12 percent for Sonoma County Transit's fixed route and paratransit services combined, although fixed route services typically are higher than the average.3 For example, in FY 2004, GGT's bus system obtained approximately a quarter of its operating cost from fares. Virtually no urban public transit system in North America pays all of its operating expenses from fares; the shortfall in transit operating is made up for by TDA and STA funds.

PROJECT REVENUES

Allocation

The 2009 CTP expenditure list can be found in Appendix A. Projects that were part of the 2004 CTP but were not completed have been included in this update. New projects were evaluated based on their ability to meet the goals determined by the SCTA. A discussion of the goals and performance measures can be found in Chapter 4.

As part of its financial forecasts for the Transportation 2035 Plan, MTC projects that $223 billion in federal, state, regional and local revenues will reasonably be available to the region over the next 25 years. About $191 billion (roughly 85 percent) is committed by voter mandate, statute or MTC policy towards maintaining and operating our existing systems. The remaining $32 billion is considered uncommitted discretionary revenues available for a wide range of investments in the areas of maintenance, system efficiency and expansion. It is anticipated Sonoma County will receive its population share of 6.5% of the total regional funding.

Implementation Process

The table at left illustrates which level of government controls which types of transportation revenues. A bottom up process is key to identifying funding for projects.

MTC has published a booklet called Moving Costs that describes the funding programs in greater detail. It is available to the public at MTC's website: (www.mtc.ca.gov/library/funding_guide/moving_costs.pdf).

3 Sonoma County Transit, Short Range Transit Plan FY2007-2016, Final April 2007, Figure 1-4.

CHAPTER 4

VISION FOR THE FUTURE

TRANSPORTATION PLAN GOALS

The four goals of the 2009 CTP are

- Maintain the System
- Relieve Congestion
- Reduce Emissions
- Plan for Safety & Health

The 2009 CTP has four overarching goals. The first two, Maintain the System and Relieve Congestion have been in previous Comprehensive Transportation Plans and continue to pose challenges and opportunities.

The last two goals, Plan for Safety and Health and Reduce Emissions are new to this plan. The issue of personal and public safety and health as it relates to transportation planning arose during the public outreach as an area of significant concern in Sonoma County. These have always been important issues in the development of transportation plans and projects, but now, especially as they intersect with other goals such as preserving air quality, maintaining a safe and efficient transportation system and reducing congestion, health and safety require special attention in transportation planning.

Addressing emissions from transportation projects has historically been done via air quality analysis on a project level basis, but with new State law and local expectations about reducing greenhouse gas emissions the 2009 CTP has a greater focus on the problem of climate change, a look at the connection to transportation and analysis of strategies to address the problem here in Sonoma County. This is set forth in the new policy goal to Reduce Emissions.

In support of the CTP update, six transportation scenarios, representing sets, or programs, of transportation improvement solutions, were tested using SCTA's travel demand model. The Sonoma County Travel Model (SCTM 07) uses land use, population, and employment data for

CTP TRANSPORTATION SCENARIOS

No Action/No Build

Projects with Likely Sources of Funding

Projects with Unknown Sources of Funding

Smart Growth Land Use with Supportive Transit Expansion

Innovative Congestion Pricing Strategies

Comprehensive–Projects, Smart Growth Land Use/Transit, and Pricing

Important transportation strategy categories are shown below with more detailed strategies included in the discussion of each CTP goal and objective (See Appendix A-i–Strategies Matrix for more detail):

- Improve Bicycle and Pedestrian Facilities and Safety
- Improve Transit Service and Facilities
- Land Use Improvements
- Promote Ride Sharing and more efficient use of existing travel system
- Implement Travel Demand Management
- Implement Transportation Pricing Policy
- Implement Traffic Flow Improvements
- Encourage Transportation Technology Improvements
- Maintain the System
- Expand the System

Sonoma County to estimate trips, travel patterns, traffic volumes, congestion, and travel mode for the current and future (2035) countywide transportation system.

The six scenarios representing different future transportation improvement alternatives were evaluated based on a set of scenario performance measures. Performance measures can be used to quantify how well the goals and objectives of the plan are being meet. Performance measures analyzed include greenhouse gas emissions, vehicle miles traveled, and congestion (See Appendix C-vi for more information on SCTM 07 and a detailed summary of scenario analysis results).

The results of the scenario analysis support the policies and projects contained in this plan. Model output, CTP project lists, and the transportation strategies matrix serve as decision support tools to aid decision makers in the prioritization of transportation projects and policies, and provide guidance on which types of projects and policies will allow SCTA to meet its goals and objectives.

There are a few specific cases where the solutions proposed here seem to contradict (for example roadways that are safer often carry more traffic and lead to more driving), but the overarching solution to transportation problems is to drive less. This is only possible when viable options are available to the public—be it transit, bike routes, land use planning, housing, school and job linkages, pedestrian amenities, car share and ride share programs, ability to make shorter trips or avoid trips altogether, etc. Mobility relies on options and the 2009 CTP is aimed at addressing how those options can best meet the needs of our community and address the plan goals.

Implementing the necessary options requires two basic ingredients: funding and a shift in personal transportation habits. Aside from being inadequate to meet the needs of transportation, funding is funneled through dozens of special programs, at various levels of government, with specific goals and eligibility that do not always fit well with the goals of the local community. Funding will be addressed in greater detail as a separate chapter in the plan. The issue of modifying personal transportation habits is reliant on the availability of reliable options to driving and is linked to pricing, land use and technology.

The 2009 CTP is structured to place general policy and planning information in this chapter and provide a higher level of detail as appendices to cover key information such as project lists, a list of innovative transportation improvements (or Transportation Strategies Matrix), transportation's role in the production of GHG emissions and more detailed reports.

PERFORMANCE MEASURES

REDUCE GHG EMISSIONS TO 25% BELOW 1990 LEVELS BY 2015, AND 40% BELOW 1990 LEVELS BY 2035.

REDUCE VMT PER CAPITA BY 10% BELOW CURRENT LEVELS (2005) BY 2035.

REDUCE PERSON HOURS OF DELAY 20% BELOW TODAY'S LEVELS (2005) BY 2035.

IMPROVE COUNTYWIDE PCI TO 80 BY 2035, WITH A MINIMUM ROAD PCI OF 70 BY 2035.

GOAL 1. MAINTAIN THE SYSTEM

Objective: Protect the investment in public transportation infrastructure.

Maintaining transportation infrastructure covers many activities from keeping ditches clear so they drain properly to purchasing new buses to keeping bike lanes free of debris and sealing cracked pavement on a local roadway. The transportation infrastructure is the most expensive asset owned by local governments and is also the most expensive to maintain.

No one likes potholes, but it is a fact of life that many jurisdictions respond to funding shortages by deferring preventative maintenance for roads, which has drastic consequences on the condition of pavement. The 25 year planning horizon must also account for replacement of the bus fleet—large fixed route vehicles as well as paratransit buses, vans and cars. This, in addition to important routine maintenance, is protection of a significant investment.

Policy 1A:

Pavement Management: Maintain streets and roads at a standard within the range of 70-80 Pavement Condition Index (PCI)—the equivalent of good to excellent on the PCI scale. Include the maintenance of bicycle routes along roadways as part of this measure.

Transportation Strategies:

- Maintain State Highway System
- Improve Local Streets/Roads PCI
- Improve Conditions/Maintenance Of Bike/Ped Facilities

Policy 1B:

Bus Fleet Management: Ensure that all revenue vehicles and all bus stop facilities and transfer stations are properly maintained and all maintenance personnel are properly trained.

Transportation Strategies:

- Maintain Transit System

GOAL 2. RELIEVE TRAFFIC CONGESTION

Objective: Reduce person hours of delay 20% below 2005 levels by 2035 through strategic improvements, technology and changes in driving habits.

Freeway congestion monitoring data for 2006 indicates that freeway congestion, measured in vehicle hours of delay, increased 75% between 2002 and 2006 in Sonoma County, and 45% between 2004 and 2006. In 2007 it increased another three percent, to 7,900 vehicle hours of delay. By way of contrast, the remainder of the Bay Area (eight counties) had less than a 15% increase in delay between 2004 and 2006. It is also noteworthy that the duration of congestion—from the time it starts until the time it ends—has also increased dramatically. Some segments of US 101 now begin experiencing congestion in the early- to mid-afternoon. Southbound Highway 101 in south Petaluma becomes congested by 5:30 AM.

State Highway 12 links Sebastopol, Santa Rosa, the Sonoma Valley, and Napa County. It also provides an important connection to the Interstate 80 corridor, for interstate trucks, commuters and recreational trips. Within Santa Rosa, between Fulton Road on the west to Farmers Lane on the east, State Highway 12 is developed to freeway standards.

The two lane sections in Sebastopol and in the Sonoma Valley are severely congested on both weekdays and weekends

Arterials are also showing signs of strain. Main Street (Penngrove) suffers considerable peak period weekday traffic congestion due to drivers avoiding congestion on U.S. 101, and new development in northeast Petaluma and east Rohnert Park. Arnold Drive, River Road, Old Redwood Highway, Bodega Highway, Lakeville Highway, and Petaluma Hill Road have heavy weekday traffic. Todd Road, Llano Road, Crane Canyon Road have congested conditions on weekdays and many roads within incorporated cities have severe congestion.

Future travel demand analysis shows that congestion could continue to worsen (roughly 6 times more congestion that current levels) given our current course. Currently congested locations are expected to experience increased back-ups, with local arterials absorbing the bulk of future traffic and becoming more and more congested.

Adding additional roadway and transit capacity, implementing smart growth land use policies, and implementing transportation pricing policies, were all shown to provide significant congestion relief in future model output.

Travel Demand Management programs and new technologies are promising methods for reducing traffic delay. Shifting travelers to different travel modes (transit, car/vanpools, bicycles, walking and car-sharing), different times to avoid peak congested periods (flextime, compressed work week), and avoiding trips altogether (telecommuting, etc) also have great potential for reducing traffic congestion.

Increases to transit service, adding rail service in Sonoma and Marin, and decreased transit headways require strategic expansion as well in terms of both capital expenses to purchase rolling stock (buses and trains), and operating and maintenance needs.

Policy 2A:

Implement strategic transit and roadway capacity expansion to meet current and future needs

There are critical roadway projects that have been planned for decades that still need to be completed—Highway 101 HOV lanes, Penngrove area improvements, certain interchange and intersection configurations and other projects identified in Appendix A-ii.

Additionally, expansion of transit service is needed both with the initiation of passenger rail service via SMART and with increased bus service from all of our local and regional operators. Providing individuals with convenient, safe and easy alternatives to their car expands the capacity of the roadways.

Adding additional roadway and transit capacity was shown to provide one of the biggest congestion relief benefits in future model runs. Roadway expansion , beyond the completion of the HOV system, may create immediate congestion relief, however long term consequences include increased VMT and GHG emissions.

Transportation Strategies:

- Expand Local Streets/Roads Capacity
- Expand Transit Capacity
- Complete HOV system

Policy 2B:

Expand rideshare, carpool, van pool, travel demand management, and telecommute programs.

There are innovative programs in place that reduce the vehicle miles traveled of individuals in single occupant vehicles. Santa Rosa CityBus and Sonoma County Transit work with local employers to provide incentives to ride the bus instead of drive. Regionally, 511.org offers ride share programs. Car-sharing is a new option that is in preliminary development in Sonoma County but is in effect in the urban centers in the Bay Area. Travel demand management and telecommute programs can be effective

at reducing countywide travel or shifting trips to less congested periods.

Transportation Strategies:

- Increase Ridematching Services
- Increase the number and capacity of park and ride facilities
- Telecommuting
- Travel Demand Management

Policy 2C:

Implement new technologies to monitor and control traffic flow.

Moving traffic smoothly will help relieve congestion on major roads by reducing the stop and go and increasing awareness of conditions with changeable message signs. Signals at freeway on ramps helps control the number of vehicles attempting to merge at one time and allows the flow of traffic to absorb more vehicles without a significant slowdown. Real-time information about traffic conditions enables drivers to make choices about what route or what mode will serve them best.

Transportation Strategies:

- Incident Management
- Traveler Information Programs
- Signalization Improvements/ Intelligent Transportation Systems
- Traffic Circles/Traffic Calming
- Turn Restrictions at Intersections
- Goods Movement Improvements

Policy 2D:

Implement pricing strategies to help relieve congestion and make progress in attaining goals related to reducing GHG and maintaining the transportation system.

User based pricing strategies have demonstrated the ability to reduce congestion, reduce the number of solo drivers, shift vehicle trips from peak hours, decrease vehicle emissions, and improve safety. Successful implementations such as London and Singapore congestion pricing systems, San Diego's I-15 HOT Lane implementation, and Trondheim, Norway's 'toll ring', suggest that these types of strategies may be successful in Sonoma County.

Transportation pricing policy measures are shown to have significant congestion and travel reduction benefits in future year analysis.

Transportation Strategies:

- Increase Gas Tax or User Fees
- Congestion Pricing
- High Occupancy Toll Lanes
- Increased Parking Charges
- Carbon Offsets

GOAL 3. REDUCE GREENHOUSE GAS EMISSIONS

Objective: Meet the targets to reduce GHG emissions 25% below 1990 levels by 2015, and 40% below 1990 levels by 2035 by working with government agencies and the public.

In Sonoma County the transportation sector contributes roughly 60% of all county greenhouse gas (GHG) emissions. This is a new issue to the field of transportation planning which requires research, analysis and aggressive strategies to ensure success in meeting greenhouse gas reduction targets. Included as Appendix C-i is the SCTA Greenhouse Gas Emissions Reduction White Paper that was written specifically to inform policy makers and the community about the connection between transportation and climate change.

In 2007, transportation GHG production represented a roughly 34% increase from 1990 levels of GHG production.[1] The California Global Warming Solutions Act (AB32) mandates that CO2 and other GHG emissions be reduced to 1990 levels by the year 2020. All Sonoma County Jurisdictions have set a more ambi-

1 Data from the Climate Protection Campaign 2005 May 2008 Status Report, HPMS (Highway Performance Management System) Annual VMT data, and GHG eCO2 productions based on output from CACP software.

tious goal of reducing GHG emissions to 25% below 1990 levels by 2015. The Bay Area region has set a longer term goal of reducing regional GHG emissions to 40% below 1990 levels by 2035.

A number of broad approaches can be taken to meet these goals. CTP model analysis shows that increasing fuel efficiencies and vehicle occupancies, implementing transportation pricing policies aimed at reducing VMT, and encouraging transit oriented development are effective at reducing future GHG emissions.

The policy solutions that reduce GHG emissions, and will allow SCTA and local jurisdictions to meet county and regional GHG reduction targets, rely upon a variety of approaches and require a concerted and sustained effort at varying levels of government. See Appendix C-i for a more detailed look at GHG Reduction strategies.

Policy 3A:

Reduce vehicle miles of travel (VMT) per capita by 10% below 2005 levels by 2035.

Land use planning for concentrated, contiguous and balanced development provides opportunities to meet daily needs with shorter car trips or by walking, bicycling, or taking transit. This will reduce overall VMT and efforts to manage congestion, reduce energy vulnerability, and achieve air quality health standards. These land use changes in conjunction with expansion of the transit system and transportation pricing measures are shown to have the greatest impact on reducing future VMT in CTP model analysis.

The VMT reduction benchmark may seem quite conservative when compared to the GHG reduction benchmark. This represents the difficultly in actually reducing the number and length of trips people are making. GHG reduction includes reducing VMT, but can also be addressed by shifting travel modes, using more efficient vehicles, and by using cleaner fuels, and achieving more aggressive reductions in GHG emissions should be easier due to the breadth of possible reduction methods.

Transportation Strategies:

- Transit Oriented Development
- 4-d Transportation Investment (density, diversity, design, destinations)
- Infill Development and Carbon Efficient Design
- Address Jobs-Housing imbalance
- Encourage smaller neighborhood locations for daily goods and services
- Housing Assistance
- Travel Demand Management (TDM)
- Public Education/Travel Choice Programs
- Promote Telecommuting
- Promote school based TDM
- Implement Carsharing Programs

Policy 3B:

Increase transit use and productivity.

Clustering and intensification of residential and commercial development along transit lines and around transit facilities increases the number of jobs, services, and recreation opportunities that can conveniently be reached by transit. These increased opportunities to use non-automobile travel modes lead to higher levels of transit ridership, cost effectiveness, and potential for even higher transit service levels.

Expansion of the countywide transit system, in conjunction with supportive land use policy, is shown to have a positive impact on reducing future congestion, VMT, and emissions in the future based on CTP modeling.

Transportation Strategies:

- Implement Rail Transit Service (SMART)
- Transit Marketing
- Increase and Improve Bus Transit Service
- Improve Transit Amenities

- Implement Bus Rapid Transit (BRT) and Express Bus Service
- Transit Priority Measures
- Lower fares
- Implement Ferry Service

Policy 3C:

Improve accessibility and safety for pedestrians at and around activity centers.

Concentrated, mixed land uses coupled with pedestrian friendly site design not only facilitate non-motorized and other non-auto driver travel by residents, but also by commuters, students and commercial visitors. Knowledge that most activities within a center can be reached on foot or via local transit diminishes perceived need to drive to a center, enhancing choice of transit and carpooling.

Transportation Strategies:

- Improve Pedestrian Facilities
- Promote and Seek Funding for Safe Routes to Schools

Policy 3D:

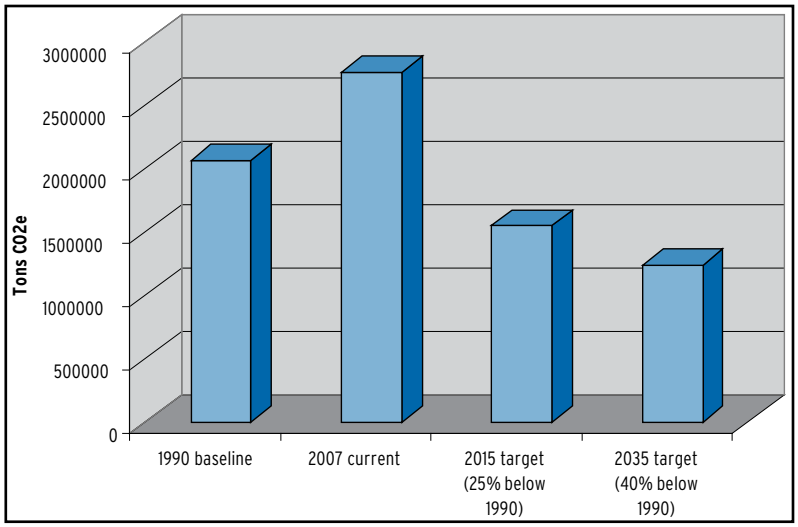
Implement 2008Countywide Bicycle and Pedestrian Master Plan

Providing a safe, attractive, and effective bicycle and pedestrian network that includes bicycle parking is an important step in encouraging increased bicycle and pedestrian travel.

Transportation Strategies:

- Improve Roadway Bicycle Facilities and Bike Paths
- Improve Transit and Bicycle Integration
- Require Bicycle Lockers/ Racks at Park and Ride Lots
- Require Bicycle Facilities and Showers at new Developments

SONOMA COUNTY GHG EMISSIONS AND TARGETS



Policy 3E:

Support development and deployment of new technologies to reduce transportation emissions.

Transportation improvements such as increase vehicle fuel economies are shown to have great potential for reducing future GHG emissions in future years. Other emerging or yet to be developed technological transportation improvements will provide additional benefits.

Transportation Strategies:

- Increase Fuel Efficiencies
- Improve Fuels/Biofuels
- Accelerate School Bus Replacement
- Provide Fuel at Stabilized Cost

GOAL 4. PLANNING FOR SAFETY AND HEALTH

Objective: Increase safety and emphasize health aspects of transportation planning strategies

There is a growing trend among transportation planners and health professionals to focus on the link between a healthy community and safe transportation options as a means to improving public health. Transportation is intimately related to public health issues on a variety of fronts, be it that traffic accidents are

the leading cause of death for teenagers or that fatality and injury accidents impact everyone in the community or that air quality effects asthma suffers, or that safe bicycle and pedestrian routes can benefit transportation and health. This chapter discusses safety and health issues in the transportation context. Appendix C-iv provides more detailed information that helps define strategic safety planning. Appendix C-ii, Transportation & the Built Environment, provides background about the health problem and healthy transportation options.

Policy 4A:

Planning for Transportation Safety—Adopt State of California goals to minimize traffic related fatalities.

Strategic safety planning, which has also been called "safety conscious planning," is done to assure that road safety becomes an explicit priority in land use and transportation planning, thus establishing a safer transportation network.

The fundamental approach is to do whatever possible at each stage of planning and design of transportation infrastructure to promote safety. This includes:

- Reducing exposure and the amount of travel
- Reducing the risk associated with travel that does take place
- Reducing the consequences of crashes that do occur

Policy 4B:

Planning for Public Health—Plan neighborhoods that encourage walking, biking and physical activity, and connect residential areas, workplaces, schools, commercial centers and community facilities

There is mounting evidence that land use planning, urban design, and transportation systems have a powerful effect on health issues.

Chronic disease, including cancer, heart disease, stroke, chronic lung disease and diabetes, accounts for the majority of deaths in Sonoma County. Many chronic diseases, some of which are linked to obesity and lack of exercise, are considered preventable.[2] Reduced reliance on the automobile is central to healthier transportation.

Transportation Strategies:

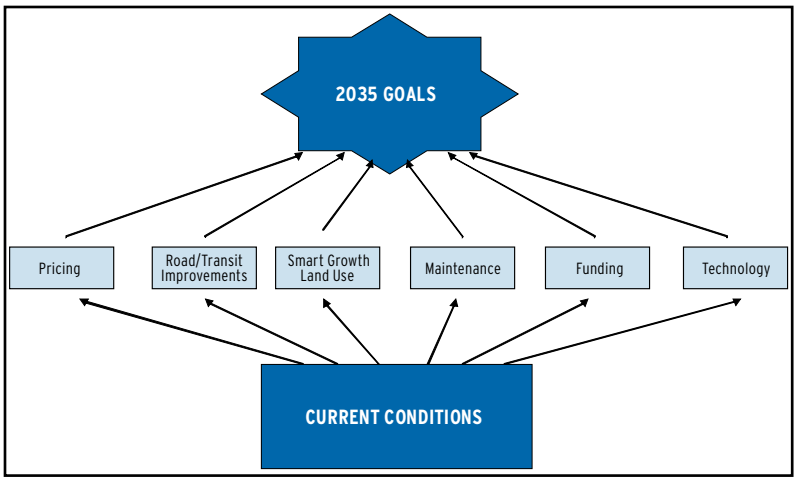
- Transit Oriented Development
- 4-d Transportation Investment (density, diversity, design, destinations)
- Infill Development and Carbon Efficient Design
- Address Jobs-Housing imbalance
- Encourage smaller and more frequent service centers
- Housing Assistance
- Improve Roadway Bicycle Facilities and Bike Paths
- Improve Transit and Bicycle Integration
- Require Bicycle Lockers/ Racks at Park and Ride Lots
- Require Bicycle Facilities and Showers at new Developments
- Improve Pedestrian Facilities
- Promote and Seek Funding for Safe Routes to Schools

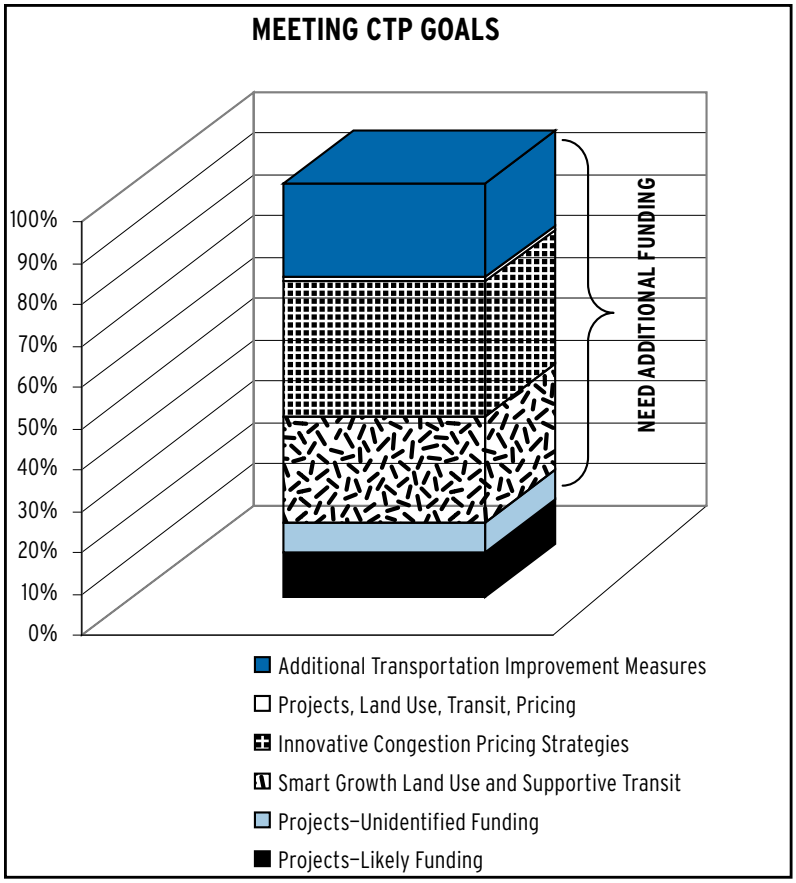
2 Sonoma County Department of Prevention & Planning

IMPLEMENTATION

A combination of capital improvements (transit and selected expansion of the highway/roadway system), land use improvements, transportation technology improvement, and the introduction of transportation pricing policy, has been demonstrated in CTP model analysis to come closest to meeting CTP benchmarks. Future year model analysis demonstrates that SCTA will only be able to make it roughly 1/10 of the way to meeting CTP benchmarks assuming only projects with likely funding are implemented in the future. Considering approaches that do not have indentified funding such as smart growth land use development and supportive transit, implementing innovative congestion pricing strategies, and funding additional transit and roadway projects have the potential to get SCTA about 70% of the way to meeting CTP benchmarks. Additional transportation improvement measures identified in this policy chapter and the transportation strategies matrix, along with emerging and currently unidentified transportation improvement strategies can help close the gap and allow these benchmarks to be met.

A balanced approach, focused on pricing, road and transit improvements, smart growth land use policy, system maintenance, maximizing and seeking new funding, and encouraging and implementing transportation technology improvements have the potential to provide the greatest level of VMT reduction, congestion, and GHG emissions reduction benefits. Many of the strategies identified in this plan are currently unfunded, making the identification and procurement of additional future transportation funding a critical component to supporting this approach and will be necessary to allow SCTA to meet CTP goals.





WHAT DO WE NEED TO DO NOW?

- Maximize and Find New Sources of Funding
- Change Travel Behavior
- Improve Transit Capacity
- Support Improvement of the Highway and Local Streets and Roads System
- Support Smart Growth Land Use
- Support Alternative Transportation
- Maintain Existing Infrastructure
- Advocate State and Federal Legislative Change
- Gather Public and Private Support
- Support Technological Innovation and Deployment

APPENDICES

Appendix A. LISTS OF PROJECTS

i. Strategies Matrix

STRATEGIES MATRIX

STRATEGIES AND ACTIONS	COST	BENEFITS	IMPLEMENTING PARTY	IMPLEMENTATION NEEDS	IMPLEMENTATION TIME FRAME	EXAMPLES OF IMPLEMENTATION
BICYCLE AND PEDESTRIAN MEASURES						
Improve Roadway Bicycle Facilities and Bike Paths	Moderate	3.5	Local Jurisdictions, SCTA	Funding, Bike Plan Updates	Medium	Local Projects, Davis, Portland, Boulder
Improve Transit and Bicycle Integration	Low	3.5	Transit Providers, SCTA	Integration Plan, Funding	Short	Sonoma County Transit
Require Bicycle Lockers/ Racks at Park & Ride Lots	Low	2.9	Transit Providers, SCTA	Funding	Short	
Require Bicycle Facilities and Showers at new Developments	Low	2.9	Local Jurisdictions	Local Ordinances and Support, Funding	Short	
Improve Pedestrian Facilities at Activity Centers	Moderate	3.5	Local Jurisdictions, SCTA	Funding, Pedestrian plans	Short	TLC Projects–Bay Area
Promote and Seek Funding Safe Routes to Schools Project	Low	3.8	Local Jurisdictions, School Districts, Non-profits, SCTA	Coordination with potential project sponsors, funding	Medium	Marin County
TRANSIT MEASURES						
Increase and Improve Bus Transit Service	Moderate	3.8	Transit Providers, SCTA	Funding, Ridership Surveys, Implementation Plan	Medium, depends upon availability of capital and operating funds	
Implement Bus Rapid Transit (BRT) and Express Bus Service	Moderate	3.5	Transit Providers, Caltrans, Local Jurisdictions, SCTA	Transit Priority Measures, funding, feasibility study	Short/Long depending on extent of implementation	VTA, Muni, Eugene
Implement Rail Transit Service (SMART)	High	3.4	SMART/SCTA	Funding	Long	Seattle
Implement Ferry Service	High	2.4	To be determined	Feasibility Studies, Funding	Long	Larkspur, other bay area
Implement Preferential Treatment for Buses on local roadways (queue jump lanes, signal preemption etc.)	Moderate	3.1	Local Jurisdictions, Caltrans, SCTA	Feasibility Studies, Funding, Implementation Plans	Medium	Ottawa, Ontario; San Francisco

STRATEGIES MATRIX

STRATEGIES AND ACTIONS	COST	BENEFITS	IMPLEMENTING PARTY	IMPLEMENTATION NEEDS	IMPLEMENTATION TIME FRAME	EXAMPLES OF IMPLEMENTATION
Improve Transit Marketing and Information	Low	2.6	Transit Providers, SCTA	Funding	Short	Ongoing Sonoma County, Santa Rosa and Petaluma
Lower Price for Transit Tickets to Encourage Ridership	Moderate	2.9	Transit Providers, SCTA	Funding, Feasibility Study	Medium, depends upon finding additional operating funds	Spare the Air Days, Free Transit Service, Chapel Hill, NC
Improve Transit Amenities (bus shelters, bulbouts, real time information)	Low/ Moderate	2.9	Transit Providers, SCTA	Funding, Implementation Plan	Medium	Santa Rosa CityBus
LAND USE MEASURES						
Cluster High Density Housing & Services Near Transit Hubs and promote compact mixed use development	Low for public sector	4.4	Local Jurisdictions, Private Sector	Land Use Policy Reform, Zoning Reform, Marketing, Public Sector buy-in	Long	Bart Station Examples, San Diego, Portland
Develop Transportation Investment Criteria that supports 4-d Development Strategy (density, diversity, design, destinations)	Low	4.5	Local Jurisdictions, Private Sector	Policy	Long	MTC
Encourage Infill Development and Carbon Efficient Design	Low	3.3	Local Jurisdictions, Private Sector	Policy	Long	
Work to overcome Jobs Housing imbalance. New job development should be accompanied by new housing suitable for jobs added.	Low for public sector	3.8	Local/Regional Government, Private Sector	Land Use/Zoning Reform, Affordable Housing, Policy	Long	
Encourage smaller less centralized locations for daily goods and services (small neighborhood groceries, clinics providing daily/routine proceedures away from hospitals, etc.).	Low for public sector	3.8	Local/Regional Government, Private Sector	Land Use/ Zoning Reform, Affordable Housing, Policy, Private Sector Buy-in	Long	
Implement Housing Assistance Program to provide apppropiate employee housing near employer	Moderate/ high depending on extent of the program	3.4	SCTA, Local Jurisdictions, Regiona//State/ Federal Government	Land Use Policy, Zoning Reform, Marketing, Public Sector Role, Funding	Medium/Long	ABAG, SCAG, Fannie Mae, Freddie Mac

STRATEGIES MATRIX

STRATEGIES AND ACTIONS	COST	BENEFITS	IMPLEMENTING PARTY	IMPLEMENTATION NEEDS	IMPLEMENTATION TIME FRAME	EXAMPLES OF IMPLEMENTATION
RIDESHARING						
Increase Ridematching Services	Low	2.8	Transit Providers, SCTA, MTC	Funding, Outreach	Short, depending on funding	
Increase the number of park and ride facilities	Moderate	2.6	Transit Providers, Caltrans, Local Jurisdictions, SCTA	Funding	Medium, dependent on funding and identifying appropriate sites	
Travel Demand Management						
Conduct outreach and provide incentives for employers to implement TDM	Low	3.0	Local Jurisdictions, SCTA, MTC	Funding, Implementation Plan, Staff	Short	Denver, North Central Texas COG, Tucson
Conduct Public Education Programs such as Travel Choice	Low	3.3	Local Jurisdictions, SCTA, MTC	Funding, Implementation Plan, Staff	Short	
Promote Telecommuting	Low	3.8	Local Jurisdictions, SCTA, MTC	Funding, Implementation Plan, Staff, Marketing/Outreach	Short	Washington–Commuter Challenge
Promote school based TDM (school pool, Safe Routes to Schools)	Low	3.9	Local Jurisdictions, SCTA, MTC	Funding, Implementation Plan	Short	Marin County
Implement Carsharing Programs	Low, covered by carsharing operator	3.1	Private Secto, Non-profits with Public Sector Support	Policy Reform, funding, marketing, support of private sector	Short	Bay Area
PRICING						
Implement HOT Lanes on major highways	N/A should generate revenue	2.0	Caltrans, SCTA, MTC	Funding, Policy Reform	Long	So. California, Bay Area, Virgina, Texas
Charge for Parking at activity centers (employers, shopping centers, etc.)	N/A should generate revenue	2.3	Local Jurisdictions, SCTA	Policy Refrom	Long needs much public outreach	SF, Berkeley, Oakland
Implement Congestion Pricing	N/A	3.0	Local Jurisdictions, SCTA	Funding for Infrastructure, Feasability study, policy reform	Medium/Long	London
Support Increases in Gas Tax or User Fees on regional, state, and federal level	N/A	3.4	SCTA	Policy Change	Unknown	Europe, Japan

STRATEGIES MATRIX

STRATEGIES AND ACTIONS	COST	BENEFITS	IMPLEMENTING PARTY	IMPLEMENTATION NEEDS	IMPLEMENTATION TIME FRAME	EXAMPLES OF IMPLEMENTATION
TRAFFIC FLOW IMPROVEMENTS						
Preferential Treatment of HOVs	Moderate	3.0	Local Jurisdictions, Caltrans, SCTA	Funding	Medium	Existing HOV networks
Incident Management Programs	Low	2.0	Local Jurisdictions, Caltrans, SCTA	Funding	Medium	Caltrans, other state DOTs
Implement/Improve traveler information programs	Moderate	2.5	Caltrans, SCTA, MTC	Funding	Medium	Caltrans, other state DOTs
Signalization Improvements or Computerized Traffic and Transit Control on Arterials and other ITS improvements	Moderate	2.4	Local Jurisdictions, Caltrans, SCTA	Funding	Medium	Santa Rosa
Add Traffic Circles and other traffic calming measures		2.4				
Turn Restrictions at Intersections	Low/ Moderate	2.5	Local Jurisdictions, Caltrans, SCTA	Funding	Short	Reno, Nevada
Goods Movement Improvements	Depends on implementation strategy	2.9	SCTA, Regional, State, Federal Government	Funding, Policy	Long	
Transportation Technology Improvements						
Increase Fuel Efficiencies	Low for public sector	2.8	State, Federal Government	Policy	Long/Medium	Europe, Japan
Improve Fuels/Biofuels	Low for public sector	2.8	State, Federal Government, Private Sector	Policy	Long/Medium	
Accelerated School Bus Replacement	Moderate	2.4	School Districts, SCTA, State/ Federal Government	Funding, Policy	Medium	
Provide Fuel at Stabilized cost	Moderate/ high depending on extent of the program	2.0	Federal/State Government	Technology Change, Market Stabilization, Energy Policy	Short/Medium	

STRATEGIES MATRIX

STRATEGIES AND ACTIONS	COST	BENEFITS	IMPLEMENTING PARTY	IMPLEMENTATION NEEDS	IMPLEMENTATION TIME FRAME	EXAMPLES OF IMPLEMENTATION
Carbon Offsets	Moderate/ high depending on extent of the program	2.0	Local Jurisdictions, SCTA, Private Sector	Funding, Policy	Short/Medium	Local programs
MAINTAINANCE						
Maintain State Highway System	Moderate	2.0	State/local government	Funding, Policy	Short/Medium	
Improve Local Streets/Roads PCI	Moderate	2.3	Local government	Funding, Policy	Short/Medium	
Improve Condition/Maint. Of Bike/Ped Facilities	Low/ Moderate	3.5	Local government	Funding, Policy	Short	
Maintain Transit LOS	Moderate	3.1	State/local government	Funding, Policy	Short/Medium	
System Expansion						
Expand Highway Capacity	High	1.8	Caltrans/SCTA	Funding, Policy	Long	
Expand Local Streets/ Roads Capacity	Moderate/ high depending on extent of the program	1.9	SCTA/local Jurisdictions	Funding, Policy	Long	
Expand Transit Capacity	Moderate/ high depending on extent of the program	3.3	SCTA/Transit Providers	Funding, Policy	Long	
Cost Range Definition: Low: $0-$1 Million, Moderate: $1-$25 Million, High: $25 Million +						
Benefit Definition: VMT Reduced, Emissions Reduced, Mobility Improved, Health Benefits, Environmental Justice, Revenue Generating, Cost, Energy Stabilization						
Time Frame: Short: 1 year, Medium: 1-3 years, Long: 3-5 years						

Appendix A. LISTS OF PROJECTS
ii. Road Projects

ROAD PROJECTS

2004 RANK	JURISDICTION	ROAD PROJECT LIST	TOTAL PROJECT IN MILLIONS
		Local Road Rehabilitation	$1,947.9
		U.S. 101 Traffic Operations System (TOS)	$25.0
		U.S. 101 ramp metering and fiber optic cable in Sonoma County	$25.0
		Route 121 traffic signal system and channelization at 8th Street	$3.1
		Hwy 116/Hwy 121 intersection improvements and Arnold Drive improvements	$14.8
		Mark West Springs Road/Porter Creek Road safety improvements	$4.8
		Bodega Highway improvements west of Sebastopol	$2.0
		River Road channelization and improvements	$4.0
		Mirabel Road and Route 116 signalization and Channelization	$3.0
		Healdsburg Bridge	$23.0
		Realign Route 116 (Stage Gulch Road) along Champlin Creek and widen remaining segments to accommodate pedestrians and bicyclists	$38.0
		Rehabilitate and widen Route 116 from Elphick Road to Redwood Drive (involves realignment, new shoulders and channelization improvements)	$83.0
		Widen U.S. 101 for HOV lanes Central Phase A (one in each direction) from Pepper Road to Rohnert Park Expressway	$118.0
		Widen U.S. 101 for HOV lanes (one in each direction) from Old Redwood Highway to Pepper Road–Central Phase B	$50.0
		Widen U.S. 101 for HOV lane (one in each direction) between Rohnert Park Expressway to Santa Rosa Avenue	$85.0
		Interchange improvements at U.S.101 & Steele Lane in Santa Rosa	$45.0
		Widen U.S. 101 for HOV lane (one in each direction) between Steele Lane and Windsor River Road–North Phase A	$120.0
		U.S. 101/Airport Boulevard interchange improvements and Airport Boulevard widening–North Phase B	$30.0
		Widen U.S. 101 (adding an HOV lane in each direction) from the Route 37 in Novato north to Old Redwood Highway in Petaluma and convert some highway sections from expressway to freeway–MSN	$400.0
		U.S. 101/Arata interchange in Windsor–Phase 4, NB on ramp	$10.0
		U.S. 101/East Washington Street interchange improvements	$23.0
		U.S. 101/Hearn Avenue interchange improvements, including widening overcrossing and ramps	$28.0
		U.S. 101/Old Redwood Highway interchange improvements	$27.6
		U.S. 101/Mill Street interchange in Healdsburg	$12.3

ROAD PROJECTS

2004 RANK	JURISDICTION	ROAD PROJECT LIST	TOTAL PROJECT IN MILLIONS
		U.S. 101/Shiloh Road interchange in Windsor	$15.0
		U.S. 101/Dry Creek interchange in Healdsburg	$4.2
		U.S. 101/Bellevue interchange	$15.0
		U.S. 101/River Road interchange	$18.0
		U.S. 101/Todd Road interchange	TBD
		Petaluma crosstown connector and Rainier interchange	$58.7
		Route 12/Fulton Road interchange and widen Fulton Road from 2 lanes to 4 lanes north of Guerneville Road to south of Route 12	$38.0
		Convert bridges of Sonoma County from one-lane to two-lane bridges	$16.9
		Forestville bypass on Route 116	$13.7
		Penngrove local road improvements including Railroad Avenue interchange	$38.0
		Extend Farmers Lane as a 3-lane or 4-lane arterial from Yolanda Avenue to Route 12	$41.4
5	Multi	Old Redwood Hwy improvements from Petaluma to Cotati	6.00
5	Santa Rosa	Phase 1 Stony Point Road widen & reconstruct from Hwy 12 to approx 800 feet south of Sebastopol Road	10.00
5	Santa Rosa	Phase 2 Stony Point Road widen & reconstruct south of Sebastopol Road to Hearn Avenue	
5	County	Brickway Boulevard Connect Airport Boulevard–River Road	7.50
8	County	Adobe Road Reconstruction–reconstruct portions of Adobe Road from Hwy 116 to Penngrove	11.50
8	County	Petaluma Hill Road–Santa Rosa to Roberts (sections)–widen from Santa Rosa to Roberts	13.00
8	Rohnert Park	Snyder Lane Widening–widen to 4 lanes from Southwest Boulevard to Keiser Lane	1.00
8	Santa Rosa	Petaluma Hill Road in Santa Rosa–widen and reconstruct from Snyder Lane to Kawana Springs Road	8.70
12	Cloverdale	Cloverdale Boulevard/South Interchange Improvement near Hwy 101	0.50
12	Cotati/Rohnert Park	E Cotati Avenue Hwy 101 to Snyder–implement arterial management	1.10
12	County	Bennett Valley Road Santa Rosa–Grange–reconstruct & widen	3.80
12	Healdsburg	S. Healdsburg Avenue/Mill Street Improvements	0.50
12	Windsor	Old Redwood Hwy–Hembree Lane to Shiloh Road	5.40
12	Windsor	Shiloh Road–Hembree Lane to Old Redwood Hwy	2.50
12	Windsor	Windsor River Road–widen & reconstruct from Windsor Road to Starr Road	0.50
19	County	Railroad Avenue Improvements–from Hwy 101 to Petaluma Hill Road	0.55
19	Petaluma	Southern Crossing of the Petaluma River	33.00
19	Windsor	Starr Road/NWPRR rebuild Grade Crossing	0.40
22	County	Dry Creek Road–Safety Improvements	4.10
23	Cloverdale	First Street Improvement–widen from Crocker Road to Asti Road & install sidewalk	0.22

ROAD PROJECTS

2004 RANK	JURISDICTION	ROAD PROJECT LIST	TOTAL PROJECT IN MILLIONS
23	County	Bellevue Avenue extension to Petaluma Hill Road	5.00
23	County	Todd Road–reconstruct from Stony Point Road to Llano Road extend east to Petaluma Hill Road	5.80
23	County/Cotati	W Sierra Arterial Improvements–Old Redwood Hwy to Stony Point Road signalization & bike lanes	0.83
23 & New Project	Santa Rosa	6th st. undercrossing, Davis Street & 6th Street Traffic Signal Installation	1.50
23	Santa Rosa	Dutton Meadows–widen & reconstruct from Hearn Avenue to Bellevue Avenue	4.50
23	Santa Rosa	New traffic signals–citywide in Santa Rosa	2.40
23	Santa Rosa	West Avenue–reconstruct and widen from Sebastopol Road to South Avenue	1.40
23	Windsor	Old Redwood Hwy–widen from Arata Lane to North Town Limits	1.64
23	Windsor	Old Redwood Hwy–Windsor Road to Windsor River Road	0.45
23	Windsor	Shiloh Road–widen to four lanes from Hwy 101 to Skylane Boulevard	2.40
	Petaluma	Petaluma Boulevard North-Hwy 101 to city limits (approx 300 ft north of Gossage)	3.80
New Project	Cotati	Old Redwood Hwy rehab–Plaza to Gravenstein Hwy	8.50
New Project	Healdsburg	5 way intersection at Healdsburg, Mill & Westside Roads	TBD
New Project	Santa Rosa	College Avenue improvements between Cleveland & Morgan	$8.00
New Project	Santa Rosa	Hwy 12/Farmers Lane ROW	TBD
	Santa Rosa	Route 12 at 4th Street	$3.5
New Project	Rohnert Park	Bodway Parkway Extension–between Valley House Drive and Railroad Avenue	TBD
New Project	Rohnert Park	Commerce Drive corridor improvements	TBD
New Project	Rohnert Park	Southwest Boulevard Corridor Improvements	
New Project	Rohnert Park	Dowdell Reconstruction & Extension between Wilfred Avenue & Business Park Drive	TBD
New Project	Rohnert Park	State Farm Drive Corridor Improvements	TBD
New Project	Rohnert Park	Neighborhood traffic calming program	TBD
New Project	Rohnert Park	City Center Drive & Pedestrian improvements at State Farm Drive	TBD
New Project	Rohnert Park	Rohnert Park expressway widening between Snyder & Petaluma Hill Road	TBD
New Project	Rohnert Park	Wilfred Avenue widening between 1999 city limits & urban growth boundary	TBD
New Project	Petaluma	Southern Crossing @ Caulfied	$72.0
	Santa Rosa	Mendocino Avenue/Hopper Avenue–Hwy 101 I/C	
2	County	Alexander Valley Road–shoulder widening for bikes & sight distance, eliminate safety issues	4.10
2	Santa Rosa/ County	Calistoga Road–Montecito to Hwy 12–traffic calming	0.25
4	County	Lakeville Road Widen to 4 Lanes from Hwy 37 to Hwy 116	22.00
4	County	Arnold Drive–construct center turn lane Country Club to Madrone	2.50
4	Santa Rosa	Hwy 12–widen from Los Alamos to Pythian	15.00

ROAD PROJECTS

2004 RANK	JURISDICTION	ROAD PROJECT LIST	TOTAL PROJECT IN MILLIONS
4	County	Arnold Drive–Verano to Petaluma Street	2.30
9	County	8th Street East/Hwy 121 intersection	0.40
9	Santa Rosa	Farmers/4th Street–intersection improvements	1.50
11	County	8th Street East widening Napa Road to Napa Street	TBD
4	County	Bodega Hwy, west of Sebastopol, Upgrade unimproved sect to 36'–full reconstruct	5.50
4	Sebastopol	Intersection Control on Hwy 116 at 4 locations in Sebastopol	1.40
7	County	River Road/Mark West Springs–construct 2 additional lanes from Fulton to Old Redwood Hwy.	2.60
8	County	Bellevue Avenue/Ludwig Avenue–realignment of Bellevue from Ludwig to Stony Point Road	2.90
8	County	Hwy 12 widening Llano Road to South Wright	TBD
8	County	Todd Road–widen from Stony Point Road to Llano Road extend east to Petaluma Hill Road	5.80
8	Santa Rosa	W College Avenue Fulton to Stony Point Road- widen and reconstruct (includes storm drain)	1.50
8	Sebastopol	Bodega Avenue Curb Gutter & Sidewalk Improvements–Golden Ridge to Pleasant Hill	0.46
8	Sebastopol	Hwy 116 Curb Gutter & Sidewalk Improvements (Healdsburg Avenue, Live Oak to Hurlbut)	0.73
14	Santa Rosa	Phase 1 Hearn Avenue realignmnet–add turn lanes and widen the Santa Rosa Avenue approaches to the Hearn interchange, include ITS	6.00
14	Santa Rosa	Phase 2 Hearn Avenue realignment–widen Hearn Avenue from the overcrosssing to Cutton Avenue, inc improvements to Hearn/Corby intersection	
14	Santa Rosa	Phase 3 Hearn Avenue realignment–complete widening of Hearn Avenue oc and reconfigure SB ramps	
14	Santa Rosa	Sebastopol Road–South Wright to Corporate Drive	7.00
14	Santa Rosa	Sebastopol Road–upgrade and reconstruct from Olive to Dutton Avenue	3.00
14	Santa Rosa	West 9th Street–widen and reconstruct from Dutton Avenue to Morgan Avenue	2.50
18	Santa Rosa	Ludwig Avenue–widen and reconstruct from Stony Point Road to Llano Road	12.00
	County	Sebastopol Bypass–Llano Road improvements & extension, Hwy 116 to Occidental Road	3.00
	County	Gravenstein Hwy South (Hwy 116) from Spooner Park to Hwy 101	
	County	Railroad Avenue–Hwy 101 Interchange (I/C)	
	County	Old Redwood Highway–Widen from Shiloh Road to SR City Limits	
	County	Old Redwood Highway–Widen from Railroad to Petaluma City Limits	
	County	Fulton Road–Widen from ORH to Piner Road	
	County	Hwy 12–Widen from Llano to 116 in Sebastopol	
	County	Bodega Hwy–Widen from Sebastopol City Limits to Jonve Road	
	County	Stony Point Road–Widen from SR City limits to Petaluma City Limits	

ROAD PROJECTS

2004 RANK	JURISDICTION	ROAD PROJECT LIST	TOTAL PROJECT IN MILLIONS
	County	Santa Rosa Avenue–Widen from SR City limits to Hwy 101	
	County	Ely Road–center turn lane ORH to Petaluma	
	County	Corona Road–center turn lane Adobe to Ely	
	County	Lakeville Hwy–Widen from Hwy 101 to Hwy 37	
	County	Hwy 37–Widen to 4 Lanes	
	County	Stage Gulch–center turn lane from Adobe to Arnold Dr	
	County	Hwy 12–center turn lane from SR to Sonoma	
	County	Arnold Dr–center turn lane from Madrone to Petaluma Avenue	
	County	Madrone Road–center turn lane from Aronold to Hwy 12	
	County	Aqua Caliente–center turn lane from Aronold to Hwy 12	
	County	Verano Avenue –center turn lane from Aronold to Hwy 12	
	County	Petaluma Avenue –center turn lane from Aronold to Hwy 12	
	Santa Rosa	Northpoint Pkwy–Extend from Fresno to S Wright	
	Santa Rosa	Northpoint Pkwy–widen from Stony Point to Frenso	
	Santa Rosa	Frenso Avenue–Extend From Northpoint Pkwy to Finley	
	Santa Rosa	Corporate Pkwy–widen from Northpoint Pkwy to Seb. Road	
	Santa Rosa	Stony Point Road–Widen from Hearn to SR City Limits	
	Santa Rosa	Maureen Dr realignment and Widening–Dutton Dr to Dutton Mdw	
	Santa Rosa	Dutton Avenue–Extend to Dutton	
	Santa Rosa	Hearn Avenue relignment from Burbank to Northpoint Pkwy	
	Santa Rosa	Sebastopol Road–Dutton to Stony Point	
	Santa Rosa	Corby Avenue–widen from Baker to Hearn	
	Santa Rosa	Baker Overcrossing Widen	
	Santa Rosa	Santa Rosa Avenue–Baker to Colgan	
	Santa Rosa	Petaluma Hill Road–widen from Aston to SR Citylimes	
	Santa Rosa	Kawana Springs Road–widen from SR Avenue to Pet. Hill Road	
	Santa Rosa	Stony Point Road–widen from 3rd Street to Hwy 12	
	Santa Rosa	W 3rd Street–widen from Senna to Fulton	
	Santa Rosa	W 9th Street–widen from Dutton to Link	
	Santa Rosa	Cleveland Avenue–College to W 9th St	
	Santa Rosa	Range Avenue–widen from Steele to Russel	
	Santa Rosa	Piner–widen from Marlow to Fulton	
	Santa Rosa	Hopper Avenue–widen from Cleveland to Coffey Lane	
	Santa Rosa	Courthouse Square Closure	
	Santa Rosa	3rd Street–widen from Morgan to B Street	

ROAD PROJECTS

2004 RANK	JURISDICTION	ROAD PROJECT LIST	TOTAL PROJECT IN MILLIONS
	Santa Rosa	Morgan–widen from 3rd Street to 5th Street	
	Santa Rosa	North Street–widen from Carr to College	
	Santa Rosa	Franklin–widen from Lewis to North Street	
	Santa Rosa	Chanate–widen from Humboldt to Mendocino	
	County	Traffic Calming of County ROW Countywide	

Appendix A. LISTS OF PROJECTS
iii. Transit Projects

TRANSIT PROJECTS

BUS TRANSIT PROJECT LIST	PROJECT DESCRIPTION	TOTAL COST (MILLIONS OF 2007$)
Santa Rosa CityBus–Technology Enhancement Program	Capital enhancement investments necessary to meet existing and future needs of Santa Rosa CityBus over 25 years. Includes installations, upgrades and/or expansions to a variety of technology systems, such as data management, video upgrades, AVL upgrades, and farebox enhancements, as well as a data management center at the Transit Operations building.	$10.70
Santa Rosa CityBus–Facilities Enhancement Program	Capital enhancement investments necessary to meet existing and future needs of Santa Rosa CityBus over 25 years. Includes upgrades and expansions to operation and maintenance facilities (including the bus yard and bus wash facilities), as well as various transit hub and bus stop improvements., and addition of data management and video upgrades (including AVL and farebox upgrades).	$7.80
Santa Rosa CityBus–Bus Expansion	Add buses to expand service to meet growth projections. Bus expansion to coincide with major bus replacement procurement. Expansion to include fixed route and paratransit fleet.	$7.10
Santa Rosa CityBus–Bus Rapid Transit Corridors	Includes purchase of supplemental buses specific to the rapid transit project, infrastructure along the routes (ie. bus stops, intermodal nodes), technological support along the routes (ie., signal pre-emption), and technological support in the transit operations facility and on the buses.	$38.10
Sonoma County Transit–Facility Expansion	In order to accommodate the estimated twenty-seven (27) expansion vehicles needed to accommodate Sonoma County Transit's proposed service expansion, the construction of a larger bus yard and maintenance facility for Sonoma County Transit is necessary.	TBD
Sonoma County Transit–Purchase Expansion Vehicles	It is estimated that Sonoma County Transit would need to acquire twenty-seven (27) vehicles to accommodate the decreased headways in Sonoma County Transit's "vision" projects that propose to expand its local and intercity bus routes.	TBD
Sonoma County Transit–Intercity Bus Service Expansion	Decreased headways on intercity routes 20 (Russian River-Santa Rosa), 26 (Rohnert Park-Sebastopol), 30 (Sonoma-Santa Rosa), 40 (Sonoma-Petaluma), 44/48 (Santa Rosa-Petaluma), 60 (Cloverdale-Santa Rosa), and 62 (Santa Rosa-Sonoma County Airport).	TBD
Sonoma County Transit–Local Bus Service Expansion	Decreased headways on local routes 10, 12, 14 (Rohnert Park/Cotati), 24 (Sebastopol), 28 (Russian River), 32 (Sonoma), 42 (Santa Rosa-Roseland), 66 (Windsor) and 68 (Cloverdale).	TBD
Golden Gate Transit (Sonoma County share)	Transit operating and capital improvement program (including replacement, rehabilitation, and minor enhancements for rolling stock, equipment, fixed facilities and other capital assets; does not include expansion)	$118.80
Golden Gate Transit (Sonoma County share)	Operating and capital program shortfall	TBD
Santa Rosa CityBus–Bus Expansion (Vision)	This project would result in the purchase of twenty additional vehicles, resulting in slightly more than double of the fixed route fleet numbers from year 2000 levels.	$12.40

TRANSIT PROJECTS

BUS TRANSIT PROJECT LIST	PROJECT DESCRIPTION	TOTAL COST (MILLIONS OF 2007$)
SMART	SMART RAIL–EIR schedule	TBD
Santa Rosa CityBus	SRCB Route 4–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 5–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 7–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 9–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 14–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 19–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 1–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 2–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 3–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 6–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 8–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 10–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 11–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 12–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 15–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 17–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 18–Decrease Headway	TBD
Santa Rosa CityBus	SRCB Route 19–Decrease Headway	TBD
Santa Rosa CityBus	Mendo/SR Ave/N-S Rapid Bus	TBD
Santa Rosa CityBus	Montgomery/Sonoma/E-W Rapid Bus	TBD
Sonoma County Transit	SCT Route 20–Decrease Headway	TBD
Sonoma County Transit	SCT Route 26–Decrease Headway	TBD
Sonoma County Transit	SCT Route 30–Decrease Headway	TBD
Sonoma County Transit	SCT Route 40–Decrease Headway	TBD
Sonoma County Transit	SCT Route 44/48–Decrease Headway	TBD
Sonoma County Transit	SCT Route 60–Decrease Headway	TBD
Sonoma County Transit	SCT Route 62–Decrease Headway	TBD
Sonoma County Transit	SCT Route 10–Decrease Headway	TBD
Sonoma County Transit	SCT Route 12–Decrease Headway	TBD
Sonoma County Transit	SCT Route 14–Decrease Headway	TBD
Sonoma County Transit	SCT Route 28–Decrease Headway	TBD
Sonoma County Transit	SCT Route 32–Decrease Headway	TBD
Sonoma County Transit	SCT Route 42–Decrease Headway	TBD
Sonoma County Transit	SCT Route 64–Decrease Headway	TBD
Port Sonoma	Port Sonoma	TBD
More projects included in Final.		

Appendix A. LISTS OF PROJECTS
iv. Bicycle Projects

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Cloverdale	Cloverdale River Trail	River Rd @ Crocker Rd	NWP Trail @ Cloverdale Airport	I	3.43	R	No	No	Rec	$1,886,521	Medium
Cloverdale	NWP Trail	McCray Rd	S Cloverdale City Limits	I	3.93	R	Yes	Yes	Trans	$2,158,772	Medium
Cloverdale	3rd St	Commercial St	Cloverdale Blvd	II	0.06	L	No	No	Trans	$4,825	High
Cloverdale	4th St	Cloverdale Blvd	Main St	II	0.08	L	No	No	Trans	$6,151	High
Cloverdale	Commercial St	3rd St	1st St	II	0.2	L	No	No	Trans	$15,050	High
Cloverdale	Cloverdale Blvd	Cloverdale City Limits	3rd St	II	0.88	R	Yes	No	Trans	$66,368	High
Cloverdale	Cloverdale Blvd	Lake St	Cloverdale City Limits	II	1.84	R	Yes	No	Trans	$138,271	High
Cloverdale	Jefferson St	School St	1st St	II	0.43	L	No	No	Trans	$32,443	Low
Cloverdale	Lake St	Cloverdale Blvd	Main St	II	0.08	L	No	No	Trans	$5,988	High
Cloverdale	Main St	4th St	Lake St	II	0.36	L	No	No	Trans	$27,299	High
Cloverdale	McCray Rd	Cloverdale Blvd	Cloverdale River Park	II	0.55	L	No	No	Trans	$40,970	Low
Cloverdale	Healdsburg Ave	Franklin St	Cloverdale Blvd	II	0.19	L	No	No	Trans	$14,182	High
Cloverdale	1st St	Cloverdale City Limits	Cloverdale City Limits	III	0.77	L	No	No	Trans	$11,612	High
Cloverdale	Foothill Blvd	School St	Cloverdale City Limits	III	0.13	L	No	No	Trans	$1,908	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Cloverdale	Franklin St	1st St	Cloverdale Blvd	III	0.52	L	No	No	Trans	$7,841	High
Cloverdale	Healdsburg Avenue	Foothill Blvd	Franklin St	II & III	0.3	L	No	No	Trans	$4,432	High
Cloverdale	Sandholm Lane	Foothill Blvd	Cloverdale Blvd	III	0.25	L	No	No	Trans	$3,813	Medium
Cloverdale	School St	Foothill Blvd	Cloverdale Blvd	III	0.43	L	No	No	Trans	$6,407	Medium
Cloverdale	Washington St	School St	Citrus Fair Drive	III	0.61	L	No	No	Trans	$9,186	Medium
Cloverdale	Citrus Fair Dr	Cloverdale Blvd	Washington St	III	0.12	L	No	No	Trans	$1,785	Medium
Cloverdale	Cloverdale Blvd	3rd St	Lake St	III	0.29	R	Yes	No	Trans	$4,301	Low
Cloverdale	3rd St	Washington St	Commercial St	III	0.06	L	No	No	Trans	$967	Medium
Cloverdale	Signing Program (Warning/ Destination Signing)	Citywide				L	Yes	No	Trans/Rec	$7,500	High
Cloverdale	Bicycle Parking Program	Citywide				L	N	N	Trans/Rec	$5,000	High
Cloverdale				Class III	7.36				Total	$4,461,592	
Cloverdale				Class II	4.67						
Cloverdale				Class III	3.48						
Cotati	Laguna de Santa Rosa	East Cotati Ave S	Lincoln Bridge	I	0.2	R	Yes	No	Trans/Rec	$96,580	High
Cotati	NWP Trail	Cotati City Limits	Cotati City Limits	I	0.4	R	Yes	Yes	Trans/Rec	$235,189	High
Cotati	Redwood Dr	City Limits	Gravenstein Hwy	II	0.6	L	No	No	Trans	$48,174	High
Cotati	Myrtle Ave	Old Redwood Hwy	Rohnert Park/ Cotati City Limits	II	0.5	L	No	No	Trans	$38,951	High
Cotati	Commerce	Old Redwood Hwy	Rohnert Park/ Cotati City Limits	II	0.1	R	Yes	Yes	Trans	$7,500	High
Cotati	Old Redwood Hwy	Gravenstein	Cotati Plaza	II	0.8	R	Yes	Yes	Trans	$57,483	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Cotati	Old Redwood Hwy	Charles St	Eucalyptus Ave	II	0.6	R	Yes	Yes	Trans	$45,953	High
Cotati	Benson Ln	Park Ave	Loretto Ave	III	0.2	L	No	No	Trans	$2,586	High
Cotati	Gilman Ranch Rd	West Cotati Ave	Madrone Ave	III	0.3	L	No	No	Rec	$4,847	High
Cotati	Park Ave	Cotati Veterans Hall	Myrtle Ave	III	0.2	L	No	No	Trans	$2,414	High
Cotati	Lincoln Ave	Lancaster Dr	Loretto Ave	III	0.4	L	No	No	Trans	$6,078	High
Cotati	Loretto Ave	Lincoln Ave	Benson Ln	III	0.1	L	No	No	Trans	$1,901	High
Cotati	Old Redwood Hwy	Cotati Plaza	Charles St	III	0.1	R	Yes	Yes	Trans	$1,307	High
Cotati	East Cotati Ave at RR	Santero Dr	Windmill Farms Dr	II	0.1	R	Yes	Yes	Trans	$225,000	High
Cotati	East School Tunnel	East School St	West School St	I	0.1	L	No	No	Trans	$75,000	High
Cotati	Signing Program (Warning & Destination Signing)	Citywide							Trans/Rec	$6,500	High
Cotati	Bicycle Parking Program	Citywide							Trans/Rec	$5,000	High
Cotati	West Cotati Ave Sidewalks	Hwy 116	Cliffard Ave	SW	0.5	L	No	No	Trans	$1,375,250	High
Cotati	West Sierra Ave Sidewalks	Water Rd	East School St	SW	0.1	R	Yes	No	Trans	$185,000	High
Cotati	Madrone Ave Sidewalks	Hwy 116	Thomas Page Elementary	SW	0.3	L	No	No	Trans	$715,000	High
Cotati				Class I	0.7					Total $3,135,212	
Cotati				Class II	2.7						

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Cotati				Class III	1.3					Bicycle Costs $859,962	
Cotati				Sidewalks	0.9					Pedestrian Costs $2,275,250	
Healdsburg	Pathway Segment 3	Healdsburg Railroad Depot	Front Street	I	0.14	Local/ Regional	No	Trans/ Rec		$490,000	High
Healdsburg	Pathway Segment 4	Mill St./ Healdsburg Ave. intersection	Healdsburg Railroad Depot	I	0.18	Local/ Regional	No	Trans/ Rec		$450,000	High
Healdsburg	Pathway Segment 5	W. Grant Street	Grove Street (Norton Slough)	I	0.16	Local/ Regional	No		Trans/ Rec	$490,000	High
Healdsburg	Pathway Segment 6	Skate Park	W. Grant Street	I	0.6	Local/ Regional	No		Trans/ Rec	$1,830,000	High
Healdsburg	Pathway Segment 7	Dry Creek Road	Skate Park	I	0.22	Local/ Regional	No		Trans/ Rec	$1,010,000	High
Healdsburg	Pathway Segment 8	Grove St. & Healdsburg Ave.	Dry Creek Road	I	0.59	Local/ Regional	No		Trans/ Rec	$1,680,000	High
Healdsburg	Pathway Segment 9	Healdsburg Ave. (Future fire sub-station)	Grove St. & Healdsburg Ave.	I	0.71	Local/ Regional	No		Trans/ Rec	$3,270,000	Low
Healdsburg	Pathway Segment 9A	Healdsburg Ave./Parkland Farms Blvd. Intersection	Grove St./ Healdsburg Ave. Intersection	I	0.19	Local/ Regional	No		Trans/ Rec	$570,000	Medium
Healdsburg	Pathway Segment 10	Northern city limits	Healdsburg Ave. (Future fire sub-station)	I	0.24	Local/ Regional	No		Trans/ Rec	$570,000	Medium
Healdsburg	Giorgi Park Pathway	University St.	Piper St.	I	0.27	Local	No		Trans/ Rec		

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Healdsburg	Grove Street	1410 Grove Street (at S-curves)	Dry Creek Road	II	0.14	Local	No		Trans	$10,191	Low
Healdsburg	Healdsburg Avenue	North city limits	Parkland Farms Boulevard	II	0.75	Local/ Regional	Yes		Trans/Rec	$56,250	Medium
Healdsburg	Healdsburg Avenue Bridge over Russian River	East bridge approach at vicinity of access into Veteran's Memorial Beach and Park	West bridge approach at Front Street intersection	II	0.09	Regional	Yes		Trans/Rec		Included in long-term bridge solution. Cost estimate irrelevant as a stand-alone project.
Healdsburg	Center Street	Matheson Street	Mill Street	III	0.14	Local	No		Trans	$2,077	Low
Healdsburg	Dry Creek Road	Highway 101 (western city limits)	Grove Street	III	0.13	Regional	Yes		Trans	$1,945	Low
Healdsburg	Matheson Street	Foss Creek Pathway	First Street	III	0.58	Local	No		Trans	$8,654	Low
Healdsburg	Mill Street	Highway 101 (western city limits)	Center Street	III	0.24	Local	No		Trans	$3,541	Low
Healdsburg	Poppy Hill Drive	Clear Ridge Drive	Sunnyvale Drive	III	0.3	Local	No		Trans	$4,442	Low
Healdsburg	University Street	Sunnyvale Drive	March Avenue	III	0.37	Local	No		Trans	$5,577	Low
Healdsburg	Fitch Street	Matheson Street	Mason Street	III	0.22	Local	No		Trans	$3,282	Low
Healdsburg	Grove Street	Dry Creek Road	Foss Creek Pathway at Norton Slough	III	0.97	Local	No		Trans	$11,832	Low
Healdsburg	Harmon/ Hudson Streets	Fitch Street	Front Street	III	0.32	Local	No		Trans	$4,800	Low

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Healdsburg	Sunnyvale Drive	Lupine Road	Poppy Hill Drive	III	0.23	Local	No		Trans	$3,448	Low
Healdsburg	Warning and Wayfinding Sign Program	Citywide				L/R	Yes	Trans/ Rec	$6,500		
Healdsburg	Bicycle Parking Program	Citywide				L/R	Yes	Trans/ Rec	$5,000		
Healdsburg				Class I	3.3					Total $105,605,001	
Healdsburg				Class II	0.98						
Healdsburg				Class III	3.5						
Healdsburg				12007 dollars							
Rohnert Park	Redwood Drive	Dowdell Street	Rohnert Park City Limits	II	0.7	L	No	No	Trans		
Rohnert Park	Redwood Drive	Milbrae Avenue	South of Willis	II	0.7	L	No	No	Trans		
Rohnert Park	Roberts Lake Road	Rohnert Park City Limits	Golf Course Drive	II	0.4	L	No	No	Trans		
Rohnert Park	Snyder Lane	Rohnert Park City Limits	East Cotati Avenue	II	2.5	R	Yes	No	Trans		
Rohnert Park	Bodway Parkway	Camino Colegio	Valley House Drive	II	0.3	L	No	No	Trans		
Rohnert Park	Country Club Drive	Rohnert Park Expressway	Southwest Boulevard	II	0.5	L	No	No	Trans		
Rohnert Park	Commerce Boulevard North	Rohnert Park Expressway	Southwest Boulevard	II	1	L	No	No	Trans		
Rohnert Park	Camino Colegio	East Cotati Avenue	Magnolia	II	0.4	L	No	No	Trans		
Rohnert Park	Commerce Boulevard North	Utility	State Farm Drive	II	0.2	L	No	No	Trans		

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Rohnert Park	Rohnert Park Expressway	Rohnert Park City Limits	Redwood Drive	II	0.8	R	Yes	No	Trans		
Rohnert Park	Alision Avenue	Commerce Boulevard	Alma Avenue	III	0.1	L	No	No	Trans		
Rohnert Park	Alma Avenue	Alison Drive	No Name Street	III	0.2	L	No	No	Trans		
Rohnert Park	Daphne Court	Dorotea Circle	Hinebaugh Creek Park	III	0.1	L	No	No	Trans		
Rohnert Park	Dorian Drive	Dorian Trail	Dorian Drive	III	0.1	L	No	No	Trans		
Rohnert Park	Dorotea Circle	Dorian Drive	Country Club Drive	III	0.4	L	No	No	Trans		
Rohnert Park	No Name Street	Alma Avenue	Southwest Boulevard	III	0.1	L	No	No	Trans		
Rohnert Park	Dorian Drive	Dexter Circle	Dorotea Circle	III	0.3	L	No	No	Trans		
Rohnert Park	Fairway Drive	Flores Avenue	Golf Course Drive	III	0.3	L	No	No	Trans		
Rohnert Park	Holly Avenue	Cul de sac	Fairway Drive	III	0.4	L	No	No	Trans		
Rohnert Park	Fairway Drive	Flores Avenue	Country Club Drive	III	0.4	L	No	No	Trans		
Rohnert Park	Fairway Drive	Holly Avenue	Country Club Drive	III	0.5	L	No	No	Trans		
Rohnert Park	Fauna Court	Flores Avenue	Cul de Sac	III	0.3	L	No	No	Trans		
Rohnert Park	Flores Avenue	Fauna Avenue	Fairway Drive	III	0.1	L	No	No	Trans		
Rohnert Park	Hillview Way	Holly Avenue	Golf Course Drive	III	0.4	L	No	No	Trans		

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Rohnert Park	Holly Avenue	Hillview Way	Snyder Lane	III	0.2	L	No	No	Trans		
Rohnert Park	Holly Avenue	Fairway Drive	Hillview Way	III	0.4	L	No	No	Trans		
Rohnert Park	Dorotea Circle	Dorian Drive	Daphne Court	III	0.3	L	No	No	Trans		
Rohnert Park			Class	I	7.1						
Rohnert Park			Class	II	9.9						
Rohnert Park			Class	III	4.6						
Santa Rosa	Projects to be included with completion of Santa Rosa Bicycle Plan										
Sebastopol	Libby Park Trail	Pleasant Hill Ave	Washington Ave	I	0.06	L	No	No	Trans/Rec	$33,000	
Sebastopol	North Main St	Eddie Ln	Analy Ave	II	0.15	L	No	No	Trans	$11,419	High
Sebastopol	North Main St	Analy Ave	Healdsburg Ave	II	0.14	R	Yes	Yes	Trans	$10,247	High
Sebastopol	Gravenstein Hwy S	Petaluma Ave/S Main St	Cooper Rd	II	0.56	R	Yes	Yes	Trans	$42,003	High
Sebastopol	(SR116)										
Sebastopol	Gravenstein Hwy N	Sebastopol City Limits	Covert Ln	II	0.52	R	Yes	Yes	Trans	$38,829	High
Sebastopol	(SR116)										
Sebastopol	Bodega Ave	City Limits	Ragle Rd	II	0.3	R	Yes	Yes	Trans	$21,045	
Sebastopol	Morris St	Laguna Park Wy	Sebastopol Ave	II	0.17	R	Yes	Yes	Trans	$12,380	High
Sebastopol	Morris St	Johnson St	Laguna Park Wy	II	0.27	R	Yes	Yes	Trans	$19,919	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Sebastopol	Covert Ln	Ragle Rd	Healdsburg Ave	II	0.5	R	Yes	No	Trans	$37,178	High
Sebastopol	Laguna Park Wy	Petaluma Ave	Morris St	II	0.27	L	No	No	Trans	$20,334	High
Sebastopol	Ragle Rd	Covert Ln	Bodega Ave	II	0.52	R	Yes	No	Trans	$39,083	High
Sebastopol	Zimpher Dr	Covert Ln	Valentine Ave	II	0.21	L	No	No	Trans	$15,564	High
Sebastopol	Jewell Ave	Bodega Ave	Meadowlark Dr	II	0.82	L	No	No	Trans	$61,694	Medium
Sebastopol	Murphy Ave	Valentine Ave	Washington Ave	II	0.2	L	No	No	Trans	$14,772	Low
Sebastopol	Pleasant Hill Ave N/	Covert Ln	Sebastopol City	II	0.56	R	No	No	Trans	$42,351	Low
Sebastopol	Pleasant Hill Rd		Limits								
Sebastopol	Valentine Ave	Ragle Rd	Murphy Ave	II	0.6	L	No	No	Trans	$44,771	Low
Sebastopol	Bodega Ave	Ragle Rd	Main St	II	1.11	R	No	Yes	Trans	$84,770	Low
Sebastopol	Healdsburg Ave	Covert Ln	N Main St	II	0.64	R	No	Yes	Trans	$47,863	Low
Sebastopol	(SR116)										
Sebastopol	McKinley St	N Main St	Petaluma Ave	II	0.08	R	No	Yes	Trans	$6,290	Low
Sebastopol	(SR116)										
Sebastopol	Murphy Ave	Healdsburg Ave	Valentine Ave	II	0.18	L	No	No	Trans	$13,814	Low
Sebastopol	N Main St /S Main St	Healdsburg Ave	Gravenstein Hwy S	II	0.81	R	No	Yes	Trans	$60,902	Low
Sebastopol	(SR116)										
Sebastopol	Petaluma Ave	McKinley St	South Main St	II	0.64	R	No	Yes	Trans	$47,886	Low
Sebastopol	(SR116)										
Sebastopol	Sebastopol Ave	Main St	Morris St	II	0.29	R	No	Yes	Trans	$21,739	Low
Sebastopol	(SR 12)										
Sebastopol	Woodland Ave	1st St	McFarlane Ave	III	0.23	L	No	No	Trans	$3,431	High
Sebastopol	Danmar Dr	Sebastopol City	Gravenstein Hwy N	III	0.05	L	No	No	Trans	$825	Medium
Sebastopol		Limits									

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Sebastopol	Fellers Ln	Litchfield Ave	Gravenstein Hwy S	III	0.26	L	No	No	Trans	$3,893	Medium
Sebastopol	Hayden Ave	Jewell Ave	Litchfield Ave	III	0.34	L	No	No	Trans	$5,075	Medium
Sebastopol	High St	Wilton Ave	Willow St	III	0.23	L	No	No	Trans	$3,437	Medium
Sebastopol	Lynch Rd	Jewell Ave	McFarlane Ave	III	0.15	L	No	No	Trans	$2,313	Medium
Sebastopol	Lynch Rd	Sebastopol City	Hwyy 116	III	0.05	L	No	No	Trans	$793	Medium
Sebastopol		Limits									
Sebastopol	McFarlane Ave	Woodland Ave	Lynch Rd	III	0.24	L	No	No	Trans	$3,660	Medium
Sebastopol	Norlee St	Sebastopol City	Covert Ln	III	0.19	L	No	No	Trans	$2,809	Low
Sebastopol		Limits									
Sebastopol	Pitt Ave	Healdsburg Ave	Wilton Ave	III	0.2	L	No	No	Trans	$2,964	Low
Sebastopol	Washington Ave	Libby Park	Bodega Ave	III	0.56	L	No	No	Trans	$8,353	Low
Sebastopol	Willow St	Jewell Ave	High St	III	0.17	L	No	No	Trans	$2,563	Low
Sebastopol	Wilton Ave	Pitt Ave	High St	III	0.03	L	No	No	Trans	$459	Low
Sebastopol	Burnett St	High St	Petaluma Ave	III	0.14	L	No	No	Trans	$2,160	Low
Sebastopol	Modify Traffic Signals/	7 traffic signals					Yes	Yes		$50,000	High
Sebastopol	Bike Detection										
Sebastopol				Class I	0.06					Total $840,587	
Sebastopol				Class II	9.54						
Sebastopol				Class III	2.84						
Sonoma	Madera Park Trail	Madera Trail	Second St	I	0.18	L	No	No	Trans/Rec	$98,009	Low
Sonoma	Sassarini School Trail	Sassarini Elementary School	Andrieux St	I	0.19	L	No	No	Trans/Rec	$104,961	High
Sonoma	Sonoma City Trail Extension	Verano Ave	Sonoma City Trail	I	0.16	R	No	No	Trans/Rec	$87,173	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Sonoma	Sonoma-Schellville Trail	Lovall Valley Rd	Sonoma Schellville Trail	I	0.09	R	Yes	Yes	Trans/Rec	$48,029	High
Sonoma	Fifth St East	Napa St	Denmark St	II	0.75	R	No	No	Trans	$56,003	High
Sonoma	Fifth St East	Denmark St	Napa Rd	II	0.39	R	No	No	Trans	$29,169	Low
Sonoma	Fifth St West	West MacArthur St	Smith St	II	0.25	R	No	No	Trans	$18,783	High
Sonoma	Seventh St West	West Spain St	Oregon St	II	0.27	L	No	No	Trans	$20,121	High
Sonoma	Broadway	Hwy 12	Napa Rd	II	1.12	R	Yes	Yes	Trans	$84,153	High
Sonoma	Hwy 12	Verano Ave	Napa St	II	0.64	R	Yes	Yes	Trans	$48,321	High
Sonoma	Hwy 12	Hwy 12	The Plaza	II	1.04	R	Yes	Yes	Trans	$78,048	High
Sonoma	Junipero Serra Dr	Palou St	West Spain St	II	0.06	L	No	No	Trans	$4,368	High
Sonoma	West McArthur St	Fifth St West	Sonoma City Limits	II	1.45	L	No	No	Trans	$108,659	Medium
Sonoma	Riverside Dr	Petaluma Ave	Hwy 12	II	0.05	R	Yes	No	Trans	$4,117	High
Sonoma	Studley St	Seventh St West	Fifth St West	II	0.21	L	No	No	Trans	$15,451	High
Sonoma	West Spain St	Junipero Serra Dr	Seventh St West	II	0.08	L	No	No	Trans	$6,155	High
Sonoma	Second St East	Lovall Valley Rd Trail	East MacArthur St	III	0.76	L	No	No	Trans	$11,329	High
Sonoma	Third St West	North Sonoma Class I Bike Path	Nicoli Ln	III	0.8	L	No	No	Trans	$11,966	High
Sonoma	Fourth St East	Lovall Valley Rd	East Napa St	III	0.25	L	No	No	Trans	$3,739	Medium
Sonoma	Fifth St West	West Napa St	West MacArthur St	III	0.5	R	No	No	Trans	$7,449	High
Sonoma	Andrieux St	Fifth St West	Broadway	III	0.57	R	No	No	Trans	$8,533	High
Sonoma	Denmark St	Brockman Ln	Fifth St East	III	0.25	R	No	No	Trans	$3,815	High
Sonoma	Hwy 12	The Plaza	2nd St East	III	0.19	R	No	No	Trans	$2,864	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Sonoma	Loval Valley Rd	Fourth St East	Sonoma City Limits	III	0.37	L	Yes		Trans	$5,493	Low
Sonoma	East Napa St	Second St East	Sonoma City Limits	III	0.67	R	No	No	Trans	$10,092	High
Sonoma	East Napa St	Sonoma City Limits	Seventh St East	III	0.13	R	No	No	Trans	$2,019	High
Sonoma	Newcomb St	Cul de sac	Broadway Drive	III	0.3	L	No	No	Trans	$4,537	High
Sonoma	Palou St	Robinson Rd	Junipero Serra Dr	III	0.05	L	No	No	Trans	$715	High
Sonoma	Robinson Rd	Sonoma City Limits	Palou St	III	0.34	L	No	No	Trans	$5,149	High
Sonoma	Signing Program (Warning &	Citywide								$7,500	High
Sonoma	Destination Signing)										
Sonoma	Bicycle Parking Program	Citywide								$7,500	High
Sonoma	Fryer Creek Bridge	Madera Park Trail	Newcomb St	1	0.04	L	No	No	Trans	$55,000	High
Sonoma	Sonoma Hwy Crosswalk	West of Sonoma Hwy in front of Maxwell Village Shopping Center	East of Sonoma Hwy		0.04	L	No	No	Trans	$15,000	High
Sonoma	Plaza Bike Racks					L	No	No	Trans	$12,000	High
Sonoma	Class I				0.62				Total	$904,220	
Sonoma	Class II				6.31						
Sonoma	Class III				5.18						
Windsor	Brooks Rd	Lakewood Dr	3rd St	I	0.16	L	No		Trans	$87,573	High
Windsor	Conde Ln	Mitchell Ln	Shiloh Rd	I	0.5	L	No		Trans	$276,982	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Windsor	Faught Creek Trail	Victory Ln	Old Redwood Hwy	I	0.34	L	No		Trans/Rec	$186,041	High
Windsor	Franklin St	Brooks Rd	4th St	I	0.09	L	No		Trans	$48,196	High
Windsor	Gumview–Windsor River Rd Connector	Gumview Rd	Windsor River Rd	I	0.63	L	No		Trans	$347,561	High
Windsor	Lakewood/ Foothill Trail	Elsbree Ln	Lakewood Dr	I	0.67	L	No		Trans/Rec	$371,204	High
Windsor	NWP Railroad Trail Connector	Oak Park St	NWP Trail	I	0.13	R	No		Trans/Rec	$70,691	High
Windsor	NWP Trail	North of Shiloh Rd	Windsor City Limits	I	0.8	R	Yes	ü	Trans/Rec	$440,886	High
Windsor	NWP Trail	Windsor City Limits	Windsor River Rd	I	1.59	R	Yes	ü	Trans/Rec	$872,713	High
Windsor	NWP Trail	End of Existing Class I	End of Existing Class I	I	0.26	R	Yes	ü	Trans/Rec	$142,083	High
Windsor	Pool Creek Trail	Hembree Ln	Old Redwood Hwy	I	0.51	L	No		Trans	$282,844	Low
Windsor	Starr Creek Trail	Starr View Dr	Starr Rd	I	1.07	L	No		Trans/Rec	$589,837	Medium
Windsor	Windsor Creek Trail	Brooks Rd	Natalie Dr	I	0.28	L	No		Trans/Rec	$153,779	High
Windsor	Windsor Creek Trail	Brooks Rd	Los Amigos Rd	I	0.96	L	No		Trans/Rec	$525,312	High
Windsor	Windsor Creek Trail	Windsor River Rd	NWP Trail	I	0.48	L	No		Trans/Rec	$263,960	High
Windsor	Windsor Creek Trail	Windsor Rd	NWP Trail	I	0.55	L	No		Trans	$304,424	High
Windsor	Windsor Creek Trail Connector	Windsor Rd	Windsor Creek Trail	I	0.14	L	No		Trans/Rec	$77,150	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Windsor	Windsor Creek Tributary Trail	Lakewood/ Foothill Trail	Skylark St	I	0.32	L	No		Trans/Rec	$177,283	High
Windsor	Brooks Rd	Los Amigos Rd	Lakewood Dr	II	0.16	L	No		Trans	$11,800	High
Windsor	Conde Ln	Windsor River Rd	Mitchell Ln	II	1.27	L	No		Trans	$95,617	High
Windsor	Hembree Ln	Victory Ln	Shiloh Rd	II	0.53	L	No		Trans	$39,422	High
Windsor	Hembree Ln	Arata Ln	Old Redwood Hwy	II	0.01	L	No		Trans	$406	High
Windsor	Los Amigos Rd	Foxwood Dr	Los Amigos Rd	II	0.15	L	No		Trans	$10,914	High
Windsor	Los Amigos Rd	Los Amigos Rd	Brooks Rd	II	0.12	L	No		Trans	$9,135	High
Windsor	Mitchell Ln	NWP Trails	Conde Ln	II	0.34	L	No		Trans	$25,646	High
Windsor	Old Redwood Hwy	Rio Ruso Dr	Windsor River Rd	II	1.8	R	Yes		Trans	$134,974	High
Windsor	Old Redwood Hwy	US 101 Windsor River Rd Offramp	Shadetree Dr	II	0.72	R	Yes		Trans	$53,943	High
Windsor	Old Redwood Hwy	Old Redwood Hwy	Lakewood Dr	II	0.24	R	Yes		Trans	$17,685	High
Windsor	Old Redwood Hwy	Shade Tree Dr	Jensen Trail	II	0.52	R	Yes		Trans	$39,279	High
Windsor	Pleasant Ave	Old Redwood Hwy	Emerson St	II	0.27	R	No		Trans	$20,596	High
Windsor	Shiloh Rd	Skylane Blvd	US 101	II	0.56	R	Yes		Trans	$41,784	High
Windsor	Shiloh Rd	US 101	Hembree Ln	II	0.25	R	Yes		Trans	$18,664	High
Windsor	Shiloh Rd E	Windsor City Limits	Faught Rd	II	0.81	R	Yes		Trans	$60,517	High
Windsor	Skylane Blvd	Shiloh Rd	Windsor City Limits	II	0.53	R	Yes		Trans	$39,611	High
Windsor	Starr Rd	Old Redwood Hwy	Windsor River Rd	II	1.08	L	No		Trans	$81,008	High
Windsor	Windsor Rd	Windsor River Rd	Reiman Ln	II	0.75	R	Yes		Trans	$55,928	High

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Windsor	Windsor Rd	Mitchell Ln	Shiloh Rd	II	0.54	R	Yes		Trans	$40,816	High
Windsor	Windsor River Rd	Jaguar Wy	Windsor City Limits	II	0.06	R	No		Trans	$4,474	High
Windsor	Windsor River Rd	Windsor City Limits	Starr Rd	II	0.44	R	No		Trans	$33,087	High
Windsor	3rd St	Jensen Ln	Old Redwood Hwy	III	0.16	L	No		Trans	$2,472	Medium
Windsor	Camelot Dr	Arata Ln	Jane Dr	III	0.33	L	No		Trans	$5,018	Medium
Windsor	Cordellia Ln	Los Amigos Rd	Jane Dr	III	0.16	L	No		Trans	$2,370	Medium
Windsor	Foothill Dr	Brooks Rd	Vinecrest Rd	III	1	L	No		Trans	$15,042	Medium
Windsor	Franklin St	4th St	3rd St	III	0.05	L	No		Trans	$815	Medium
Windsor	Jaguar Wy	Starr Rd	Windsor Rd	III	0.5	L	No		Trans	$7,507	Medium
Windsor	Jensen Ln	3rd St	End of Jensen Ln	III	0.79	L	No		Trans	$11,858	Medium
Windsor	Jensen Trail	Jensen Ln	Old Redwood Hwy	III	0.83	L	No		Trans	$12,383	Medium
Windsor	Mitchell Ln	Windsor Rd	NWP Trail	III	0.67	L	No		Trans	$10,098	Medium
Windsor	Natalie Dr	Camelot Dr	Natalie Dr	III	0.22	L	No		Trans	$3,366	Medium
Windsor	Natalie Dr	Jane Dr	Brooks Rd	III	0.24	L	No		Trans	$3,593	Medium
Windsor	Oak Park St	Cul de sac	Windsor River Rd	III	0.21	L	No		Trans	$3,174	Medium
Windsor	Rio Ruso Dr	Starr Rd	Old Redwood Hwy	III	0.49	L	No		Trans	$7,399	Medium
Windsor	Shannon-Cornell-Billington	Hembree Ln	Old Redwood Hwy	III	0.63	L	No		Trans	$9,480	Medium
Windsor	Starr Rd	Windsor River Rd	Reiman Lane	III	0.76	L	No		Trans	$11,367	Medium
Windsor	Vinecrest Rd	Vinecrest Circle	Vinecrest Rd	III	0.14	L	No		Trans	$2,074	Medium
Windsor	Windsor Rd	Old Redwood Hwy	Windsor River Rd	III	0.38	R	Yes		Trans	$5,686	Medium

BICYCLE PROJECTS–CITIES

LOCATION	PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	PRIMARY NETWORK	SF BAY AREA REGIONAL ROUTE	USE	COST	PRIORITY
Windsor	Windsor River Rd	Windsor Rd	Old Redwood Hwy	III	0.32	R	No		Trans	$4,811	Medium
Windsor	Signing Program (Warning & Destination Signing)	Townwide							Trans/Rec		
Windsor	Bicycle Parking Program	Townwide							Trans		
Windsor	Class I				9.48						
Windsor	Class II				11.15						
Windsor	Class III				7.88						

BICYCLE PROJECTS–COUNTIES, SONOMA COUNTY UNINCORPORATED
DRAFT PROPOSED PROJECTS AND PRIORITIES: COUNTYWIDE BICYCLE & PEDESTRIAN MASTER PLAN, JUNE 2008

PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Sonoma–Schellville Trail (SCBT–VII)	Sonoma City Limits	Dale Avenue	I	4.79	R	$1,914,720	High	Trail/Pathway
West County Trail Extension	Pajaro Lane	Forestville Youth Park	I	0.67	R	$266,680	High	Trail/Pathway
Colgan Creek Trail Extension	Todd Road	Laguna de Santa Rosa Trail	I	1.79	R	$717,108	High	Trail/Pathway
Roseland Creek Trail	Santa Rosa City Limits	Laguna de Santa Rosa Trail	I	1.41		$562,716	High	Trail/Pathway
SMART Rail Trail (NWP)	Sonoma/Marin County Line	Petaluma City Limits	I	3.67	R	$1,469,840	High	Trail/Pathway
SMART Rail Trail (NWP)	Petaluma City Limits	Cotati City Limits	I	2.91	R	$1,163,260	High	Trail/Pathway
SMART Rail Trail (NWP)	Rohnert Park City Limits	Santa Rosa City Limits	I	2.24	R	$897,484	High	Trail/Pathway
SMART Rail Trail (NWP)	Santa Rosa City Limits	Windsor Town Limits	I	2.97	R	$1,188,956	High	Trail/Pathway
SMART Rail Trail (NWP)	Windsor Town Limits	Healdsburg City Limits	I	2.05	R	$820,764	High	Trail/Pathway
SMART Rail Trail (NCRA) *	Healdsburg City Limits	Cloverdale City Limits	I	13.20	R	$5,281,828	High	Trail/Pathway
SMART Rail Trail (NCRA) *	Cloverdale City Limits	McCray Road	I	0.36	R	$142,385	High	Trail/Pathway
Santa Rosa Creek Trail Extension	Santa Rosa City Limits	Guerneville Road	I	3.30	R	$1,321,572	High	Trail/Pathway
Santa Rosa Creek–Joe Rodota Trail Connector	Santa Rosa Creek Trail	Joe Rodota Trail	I	1.80	R	$720,280	High	Trail/Pathway
Central Sonoma Valley Trail (CSVT–I)	Main Street	Encinas Lane	I	0.10		$38,330	High	Trail/Pathway
Central Sonoma Valley Trail (CSVT–I)	Encinas Lane (Dead End)	Fairview Lane	I	0.01		$5,798	High	Trail/Pathway

BICYCLE PROJECTS–COUNTIES, SONOMA COUNTY UNINCORPORATED
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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Central Sonoma Valley Trail (CSVT–II)	Melody Lane	Happy Lane	I	0.10		$38,330	High	Trail/Pathway
Central Sonoma Valley Trail (CSVT–III)	Happy Lane (Dead End)	Orchard Ave.	I	0.05		$21,235	High	Trail/Pathway
Central Sonoma Valley Trail (CSVT–V)	Larson Park Entrance	Depot Road	I	0.28		$110,829	High	Trail/Pathway
Central Sonoma Valley Trail (CSVT–V)	Depot Road	Vailetti Drive	I	0.15		$58,628	High	Trail/Pathway
Central Sonoma Valley Trail Extension *	Agua Caliente Road	Melita Road	I	12.64		$5,056,160	High	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P23, P29, P30, P31, P34) *	Todd Road	Joe Rodota Trail	I	2.18	R	$870,800	High	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P43, P45, P46) *	Highway 12	Occidental Road	I	1.36	R	$542,716	High	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P60, P62, P63) *	Occidental Road	Sanford Road	I	0.72	R	$286,914	High	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P68, P70) *	Hall Road	Santa Rosa Creek Trail	I	1.26	R	$504,592	High	Trail/Pathway
Piner Creek Trail *	Santa Rosa City Limits	Santa Rosa Creek Trail	I	0.16		$64,766	High	Trail/Pathway
Copeland Creek Trail *	Rohnert Park City Limits	Crane Creek Park	I	1.81	R	$722,423	High	Trail/Pathway
Bodega Bay Trail (BBT–1B, 1C, 2B) *	Keefe Ave.	Bay Flat Road	I	1.43	R	$572,252	High	Trail/Pathway
Bodega Bay Trail (BBT–3A, 3B-1) *	Eastshore Road	Taylor St.	I	0.20	R	$1,521,221	High	Trail/Pathway
Bodega Bay Trail (BBT–3C-2) *	Harbor View Drive	Highway 1	I	0.65	R	$259,184	High	Trail/Pathway
Bodega Bay Trail (BBT–3D-1, 3D-2) *	Bay Flat Road	Lucas Warf/Smith Bros. Road	I	0.92	R	$2,050,169	High	Trail/Pathway
Bodega Bay Trail (BBT–5B, 6C, 6D) *	Lucas Warf/Smith Bros. Road	Doran Beach Road	I	0.66	R	$265,688	High	Trail/Pathway

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Petaluma–Novato Trail (Hwy. 101) *	Petaluma City Limits	Sonoma/Marin County Line	I	2.91	R	$1,165,364	High	Trail/Pathway
Gualala River Bridge Trail (Hwy. 1) *	Gualala River Bridge	Gualala River Bridge	I	0.30		$119,160	High	Trail/Pathway
Sonoma County Bay Trail (SCBT–VI-Ramal Road) *	Dale Ave.	Sonoma/Napa County Line	I	4.02	R	$1,609,688	High	Trail/Pathway
Sonoma County Bay Trail (SCBT–V-Hudeman Slough) *	Ramal Road	Skagg's Island Road	I	2.10	R	$841,160	High	Trail/Pathway
Sonoma County Bay Trail (SCBT–IV-Skagg's Island Road) *	Hudeman Slough	Sonoma/Napa County Line	I	3.91	R	$1,565,800	High	Trail/Pathway
Sonoma County Bay Trail (SCBT–II, III-Tolay Creek Trail) *	Sonoma Creek	Highway 121	I	8.55	R	$3,418,868	High	Trail/Pathway
Sonoma County Bay Trail (SCBT–I, II-Sears Point Trail) *	Highway 121	Port Sonoma	I	4.61	R	$1,845,328	High	Trail/Pathway
Sonoma County Bay Trail (SCBT–I-Port Sonoma Trail) *	NWP/SMART Railroad Right-of-Way	Sonoma/Marin County Line	I	0.49	R	$195,880	High	Trail/Pathway
Russian River Trail *	Healdsburg City Limits	Monte Rio Bridge	I	22.86	R	$9,144,800	High	Trail/Pathway
Laguna de Santa Rosa Trail (Alternative)	Joe Rodota Trail	Wastewater Treatment Plant	I	4.17	R	$1,669,000	Low	Trail/Pathway
Peterson Creek Trail	Santa Rosa Creek Trail	Santa Rosa City Limits	I	1.41		$563,764	Low	Trail/Pathway
Hunter Creek Trail Extension	Hunter Creek	Snyder Lane	I	0.10		$41,461	Low	Trail/Pathway
Mark West Creek Trail	Old Redwood Hwy.	SMART Rail Trail (NWP)	I	1.39		$554,524	Low	Trail/Pathway
Saddle Drivew Trail (Healdsburg) *	Passalaqua Road	Healdsburg City Limits	I	0.15		$59,823	Low	Trail/Pathway
Jensen Trail (Windsor) *	Vinecrest Road	Windsor Town Limits	I	0.26		$102,894	Low	Trail/Pathway

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Jensen Trail (Windsor) *	Windsor Town Limits	Jensen Lane	I	0.26		$102,894	Low	Trail/Pathway
Gumview Trail (Windsor) *	Windsor Town Limits	Windsor River Road	I	0.63		$252,772	Low	Trail/Pathway
Crane Creek Trail (Rohnert Park) *	Snyder Lane	Petaluma Hill Road	I	1.06		$423,246	Low	Trail/Pathway
Five Creek Trail (Rohenrt Park) *	Snyder Lane	Petaluma Hill Road	I	1.05		$419,099	Low	Trail/Pathway
University District Trail (Rohnert Park) *	Keiser Ave.	Moura Lane	I	0.76		$302,400	Low	Trail/Pathway
Petaluma River Trail (Petaluma) *	Petaluma City Limits (Corona Road)	Petaluma City Limits (Gossage Ave.)	I	0.36		$143,989	Low	Trail/Pathway
Cloverdale River Trail (Cloverdale) *	Cloverdale City Limits	Theresa Drive	I	3.43		$1,372,000	Low	Trail/Pathway
Monte Rio–Willow Creek Trail *	Monte Rio Bridge	Sonoma Coast State Park	I	7.51		$3,004,292	Low	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P10) *	Rohnert Park City Limits	Stony Point Road	I	0.57	R	$227,338	Medium	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P15) *	Stony Point Road	Wastewater Treatment Plant	I	1.92	R	$767,244	Medium	Trail/Pathway
Laguna de Santa Rosa Trail (LSRT–P20) *	Wastewater Treatment Plant	Todd Road	I	1.39	R	$554,160	Medium	Trail/Pathway
Laguna de Santa Rosa Trail Extension	Santa Rosa Creek Trail	Riverfront Park (Eastside Road)	I	5.61	R	$2,242,605	Medium	Trail/Pathway
Kenwood–Santa Rosa Trail	Warm Springs Road	Annadel State Park	I	2.08		$832,117	Medium	Trail/Pathway
Dutch Bill Creek Trail	Highway 116	Graton Road	I	5.46		$2,184,536	Medium	Trail/Pathway
Gossage Creek Trail *	Laguna de Santa Rosa Trail	Derby Lane	I	1.04		$416,308	Medium	Trail/Pathway

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Bellevue Creek Trail (Rohnert Park) *	Petaluma Hill Road	Stony Point Road	I	4.74		$1,896,972	Medium	Trail/Pathway
Bellevue Creek Trail Connector (Rohnert Park) *	Bellevue Creek Trail	Rohnert Park City Limits	I	0.23		$91,887	Medium	Trail/Pathway
Bodega Bay Trail (BBT–f) *	Eastshore Road	Campbell Cove	I	2.34		$936,164	Medium	Trail/Pathway
Bodega Bay Trail (BBT–i & j) *	Highway 1	Jetty Campground	I	1.78		$713,008	Medium	Trail/Pathway
Adobe Creek Trail *	Petaluma City Limits	Adobe Road	I	0.69		$274,408	Medium	Trail/Pathway
Petaluma Marsh Trail *	Petaluma City Limits	Port Sonoma	I	11.05		$4,419,920	Medium	Trail/Pathway
Petaluma–Sebastopol Trail *	Petaluma City Limits	Sebastopol City Limits	I	11.19	R	$4,477,520	Medium	Trail/Pathway
Cloverdale–Lake Sonoma Trail (Cloverdale) *	Cloverdale City Limits	Lake Sonoma	I	5.08	R	$2,033,952	Medium	Trail/Pathway
Salmon Creek Trail *	First St. (Occidental)	Town of Bodega	I	3.78		$1,513,540	Medium	Trail/Pathway
North Cloverdale Blvd.	McCray Road	Highway 128	II	0.99		$24,633	High	Cloverdale
Foothill Blvd. Extension (Cloverdale) *	Kelly Road	Sandholm Road	II	0.29		$7,135	Low	Cloverdale
Foothill Blvd. Extension (Cloverdale) *	Cloverdale City Limits	Cloverdale City Limits	II	0.37		$9,246	Low	Cloverdale
Canyon Road *	Geyserville Ave.	Drive Creek Road	II	2.25		$56,149	Medium	Cloverdale
Theresa Driveve *	Asti Road	Dutcher Creek Road	II	0.12		$3,059	Medium	Cloverdale
Crocker Road	Cloverdale City Limits	River Road	II	0.68		$17,101	Medium	Cloverdale
Geyserville Avenue–Asti Road	Canyon Road	Weidersheim Road	II	3.72		$93,073	Medium	Cloverdale
Dutcher Creek Road	Cloverdale City Limits	Drive Creek Road	II	5.27		$131,872	Medium	Cloverdale

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Valley Ford Road *	Highway 1	Bodega Ave.–Petaluma	II	10.39		$259,685	High	Petaluma
Adobe Road	Lynch Road	Highway 116	II	3.26	R	$81,394	High	Petaluma
Meacham Road *	Pepper Road	Stony Point Road	II	1.90		$47,395	Low	Petaluma
Bodega Avenue–Petaluma	Petaluma City Limits	King Road	II	3.59	R	$89,663	Low	Petaluma
Bodega Avenue–Petaluma	Middle Two Rock Road	Valley Ford Road	II	1.69	R	$42,163	Low	Petaluma
Lakeville Highway (SCBT)	Highway 116	Highway 37	II	6.98	R	$174,436	Low	Petaluma
"D" Street–Petaluma	Petaluma City Limits	Sonoma/Marin County Line	II	3.11	R	$77,679	Low	Petaluma
Ely Road	Old Redwood Hwy.	Petaluma City Limits	II	1.16		$28,934	Medium	Petaluma
River Road	Highway 101	Scenic–Martinelli Road	II	9.84	R	$245,876	High	River/Coast
River Road	Westside Road	Highway 116	II	5.28	R	$132,066	High	River/Coast
Mirabel Road	Lois Lane	Trenton Road	II	0.28	R	$7,077	High	River/Coast
Occidental Road	Atascadero Creek	Sanford Road	II	2.20		$55,028	High	River/Coast
Armstrong Woods Road *	Highway 116	State Park Entrance	II	1.84		$45,994	Medium	River/Coast
Petaluma Hill Road	Santa Rosa City Limits	Adobe Road	II	8.31	R	$207,747	High	Rohnert Park/ Cotati
East Cotati Avenue *	Rohnert Park City Limits	Petaluma Hill Road	II	0.51		$12,760	High	Rohnert Park/ Cotati
Old Redwood Highway (North)	Cotati City Limits	Petaluma City Limits	II	3.26	R	$81,583	High	Rohnert Park/ Cotati
Valley House Driveve (Rohnert Park) *	Rohnert Park City Limits	Petaluma Hill Road	II	0.50		$12,593	Low	Rohnert Park/ Cotati
Rohnert Park Expressway (West)	Rohnert Park City Limits	Stony Point Road	II	0.58		$14,533	Low	Rohnert Park/ Cotati

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Snyder Lane	Rohnert Park City Limits	Petaluma Hill Road	II	0.68	R	$17,003	Low	Rohnert Park/ Cotati
Old Redwood Highway	Santa Rosa City Limits	Windsor Town Limits	II	3.83	R	$95,787	High	Santa Rosa
Stony Point Road	Santa Rosa City Limits	Petaluma City Limits	II	10.11	R	$252,828	High	Santa Rosa
Guerneville Road	Santa Rosa City Limits	Highway 116	II	5.33	R	$133,303	High	Santa Rosa
Airport Blvd.	Highway 101 Overpass	Highway 101 Overpass	II	0.30		$7,496	High	Santa Rosa
Hall Road (LSRT–P66)	Willowside Road	Santa Rosa City Limits	II	1.69		$42,360	High	Santa Rosa
Fulton Road	Highway 101 Overpass	Highway 101 Overpass	II	0.27	R	$6,838	High	Santa Rosa
Llano Road	Highway 12	Highway 116	II	4.40		$110,006	High	Santa Rosa
Laguna Road–Old Trenton Road	Guerneville Road	Vine Hill Road	II	1.31		$32,817	Low	Santa Rosa
Santa Rosa Avenue	Robert's Lake Road	Santa Rosa City Limits	II	1.98	R	$49,443	Low	Santa Rosa
North Dutton Avenue *	Santa Rosa City Limits	Hearn Ave.	II	0.78		$19,535	Medium	Santa Rosa
Mill Station Road *	Ragle Road	Highway 116	II	0.26		$6,593	High	Sebastopol
High School Road	Sebastopol City Limits	Occidental Road	II	1.26		$31,568	High	Sebastopol
Bodega Highway	Jonive Road	Bohemian Hwy.	II	0.69	R	$17,353	Low	Sebastopol
Bloomfield Road	Lone Pine Road	Highway 116	II	0.94		$23,531	Low	Sebastopol
Lone Pine Road	Blucher Creek	Bloomfield Road	II	1.26		$31,560	Low	Sebastopol
Valley Ford–Freestone Road *	Highway 1	Bodega Hwy.	II	10.39		$259,685	Medium	Sebastopol
Green Valley Road–Vine Hill Road	Atascadero Creek	Ross Road	II	0.14		$3,583	Medium	Sebastopol
Arnold Driveve	Gibson St.	Highway 12	II	0.47	R	$11,872	High	Sonoma Valley

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Arnold Driveve (SCBT)	Highway 116	Petaluma Ave.	II	2.85	R	$71,274	High	Sonoma Valley
Leveroni Road–Napa Road (SCBT)	Arnold Drive	Highway 12	II	6.05	R	$151,364	High	Sonoma Valley
Railroad Avenue	Verano Ave.	Boyes Bl vd.	II	0.77		$19,303	High	Sonoma Valley
Denmark Street	5th St. East	East Napa St.	II	1.72	R	$43,094	High	Sonoma Valley
Madrone Road *	Highway 12	Arnold Drive	II	0.88		$21,979	Medium	Sonoma Valley
5th Street West *	Sonoma City Limits	Leveroni Road	II	0.36		$9,120	Medium	Sonoma Valley
Highway 37 (SCBT–I, II, III, IV) *	Sonoma/Napa County Line	Sonoma/Marin County Line	II	6.42	R	$160,566	High	State Highway
Highway 116–North	Cotati City Limits	Stony Point Road	II	0.65	R	$16,371	High	State Highway
Highway 116–North	Sebastopol City Limits	Green Valley Road	II	2.78	R	$69,428	High	State Highway
Highway 116–North	Armstrong Woods Road	Foothill Drive	II	4.63	R	$115,797	High	State Highway
Highway 116–North	Duncan Road	Moscow Road	II	2.90	R	$72,380	High	State Highway
Highway 116–South (SCBT)	Arnold Drive	Highway 121	II	1.60	R	$39,958	High	State Highway
Highway 12	Santa Rosa City Limits	Kunde Winery Road	II	2.52	R	$62,923	High	State Highway
Highway 12	Agua Caliente Road	Sonoma City Limits	II	1.74	R	$43,462	High	State Highway
Highway 1	Slaughter House Road	Doran Beach Road	II	7.23	R	$180,745	High	State Highway
Highway 121 (SCBT) *	Highway 37	Bisso Road	II	3.24	R	$80,940	Medium	State Highway
Highway 121 (SCBT) *	Napa Road	Sonoma/Napa County Line	II	0.94	R	$23,588	Medium	State Highway
Highway 1	Sonoma/Marin County Line	Valley Ford Road	II	1.52	R	$37,928	Medium	State Highway
Skylane Blvd. *	Airport Blvd.	Windsor Town Limits	II	0.52	R	$13,070	High	Windsor

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Windsor River Road *	Eastside Road	Windsor Town Limits	II	0.59		$14,823	Medium	Windsor
McCray Road	Cloverdale River Park	N. Cloverdale Blvd.	II (S)	0.55		$409,703	High	Cloverdale
Geysers Road	River Road	Sonoma/Mendo. County Line	II (S)	2.59		$1,945,140	Low	Cloverdale
River Road–Cloverdale	Crocker Road	Geysers Road	II (S)	1.00		$747,610	Low	Cloverdale
Geyserville Avenue–Asti Road	Lytton Springs Road	Canyon Road	II (S)	5.02		$3,764,625	Medium	Cloverdale
Geyserville Avenue–Asti Road	Weidersheim Road	Airport Road	II (S)	2.74		$2,055,525	Medium	Cloverdale
Healdsburg Avenue–Lytton Springs Road	Healdsburg City Limits	Geyserville Ave.	II (S)	1.16		$868,350	High	Healdsburg
Drive Creek Road	Healdsburg City Limits	Drive Creek Road	II (S)	10.07		$7,551,525	High	Healdsburg
Eastside Road	Old Redwood Hwy.	Trenton–Healdsburg Road	II (S)	5.18		$3,883,950	Medium	Healdsburg
Alexander Valley Road	Healdsburg Ave.	Highway 128	II (S)	3.83		$2,874,120	Medium	Healdsburg
Adobe Road	Old Redwood Hwy.	Lynch Road	II (S)	2.99	R	$2,242,425	High	Petaluma
East Washington Street	Adobe Road	Petaluma City Limits	II (S)	0.24	R	$182,364	High	Petaluma
Petaluma Blvd. South	Petaluma City Limits	Highway 101 Entance/Exit	II (S)	0.93	R	$700,547	High	Petaluma
Corona Road	Adobe Road	Petaluma City Limits	II (S)	0.74		$553,506	High	Petaluma
Roblar Road	Valley Ford Road	Stony Point Road	II (S)	6.50		$4,871,723	High	Petaluma
Bodega Avenue–Petaluma	King Road	Middle Two Rock Road	II (S)	2.08	R	$1,556,550	Low	Petaluma
Pepper Road *	Bodega Ave.–Petaluma	Meacham Road	II (S)	2.59		$1,942,253	Medium	Petaluma

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Casa Grande Road	Adobe Road	Petaluma City Limits	II (S)	0.60		$446,321	Medium	Petaluma
River Road	Scenic–Martinelli Road	Westside Road	II (S)	0.93	R	$698,873	High	River/Coast
Mirabel Road	Highway 116	Lois Lane	II (S)	0.87	R	$651,260	High	River/Coast
Mirabel Road	Trenton Road	River Road	II (S)	0.22	R	$165,176	High	River/Coast
Occidental Road	Sanford Road	Santa Rosa City Limits	II (S)	3.06		$2,292,600	High	River/Coast
Graton Road	Dyer Ave.	Highway 116	II (S)	1.03		$771,450	High	River/Coast
Graton Road	Bohemian Hwy.	Acreage Lane	II (S)	0.59		$446,081	Low	River/Coast
Doran Beach Road (BBT–f)	Highway 1	Jetty Campground	II (S)	2.22		$1,668,608	Medium	River/Coast
Mountain View Avenue	Hunter Lane	Snyder Lane	II (S)	0.50		$373,736	High	Rohnert Park/ Cotati
Dowdell Driveve (Rohnert Park) *	Wilfred Ave.	Millbrae Ave.	II (S)	0.72		$539,682	Low	Rohnert Park/ Cotati
Wilfred Avenue *	Rohnert Park City Limits	Stony Point Road	II (S)	1.43		$1,073,948	Low	Rohnert Park/ Cotati
Millbrae Avenue *	Rohnert Park City Limits	Stony Point Road	II (S)	1.31		$986,010	Low	Rohnert Park/ Cotati
West Sierra Avenue	Cotati City Limits	Stony Point Road	II (S)	1.25		$937,590	Medium	Rohnert Park/ Cotati
Ludwig Avenue *	Llano Road	Stony Point Road	II (S)	1.45		$1,084,342	High	Santa Rosa
Burbank Avenue *	Sebastopol Road	Hearn Ave.	II (S)	1.00		$751,800	High	Santa Rosa
Todd Road	Santa Rosa Ave.	Highway 116	II (S)	5.02		$3,768,143	High	Santa Rosa
South Wright Road	Santa Rosa City Limits	Ludwig Ave.	II (S)	1.39		$1,039,575	High	Santa Rosa
Sanford Road (LSRT–P66)	Occidental Road	Hall Road	II (S)	0.88		$663,375	High	Santa Rosa
Hall Road (LSRT–P66)	Sanford Road	Willowside Road	II (S)	1.01		$759,375	High	Santa Rosa

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Piner Road–Olivet Road	Fulton Road	River Road	II (S)	3.76		$2,819,138	High	Santa Rosa
Frei Road	Highway 116	Guerneville Road	II (S)	1.41		$1,056,960	Low	Santa Rosa
Laguna Road–Old Trenton Road	Vine Hill Road	River Road	II (S)	1.39		$1,041,390	Low	Santa Rosa
Mark West Springs–Porter Creek Road	Highway 101	Petrified Forest Road	II (S)	9.72		$7,287,668	Low	Santa Rosa
Petrified Forest Road	Porter Creek Road	Sonoma/Napa County Line	II (S)	2.37		$1,774,028	Low	Santa Rosa
Willowside Road	Hall Road	Piner Road	II (S)	2.01		$1,509,825	Low	Santa Rosa
Barnes Road *	Santa Rosa City Limits	River Road	II (S)	0.88		$659,201	Medium	Santa Rosa
Ragle Road *	Sebastopol City Limits	Mill Station Road	II (S)	0.41		$309,099	High	Sebastopol
Bodega Highway	Sebastopol City Limits	Jonive Road	II (S)	3.46	R	$2,598,075	High	Sebastopol
Bodega Highway	Bohemian Hwy.	Valley Ford–Freestone Road	II (S)	1.30	R	$976,125	High	Sebastopol
Pleasant Hill Road	Bloomfield Road	Elphick Road	II (S)	2.16		$1,617,420	High	Sebastopol
Water Trough Road	Elphick Road	Bodega Hwy.	II (S)	1.71		$1,279,335	High	Sebastopol
Bloomfield Road	Pleasant Hill Road	Lone Pine Road	II (S)	0.85		$637,027	Low	Sebastopol
Lone Pine Road	Highway 116	Blucher Creek	II (S)	0.30		$223,060	Low	Sebastopol
Green Valley Road–Vine Hill Road	Ross Road	Guerneville Road	II (S)	0.89		$667,619	Medium	Sebastopol
Agua Caliente Road (CSVT–V) *	Arnold Drive	Highway 12	II (S)	0.83		$625,874	High	Sonoma Valley
Arnold Driveve	Country Club Drive	Chauvet Road	II (S)	3.47	R	$2,600,288	High	Sonoma Valley
Petaluma Avenue	Arnold Drive	Riverside Drive	II (S)	0.62		$465,075	High	Sonoma Valley
Bennett Valley Road	Santa Rosa City Limits	Grange Road	II (S)	2.08		$1,559,723	High	Sonoma Valley
Warm Springs Road	Bennett Valley Road	Arnold Drive	II (S)	2.40		$1,798,882	High	Sonoma Valley

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Warm Springs Road	Highway 12	Bennett Valley Road	II (S)	2.73		$2,044,598	Low	Sonoma Valley
8th Street East *	East Napa St.	Highway 121	II (S)	3.09	R	$2,315,873	Medium	Sonoma Valley
MacArthur Street East *	Sonoma City Limits	8th St. East	II (S)	0.33		$244,991	Medium	Sonoma Valley
Highway 128 *	Geyserville Ave.	Chalk Hill Road	II (S)	9.93	R	$7,448,190	High	State Highway
Highway 121 (SCBT) *	Bisso Road	Napa Road	II (S)	7.45	R	$5,585,250	High	State Highway
Highway 116–North	Stony Point Road	Gilchrist Road	II (S)	1.18	R	$882,968	High	State Highway
Highway 116–North	Gilchrist Road	Sebastopol City Limits	II (S)	4.53	R	$3,393,938	High	State Highway
Highway 116–North	Green Valley Road	Armstrong Woods Road	II (S)	9.67	R	$7,249,905	High	State Highway
Highway 116–North	Foothill Drive	Duncan Road	II (S)	0.59	R	$443,762	High	State Highway
Highway 116–North	Moscow Road	Highway 1	II (S)	3.71	R	$2,784,308	High	State Highway
Highway 116–South (SCBT)	Lakeville Hwy.	Arnold Drive	II (S)	5.56	R	$4,170,638	High	State Highway
Highway 12	Kunde Winery Road	Agua Caliente Road	II (S)	6.93	R	$5,193,893	High	State Highway
Highway 1	Valley Ford Road	Slaughter House Road	II (S)	1.49	R	$1,119,000	High	State Highway
Highway 1	Doran Beach Road	Highway 116	II (S)	11.04	R	$8,278,350	High	State Highway
Highway 128 *	Chalk Hill Road	Sonoma/Napa County Line	II (S)	9.22	R	$6,912,338	Medium	State Highway
Highway 128 *	N. Cloverdale Blvd.	Sonoma/Mendo. County Line	II (S)	4.43	R	$3,322,830	Medium	State Highway
East Shiloh Road	Windsor Town Limits	Faught Road	II (S)	0.81		$605,172	Low	Windsor
Pleasant Avenue	Windsor Town Limits	Chalk Hill–Faught Road	II (S)	0.88		$657,861	Medium	Windsor
Trenton Road–Healdsburg Road	River Road	Eastside Road	II (S)	1.32		$988,748	Medium	Windsor

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Faught Road	Old Redwood Hwy.	Pleasant Ave.	II (S)	2.55		$1,914,608	Medium	Windsor
Kinley Driveve *	Westside Road	Drive Creek Road	III	1.45		$7,243	Medium	Healdsburg
Eastside Road	Trenton–Healdsburg Road	Wholer Road	III	1.15		$5,740	Medium	Healdsburg
Pepper Road *	Meacham Road	Stony Point Road	III	3.29		$16,436	High	Petaluma
Purrington Road (Petaluma) *	"I" St.	Mountain View Ave.	III	0.41		$2,028	Low	Petaluma
Reclamation Road	Highway 37	NWP Railroad Right-of-Way	III	0.47		$2,327	Low	Petaluma
Tomales Road *	Valley Ford Road	Sonoma/Marin County Line	III	1.93		$9,629	Medium	Petaluma
Chileno Valley Road *	Western Ave.	Sonoma/Marin County Line	III	3.52		$17,612	Medium	Petaluma
San Antonio Road *	"D" St.	Highway 101	III	3.64		$18,196	Medium	Petaluma
Cazadero Hwy.–Austin Creek Road *	Highway 116	Fort Ross Road	III	6.31		$31,547	Low	River/Coast
Fort Ross Road *	Highway 1	Cazadero Hwy.	III	10.59		$52,934	Low	River/Coast
Meyer's Grade Road *	Highway 1	Fort Ross Road	III	4.92		$24,602	Low	River/Coast
Seaview Road *	Fort Ross Road	Kruse Ranch Road	III	6.65		$33,229	Low	River/Coast
Kruse Ranch Road *	Sea View Road	Highway 1	III	3.65		$18,272	Low	River/Coast
Moscow Road	Bohemian Hwy.	Casini Ranch	III	3.49		$17,443	Low	River/Coast
Bohemian Highway–Main Street	Highway 116	Morelli Lane	III	5.23		$26,151	Low	River/Coast
Bohemian Highway–Main Street	Occidental–Camp Meeker Road	Bodega Hwy.	III	4.06		$20,293	Low	River/Coast
Green Hill Road	Graton Road	Occidental Road	III	0.89		$4,432	Low	River/Coast
Occidental Road	Green Hill Road	Atascadero Creek	III	1.70		$8,523	Low	River/Coast
Graton Road	Acreage Lane	Dyer Ave.	III	4.43		$22,142	Low	River/Coast
Coleman Valley Road *	Highway 1	Bohemian Hwy.	III	9.54		$47,720	Medium	River/Coast
Wohler Road	River Road	Westside Road	III	1.73		$8,633	Medium	River/Coast

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Occidental Road–Camp Meeker Road *	Morelli Lane	Bohemian Hwy.	III	1.26		$6,291	Medium	River/Coast
Bean Ave.–Ocean View Ave. (BBT–b) *	Ocean View Ave.	State Beach Entrance	III	0.23		$1,145	Medium	River/Coast
Ocean View Avenue (BBT–b, c) *	Keefe Ave.	Highway 1	III	0.12		$585	Medium	River/Coast
Keefe Avenue (BBT–c) *	Bodega Bay Trail (1B)	Ocean View Ave.	III	0.12		$601	Medium	River/Coast
Bodega Avenue (BBT–3C-1) *	Highway 1	Windy Lane	III	0.23		$1,161	Medium	River/Coast
Taylor Street (BBT–3C-1) *	Highway 1	Bodega Ave.	III	0.04		$200	Medium	River/Coast
Windy Lane (BBT–3C-1) *	Highway 1	Bodega Ave.	III	0.06		$303	Medium	River/Coast
Harbor View Driveve (BBT–3C-2) *	Bodega Ave.	Highway 1	III	0.25		$1,228	Medium	River/Coast
Smith Brother's Road (BBT–5B) *	Highway 1	Highway 1	III	0.30		$1,512	Medium	River/Coast
Penngrove–Main Street *	Adobe Road	Old Redwood Hwy.	III	0.48		$2,393	High	Rohnert Park/ Cotati
Robert's Road–Pressley Road	Petaluma Hill Road	Sonoma Mountain Road	III	4.24		$21,194	Low	Rohnert Park/ Cotati
Crane Canyon Road	Alta Monte Drive	Petaluma Hill Road	III	1.53		$7,665	Low	Rohnert Park/ Cotati
Derby Lane *	Highway 116	Laguna de Santa Rosa Trail	III	0.54		$2,704	Medium	Rohnert Park/ Cotati
Mountain View Avenue	Santa Rosa Ave.	Hunter Lane	III	1.00		$5,000	Medium	Rohnert Park/ Cotati
Irwin Lane *	Highway 12	Occidental Road	III	0.79		$3,953	Low	Santa Rosa
Calistoga Road *	Santa Rosa City Limits	Petrified Forest Road	III	5.53		$27,645	Low	Santa Rosa
St. Helena Road	Calistoga Road	Sonoma/Napa County Line	III	6.47		$32,353	Low	Santa Rosa
Wallace Road–Reibli Road	Mark West Springs Road	Santa Rosa City Limits	III	3.80		$19,011	Low	Santa Rosa

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PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Danmar Driveve (Sebastopol) *	Sebastopol City Limits	Norlee St.	III	0.03		$151	Low	Sebastopol
Lynch Road *	Sebastopol City Limits	Beattie Lane	III	0.43		$2,142	Medium	Sebastopol
El Verano–Main Street (CSVT–I) *	Verano Ave.	Highway 12	III	0.11		$553	High	Sonoma Valley
Encinas Lane (CSVT–I) *	Highway 12	Encinas Lane (Dead End)	III	0.07		$339	High	Sonoma Valley
Fairview Lane (CSVT–I) *	Encinas Lane (Dead End)	Academy Lane	III	0.09		$451	High	Sonoma Valley
Academy Lane (CSVT–I) *	Fairview Lane	Melody Lane	III	0.01		$69	High	Sonoma Valley
Melody Lane (CSVT–II) *	Academy Lane	West Thompson Ave.	III	0.19		$940	High	Sonoma Valley
Happy Lane (CSVT–III) *	West Thompson Ave.	Happy Lane (Dead End)	III	0.24		$1,188	High	Sonoma Valley
Orchard Avenue (CSVT–III) *	Happy Lane (Dead End)	Greger St.	III	0.10		$511	High	Sonoma Valley
Greger Street (CSVT–III, IV) *	Orchard Ave.	Lichtenberg Ave.	III	0.32		$1,609	High	Sonoma Valley
Lichtenberg Avenue (CSVT–IV) *	Greger St.	Dechene Ave.	III	0.05		$256	High	Sonoma Valley
Dechene Avenue (CSVT–IV) *	Lichtenberg Ave.	Larson Park Entrance	III	0.24		$1,219	High	Sonoma Valley
Vailetti Driveve (CSVT–V) *	Agua Caliente Road	Ceder Ave.	III	0.46		$2,293	High	Sonoma Valley
Ceder Avenue (CSVT–V) *	Vailetti Drive	Agua Caliente Road	III	0.20		$1,024	High	Sonoma Valley
Arnold Driveve	Chauvet Road	Gibson St.	III	0.80	R	$3,989	High	Sonoma Valley
Verano Avenue	Highway 12	5th St. West	III	0.28		$1,401	High	Sonoma Valley
Trinity Road *	Highway 12	Sonoma/Napa County Line	III	4.58		$22,887	Low	Sonoma Valley
Riverside Driveve *	Petaluma Ave.	Verano Ave.	III	0.79		$3,959	Low	Sonoma Valley
7th Street East *	Lovall Valley Road	Denmark St.	III	0.99		$4,947	Low	Sonoma Valley

BICYCLE PROJECTS–COUNTIES, SONOMA COUNTY UNINCORPORATED
DRAFT PROPOSED PROJECTS AND PRIORITIES: COUNTYWIDE BICYCLE & PEDESTRIAN MASTER PLAN, JUNE 2008

PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Lovall Valley Road (Sonoma) *	Sonoma City Limits	7th St. East	III	0.20		$978	Low	Sonoma Valley
Robinson Road (Sonoma) *	Sonoma City Limits	Verano Ave.	III	0.10		$518	Low	Sonoma Valley
Sonoma Mountain Road	Bennett Valley Road	Warm Springs Road	III	7.64		$38,187	Low	Sonoma Valley
Ramal Road (SCBT–V, VI)	Highway 121	Sonoma/Napa County Line	III	4.39		$21,968	Low	Sonoma Valley
Skagg's Island Road (SCBT–VI)	Ramal Road	Sonoma/Napa County Line	III	5.29		$26,452	Low	Sonoma Valley
Dale Avenue (SCBT–VI) *	Burndale Road	Ramal Road	III	0.49		$2,442	Medium	Sonoma Valley
East Napa Street *	Sonoma City Limits	8th St. East	III	0.21		$1,052	Medium	Sonoma Valley
Dunbar Road *	Arnold Drive	Highway 12	III	1.64		$8,199	Medium	Sonoma Valley
Bennett Valley Road	Grange Road	Warm Springs Road	III	5.42		$27,101	Medium	Sonoma Valley
Burndale Road (SCBT)	Napa Road	Dale Ave.	III	2.81		$14,051	Medium	Sonoma Valley
Highway 1	Meyer's Grade Road	Kruse Ranch Road	III	16.12	R	$80,600	Medium	State Highway
Westside Road	Healdsburg City Limits	River Road	III	12.33		$61,664	High	Windsor
Jaguar Avenue (Windsor) *	Windsor River Road	Starr Road	III	0.76		$3,775	Low	Windsor
Chalk Hill Road	Pleasant Ave.	Highway 128	III	8.18		$40,921	Low	Windsor
Mark West Station Road *	Trenton–Healdsburg Road	Slusser Road–Windsor Road	III	2.22		$11,086	Medium	Windsor
Slusser Road–Windsor Road *	River Road	Windsor Town Limits	III	3.40		$16,977	Medium	Windsor
Grange Road	Bennett Valley Road	Alta Monte Drive	III	2.10		$797,841	Low	Rohnert Park/ Cotati

BICYCLE PROJECTS–COUNTIES, SONOMA COUNTY UNINCORPORATED
DRAFT PROPOSED PROJECTS AND PRIORITIES: COUNTYWIDE BICYCLE & PEDESTRIAN MASTER PLAN, JUNE 2008

PROJECT CORRIDOR/ STREET	BEGIN POINT	END POINT	CLASS	LENGTH (MILES)	LOCAL (L) REGIONAL (R)	ESTIMATED COST	PRIORITY	AREA
Highway 1	Highway 116	Meyer's Grade Road	III	6.05	R	$2,359,500	Medium	State Highway
Highway 1	Kruse Ranch Road	Gualala River Bridge	III	15.47	R	$6,033,729	Medium	State Highway
	Total Project Miles			785.42		$248,775,575		
* All new segments and/or revised types of improvements on list since 1997 Plan are notated with an asterisk.						$66,163,280	26.60%	
Projects proposed by cities but which are located in unincorporated areas have city indentified in parantheses.						$81,957,512	32.94%	
Grange Road and two segments of State Highway 1 are Class III but with shoulders in southbound direction only.						$100,654,782	40.46%	
(S) = New shoulders need to be constructed with Class II faciliy. Cost estimates for two segments of Bodega Bay Trail were taken from Bodega Bay Trails Plan feasibility study. SCBT = Sonoma County Bay Trail Project CSVT = Central Sonoma Valley Trail Project LSRT = Laguna de Santa Rosa Trail Project BBT = Bodega Bay Trail Project								
	Total Proposed Projects	208						
	Class 1 Trail	42	197.09 Miles	20.19%				
	Class 2 Bike Lanes	**94**	**377.51 Miles**	**45.19%**				
	Class 3 Bike Routes	**72**	**210.81 Miles**	**34.62%**				

Appendix B. PUBLIC OUTREACH REPORT

The Results Group

Strategy • Change • Development

Sonoma County Transportation Authority

CTP Update 2008

Public Outreach Report
June 27, 2008

Introduction

Every four years the Sonoma County Transportation Authority (SCTA) prepares an update of its 25 year Comprehensive Transportation Plan (CTP). The CTP articulates how Sonoma County's entire transportation infrastructure (e.g. streets, highways, transit systems and bicycle/pedestrian pathways) will be maintained and improved over the next 25 years.

To ensure that the public had ample opportunity to participate in the identification of transportation issues and priority setting, the SCTA carried out a planning process that integrated community involvement and included:

- Public opinion poll
- Public workshops
- Focus groups
- Individual interviews.

The Results Group of Santa Rosa California was retained the SCTA to support the agency's public input gathering process. This is a report by The Results Group of the findings of the public input process.

Throughout the public participation process over 140 people provided input on a variety of transportation related topics.

Key Findings

The following are the key findings are organized by transportation theme and source that emerged from public opinion poll and the public workshops, focus groups and interviews.

In mid-December 2007, 575 Sonoma County Residents were surveyed via telephone polling. The following key findings are from that public opinion poll.

***Public opinion poll**:*

1. The top three high-priority issues that Sonoma County voters are most concerned about are:
    a. Safety and security
    b. Reducing our dependence on foreign oil
    c. Providing sufficient public water supplies
2. Regarding transportation:
    a. Most people polled remembered supporting Measure M
    b. There was overwhelming support for a balanced approach to reducing congestion

c. Sonoma County voters felt that it is time to invest in alternative transportation options

d. While this indicates support for public transit, especially SMART, Sonoma County voters do not yet see climate protection as a high priority and do not see a need for personal behavior change around driving habits

e. Most people polled felt that they would use the bus, walk or ride a bicycle only if they did not have a car

f. The SMART train received strong support, but most people polled stated that they hoped others would use it

The following key findings are from the public workshops and focus groups.

Bus Transit:

1. People felt that the biggest barrier to transit use is the inconvenience of using public transit:
    a. Travel time is too long
    b. Buses don't go directly where people want to go
    c. On-time performance could be improved
2. Co-locate transit hubs with employment and shopping centers, and other amenities/services (e.g. medical centers).
3. Increase bus subsidies to make bus service free.
4. Redesign bus routes to increase convenience:
    a. Develop a bus service/route plan that emphasizes door-to-door service
5. There need to be a very large scale effort to change the image associated with using public transit:
    a. From its only used by transit dependent people to its used by cool, caring progressive people
    b. Need to keep homeless people from loitering at bus stations
    c. Buses need a face lift to make them more attractive
6. Put GPS locators on buses to provide accurate information on reader boards at transit centers and install message boards at multi-modal bus transit hubs that provides updates on arrival times, delays, etc.
7. Increase bus frequencies on heavily utilized routes.
8. Provide better on-time service.
9. Utilize smaller buses on routes with lower ridership.
10. Create more bikes storage on buses.
11. Provide later (PM) bus service (especially for late night workers).
12. Improve bus/shuttle service in smaller and outlying communities.
13. Increase bus efficiencies by overnighting buses in cities far away from Santa Rosa (this will reduce GHG emissions due to deadheading buses in the morning).
14. Create a trip planning service or web-based application (like map quest, but for trip planning) for people who want to ride the bus (or train), but need help figuring out what to do.

Bicycle/Pedestrian:

1. Implement strategies to increase the prestige of riding bicycles (make bicycling sexy).

2. Work to normalize the concept of riding bicycles and walking to work and for running errands.
3. Educate bicyclists to improve street skills.
4. Create wider Class II bike lanes on streets and roads.
5. Create more secure bike parking at transit stations, shopping and employment centers.
6. Create more frequent "bike-to-work" days… once a month or week.
7. Connect bike/ped pathways to schools, parks, and other amenities.
8. We need more Class I bike paths.
9. Keep pathways open at night; install safety lighting on pathways.

Rail Transit:

1. Need to pass SMART sales tax measure this November.
2. Need to begin planning for electrification of rail as oil is in decline.
3. Ensure connections to SMART from communities that are located away from SMART stations
4. Reintroduce neighborhood trolleys and/or shuttles
5. Extend SMART to Ukiah and to Vallejo
6. Re-establish freight rail service.

Highways, Streets and Roads:

1. Reduce/end free parking.
2. Reduce congestion.
3. Create education program to improve driving behaviors that lead to safer roads for bikes, pedestrians, as well as for drivers.
4. Implement protective-permissive let turn intersections.
5. Increase the use of roundabouts.
6. Reduce the number of stop signs.
7. Create disincentives to driving:
    a. Gas tax
    b. Charge for current free parking (schools, employment centers, etc.)
8. Increase pedestrian safety by improving crosswalks:
    a. Pavement lights
    b. Flashing lights
9. SCTA should start planning for the impacts of oil depletion.

Water Transit:

1. There was a range of opinion about Port Sonoma:
    a. We need to implement water based transit (e.g. ferry) in Sonoma County
    b. Port Sonoma is not, nor does support city centered, transit oriented development due to the distance it is from any other city center

c. We should max out other transit options before developing Port Sonoma

Climate Protection:

1. Change driver behaviors:
    a. Incremental change (e.g. once or twice a week)
    b. Clustering trips
    c. Create education programs to raise awareness of the need to reduce VMT and GHG emissions and how to do that through the use of alternative transportation
    d. Journaling trips to see how to one's trips might not be necessary or could be clustered to decrease GHG emissions
2. Reduce speed limits on our highways.
3. Reduce and/or charge for high school parking.
4. Implement a media campaign to make people aware of the need for and existence of alternative transportation options.
5. Underwrite a reporter at the PD to focus on transit alternatives.
6. Replace stop signs with yield signs to improve flow of traffic.
7. Redistribute service delivery to local markets (e.g. contract with health care providers to do routine procedures in local clinics).
8. Increase the use of hybrids in public fleets.
9. Focus education and market marketing on youth.
10. Do social marketing (e.g. friends don't let friends drive when they can walk, ride, or use transit).
11. Increase the gas tax as a disincentive to driving and to raise funds for transit.
12. Encourage cities to implement car-free days in their downtowns.
13. Initiate a research program to determine the how best to stimulate mode shift from the car to alternatives.
14. Survey young people to learn what they think the best way is to reduce GHG emissions.
15. Support the implementation of electric car share programs.

Land Use:

1. Support Transit Oriented Development through:
    a. Zoning changes
    b. Incentives
    c. Co-locating employment, commercial, and other mixed-use facilities with existing and future transit hubs
2. Create ordinances that permit bikes, walking or small electric vehicles only in specified neighborhoods.
3. Change zoning to allow more mixed-use in all neighborhoods.
4. Implement "performance zoning," (e.g. measure the GHG performance of zones and adjust to increase desired outcomes).

5. Cluster employment centers along Highway 101 close to transit hubs.

Business:

1. Work with business to encourage and increase the use of alternative transportation through:
    a. Incentives
    b. Rewards
    c. Recognition
    d. Benefits (free transit passes as a benefit)
2. Implement Transportation Demand Management (TDM) systems:
    a. Set up car pool programs
    b. Provide free transit passes
3. Encourage telecommuting:
    a. Create incentives for telecommuting for businesses
    b. As similar to bike-to-work days… do telecommute days once a month or even once a week
4. Encourage and support business leaders in role modeling the use alternative modes of transportation.
5. Get business to use the car share model or subscribe to an existing car share group.

Seniors:

1. Provide free bus passes to seniors.
2. Seniors will not benefit as much as from investment in bike/ped pathways. You need to explain why this investment is important to the community to seniors.
3. 20% of Sonoma County has some sort of disability; in the future this may go up to 40%, so SCTA need to have a plan for dealing with the growth in paratransit demand.
4. Healthy older adults should be able to easily use the bus system… and the bus system needs to be more attractive to seniors.
5. A lot of older people live beyond ¾ mile so SCTA needs to support the expansion of ADA requirement to provide service at ¾ mile. We need to provide paratransit service above and beyond this framework.

Youth:

1. Bike travel:
    a. There should be full time bike energizer stations along popular routes to provide water and support
    b. Build public showers as a part of bike facilities at transit stations
2. Reducing school related GHG emissions:
    a. Reduce high school parking and encourage the use of alternative transit.
    b. 4 day school weeks (10 hour days)
    c. Create safe paths to school so students can ride bikes

d. SCTA subsidize school-owned bikes for schools to check out to students for the year (auto/bike shop can maintain)

e. Change the laws prohibiting car pooling for teen drivers

Latino Community:

1. We need maps of routes and schedules at all bus stops (in Spanish as well as English).
2. Bus service schedules need to take in to account and that lower income peoples have different schedules that more affluent middle class people. Bus service needs to extend into late evening hours to accommodate lower income jobs.
3. Bus stops are not perceived to be safe for people to stand by as they wait for the bus.
4. There need to be an effort to educate people (especially men) on how to ride bikes safely (e.g. wear a helmet and use light at night).
5. There needs to be more traffic calming in neighborhoods (especially those without sidewalks).
6. We need more sidewalks.
7. The Latino Community is not very aware of the need to reduce GHG emissions. There needs to be an effort to educate Latinos about the need for this and ways to do it.

Public Workshops

During the month of April 2008, SCTA conducted a series of public workshops to gather input from the public for the Comprehensive Transportation Plan (CTP) Update. Workshops were held the following locations and dates:

6:30 PM Tuesday, April 15

Santa Rosa Veterans Memorial Auditorium
1351 Maple Ave, Santa Rosa

6:30 PM Thursday, April 17

Petaluma Community Center
320 N. McDowell Blvd., Petaluma

6:30 PM Monday, April 21

Windsor Public Library Community Room
9291 Old Redwood Hwy., Windsor

6:30 PM Tuesday, April 22

Sonoma Community Center Room 110
276 East Napa Street, Sonoma

6:30 PM Wednesday, April 23

Sebastopol Veterans Memorial Conf. Room
282 High Street Sebastopol

6:30 PM Wednesday, April 30

Rohnert Park Public Library Community Room
6250 Lynne Conde Way, Rohnert Park

Who Participated:

Where	*Number of Participants*
Santa Rosa	25
Petaluma	19
Windsor	3
Sonoma	8
Sebastopol	12
Rohnert Park	15

Transportation Improvements Prioritization

The public workshops provided an opportunity for the public to weigh-in on the priority for transportation improvements. The following are the top five items from the voting process from the combined public workshops organized by high, medium and low priority:

High Priority:

1. Improving bicycle and pedestrian facilities
2. Establishing passenger train service between Cloverdale and Marin County
3. Expanding bike lanes on local streets and roads
4. Expanding local bus service and frequency of bus service
5. Improving pedestrian walkways to schools

Medium Priority:

1. Improving pedestrian walkways to schools
2. Maintaining streets and roads
3. Providing special transit services for seniors and disabled persons
4. Re-establishing freight rail service
5. Increasing carpool and rideshare lanes

Low Priority:

1. Installing more message signs on freeways to provide drivers with traffic information
2. Widening major streets which are congested
3. Installing meters on freeway on-ramps to help manage traffic flow
4. Expanding the Charles Schultz Sonoma County Airport
5. Building a ferry terminal at Port Sonoma, south of Petaluma on the San Pablo/San Francisco Bay

World Café

The public workshops also provided an opportunity for the public to weigh-in on the question of **"what will motivate and support you in making significant behavior change that results in reducing your green house gas emissions?"** Workshop participants in a small group process called World Café discussed this question. The following are the most frequently discussed strategies for reducing GHG emissions.

1. Publicity:
    a. Get local media to promote the use of alternative transit modes by wider sectors of the public
    b. Reframe alternative as something that is prestigious, sexy and cool
    c. Underwrite a reporter at the Press Democrat to cover and promote alternative transit modes
2. Education:
    a. Change driving pattern changes once or twice a week
    b. Focus on youth

   c. Create education program to improve driving behaviors that lead to safer roads for walkers and cyclists

3. Bus service:
   a. Co-locate transit hubs and amenities and employment centers
   b. More frequent service on popular routes
   c. Extend service on weekends and evenings
   d. Use smaller buses on less popular routes
   e. More bike racks on buses
   f. Better on time service
   g. GPS locators on buses and real time info at transit hubs
4. Normalize cycling as a conventional transportation mode:
   a. Attach and increase prestige to cycling
   b. Build more bike lanes
   c. More secure bike parking at shopping and employment centers
5. Work with business to encourage and increase the use of alternative transportation through:
   a. Incentives
   b. Rewards
   c. Recognition
   d. Benefits (free transit passes as a benefit)

Individual Public Workshop Data
The following pages contain the summarized input from each individual public workshop organized by World Café data, comment cards and photo of priority chart for transportation improvements.

Santa Rosa

World Café Summary:

1. Normalize cycling as a conventional transportation mode:
   a. Attach and increase prestige to cycling
   b. Build more bike lanes
   c. More bike parking at shopping and employment centers
   d. Create bike boulevards
2. Education:
   a. Encourage driving pattern changes once or twice a week
   b. High school kids about driving less
3. Publicity:
   a. Local media beats the drum for alternative transit modes
   b. Reframe cycling as cool
   c. Better marketing of transit

   d. Underwrite a reporter at the Press Democrat to cover and promote alternative transit modes
4. Reduce speed limit to 55 mph.
5. Use cameras and other technology to enforce new rules.
6. Improve the effectiveness of bus routes.
7. Reduce high school parking.
8. Bus service:
   a. Co-locate transit hubs and amenities and employment centers
   b. Post more bus schedules and routes
   c. Install message board at transit stations
   d. More frequent service on popular routes
   e. Extend service on weekends and evenings
   f. Use smaller buses on less popular routes
   g. More bike racks on buses
   h. Better on time service
   i. GPS locators on buses and real time info at transit hubs
   j. Increase headways and routes such that anyone can walk no more than 10 minutes and wait no longer than 15 minutes for a bus
9. Utilize our waterways (e.g. ferry service).
10. End free parking.
11. Reduce congestion.
12. Provide free bus service for seniors.
13. Provide transit trip planning service (door to door).
14. Incentivize business to provide support to their employees in utilizing alternative transit modes.
15. Replace stop signs with yield signs.
16. Do free ride programs where businesses give free passes to employees
17. Extend SMART to Ukiah.
18. Monorail
19. Increase transit oriented development
20. Do transit-centered public meetings
21. Connect SMART with BART

Comment Card Comments:

What is your vision for the future of mobility in Sonoma County?	**Frequency:**
To be able to move about the county by using alternative transit (bus, rail, bike, walking)	2
People are using electric cars and buses, riding bicycles and trains	
Everyone shifts their transportation to alternative modes willingly	2

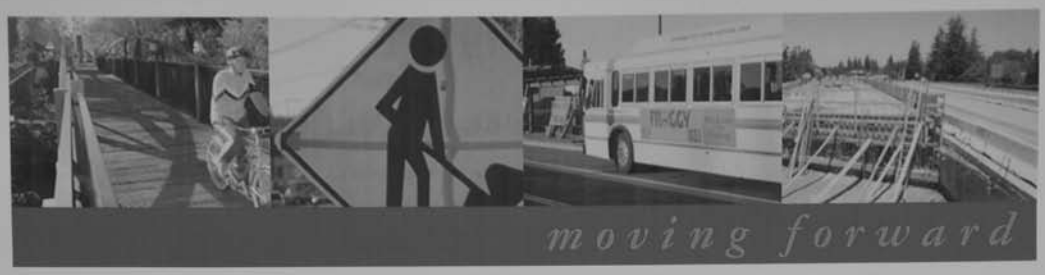
All development is transit oriented	2
Our transportation system is fully integrated and connects with the Bay	
We need monorail in Sonoma County	
SCTA has established and fund the following priorities: ADA, bicycle/pedestrian pathways and transit	
Bus transit is on time and goes where people want to go	3

What are the greatest issues of concern you have about Sonoma County's transportation systems and infrastructure?	**Frequency**
A bus trip should take only twice as long as a car trip… not 3, 4 or 5 times as long	
Stop encouraging auto use and accompanying air pollution by adding more lanes to Hwy. 101	
Lack of infrastructure maintenance	
Air pollution	
Current bus system is too sparse and too inconvenient to attract and maintain ridership	3
Efficiency: we should be using smaller buses on routes that are less used	
Lack of secure bicycle parking	
Lack of 24X7 bus service	

What opportunities do you see for improving Sonoma County's transportation systems and infrastructure?	**Frequency:**
Implement shorter bus headways	
Open up our waterways to transit	
Form an alliance with the local colleges to provide students with free passes and structure routes and schedules to support student use	
Pass the SMART tax and get people out of their cars	5
Improve bus routes and frequency of service	4
Implement translink for all transit in Sonoma County	
Complete SMART bike/ped pathway even if SMART fail at the ballot	

How can SCTA help reduce green house gas emissions and vehicle miles traveled in Sonoma County?	**Frequency:**
Improve the quality of the bus experience by providing better, on time service and by having higher quality bus stops	2
Get SMART	3
Implement express bus service now	
Charge for all parking	
Fully subsidize free bus service	
All govt. employees should have to role model alternative transit use	

Santa Rosa



Please prioritize the following potential future transportation improvements by allocating your largest sticky dots to the highest priorities, your medium sized stick dots to the medium priorities and your smallest sticky dots to the lowest priorities.

- Improving pedestrian walkways to schools
- Providing special transit services for seniors and disabled persons
- Improving safety on streets and roads
- Synchronizing traffic signals on major streets
- Maintaining streets and roads
- Establishing passenger train service between Cloverdale and Marin County
- Installing meters on freeway on-ramps to help manage traffic flow
- Improving bicycle and pedestrian routes
- Increasing carpool and ride-share programs
- Widening major streets which are congested
- Adding carpool and bus lanes on freeways
- Expanding the Charles Schultz/Sonoma County Airport
- Re-establishing freight rail service
- Expanding local bus service and frequency of bus service
- Building high-density housing and commercial buildings near bus and rail transit stations to encourage more transit use
- Expanding bike lanes on local streets and roads
- Building a ferry terminal at Port Sonoma, south of Petaluma on San Pablo/San Francisco Bay
- Installing more "message signs" on freeways to provide drivers with traffic information

Petaluma

moving forward

Please prioritize the following potential future transportation improvements by allocating your largest sticky dots to the highest priorities, your medium sized stick dots to the medium priorities and your smallest sticky dots to the lowest priorities.

- Improving pedestrian walkways to schools
- Providing special transit services for seniors and disabled persons
- Improving safety on streets and roads
- Synchronizing traffic signals on major streets
- Maintaining streets and roads
- Establishing passenger train service between Cloverdale and Marin County
- Installing meters on freeway on-ramps to help manage traffic flow
- Improving bicycle and pedestrian routes
- Increasing carpool and ride-share programs
- Widening major streets which are congested
- Adding carpool and bus lanes on freeways
- Expanding the Charles Schultz/Sonoma County Airport
- Re-establishing freight rail service
- Expanding local bus service and frequency of bus service
- Building high-density housing and commercial buildings near bus and rail transit stations to encourage more transit use
- Expanding bike lanes on local streets and roads
- Building a ferry terminal at Port Sonoma, south of Petaluma on San Pablo/San Francisco Bay
- Installing more "message signs" on freeways to provide drivers with traffic information

Petaluma

World Café Summary:

1. Educate people about the SMART project.
2. Continue to improve bicycle and pedestrian facilities:
    a. More and better crosswalks
    b. Pavement lights
    c. Wider shoulders on streets and roads
3. Education:
    a. Focus marketing on youth
    b. Illuminate the GHG consequences of driving
    c. Use graphic images
4. Offer more low cost transit options.
5. Co-locate shopping and other amenities at transit stations.
6. Charge for parking at employment centers.
7. Increase gas tax.
8. Incentivize telecommuting.
9. Implement Smart Growth strategies.
10. Leverage water transit in fighting GHG emissions.
11. Build more Class I bike paths.

Comment Card Comments:

What is your vision for the future of mobility in Sonoma County?	**Frequency:**
Well developed passenger rail	2
Lots of transit oriented development	
Integrated bicycle routes, especially with class II pathways	2
Less traffic in our cities and towns as more people use alternative transit modes	

What are the greatest issues of concern you have about Sonoma County's transportation systems and infrastructure?	**Frequency:**
Gridlock	3
High fuel costs	
Few alternatives to driving are available to the average person	
Lack of safe routes to schools and shopping	

What opportunities do you see for improving Sonoma County's transportation systems and infrastructure?	**Frequency:**
SMART rail and trail	5
Transit Oriented Development	

How can SCTA help reduce green house gas emissions and vehicle miles traveled in Sonoma County?	**Frequency:**
Encourage cities to experiment with car free days in their downtowns	2
Provide financial incentives to employers to in turn promote and support their employees in alternative transit use	

Raise parking fees	
Safe Routes to Schools	
Continue to invest in bike/ped pathways that connect with schools, shopping, work and parks	
Support passenger and freight rail service	
Connect buses and train to Port Sonoma ferry service	4

Windsor

No World Café exercise took place during this session nor was a transportation improvements priority chart filled-out. Council members Fudge and Salmon were in attendance and engage staff in the discussion:

1. Does not support Port Sonoma:
    a. Need to determine GHG profile of Port Sonoma
    b. Not city centered growth
    c. Should max out other options first
2. Need to focus on land use as one of the main GHG reduction strategies.
3. The County needs to accept that GHG reduction is as important as improving auto facilities.
4. Need to find a way to put more bikes on buses.
5. Should store buses overnight in Windsor in satellite garage/facilities.

Sonoma

No World Café exercise took place during this session. A focus group style conversation was conducted instead- focused on the question: what get you to change your behavior:

1. Higher prices above $6/gal. will begin to get people to rethink more of their trips.
2. Seniors would like small electric vehicles for small town travel.
3. Convenience is the #1 factor in getting people out of their cars and into transit.
4. Decentralizing out patient medical services (and other types of services) in small towns (like Sonoma).
5. Safe Routes to Schools.
6. More, better, safer bike paths.
7. Create incentives to telecommute:
    a. Financial
    b. Simple recognition would also work
8. Remove on-street parking to facilitate bike and scooter use.
9. Encourage people to cluster trips.
10. Create volunteer driving groups.
11. Sonoma needs bus service to San Francisco.
12. Buses could be smaller to better utilize fuel on routes that has fewer riders.
13. Buses providing weekend service need more on-board space for shopping bags.
14. Need better information for transit based trip planning.
15. Implement green marketing program.
16. Increase subsidy for fully free bus service.
17. Sonoma needs shuttle service to SMART.

Sebastopol

World Café Summary:

1. Encourage trip journaling to help identify un-necessary trips.
2. Support car-share programs.
3. Increase and improve bus service: more routes, more frequent headways, and better on-time performance.
4. Support employee-based car-pooling and implement other TDM strategies.
5. Change zoning to "performance zoning" allow more mixed use and different types of uses in neighborhoods.
6. Create disincentives to reducing driving
7. Create incentives to increase the use of alternative transportation modes.
8. Make the use of transportation alternatives sexy!
9. Make the bus riding experience more dignified.
10. Improve road safety by encouraging/educating for driver behavior change.
11. Make wider shoulders on the roadways.
12. Create car-free days/zones supported by shuttle buses.
13. There is no mention of oil depletion and increasing energy costs in the PPT presentation. SCTA needs to start focusing on this issue.
14. SCTA needs to explain how the older population will be benefit from investment in bike/ped pathways. Seniors tend not to bike.
15. Need to implement intersection controls such as "protective-permissive" and roundabouts.
16. We need more bike paths, especially class 1 pathways. The goal for the SMART path should be to close all gaps and build ASAP.
17. Should implement a neighborhood policy where only electric vehicles (especially for seniors) are allowed entry. Also, implement reduced speed limits in neighborhoods.
18. Reduce the number of 4-way stop signs in the county.
19. Focus on youth during media campaigns to reduce VMT and GHG emissions.
20. Implement trolleys in and between local communities.

Comment Card Comments:

What is your vision for the future of mobility in Sonoma County?	**Frequency:**
Fewer cars and trucks… more rail	3
Care share programs become the norm	
There are trolleys connecting our communities	
There is a highly efficient, integrated public transportation system	
Streets are safe for cyclists and seniors	
There are a mix of modes providing transit choices and equitable access	2
Improved traffic flow on streets and roads	
SMART is up and running	

What are the greatest issues of concern you have about Sonoma County's transportation systems and infrastructure?	**Frequency:**
Lack of bike facilities	
Too many stop signs	
Roads are unsafe for bicyclists	
Too many cars	
The current bus system does not provide a very effective alternative to driving	3
Seniors who can't drive are not considered in planning	
The lack of safety for walkers and bikers	2
Our reliance on oil in a time of oil depletion	
Air pollution	
Inadequate public transit	
Traffic lights tying up traffic	

What opportunities do you see for improving Sonoma County's transportation systems and infrastructure?	**Frequency:**
Shorten bus headways to 10 minutes	
Car share programs	2
Safe Routes to School	
Support electric vehicles	3
Implement earlier HOV hours on Hwy. 101	
Improve Route 20 (go to SR first, then County Center, end at Coddingtown)	

How can SCTA help reduce green house gas emissions and vehicle miles traveled in Sonoma County?	**Frequency:**
Reduce the number of stop signs in the county	
Maintain/increase funding for bus transit	
Reduce the cost of bus passes for the public	
Create car free zones/days	2
Force car-pooling on car free days	
Support car sharing	
Implement an education program to retrain the public around reducing VMT	
Increase bike awareness for drivers and riders	
Better coordinated bus schedules and routes to increase ridership	
Work with Safe Routes to Schools and the school district to get more kids out of cars (parents and their own) during school trips	
Lower speed limits	
Replace signals with roundabouts	
Implement "protective-permissive" left turn lanes	

Sebastopol

Please prioritize the following potential future transportation improvements by allocating your largest sticky dots to the highest priorities, your medium sized stick dots to the medium priorities and your smallest sticky dots to the lowest priorities.

- Improving pedestrian walkways to schools
- Providing special transit services for seniors and disabled persons
- Improving safety on streets and roads
- Synchronizing traffic signals on major streets
- Maintaining streets and roads
- Establishing passenger train service between Cloverdale and Marin County
- Installing meters on freeway on-ramps to help manage traffic flow
- Improving bicycle and pedestrian routes
- Increasing carpool and ride-share programs
- Widening major streets which are congested
- Adding carpool and bus lanes on freeways
- Expanding the Charles Schultz/Sonoma County Airport
- Re-establishing freight rail service
- Expanding local bus service and frequency of bus service
- Building high-density housing and commercial buildings near bus and rail transit stations to encourage more transit use
- Expanding bike lanes on local streets and roads
- Building a ferry terminal at Port Sonoma, south of Petaluma on San Pablo/San Francisco Bay
- Installing more "message signs" on freeways to provide drivers with traffic information

Rohnert Park

World Café Summary:

1. Highway 101 is a barrier to efficient bike and pedestrian travel. We need more bike/ped overcrossings.
2. We need to create more incentives to stimulate transit use:
    a. Implement economic incentives for potential transit users
    b. Create incentives for employers to stimulate employee transit use:
        i. Provide lockers to their employees
        ii. Provide transit passes as an employee benefit
3. Co-locate employment centers and public transit.
4. We also need to increase convenience, frequency and reliability of transit and make using transit a more pleasant experience.
5. Improve the amenities on and around buses.
6. Improve bus service:
    a. Provide free bus service
    b. Improve the transit mall
    c. Improve bus routes
    d. Increase frequency
    e. Put more bike rakes on buses
    f. Freeze transit cuts
    g. Multimodal passes
7. Support casual car pools (hitch-hiking) by setting up registration and meeting places.
8. Support Safe Routes to Schools.
9. Implement intersection controls such as roundabouts and lower speed limits.

Comment Card Comments:

What is your vision for the future of mobility in Sonoma County?	**Frequency:**
Safer bike/pedestrian pathways are give high priority in transit planning and funding	4
More frequent public transit	
Change people's behaviors: decrease car use and increase transit use	3
Fewer stop signs and signals	
SMART Train in the North Bay	4
Integrated transportation systems in Sonoma County (Trains, buses, bikes, walkers)	
BART connection to SMART	
Driving should be expensive and transit should be inexpensive	
Implement a BART/Growth initiative that focuses growth on transit oriented development	
Employers implement incentives for employee transit use	2
A transit network evolves with easy convenient transfer points	

Rohnert Park

Please prioritize the following potential future transportation improvements by allocating your largest sticky dots to the highest priorities, your medium sized stick dots to the medium priorities and your smallest sticky dots to the lowest priorities.

- Improving pedestrian walkways to schools
- Providing special transit services for seniors and disabled persons
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- Installing more "message signs" on freeways to provide drivers with traffic information

All transit stations have rail access	
Rail freight service	
Many pathways	
Interesting walkable communities	
Would like to see Sonoma County remain as rural as possible. Don't add people, just add bike lanes and public transit options	

What are the greatest issues of concern you have about Sonoma County's transportation systems and infrastructure?	**Frequency:**
Limited access to public transportation	3
Not enough shoulders and bike lanes	
Declining driver courtesy and driver safety	3
Development is too auto centric	
Too difficult crossing Highway 101 by bike and walking… need bike/ped crossings along the corridor (every ½ mile)	
Not enough express bus service to San Francisco	
Need wider bike lanes	
Not enough funding for public transit	
Too much auto dependency and VMT	
Too little attention paid to declining petroleum supplies	
Through traffic is kept away from neighborhoods (except for the people who live their)	
The proposed Wilfred Interchange/Golf Course Drive punch through resulting in a thoroughfare through a residential area in Rohnert Park to proposed casino	
Over crowded streets and Highways (101)	

What opportunities do you see for improving Sonoma County's transportation systems and infrastructure?	**Frequency:**
Making bus timing more consistent	
Increase bus service and routes	
Stop putting transit dollars in sound walls	
Class 1 bike paths along all creeks	
Acquire easements along vineyards and put in pathways	
Create incentives to stimulate biking and walking	
Create disincentives to reduce driving and parking (charge market rates for parking)	
SMART rails and trails	6
SMART and TOD can begin to change travel patterns	
Safe Routes to Schools	
Improve East/West transit routes in Rohnert Park	
Transition seniors to transit before it is necessitated by health issues	
Increase the use of roundabouts on too fast roadways (e.g. residential areas on Golf Course Dr.	
Do a ferry terminal closer to Sonoma County that connects to BART	

How can SCTA help reduce green house gas emissions and vehicle miles traveled in Sonoma County?	**Frequency:**

Provide safe bike routes	2
Improve public transit connections around train, bus, bike and walking	2
Implement a strong public education program	3
Implement roundabouts	
Reduce subsidies to car infrastructure (such as parking)	
The County installs class 1 bike paths everywhere (not just class 2 on shoulders)	
10% of all transportation funds should go to GHG reducing alternative transit modes	
Implement bike to school days	
Free bus days	2
Reduce auto speeds on highways, streets and roads	
SCTA to actually develop a plan for complying with AB 32	
SCTA develop a plan for helping transition the public to getting by on 65% of current fuel supplies	
Create incentives to companies to stimulate employee transit, bike and carpool use	3

Focus Groups and Interviews

Following the public workshops in May/June, focus groups and individual interviews were conducted focusing on the following areas and are summarized below:

- Business
- Paratransit and seniors
- Youth
- Latino Community

Sonoma County Alliance Focus Group

Summary:

1. We should not be putting all of our eggs in one basket (e.g. Hwy.101):
    a. There is too much emphasis on a "one corridor" policy- we need a second highway like Highways 280 and 101 in the South Bay
    b. We also need to invest in alternative modes such as the SMART train
    c. The North Bay transportation system needs to be interconnected like in Europe
2. Home to school trips offer a great opportunity to reduce GHG emissions.
3. SMART will have to integrate with multiple transit modes to be effective.
4. Bus schedules are too inconvenient to be of use to our professional workforce.
5. We need to educate people about the need to increase their use of transit.
6. We should implement HOT/usage/congestion based pricing (e.g. toll roads), especially in bottleneck areas.
7. We need to facilitate a shift in we think about transportation in Sonoma County:
    a. Focus on education
    b. Need to increase convenience

   c. TDM
      i. Telecommuting
      ii. Car pooling
      iii. Transit
      iv. Flex work start times
   d. Provide persuasive leadership
   e. Shame people into change
8. Create bike dispensers (card swipe rental bikes).
9. Leverage economic incentives and/or disincentives.
10. Co-locate business, commercial areas with transit hubs.
11. Support car share businesses.

Santa Rosa Chamber of Commerce Focus Group
Summary:

1. Bus transit:
   a. We really don't have a clear vision of what our bus system should be.
   b. Should bus service be structured around the needs of the transit dependent or should we be focusing service on the needs of business commuters?
   c. We need to have buses that are size specified to ridership levels.
   d. We need to improve the connectivity between home-work-school trips and transportation choices.
   e. A lot of people live in rural Sonoma County. We need to shift bus service to serve these people.
2. Land use:
   a. High-density housing that is located away from employment centers does not work. We need to build housing and employment together, not just live work
   b. SCTA should stay out of land use planning: SCTA should be observant of land use planning and adapt strategies to existing land use patterns
   c. People love suburban living so future development should focus on small clusters of housing that does not have a high density feeling
3. The bike paths seem mostly empty. Is this how we should be spending our money?
4. The airport is currently an Enterprise Fund entity. We should make airport fudging more like bike/ped pathway investments.
5. VMT reduction is important, but ITS may get us where we need to go regarding GHG reduction; we need to expand ITS to improve the flow of traffic.
6. We need to focus GHG reduction efforts on education the public on the issue and the benefits of using alternative modes.

Paratransit Advisory Committee Focus Group
Summary:

1. ITS should be a priority to keep traffic flowing.
2. Eliminate left turn lanes on two lane roads.
3. 20% of Sonoma County has some sort of disability… in the future this may go up to 40%, so SCTA need to have a plan for dealing with the growth in paratransit demand.
4. Healthy older adults should be able to easily use the bus system… and the bus system needs to be more attractive to seniors.
5. A lot of older people live beyond ¾ mile so SCTA needs to support the expansion of ADA requirement to provide service at ¾ mile. We need to provide paratransit service above and beyond this framework.

Youth Focus Group

Summary:

1. Employers need to align the beginning and ending times for work so people can car pool and use transit.
2. Someone needs to invent a TransQuest website that works like Mapquest where you put in your starting point and your destination, and you get a travel plan for using public transit. You could also buy your transit passes on-line (print out a barcode) would eliminate the need to buy a translink pass.
3. There need to be a very large scale effort to change the image associated with using public transit:
    a. From its only used by transit dependent people to its used by cool, caring progressive people
    b. Need to keep homeless people from loitering at bus stations
    c. Buses need a face lift to make them more attractive
4. Bus service needs to improve significantly:
    a. Shorter headways
    b. Goes more places
    c. Reduce travel time to compete with car
    d. Need more bike secure storage at stations/stops
    e. More bike storage on buses
5. Bike travel:
    a. Build public showers as a part of bike facilities at transit stations
6. Reducing school related GHG emissions:
    a. 4 day school weeks (10 hour days)
    b. Create safe paths to school so students can ride bikes
    c. SCTA subsidize school owned bikes for schools to check out to students for the year (auto shop can maintain)
    d. Change the laws prohibiting car pooling for teen drivers
7. Create toll roads.
8. Employ social networking to increase public transit use (friends don't let friends drive their car when they can ride, walk or take transit).

9. Build wind turbines along the Hwy. 101 to generate electricity when cars go buy.

Latino Community Interviews

Summary:

1. 25% of all Santa Rosa City Bus riders are from Roseland.
2. Bus routes are too long and as a result it takes too long to get to one's destination.
3. We need more direct bus service that runs on a grid not the loops that we currently have.
4. We need maps of routes and schedules at all bus stops.
5. Bus service schedules need to take in to account and that lower income peoples have different schedules that more affluent middle class people. Bus service needs to extend into late evening hours to accommodate lower income jobs.
6. Bus stops are not perceived to be safe for people to stand by as they wait for the bus.
7. There need to be an effort to educate Hispanic men on how to ride bikes safely (e.g. wear a helmet and use light at night).
8. There needs to be more traffic calming in neighborhoods (especially those without sidewalks).
9. We need more sidewalks.
10. The Latino Community is not very aware of the need to reduce GHG emissions. There needs to be an effort to educate Latinos about the need for this and ways to do it.
11. Subsidize Safe Routes to Schools.

Appendix C. RESEARCH & TECHNICAL DOCUMENTS

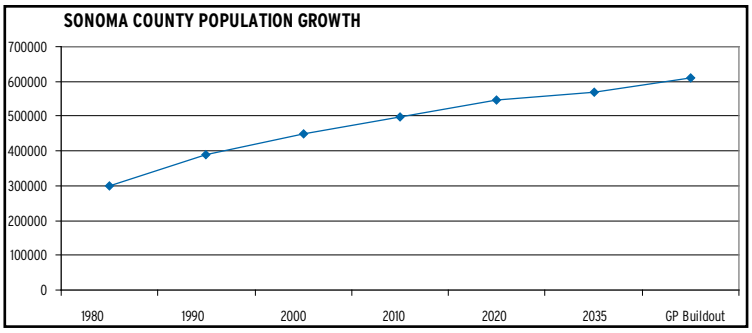
i. Greenhouse Gas Emissions Reduction White Paper

INTRODUCTION

Purpose

The purpose of this technical memorandum is to provide recommendations to the Sonoma County Transportation Authority (SCTA) Ad Hoc Committee in developing Green House Gas (GHG) reduction policies that will be incorporated into the update of the Countywide Transportation Plan (CTP). All nine cities and the County have committed to reducing GHG emissions and adopted the goal of reducing emissions to 25% below 1990 levels by 2015. This exceeds the California Global Warming Solutions Act of 2006 (AB 32) goal of reducing emissions to 1990 levels by the year 2020. In Sonoma County it is estimated that transportation may be responsible for up to 60% of all man-made GHG emissions.

At the outset, it must be acknowledged that this is an ambitious goal in a growing county. For example, from 1990 to 2020, Sonoma County's population is expected to increase 41%, from approximately 388,000 to 546,000 residents.[1] Much of this growth will occur by 2015, since the growth rate from 2015 to 2020 is expected to be slower. Assuming level per capita emissions, this would result in a 41% increase in GHG. This magnitude is larger than can be offset by any one type of effort or a typical travel demand management (TDM) program, which usually strive for a 5 to 15% reduction in peak hour traffic, sometimes by shifting trips to off peak periods (which provides little benefit in GHG reduction). This is not to say the problem is insoluble, but rather that a variety of different approaches are going to have to be taken if the goals in the paragraph above are to be achieved. Many of the measures proposed for reducing GHG emissions in this document provide additional transportation or quality of life benefits and will help SCTA meet other CTP goals and address transportation issues beyond climate change. For example, the reduction of VMT, congestion, and average trip length would reduce GHG as well as improve mobility and accessibility, reduce delay related costs to businesses and individuals, improve overall air quality, and put a lower strain on the system allowing it to be maintained more effectively.



Scope

The intent of this paper is to provide planners and policymakers with recommendations to consider including in the CTP update to assist in reducing GHG emissions from transportation. It is intended as an overview, rather than an exhaustive study of each of the potential GHG reduction techniques. This paper emphasizes actions that are within Sonoma County and its cities power to control, be it through direct actions or advocacy for policy changes at the State and federal levels.

From a policy perspective, global warming and transportation involves two distinct but related issues:

1 ABAG's population forecasts are somewhat lower than the County's Draft General Plan 2020. If population growth is interpolated between 2000 and 2015 using the County's figures, the 2015 population would be 524,000, which is 35% greater than the 1990 level.

- Global climate change's impact on transportation infrastructure
- Transportation's impact on global climate change

The first of these is briefly considered in the first part of this paper. It is important because officials should be aware that the costs of maintaining infrastructure are likely to increase as the global climate changes, leaving fewer resources for improving the condition of existing facilities, and expanding the transportation system with new projects.

This paper focuses on carbon dioxide (CO_2) emissions. They are not the only greenhouse gases—nitrous oxides, methane, and chlorofluorocarbons are also important. Other greenhouse gases can be measured by determining the amount of CO_2 that would have the same global warming potential as a given amount of the greenhouse gas over a given timeframe (Carbon dioxide equivalent—CDE or Equivalent carbon dioxide—CO_2e). The emphasis in this memorandum is on CO_2 because it is one of the chief GHG emissions produced by motor vehicles, and because CO_2 is long lasting (and therefore more potentially damaging), and the data for CO_2 emissions is readily available. Future efforts and analysis could provide more information on these additional measures of GHG production.

What Can Sonoma County Do?

This paper is generally focused on direct actions that SCTA member agencies can take to reduce transportation's contributions to GHG emissions though there is an additional component that addresses policy issues the SCTA can advocate for at the State and federal levels such as fuel economy standards, fuel reformulation, and road or carbon pricing.

THE IMPACT OF GLOBAL CLIMATE CHANGE ON TRANSPORTATION INFRASTRUCTURE

Climate change poses a range of potential threats to transportation infrastructure. For example, more frequent and intense storms could lead to subsidence/erosion damage to roads and bridges, as well as other transportation facilities. This includes everything from more potholes to road closures and subsidence. The west and north areas of the County would be affected most, because of the topography and soils conditions in those areas are more susceptible to subsidence and flooding, although low-lying areas along the bay (e.g., Highway 37) would also be at risk. Road closures and increased maintenance costs would result from more numerous major storm events. Flooding could close or damage roadways, as has happened in the past in a number of parts of the County, especially the Russian River valley, Petaluma, and in the south/southeast portions of the County at the Marin/Sonoma border and baylands.

A rise in sea level could affect ports and coastal areas, although most roads are well above sea level in Sonoma County. According to the San Francisco Bay Conservation and Development Commission, San Francisco Bay sea level has risen approximately four to five inches in the last 100 years. The rate of rise in recent years is roughly two times the rate observed in the past 100 year period, and the San Francisco Bay is expected to rise another 4-5 inches in the next 50 years (this could be further accelerated by continued global warming). Many of the North Bay Marshland around Sonoma Creek and San Pablo Bay would likely be submerged by increasing sea level rise. Businesses in the county that depend on foreign imports or exports could also be affected, e.g., if there are higher costs of maintaining port operations. Bodega Bay is the County's only port of any size, although it is oriented toward fishing and pleasure craft, rather than commercial shipping.

There may need to be new standards for planning, design, and operation of transportation facilities to reflect the potential change in the environment. For example, roadways are typically planned to be above the hundred year flood level, but if storm events increase in frequency and intensity, consideration may need to be

given to locating them at higher elevations. New perspectives on emergency management, particularly evacuation schemes, need to be developed; the County has considerable experience with this from major events like the floods of 1986, but some of that knowledge may be lost due to the turnover and retirement of emergency response personnel.

TRANSPORTATION'S IMPACT ON GLOBAL CLIMATE CHANGE

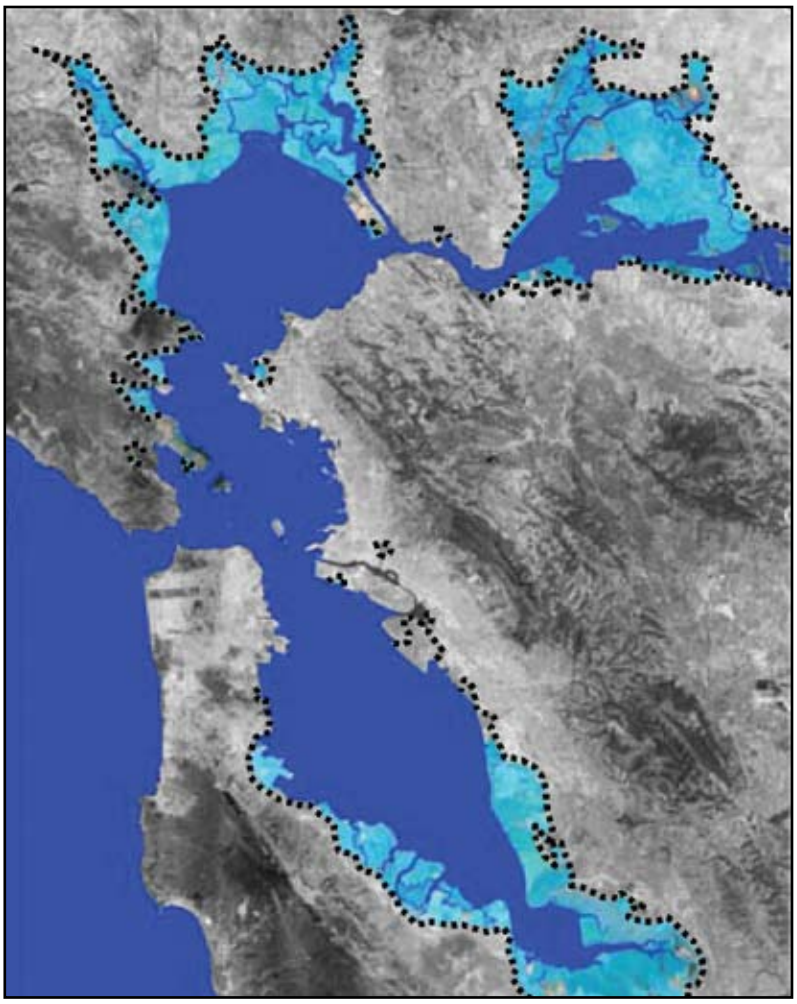
At the global level, transportation's direct contribution to greenhouse gas emissions varies significantly from one world region to another. Carbon dioxide (CO2) is the most serious GHG emission from transportation sources and has long a long life in the upper atmosphere. Globally, the largest sources of CO2 emissions are transportation, industry, electric power generation, agriculture/farm operations, and residential heating.

Transportation may account for 15 to 25% of all CO2 emissions worldwide, but because we tend to drive more and burn less coal relative to other places in the world, in places like the Bay Area transportation accounts for a considerably higher share of all CO2 emissions. In Sonoma County, it is estimated that transportation is responsible for up to 60% of CO2 emissions because of a mild climate, a modest industrial base, controls on agricultural burning, and an absence of fossil-fueled power plants (Climate Protection Campaign).

EMISSION ESTIMATES FOR SONOMA COUNTY MOTOR VEHICLES

Based on data published by Caltrans,[2] Sonoma County residents traveled 3.89 billion miles in vehicles in 2005, and consumed 208.3 million gallons of motor fuel (gasoline and diesel). Using conversion factors provided by MTC[3], this results in an estimate of 1.87 million metric tonnes[4] per year of CO2 emissions. The Clean Air and Climate Protection Software (CACPS)[5] package estimates 2.24 million tons equivalent CO2 produced for this period. Assuming the same mix of gasoline and diesel was present in 1990; this is an increase of nearly 17% from 1990 levels, when 1.60 million metric tonnes were pro-

SAN FRANCISCO BAY PREDICTED SEA LEVEL RISE



2 Motor Vehicle Stock, Travel, and Fuel Forecast (MVSTFF) Report, Division of Transportation System Information, December 2006 (issued annually). This is the most recent version; the 2007 update had not been released at the time of writing.

3 19.4 pounds of CO2 per gallon of gasoline, and 22.2 pounds per gallon of diesel fuel.

4 A metric tonne is approximately 2,200 pounds, or 1,000 kg. The spelling distinguishes it from a 'short' ton (2,000 pounds). Most documents on GHG use metric tonnes (sometimes abbreviated MT), so to aid in comparison, the same units have been used here.

5 CACPS software developed for ICLEI (International Council for Local Environmental Initiatives, STAPPA (State and Territorial Air Pollution Program Administrators, and ALAPCO (Association of Local Air Pollution Control Officials).

duced (2.07 million tons equivalent CO2). Part of the reason that CO2 emissions did not grow as fast as population was that there were improvements in vehicle fuel economy in that period. In 2006, Caltrans predicted that fuel economy will continue to improve through 2015, but will level off after that time. This was before the recent changes in the fuel economy standards (CAFÉ). Between 1990 and 2005, the County's population grew from 388,200 to 478,800, or approximately 23%.[6]

Assuming no policy intervention (or "business as usual"), and the older fuel standards, Caltrans data point toward CO2 emissions in Sonoma County from motor vehicles increasing to 2.53 million metric tonnes in 2020, and 3.01 million metric tonnes in 2030 (roughly 3.03 and 3.61 million equivalent CO2 in 2020 and 2030). The year 2020 is an important benchmark, because AB32 (Nunez) calls for a reduction of actual 2020 emissions to the estimated 1990 levels. This would require a reduction of almost 37% in vehicle emissions, equivalent to a reduction of 930,000 metric tonnes per year (approximately 960,000 tons equivalent CO2 per year). SCTA's adopted policy is even more stringent, and will require a reduction of 1,350,000 tons equivalent CO2 per year and a reduction of approximately 1.5 billion vehicle miles traveled (VMT) per year by 2015.[7] These figures take on greater importance if carbon offsets were used to meet part of the goal, as discussed later in this paper.

PROPOSED STRATEGIES FOR REDUCING CO2 EMISSIONS FROM MOTOR VEHICLES

Many of the policy solutions that reduce CO2 require a concerted and sustained effort at all levels of government: local, regional, state, and federal. There are three types of actions that local governments in Sonoma County could consider:

- Those that can be implemented locally. An example is expanded transit service.
- Those that could be implemented if the appropriate changes were made in state and/or federal legislation. Examples of this include high occupancy toll (HOT) lanes and/or pricing on Highway 101, and incentive or mandated employer-based TDM programs.
- Those that require advocacy in order to be implemented as it falls outside the authority of local governments. This includes such things as low carbon fuels for the entire vehicle fleet, electric vehicles, and changes to CAFÉ standards, etc.

This paper focuses on the first group of actions, although also provides discussion of some of the policies and legislative changes that the County and the cities could support to bring about more significant change. Several large cities, such as Portland, Oregon; Seattle, and New York City have been pioneers, independent of the federal government, in reducing CO2 emissions. For example, New York, which has a large taxicab fleet, will require all cabs to be hybrids by 2012, and will plant one million new trees as part of its CO2 reduction program.

There is an ongoing debate among transportation professionals as to whether the solution to reducing transportation's contribution to GHG emissions lies primarily in technology changes to the vehicle fleet, or major changes in life style, behavior, and land use patterns. It is clear that any policy that seeks to reduce transportation-related carbon dioxide emissions will require some combination of better vehicle fuel technology, improved vehicle fuel economy, and reductions in vehicular travel.

Most of the changes in technology require federal and or state legislation that SCTA can support through its legislative program. However, SCTA has the opportunity to take a more direct role in reducing travel demand. Strategies to reduce travel demand will likely need to do two things:

6 1990 population is official US Census figure; 2005 is from ABAG Projections 2007.

7 These figures represent a reduction below projected 2015 conditions.

reduce energy use per unit of distance traveled and decrease per capita distance traveled. Although improvements in fuel and vehicle technology can help, land-use and transportation planning that reduces vehicle demand is crucial, especially in light of population growth. This approach is consistent with the overarching principles the SCTA board reviewed and approved at its July meeting.

The following is a list of direct and indirect measures that could be employed by Sonoma County to reduce GHG emissions. A more comprehensive list of possible GHG mitigation measures is being prepared as part of the SCTA Comprehensive Transportation Plan (Strategies Matrix). We recognize that no single measure will provide the "silver bullet", and that these measures will need to be combined into a comprehensive GHG reduction program.

- Transportation Demand Management
- Vehicle Fuels
- Vehicle Efficiency
- Land Use
- Parking
- Transit
- Bicycle and Pedestrian
- Intelligent Transportation Systems/ Signal Timing Improvements
- Congestion Reduction
- Accelerated Vehicle Replacement
- Carbon Offsets

Transportation Demand Management (TDM)

Travel demand, at its most basic level, is the result of a desire to engage in an activities (work, shopping, recreation, etc.) that are physically separated from one's present location. Sometimes this demand is virtually mandatory (e.g., going to work five days a week); sometimes it is flexible (we need to buy groceries, but can easily decide where and when to do so); and sometimes it is optional (we drive to the beach because it's a warm day and because we like the ocean). There are many ways to measure travel demand, but most frequently it is by the vehicle miles or vehicle hours traveled. Increasingly, there are in-home substitutes available as an alternative to travel, e.g., we can shop on-line, or we can have a DVD mailed to our house rather than drive to the movies.

TDM programs represent a variety of measures that transportation planners have developed over the past 40 years in an effort to reduce single occupant vehicle use, travel demand, and overall VMT, at a relatively low cost. They generally fall into five broad categories:

- Increased options for commuters
- Market based (pricing) strategies
- Time of travel shifts
- Improving traffic flows
- Regulation of parking and driving

TDM measures are usually applied at the employment end of the trip, where they are most effective. In the mid-1990s the state legislature prohibited mandatory employer-based in most of California. However, several cities and employers in Sonoma County have voluntary TDM programs and many employers have informal approaches to TDM style programs.

TDM typically works best with large employers, as there are economies of scale to an informational program. Employers with more than 50 or 100 employees are usually the best "target audience" for TDM. One of the challenges of applying TDM programs in Sonoma County is that the employment structure tends to be one of many small employers. The 2005 County Business Patterns revealed that of the 13,847 private-sector business establishments (work places) in the county, only 229 had 100 or more employees, and only eight establishments had more than 1,000 employees.[8]

8 One employer could have more than one "establishment," e.g., if a grocery store chain had 10 stores in the county, it would be counted as 10 establishments. Because the data are based on social security payroll information, it excludes most governmental employees.

Vehicle Fuels

Biofuels (ethanol, biodiesel, biomass, cellulose) can be encouraged as alternatives to petroleum-based fuels because they emit less carbon dioxide per gallon burned. Gasoline reformulation may also be capable of reducing CO2 emissions by 10% per gallon consumed. Care must be taken when implementing wide spread use of Biofuels. Increased use of these types of fuels could have adverse impacts on worldwide food supply and food prices.

Vehicle Efficiency

Vehicle efficiency: Regulations and incentives for improved fuel economy are the primary policy tools to address vehicle fuel efficiency. Besides improvements to existing gasoline powered vehicles, it could include electric, hybrid, or other low-emission technology vehicles. CO2 emissions are directly proportional to the fuel economy of a given vehicle; doubling fuel economy (even with no change in miles driven) will halve the CO2 emissions.

Land Use

Many—perhaps most—local jurisdictions in Sonoma County have included policies in their general plans encouraging higher densities, which as a by-product, promote many of the goals of GHG reduction. Land use policies to promote GHG emissions need to incorporate the 4 "D"s: density, diversity, design, and destinations. SCTA could continue to work with its local jurisdictions to identify opportunities for complementary land use and transportation projects around major transit hubs, such as SMART stations or important bus transfer centers.

Housing affordability is an increasingly important issue in Sonoma County. As housing costs increase, workers are forced to live further from workplaces in an effort to find suitable and affordable housing. Those employed in the county should have affordable housing opportunities so that they can live near where they work. A balance of jobs and suitable housing has great potential to reduce trip lengths and frequencies and thereby reduce transportation related GHG emissions. Loan programs or other financing tools may provide assistance in this area.

Parking

Although parking is not directly under SCTA's control, it plays an important role in influencing travel, and is within the purview of local jurisdictions. Parking supply in new development is usually determined by parking codes, some of which have remained unchanged for many decades. Many parking codes were last visited in the 1960s and 1970s, and are often a "set and forget" part of local government codes.

Excess parking increases development costs, makes places less pedestrian friendly, encourages driving, and reduces the effective density of land uses. As a result, some cities have reduced their minimum parking standards where it seemed appropriate, or created minimum and maximum standards to discourage excess parking. Charging for parking is another way to affect mode shares, although it is likely to be politically unpopular, especially in a place like Sonoma County where parking has been free nearly everywhere except in downtown Santa Rosa and the Junior College. Drivers are more accustomed to paying for parking when parking is in a structure than on the surface.

Transit

The 2000 Census indicated that 2.3% of Sonoma County residents regularly used transit to travel to and from work. Although the margin of error in this estimate is +/- 0.6%, this still represents a small fraction of all commuters. For all trip purposes, transit carries perhaps 0.5% of all trips. On a positive note, this is higher than the percentage found in many other low-density counties across the country, and transit does perform much better in selected markets. For example, approximately 8.2% of inter-county trips (mostly to Marin and San Francisco counties) are made by transit. Generally, the longer the trip the more amenable it is to transit.

This also points out the unintended consequence of policies encouraging job creation within Sonoma County: as the share of workers commuting to jobs outside of the county decreases, the more difficult it is to "capture" commute trips on transit. The County has long had the laudable goal of encouraging shorter, in-county commute trips, to the point where Sonoma County has one of the lowest percentages of any Bay Area county for "out-commuters." However, this policy has worked counter to increasing transit mode shares, because of the difficulty of serving dispersed job locations in Sonoma County. From an individual's standpoint, taking a bus to a job in the San Francisco Financial District makes a lot of sense; taking a bus from one's home in Bennett Valley to a job in the Santa Rosa Corporate Center does not, at least if one has a car.

Density improves the efficiency of transit, yet transit service and use must be balanced with how much public resource can be devoted to expansion. Most studies (see Pratt, 2000) indicate that doubling the frequency of bus service on a given line will typically yield only 50% more riders. For example, consider an existing bus route operating every 30 minutes and carrying 400 daily riders. Increasing the frequency of service to every 15 minutes would probably result in about 200 new riders (600 total). Because Sonoma County is starting at a very low base (2-3% transit mode share), achieving a significant transit mode share (5-10%) might require tripling or even a six-fold increase in the number of buses being operated compared to current levels. This would require significant new sources of revenue.

Bicycle and Pedestrian Improvements

Implementation of Bicycle and Pedestrian access improvements as prioritized in the Bicycle and Pedestrian Master Plan should be an important goal of the CTP. As quoted from the draft updated SCTA Countywide Bicycle and Pedestrian Plan:

"Each time a Sonoma County resident, worker or visitor chooses to travel by bicycle or on foot rather than to drive, they are reducing fossil fuel consumption, thereby decreasing their contribution to air pollution and global climate change. Walking and bicycling are the ultimate clean air, zero emission transportation modes, which also reduce water pollution because vehicular oil drips are a significant source of water pollution.

The benefits of walking and bicycling to the environment are particularly strong on short trips—two miles or less. For example, 60 percent of emissions that contribute to smog are released in the first few seconds of a one-mile trip. A 2006 study by Analy High School students revealed that 40 percent of students who live less than one mile from the Sebastopol campus drive alone to school. Although Sonoma countywide data isn't available, nationally, 13 percent of trips are less than one-half-mile, considered to be a comfortable walking distance, and over one-third of trips are within convenient bicycling distance, less than three miles long. As more motor vehicle trips are replaced with bicycling and walking, Sonoma County's air will become cleaner, and the County will contribute less to global climate change, making measurable progress towards meeting its greenhouse gas reduction goal."

Intelligent Transportation Systems/ Signal Timing Improvements

Intelligent transportation systems (ITS) is defined as the application of advanced electronics and communication technologies to enhance the capacity and efficiency of surface transportation systems, including traveler information, public transportation, and commercial vehicle operations. Perhaps one of the most promising techniques for reducing vehicle fuel and energy consumption is that of simply re-timing traffic signals on a regular basis (typically every three to five years, depending on how much traffic conditions may have changed). Some years ago, the California Energy Commission had a program known as the FETSIM (Fuel-Efficient Traffic Signal Management) program to provide local government

with funds to accomplish this. Proposition 1B funds are currently being used for better traffic light synchronization, but primarily for hardware purchases.

Better timing of traffic signals can reduce the number of vehicle stops and idling, and thereby reduce energy consumption and GHG emissions. The size of the reduction is small, but it is a relatively easy one to do and is highly cost-effective.

Congestion Reduction

Congestion also contributes to excess energy consumption and GHG emissions. Motor vehicles operate most efficiently (lowest fuel consumption and emissions per mile) at steady speeds of around 45-60 mph (ORNL, 2007). Stop-and-go traffic contributes to excess GHG emissions. As an example of the benefit of congestion relief on GHG, consider a congested four lane freeway, where two HOV lanes are added (total six lanes in both direction), and the average peak period travel speed increases from 20 mph (before improvement) to 30 mph (after adding HOV lanes). The reduced fuel consumption would be equivalent to approximately 2,850 tonnes per year of CO2. This example assumes that no entirely new trips would be induced by the improvement, an assumption that seems justified given the relatively modest increase in speeds.

The following measures could be employed to reduce congestion in Sonoma County:

- Complete HOV lanes on HWY 101
- Implement Signal Timing and other ITS measures
- Shift trips to less congested periods (flexible work schedules)
- Shift trips to alternative transportation modes (transit, bicycle, pedestrian)
- Encourage telecommuting and carpooling

Accelerated Vehicle Replacement

The objective here would be to accelerate the pace at which new, lower emission vehicles are introduced into the vehicle fleet. Most municipal vehicle fleets are already fairly new and efficient, and many of the trucks that operate in Sonoma County may be based elsewhere. Public school buses are probably the largest fleet still operating older vehicles.

Incentives could be provided for Sonoma County public school districts to replace vehicles with newer, more fuel efficient, and less polluting buses. Sonoma County's school bus fleet had more than 400 vehicles in 2006.[9] The Sonoma County Office of Education, which operates approximately 80 of those vehicles, has indicated that the average age of its small buses is approximate 13 years, and large buses average approximately 20 years old.

There are a variety of options for replacement vehicles, including vehicles with greater fuel efficiency or alternative fuel buses (compressed natural gas, hybrid, biodiesel). According to the "Biodiesel for Schools" website (www.biofuels4schools.org), West County Transportation Agency will begin using 20% biodiesel (B20), resulting in a reduction of more than 145 metric tonnes per year.

A broader program, targeted at the general public, could provide incentives, such as a cash rebate, to any buyers of very fuel efficient vehicles (such as hybrids). There are currently some tax incentives to encourage this, and some private companies have also offered programs as an employee benefit (e.g., Google and Timberland shoes do this, typically with a rebate of between $1,500 and $5,000 per vehicle).

Carbon Offsets

Carbon offsets are purchases made by one entity (the buyer) who are willing to pay another party (the seller) to reduce

9 Information provided by Michael Murphy, Bay Area Air Quality Management District. Because the Air District does not include Healdsburg and Cloverdale, the figure does not include school buses in those areas.

GHG emissions elsewhere. In essence, buyers are paying someone else to reduce GHG emissions in their stead. A similar system has been successfully used for some years to reduce acid rain. The current price for carbon offsets is $10-$15 per tonne.[10] The equivalent price, if added to the retail price of gasoline, would be on the order of 11 cents per gallon.[11] Because CO2 is a global problem, the offsets might occur anywhere in the world, since a ton of GHG reduction is the same regardless of where it is produced. Several organizations, both non-profit and for profit, have been formed in recent years to sell carbon offsets.[12]

Advantages of using carbon offsets for GHG reductions are that:

- They are economically efficient—the attraction being that a buyer having a high cost/ton of carbon reduction can buy an offset from another party having a lower cost/tonne of reduction, and achieve the same basic result of reducing emissions
- They don't represent a long term investment by the buyer, and so can be used for short periods of time to make up for deficiencies

Some disadvantages of carbon offsets are:

- They have low visibility, because the reductions might occur outside Sonoma County (in fact, they might occur anywhere in the world)
- The projects must be truly in addition to what would have been done without the purchase of the offset
- Strict accounting and monitoring is required to ensure offsets are not "double counted" (i.e., two purchasers buying the same offset)
- The offset projects must be verifiable and permanent (e.g., planting trees may be a good mitigation, but may die or be cut later)
- The costs of purchasing offsets, depending on their magnitude, could diminish funds available for making transportation improvements, perhaps significantly

The SCTA may want to consider the purchase of carbon offsets as the last resort for mitigating GHG impacts, and that all other options should be explored and exhausted before deciding to use this method for mitigating carbon emissions in Sonoma County. If the purchase of carbon offsets is deemed necessary, local offsets within the County of Sonoma should be a priority.

RECOMMENDATIONS

The policy solutions that reduce GHG emissions, and will allow SCTA and local jurisdictions to meet county and regional GHG reduction goals, include a variety of approaches and may require a concerted and sustained effort at varying levels of government. Proposed policies have been split into those that can be implemented at the local level, and those that will require advocacy at the regional, state, or federal level. A more complete list is in Appendix A-iv—2008 Comprehensive Transportation Plan Strategies Matrix.

Local Efforts:

- Give high priority to projects and programs that demonstrate the ability to reduce fuel consumption and emissions.
- Improve roadway and off-road bicycle and pedestrian facilities and paths.
- Promote and seek funding for Safe Routes to Schools Projects.
- Increase and improve bus transit service.
- Implement a regional transit "backbone" using Bus Rapid Transit (BRT) and Rail Transit Service (SMART).
- Implement preferential treatment for buses on local roadways.

10 Quoted from presentation by Alex Farrell, Associate Professor, University of California, Berkeley, 1/14/08. Other estimates range from $5 to $40 per tonne.

11 208.3 million gallons gas and diesel per year/(1.87 million metric tones CO2 per year*$10 offset per tonne) = 11.14 cents per gallon.

12 Examples include TerraPass (www.terrapass.org) and Carbon Fund (www.carbonfund.org).

- Fund improved transit information and marketing programs.
- Support high density development around transit hubs.
- Develop transportation investment criteria that supports 4-d development strategy (density, diversity, design, destinations).
- Implement housing assistance program to aid employees in finding adequate housing near employers.
- Increase ridematching services and park and ride capacity.
- Review parking codes, and support increased parking costs.
- Review land use codes, and support reforms that encourage compact mixed use development, infill, and carbon efficient design.
- Provide incentives for employers implementing TDM programs.
- Promote telecommuting and compressed work schedules.
- Support development of Carsharing Programs.
- Complete Sonoma County's portion of the regional HOV network.
- Support Local and Regional Intelligent Transportation System (ITS) development (Signal improvements, turn restrictions, etc.)
- Support development of non-highway, carbon efficient goods movement.

ADVOCACY EFFORTS:

- Support efforts to implement technologically-based fuel economy improvements, such as low carbon fuels, hybrid vehicles, etc.
- Support efforts to increase and index gas taxes.
- Require major new transportation projects to analyze its GHG emissions as part of the environmental process.
- Support efforts to garner an EPA exemption to allow California to set standards for GHG from motor vehicles.
- Repeal Section 40717.9 of the Health and Safety Code which restricts local governments from requiring that employers implement a trip reduction program.
- Support efforts to implement congestion pricing, including HOT lanes, tolling and road pricing.
- Support efforts to increase the fuel economy standards beyond the 35 mpg recently passed by Congress in the Energy Independence and Security Act of 2007.
- Support efforts to improve fuel consumption and emission standards for commercial vehicles.
- Support efforts to increase freight fees to address air quality issues.
- Purchase Carbon Offsets if necessary.

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Appendix C. RESEARCH & TECHNICAL DOCUMENTS
ii. Pavement Management

Many jurisdictions respond to funding shortages by deferring preventative maintenance, which allows roadway systems to deteriorate at high rates. As cities and counties concentrate their limited resources on the most obvious needs, such as filling the worst potholes or reconstructing streets with the worst pavement conditions, the critical area of preventive maintenance is neglected. Research has shown that a typical pavement deteriorates 40 percent in quality in the first 75 percent of its life, and then deteriorates another 40 percent in the next 12 percent of its life.

A pavement management system (PMS) allows jurisdictions to identify needs and allocate a sufficient amount of funds to preventative maintenance, which, in turn, lowers the overall cost of maintaining the street network. The cost of preventive maintenance is generally one-fifth to one-tenth the cost of repairing pavement that is 80 percent deteriorated. Studies of pavement failure and rehabilitation strategies have found that if streets are properly maintained while still in a "good" to "excellent" condition, the total sum of preventative maintenance investment is significantly less than if the pavement is allowed to deteriorate to the "poor" and "failed" conditions and is then reconstructed. The goal of PMS is to raise the condition of the street network so that preventive maintenance is the primary strategy being applied, which will minimize long-term budget needs.

The Pavement Management System is composed of five different processes. They include (1) entering street inventory data, (2) calculating pavement conditions, (3) specifying maintenance treatments, (4) determining budget and maintenance needs, and (5) formulating budget scenarios. The following discusses these processes and identifies the information that is required in order to complete them.

Street Network Inventory

The first step in establishing a street network inventory is to divide the streets into numbered sections, usually based on City blocks. Each section consists of a street segment that is uniform in its condition, surface type, and width. These sections are the basic management units of the PMS.

Geometric and historical information is entered into the PMS database for each maintenance section. This data includes the section number, beginning point, end point, length, width, surface type, number of lanes, year of construction, and functional class of each section.

A typical inspection unit, usually 100 feet in length for most City streets, is selected from each street section for more careful examination. The inspection unit chosen is typically representative of the condition of the street section as a whole. Generally, an inspection unit includes at least 10 percent of the area of the street section.

Each inspection unit is surveyed for pavement distress for each of the following categories:

- Alligator cracking
- Block cracking
- Distortions
- Longitudinal and transverse cracking
- Patching
- Rutting
- Weathering

The guidelines that are followed for inspecting pavement can be found in the Manual for Pavement Condition Index Distress Identification as published by MTC. Once the information is collected, the distress information is entered into the PMS program with the respective quantities and levels of severity.

Pavement Condition Calculation

When the street section information is entered into the program, the PMS program determines pavement conditions based on a rating scheme developed by MTC. The condition of each of the street sections is described by a Pavement Condition Index (PCI) number, based on the distress observed when the section was inspected. The Pavement Condition Index values range from "Very Good" (PCI = 70 to 100) to "Failed" (PCI = 0 to 25). PCI value calculations are based on accumulated data and pavement testing done by the U.S. Army Construction Engineering Research Laboratory and used within MTC's program. The program initially assumes each section to be in perfect condition, and lowers its PCI for every distress recorded when it was inspected.

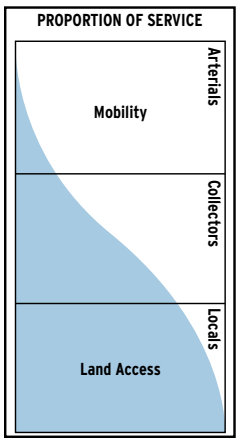
The PCI is separated into five categories that describe the extent of pavement deterioration. Deterioration may be caused by load-related distresses, the environment, or both.

Preventative Maintenance and Rehabilitation Treatment Specification

The PMS program requires a jurisdiction to specify the preventative maintenance or rehabilitation treatment, along with its unit cost, for each PCI category. PMS software then matches each street section with an appropriate treatment based on its PCI. PCI Category II is considered "Preventive Maintenance," and usually requires crack sealing, slurry seals, or thin overlays. PCI Categories III, IV and V are considered "Rehabilitation". Rehabilitation treatments range from thin overlays (Category III), to thick overlays (Category IV), to full pavement reconstruction (Category V).

The PMS program also allows the user to specify different treatment strategies for streets, corresponding to their functional classes (residential, collector, or arterial) and their different surface types, including asphalt concrete (AC), asphalt concrete over asphalt concrete (AC over AC), portland cement concrete (PCC), and asphalt concrete over Portland cement concrete (AC over PCC). The MTC Pavement Management System User's Guide can be referenced for a more complete description of the process and criteria for matching the pavement condition with the maintenance type.

RELATIONSHIP OF FUNCTIONALLY CLASSIFIED SYSTEMS IN SERVING TRAFFIC MOBILITY AND LAND ACCESS



THE CONCEPT OF FUNCTIONAL CLASSIFICATION

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Most travel involves movement through a network of roads. It becomes necessary then to determine how this travel can be channelized within the network in a logical and efficient manner.

Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a highway network.

Functional classification can be applied in planning highway system development, determining the jurisdictional responsibility for particular systems and in fiscal planning.

Freeways

Freeways are designed to carry large volumes of interurban, regional and interstate traffic, although they may carry local traffic in urbanized areas. They are designed to separate two or more travel lanes with a median, to prohibit access from abutting property and to limit access from cross streets by providing grade separations.

Access to a restricted number of cross streets may be provided at grade-separated interchanges. Acceleration and deceleration lanes are provided at interchanges. The desired minimum spacing between interchanges is one mile in urban areas, and two miles in rural areas. Auxiliary lanes may be provided from one interchange to the next in densely developed urban areas with closely spaced interchanges, or where

a considerable amount of traffic travels only between two interchanges.

Primary Arterials

Arterials are major through highways that carry large volumes of traffic over long distances. Although they are principally intended to serve intercity travel, they may also provide routes of regional significance in less heavily traveled corridors and some local traffic in larger urban areas. Arterials are intended to serve a through-traffic function and not to provide access to property. The number of lanes of traffic may vary from two to four or more. Continuous or intersection-turn lanes may be provided.

Secondary Arterials

Secondary arterials serve the same function as primary arterials but either carry a lesser volume of traffic or carry a higher proportion of local traffic over shorter distances. Within urban areas, these arterials may connect locations with large-scale traffic generators. Although access to abutting land is permitted, it is secondary to the traffic function of the arterial.

Major Collectors

This class of highways primarily serves internal traffic within a sub-county local area and carries this traffic to the arterial system. Major collector highways do not ordinarily carry a high proportion of long through trips and are not, of necessity, continuous for great lengths. In urban areas, collectors may carry traffic volumes in excess of 10,000 vehicles per day, although in rural areas volumes are considerably less.

Minor Collectors

This class of highways serves the same function as major collectors, but occurs primarily in rural areas where traffic volumes are lower but the length of trips and the roadway are usually longer.

Local Roads

The sole function of these roadways is primarily to provide access to adjacent land. These highways make up a large percentage of the roadway network but carry a small proportion of the total vehicle miles of travel.

TRAFFIC LEVEL OF SERVICE CONCEPT

The concept of levels of service uses qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as travel speed (and thus travel time), freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. The analysis is usually done for peak period driving conditions. "A" represents the best possible service; "F" represents the worst. The characteristics of traffic flow for these

LEVEL OF SERVICE THRESHOLDS

LEVEL OF SERVICE	FREEWAY	ARTERIAL CLASS I	ARTERIAL CLASS II	ARTERIAL CLASS III	ARTERIAL CLASS IV
Range of Free Flow Speed (mph)	55-70	55 to 45	45 to 35	35 to 30	35 to 25
Typical Free Flow Speed (mph)	65 mph*	50 mph	40 mph	35 mph	30 mph
A	-	> 42	> 35	> 30	> 25
B	≥ 50	> 34-42	> 28-35	> 24-30	> 19-25
C	≥ 47	> 27-34	> 22-28	> 18-24	> 13-19
D	≥ 42	> 21-27	> 17-22	> 14-18	> 9-13
E	≥ 30	> 16-21	> 13-17	> 10-14	> 7-9
F	< 30	≤ 16	≤ 13	≤ 10	< 7

* Freeway design speed
Source: Highway Capacity Manual 2000, Exhibit 15-2. Transportation Research Board.

various levels of service are summarized in the table on page 137. Level of service "D" is defined as the stage approaching unstable traffic flow, where speeds and maneuverability are restricted.

Appendix C. RESEARCH & TECHNICAL DOCUMENTS
iii. Transportation & the Built Environment

The purpose of this paper is to discuss some of the relationships between land use and transportation. Although the SCTA does not have direct control over land use and growth in Sonoma County, land use and transportation are intimately related in many ways. Transportation affects, and in turn is effected by, land use. As discussed later in this paper, such variables as proximity of uses, diversity of land uses, density, and a balance of land uses, can affect the number of trips made, how far they are made, and by what mode of travel.

LAND USE AND TRANSPORTATION

The architecture of our land use patterns and streetscapes reflects a melding of numerous economic, social and other influences, of which transportation is only one. Transportation goals should be weighed alongside other goals, including providing desirable and affordable housing, enhancing quality of life, supporting economic development, preserving agricultural and environmentally sensitive lands, and minimizing costs. Costs include new infrastructure which, in addition to transportation facilities, includes sewers, water and schools. Costs also include the social, economic and lost resource costs of losing productive open space, and of having previously viable urban neighborhoods left behind in outward growth. Not to be overlooked, however, are worthy transportation objectives for shaping land use patterns and site design features in the interests of transportation efficacy and impact mitigation. These objectives include:

- Reductions in vehicle miles of travel (VMT), pollution, and energy consumption. Concentrated, contiguous development and balanced land use provide opportunities for households to meet daily needs with shorter automobile trips or by walking, bicycling, or taking transit, thus contributing to reduction in overall VMT and efforts to manage congestion, reduce energy vulnerability, and achieve air quality health standards.
- Increased transit use and productivity. Clustering and intensification of residential and commercial development along transit lines and around transit facilities increases the number of opportunities that can conveniently be reached by transit, which in turn leads to higher levels of ridership, correspondingly increased service productivity and cost effectiveness, and potential for even higher transit service levels.
- Pedestrianization of activity centers. Concentrated, mixed land uses coupled with pedestrian friendly site design not only facilitate non-motorized and other non-autodriver travel by residents, but also by commuters and commercial visitors. Knowledge that most activities within a center can be reached on foot or via local transit once there diminishes perceived need to drive to a center, enhancing choice of transit and carpooling.

Types of Land Use and Site Design Strategies

There are a number of specific actions that governments or planning agencies have taken to try to manage or influence land use or site design in relation to transportation or other public policy concerns. Examples include:

Growth Boundaries or Regulatory Controls: A major achievement in the past two decades has been that all of the major jurisdictions in Sonoma County have enacted urban growth boundaries (UGB). A number of states and metro-

politan areas have enacted legislation or imposed regulatory controls on growth in the interests of curbing sprawl and associated deleterious effects. The state of Oregon has metro area Urban Growth Boundaries to constrain urban growth within established limits. Portland, Oregon, established its Urban Growth Boundary in 1980. Minneapolis/St. Paul has a similar boundary, largely to protect commercial agricultural lands and northern lakes wilderness areas, and to control regional water and sewer requirements. More recently, states like Maryland, New Jersey, and Massachusetts have enacted "Smart Growth" types of laws with comparable objectives.[1]

Planning and Zoning: Planning and zoning are among the oldest tools used to guide growth at the local level. An area's comprehensive land use plan and zoning designates the location, mix, and intensity of uses that are desired for development in the community. At a macro scale, specific plans may be developed for cities, counties, or regions to establish intended uses in terms of intensities, location and supporting transportation facilities. Sometimes addressed in these plans is the jobs-housing ratio, a measure of the balance among land uses, particularly in relation to work travel. A major planning consideration is highway, street, and pedestrian facility layout, typically enforced at the local level through design standards and land subdivision controls.

Building Codes and Site-Level Zoning Requirements: At a site level, building codes and site-level requirements of zoning may have provisions that can have important effects on transportation options and travel behavior. Some areas, like Bellevue, Washington, and Montgomery County, Maryland, limit or seek to discourage on-site parking by placing maximums on spaces per 1,000 square feet or offering density incentives for building less parking. Other strategies include reduced building setbacks to improve access for walk, bike and transit users, and suburban office park requirements for supply of a mix of pedestrian-accessible services on site, to reduce need for auto commuting.

Growth Management and Traffic Ordinances: Some jurisdictions have adopted ordinances that regulate the pace of new development to ensure adequate capacity and performance of existing and new public facilities. Petaluma, for example, has one of the oldest growth management programs in the country. Some limit development at a site if its addition would increase traffic congestion beyond a specified threshold. "Adequate Public Facility" and similar "concurrency" ordinances fall in this category. They must be carefully structured to avoid inadvertent discouragement of desired construction such as higher-density, compact development supportive of transportation alternatives.

Transit Oriented Development (TOD): Development earns the TOD designation when growth is focused or intensified in the immediate proximity of a transit route, station or other service node. Along with the higher densities, TODs need pedestrian and transit friendly design. Various cities along the proposed SMART line have proposed TODs around the relevant rail stations.

Traditional Neighborhood and Pedestrian Friendly Development: A movement has emerged to build new or redeveloped areas which look and behave more like traditional towns. Structuring an activity center or community so that it has key traditional town characteristics of mixed uses, walkable distances, sidewalks, and other design features conducive to walking, biking or transit use is often termed Traditional Neighborhood Development (TND) or, less frequently, Traditional Neighborhood Design. If such developments reflect past practices in extensive detail, such as accompaniment by streets and alleys laid out in a full conventional grid pattern, they may be classified as Neo- Traditional Development. Conversely, Pedestrian or

1 For example, Statewide Programs to Assess Impacts of Land Use Decisions on Transportation, Report of ITE Technical Committee 6A-57, Steven B. Colman, chair. Report IR-088, January 1996.

Transit Friendly Development may provide close-at-hand retail and services, walkability, easy bicycling and transit supportive infrastructure without Neo-Traditional design constraints. Unlike TOD, neither TND nor Pedestrian Friendly Development necessarily requires high densities.

Infill and Brownfields Development: Efforts to strengthen central places, make better use of existing infrastructure, and reuse semi-abandoned urban lands, all in preference to equivalent outward expansion, have led to use of infill and brownfields development. Infill refers to building on vacant parcels within otherwise developed urban landscapes, while brownfields development pertains to redeveloping sometimes large urban tracts often saddled with industrial contaminants that must be remediated. Infill and especially brownfields development often require incentives and other seed money.

Incentives and Fees: Pricing mechanisms may be applied to alter existing conditions in the market place that act as development signals. These may directly or indirectly affect land use or transportation. Governments are experimenting with location efficient mortgages or job creation incentives to attract development to desired locations. The City of Rohnert Park has engaged in an agreement with a developer to collect regional traffic mitigation funds for transportation improvements outside its city limits.

Travel Behavior and the Built Environment

Travel behavior research associated with the built environment has generated multiple Dimensions, or "Ds" (At last count, we have seen over seven!).

Recent reviews document over 70 studies during the 1990s that explored and quantified these relationships (Handy, 2006; Boarnet and Crane, 2001; Ewing and Cervero, 2001). One of the biggest challenges all of these studies face is sorting out the extent to which socio-economic characteristics and their interplay with characteristics of the built environment impact travel behavior.

Neighborhood Dimensions: Distance, Density, Diversity and Design

According to Handy (2005), we need to better understand the scale at which these various dimensions influence travel and VMT. For example, at Neighborhood/ Station Area Scale, the local neighborhood dimensions of distance, density, diversity, and design have a bigger effect on walking than on driving, and especially on "purposeful walking". And finally, Handy (2005) notes that distance to destinations are key to walking: an attribute more directly affected by diversity (i.e., land use mix) than by density. This makes sense, as these factors are key determinants of the quality of a person's interaction and experience with their environment.

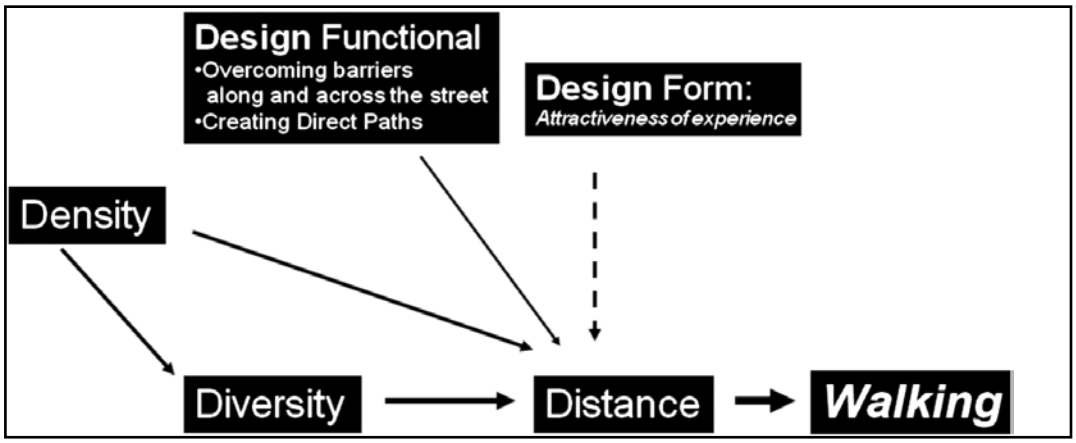
Distance

How Far Are People Willing to Walk?

The average adult walks three to four feet per second (about two to three miles per hour); children, seniors, and people with mobility limitations tend to move more slowly. To understand how far people in a certain community are willing to walk, research tailored to the needs, attitudes and unique community contexts are needed. For example, many factors such as land use mix (retail, housing and residential opportunities), Urban Design, attitudes, etc, all play an important role and can vary significantly from community to community.

Why would someone decide to walk instead of drive? This requires a much more detailed answer, but the emerging conventional wisdom, in short, is that the decision to walk is largely determined by a traveler's perception of distance and the inconvenience of other travel modes. Therefore other dimensions or "Ds" of the built environment such density, diversity and design (functional aspects of pedestrian and bicycle facilities and their attendant networks, in particular), are important components to creating inviting, safe and livable walkable & bikeable communities. Furthermore, the distances individuals are willing to walk vary significantly, depending on

THE NEIGHBORHOOD DIMENSIONS OF TRAVEL BEHAVIOR Source: Bruce Appleyard, 2007



distances between homes, workplaces, and other activities; the quality of sidewalks, roadway crossings and other elements of the pedestrian environment; trip purposes; and personal ability and perceptions of safety. And finally, as travelers become increasingly aware of higher energy costs and negative environmental impacts when choosing travel modes, the distances pedestrians may be willing to travel for work, school and other trips has the potential to increase. Nevertheless, beginning with Richard K. Untermann's 1984 study1, planners have long referred to the "rule-of-thumb" standard that people in the US would only be willing to walk a quarter to a third of a mile for any purpose. A more recent 2007 study, however, by Marc Schlossberg, A. Weinstein and others found that people are willing to walk further, about a half mile, at least get to a transit station.2

Finally, the it is important to recognize how the interaction of Density plus Diversity reduce Distance. In their study of travel characteristics of TOD in California, Lund, Cervero, Willson (2004) found that residents living within ✣ mile of transit stations are almost four times more likely to transit than those live ✣ to three miles out. Compared with other areas in the region, those within a ✣ mile are five times more likely to ride transit.

- Density, which relates to concentration or compactness of development, measured by the number of opportunities (activities, jobs, places to live, or combinations) located within a given geographic space.
- Diversity or "Land Use Mix," which relates to the extent and nature of the mix of uses, and the balance, or compatibility, of the uses with each other.
- Design, which refers to the way in which the various uses are combined, linked and presented on a site, and the results in terms of ease of access, use, and attractiveness. As a partial guide to how the eight actions or land use strategies listed at the outset may be aligned with these three more elemental characteristics of land use, the table above provides a cross-referencing between the various strategies and the aspects of land use they are most likely to influence. Fullness of the circles indicates strength of the connection:

As discussed above there are at least four primary built environment dimensions that are primarily influential at the neighborhood/station area level: Distance, Design, Diversity, Density, and they most strongly influence walking rates for transportation "utilitarian" purposes (as opposed to walking for recreation or pure exercise).

- First and foremost, distance between local destinations, both real and perceived, has the strongest, most direct influence on whether one decides to

walk (Handy, 2005). It is important to note that distance is more directly affected by diversity (i.e., land use mix) than by density. Therefore, the influence of the other Ds on walking occurs primarily through their influence on Distance as follows:

- Design (including function, form, and experiential quality), has an indirect influence on walking via its influence on a person's perception of distance, whether accurate, exaggerated, or encouraging. For example:
- Functional design helps a walker overcome distance by providing adequate, safe and direct paths and crosswalks.
- Design form helps a walker overcome distance by raising the quality and attractiveness of the walking experience via attractive placemaking, feelings of safety, comfort, etc. While important, it is perhaps weaker than the functional aspect of design.
    - Combined, function and form define the experiential quality of the walking trip (e.g., ability to overcome real and/or perceived threats to safety from traffic and/or crime.)
- Diversity has a direct relationship with distance, by placing important destinations closer together—people to support businesses, services, bus stops, parks, schools, etc.—and thus has an indirect influence walking. Diversity may also affect the experiential quality of the walking trip.
- Finally, although it is most often used to as the primary measure of the built environment to determine the walkability, transit ridership, and hence driving rates an area, Density is actually associated indirectly with walking via distance. Density is a proxy measure for proximity, and more powerfully so when coupled with Diversity AND Distance.

Regional Scale: Regional Accessibility (Destinations) and Jobs Housing Balance

As discussed above, the first four land-use dimensions are influential primarily at the neighborhood level; the concept of destinations operates at the city, regional and corridor level (see TOC discussion below). At the regional level, destinations, or the accessibility of important regional activities (e.g., jobs to homes) is a key influence on lowering driving rates. In the terminology of land-use planners, a large part of what is important about destinations is the balance of jobs and housing

Ewing and Cervero (2001) find that this dimension probably has the most potential for larger effects on transportation in the long run. The logic is hard to refute: in theory, if people lived near where they work, shop, learn, and recreate, they would make shorter trips and could make fewer trips by automobile. Thus, a land-use strategy at the regional level that could have a big impact on surface transportation is to plan and provide incentives for the location, scale, and intensity of important land-uses.

The land-use policy discussion most directly related to transportation's concerns with origins and destinations is the one about the balance of jobs and housing. Cervero and Duncan (2006) find the number of jobs within a four-mile distance to housing leads to a decrease in vehicle miles traveled (VMT) and vehicle hours traveled (VHT); Ewing and Cervero (2001) find lower auto use.

Parking

Parking is directly at the intersection of land-use and transportation: it is a transportation use that is also a land use. In downtowns, it is a transportation use that occurs in buildings (parking structures). Its amount and design is controlled more by land-use regulations than by highway engineering standards.

Parking requirements have a direct influence on urban density. As a rough rule of thumb, except for in dense downtowns, conventional parking requirements translate into a 1:1 ratio of parking area to commercial space. Those standards typically require three to four parking

GENERAL EFFECTS OF SAMPLE LAND-USE POLICIES ON THE 5DS

LAND-USE TOOL OR STRATEGY	NEIGHBORHOOD DENSITY	NEIGHBORHOOD DIVERSITY	NEIGHBORHOOD DISTANCE	NEIGHBORHOOD DESIGN	(REGIONAL ACCESSIBILITY TO) DESTINATIONS
Euclidian zoning	–	–	–	–	+[a]
Flexible zoning	+	+	+	+	=
Design guidelines	+[c]	=	+[b]	+	=
Density bonuses	+	+	+	+	+[a]
Tax incentives to attract growth and density	+	+	+	+	+[a]
Growth boundaries	+	=	+	=	=
Transferable development rights	+[c]	=	+[a]	=	+[a]
Parking pricing/management	+	=	=	=	=
Regional land-use planning	+	+	+	+	+
Transit-oriented planning/incentives	+	+	+	+	+[a]

Note: A plus sign suggests the potential to affect the dimension in a beneficial way (in the context of improving the connection between land use and transportation); a negative sign suggests the opposite; an equal sign suggests neutrality or uncertainty.

a. Possibly effective if coordinated at regional level.

b. Distance may be overcome via construction of inviting, direct paths.

c. Design guidelines can make higher densities attractive and appealing to the surrounding communities.

Source: Moore, T., Thornes, P., Appleyard, B. 2007. The Transportation/ Land Use Connection, American Planning Association: Planning Advisory Report 546/547

spaces for every 1,000 square feet of gross leasable area (three for office; four for retail). A typical parking stall consumes about 350 square feet of space, including aisles, landscaping: about three stalls per 1,000 square feet. Thus, every 1,000 feet of commercial space requires at least 1,000 square feet of parking. That is about a 1-to-1 ratio, or a floor-to-area ratio of 0.5, depending on the presence and character of landscaping requirements (taking up about 20% of the land developed for parking).

Those parking requirements constrain building form and massing. Assume a one acre parcel (the size of a block in downtown Portland, Oregon), and a standard 10,000-square-floor plate for a commercial office building. To meet on-site parking requirements using surface parking, the building can go no higher than three stories. To go more than three stories either (1) the floorplate must be smaller and a larger percentage of the parcel must be dedicated to parking, or (2) multi-level structured parking must be built, which adds significantly to cost.

Both means of increasing density have economic problems. Going to a smaller, nonstandard floorplate size and a high building will increase costs per square foot. Structured parking is, economically, even more of a problem. The average cost of a parking stall (not counting land cost) is five to eight times greater in a parking structure than in a surface parking lot. A rule of thumb calculation is that structured parking cannot work without a subsidy until the price of land reaches $40 to $50 per square foot.

It may be that the market is demanding these spaces because they felt they were required for the success of their business. That certainly used to be true (or believed to be true), and probably still is for big-box retailers in suburban locations. But increasingly developers and local governments are looking to alternatives to on-site parking requirements, removing minimum parking requirements, allowing shared and/or off-site parking

arrangements, and allowing for developers to unbundle the parking from the business and/or residential units they are building. Combined, these strategies not only give residential and commercial users more flexibility as whether or not they want to buy or rent a parking space, but people seeking to own fewer cars (and for those not to own a car at all) are thus financially rewarded.

The following is a more detailed discussion of other innovative parking strategies that are possible:

- Parking cash-out. Employers are now allowed to give employees free transit passes (which employers can deduct as an expense) in lieu of the free parking. This typically works best where parking is already being charged for (e.g., downtowns). See Shoup (2005).
- Shared parking. Different uses require peak parking at different times of day or on different days. Sharing parking reduces the amount of land and cost dedicated to parking.
- Parking maximums. In the downtown of Portland, OR, the City allows a maximum of 0.25-0.75 parking spaces per residential unit, 1.0 parking spaces for every 2,500-4,500 square feet of non-residential space. These transit-accessible areas can attract businesses that need central locations because they draw business and employees from a regional market, and a subset of residents who want to own fewer cars and rely on them less and those who want to live close to transit.
- Other complementary strategies. Unbundle parking costs from the rental or purchase price of the housing or office units. Promote car-sharing services (e.g., by reserving on-street and garage parking spaces). Create a "park-it-once" district that has a mixture of compatible destinations accessible by well designed pedestrian environment.
- There are also ways to reduce the hassle of organizing group travel. An example strategy is "rideshare matching." Employers or the public sector can use web sites or other methods to help those interested in carpooling to match up with others in their area who travel at similar times to similar locations. They can help provide locations for informal carpools, which skip the organizational hassles and can often operate on demand.
- "Car sharing" is another example of an intelligent way to reduce a disadvantage of car-pooling. Commuting by transit or carpool means lack of access to a car during the work day. With car sharing, participants purchase hourly or monthly plans to use a "share" of a pool of vehicles, and are able to use any vehicle in the program any time they like. Vehicles are ideally located throughout a downtown and once enrolled, participation in the program is simple.
- Finally, parking codes have often been the product of "set and forget" thinking—in many cases, they have been copied from other jurisdictions or model codes with minimal thought, and have been allowed to remain unchanged over many decades. Re-examination of some of the thinking and motivation that went into these codes could prove productive in establishing parking codes that are more favorable to current economics and transportation planning philosophy.

Transportation Planning for Public Health

During the past decade, it has become increasingly clear that there is an important linkage between transportation and public health. Although concerns about traffic safety as a public health issue go back at least to 1960, there is mounting evidence that land use planning, urban design, and transportation systems have a powerful effect on other health issues.

Chronic disease, including cancer, heart disease, stroke, chronic lung disease and diabetes, accounts for the majority of deaths in Sonoma County. Many chronic diseases, some of which are linked to obesity and lack of exercise are considered preventable. Reduced reliance on the automobile is central to healthier transportation. Priorities for planning for health include:[2]

- Land use planning that creates walkable and bikeable neighborhoods that encourages walking, biking and physical activity, and connects residential areas, workplaces, commercial centers and community facilities
- Safe ways for children to travel to and from school.
- Safe, accessible parks, trails and other recreation options that are linked to residential areas.
- Design features that allow seniors stay in their homes and communities as they age.
- Increase options for non automobile travel.

Out the outset, it should be noted that some of the problems discussed here are multi-faceted and may have several potential causes. Although there is general agreement that child and adult obesity is on the rise and is unhealthful, the exact causes may be more difficult and complex to tease out. For example, a recent study by the Canadian Institute for Health Information (2008) found that residents of low-income communities were more likely to have ample access to purveyors of high-calorie foods and limited access to grocery stores selling healthy foods than residents of more affluent neighborhoods. But they also found walkability and access to recreational facilities—which can be considered part of the transportation system— appeared to be associated with residents' weight status.

It is also clear that some public health factors may be beyond the ability of transportation to influence. For example, there is strong factual evidence that more children are being driven to school today than two decades ago, when more children walked or biked to school. That change is probably due to a variety of causes:

- Parents' concern over their children's security (such as fear of abduction)
- Parents' concern over their children's safety (including safety crossing streets)
- Cutbacks in school bus services in many areas
- Increasing distance to school

Finally, there are some factors at work that probably aren't attributable to transportation, e.g., Americans' per capita consumption of carbohydrates appears to also be increasing.

How Much Physical Activity Do We Need?

The 1996 Surgeon General's Report on Physical Activity and Health documents the benefits of achieving moderate regular activity 30 minutes per day most days of the week, even through relatively brief physical activity (e.g., a 10-minute walk to and from transit). Walking is the most readily available physical activity to nearly everyone, offering transportation and environmental benefits at the same time enhancing health. Physical activity is a key predictor of healthy body weight, and hence they are both important predictors of morbidity. A primary measure used is the body mass index (BMI), which is the ratio between one's height and weight. Although the presence of a causal relationship between the built environment and health is still being debated, evidence shows significant associations between neighborhood design, physical activity, and obesity. Increasing opportunities for physical activity, with sidewalks, trails and livable streets, have been shown to increase the level of physical activity, as well as cognitive and creative health (Appleyard 2003). Several studies show that increased levels of walkability are associated with higher physical activity and lower BMI.

2 Sonoma County Health Services Prevention & Planning

For example, residents in Atlanta's most walkable areas are 2.4 times more likely to get the recommended 30 minutes of moderate activity (Frank and Engelke 2005). Another study found that each additional kilometer (3,000 feet or about eight blocks) walked was associated with a 4.8 percent decrease in the likelihood of being obese, and each additional hour spent per day in a car was associated with a 6 percent increase in the likelihood of being obese (Frank, Anderson, and Schmid 2004). As discussed in the Land Use section of the CTP, such variables as proximity and diversity of land uses, density, and a balance of complementary land uses, can affect the number of trips made, how far they are made, and by what mode of travel.

According to Handy (2005), the local neighborhood dimensions of density, diversity, distance, and design—the dimensions at the level of human interaction with the urban environment—have a greater effect on walking than on driving, and especially on "purposeful walking" (e.g., going to work, as opposed to recreational walking). Improving the street environment for pedestrians has also been associated with other quality-of-life benefits as well.

Street Livability

As traffic volumes and speeds on city streets increase, quality-of-life factors that lead to healthy and strong communities are weakened by making them inhospitable places for pedestrians and neighbors who want to create stronger social ties. That, in turn, affects other aspects of community life and safety, which affects public services and costs. Donald Appleyard (1981) first articulated the notion of the ecology of the street and the unequal distribution of power often held by drivers over residents, pedestrians, and cyclists. Streets comprise a significant part of the land area urbanized areas and the majority of their publicly owned space. They provide more than access, and certainly more than conduits to desired destinations: they contain many of those destinations people want to reach.

Importance of Street Connectivity

Street connectivity—how well streets are connected together to minimize detours, deadends, and minimize total travel distance—is important to promote walking and cycling trips. In the 1950s and 1960s, traffic engineers and land use planners encouraged discontinuous curvilinear streets in residential areas as a way to reduce through traffic and vehicle speeds; this has been called the "stick and lollipop" approach to residential subdivisions, because cul-de-sac streets were often placed perpendicular to a spinal street in a development. In business districts, transportation professionals often promoted wide streets and "superblocks" 500 to 1000 feet long. This approach, although serving the needs of auto traffic, tended to discourage other modes of travel and lengthen trip distances for all modes, including the auto. The SMARTRAQ Project analysis in Atlanta, Georgia, found that doubling the current regional average intersection density, from 8.3 to 16.6 intersections per square kilometer was associated with a reduction in average per capita vehicle mileage of about 1.6 percent. Furthermore, the Frank et al. (2006) study of King County, Washington, found that per-household VMT declines with increased street connectivity, all else held constant.

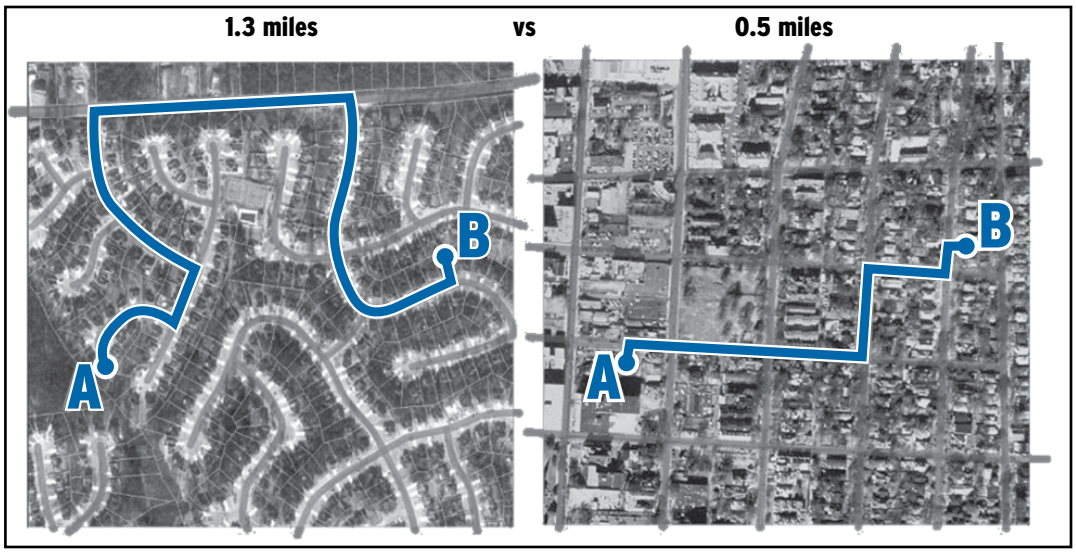
The Importance of Mixed Land Uses and Human Scale

The King County, Washington HealthScape Study showed that the number of retail uses (not simply retail square footage) led to increases in walking trips. This result and evidence from other studies suggest zoning should allow and perhaps encourage more small to modest-size neighborhood stores and restaurants. Another finding from another SMARTRAQ study shows that teens too young to drive are the most sensitive youth age group to "built environment" factors. For example, they are several times more likely to walk if they live in neighborhoods with a mix of uses, have parks, and a connected street network (Frank et al. 2007). This study of 3,100 children in the

STREET CONNECTIVITY AND DISTANCE

The blue line shows the shortest path from 'A' to 'B' is more than twice as long in a typical post-war development as in an older 'grid' style street system

Images are same scale, approximately 1 sq mi. Source: Dr Lawrence Frank, UBC



Atlanta region found that the presence of recreational spaces within a kilometer walking distance of a child's home was the most consistent predictor of walking for youth of all age groups. This same study, however, showed that additional household vehicles meant that young people walked less often and, when they did walk, they walked shorter distances.

Pedestrian and Bicycle Facilities and Economic Benefits

A rigorous 2004 survey of park and trail use in Eugene, Oregon, found that city businesses and stores benefited directly from biking and walking trails that attracted customers from out of town, as well as facilitating their travel. The website, www.bicyclinginfo.org/bike-cost, provides a tool for estimating trail costs and benefits, such as the number of new trail users, the measured economic benefits, time savings, decreased health costs, etc. Furthermore, research also shows that providing such physical activity opportunities provides important economic benefits—helping the bottom line as well as the waistline. For example, Wang et al. (2004) found that for every dollar invested in trail development, nearly $3 of public health benefits are produced.

Strategies to improve public health through transportation policy

Much of this paper leads to the question of what role SCTA should play in considering public health and transportation, or whether other agencies (e.g., the County's Public Health Department) should play the leading role. In reality, this is not an "either/or" proposition, but rather a question of which agency is best suited to take the leading role. In San Francisco, the Public Health Department has been selected. In addressing transportation/public health issues, one difficulty that must be overcome is that the cultures of the public health and transportation organizations are frequently different. Public health agencies typically see problems as having solutions involving prevention and education, whereas transportation and land use agencies (such as planning departments) typically see solutions in terms of design and the built (physical) environment. These differences will need to be reconciled to develop an effective program.

The question is whether SCTA should devote scarce resources to addressing some of the public health aspects of transportation. Very broadly, potential roles could include:

A leadership role, convening other agencies (County public health, law enforcement, traffic engineering/public works, planning departments). This might involve providing a central role for grant applications for funds to address transportation safety and related public health issues

An active participant role, but allowing another agency (or agencies) to take the lead in addressing these issues

A non-participant role; focusing instead on other transportation traditional transportation planning and programming roles

As well as helping shape a healthier environment for Sonoma County through its direction of projects and policies, SCTA could play an important role as a convening and coordinating role between important public health related institutions and agents, including Public Health officials and both public and private entities involved with local land use planning and urban design issues.

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Completing our Streets for Livability

"We should raise our sights for the moment. What could a residential street—a street on which our children are brought up, adults live, and old people spend their last days—what could such a street be like?"

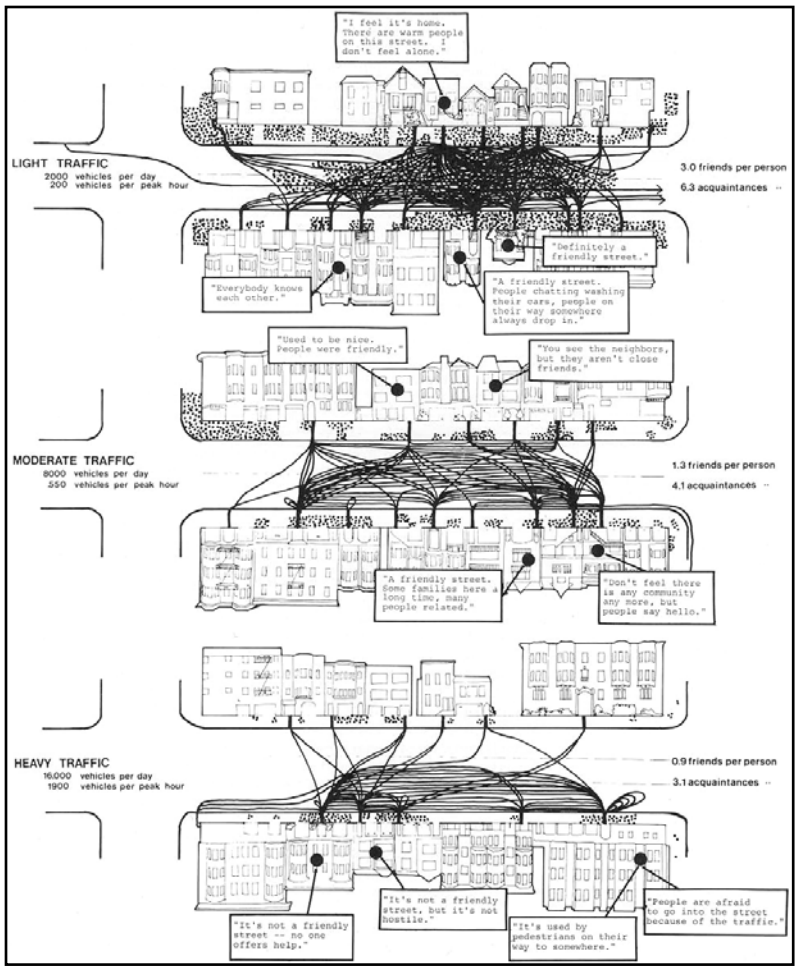
—Donald Appleyard, Livable Streets, 1981[3]

Even after a quarter century these words remind us that streets, which constitute most of the easily accessible public space in our urban areas, are for people, not just cars; that they are places where neighbors can socialize and build community; where young and old alike should be able to freely engage in activities that simultaneously strengthen their community connections, as well as their physical and creative health.

As effectively conveyed in the graphic below, Donald Appleyard and his colleagues uncovered, articulated, and then pictured the accelerating conflict playing out on our streets between traffic and people, that was felt by many, but until then had remained unexplained and, perhaps more importantly, unimagined.

The myopic focus on accommodating driving has left us with a legacy of neighborhood streets that need to be retrofitted, and "completed", for livability. As Norton (2007), Southworth and Ben-

3 Donald Appleyard, Livable Streets, Berkeley: University of California Press, 1981s



Joseph (2003)[4] and Appleyard (1997)[5] have shown, our lack of livable streets is due in large part created by a systemic bias towards building roads for cars over people and residents. It was a result of the transportation institutions we set up and the values, standards rules and technology they adopted. The lack of livable streets in the US is thus a result of focusing too narrowly and acting too simply to address a single problem—efficiently moving the growing number of cars through city and neighborhood streets by removing all other users, and their potential for disrupting flow; While removing cyclists and pedestrians from the road was justified, in part, for their safety, the ultimate effect was to place cyclists and pedestrians on uneven footing with automobiles. Because of this our communities now need to deal with an enormous number of streets in need be "completed" and retrofitted for livability, let alone ensuring that all new roads "routinely accommodate" pedestrians and cyclists.

The figure at left powerfully conveys the inverse relationship between social ties (shown by the lines across the streets) and vehicular traffic, which increases from top to bottom. In the top street, where there is light vehicular traffic, there are many social connections and an active street-life. Whereas in the bottom street, the reverse can be seen with heavy traffic and fewer social ties. In sum, this image show how community ties can actually be knit together by a street that is livable and inviting or, alternatively, they can be torn apart when auto traffic noise, pollution and threats dominate the street environment.

Completing Streets to be both Safe and Livable require that thoughtful design and consideration be given to the following components:

- Getting Across the Street (for both pedestrians and cyclists)
- Getting Along the Street (for both pedestrians and cyclists)
- Placemaking: See Land Use Planning Section
- Traffic Calming: various measures to lower vehicle speeds and, if practicable, volumes— the essential principle is to design streets that are safer and more comfortable for non-drivers (cyclists, pedestrians, etc.).

The following is a more detailed discussion of specific elements of these components that are needed to create a safe, inviting and livable walking and bicycling experiences. While this section provides an overview of key issues, readers who would like more information

4 Norton, Peter. 2007. Fighting Traffic. MIT Press Southworth, Michael, and Eran Ben-Joseph. 2003. Streets and the Shaping of Towns and Cities. Washington, D.C.: Island Press.

5 Appleyard, Bruce. 1997, Retrofitting Auto Suburbia: A Community Guide. University of California at Berkeley Professional Report.

on the critical nuances should turn to some of the following practical references:

- AASHTO Guide for the Design of Pedestrian Facilities;
- ITE Traffic Calming Guidelines;
- ITE Context Sensitive Solutions for Major Urban Arterials
  - Direct Connections. Handy, Paterson and Butler (2004)[6] provide recommendations for improving roadway and pathway connectivity, recommending that pedestrian (and bicycle) path connections from street to street should be every 300 to 500 feet; For motor vehicles, on the other hand, they recommend 500 to 1000 feet. These standards can be implemented for new development through subdivision ordinances.[7]
- Width.
  - Since walking can and should be viewed as a social activity, paths should be five to six feet wide (seven feet, if the walkway has a wall on one side), to provide enough room for two people to walk side by side and for a third person to pass comfortably.
  - The American's with Disability Act (ADA) requires a minimum "clear zone" width of 36" with a 60" minimum passing area every 200 feet. So most jurisdictions rely on 60", or Five foot minimum widths for sidewalks overall.
  - A cyclist in motion requires width to maintain balance and to weave to the extent necessary to move forward while keeping the bicycle upright; "shy distance" is also necessary to separate the bicyclist from curbs, posts, and other potential hazards. Combining these allowances with the width of an average bicycle means that a bicyclist will need about a five-foot-wide space to ride comfortably.3
- Traffic buffering. Sidewalks should be buffered on arterials and collector roadways so that walkers are protected from traffic and spared the discomfort of traffic noise. Buffering options include on-street parking; a five- to eight-foot-wide "furniture zone" for utilities, signs, benches, transit shelters, planters, and trees; and a continuous landscaped strip. Furthermore, they work to facilitate engagement and interplay between commercial activity in building and the street, such as sidewalk, café's and restaurant seating, about fifteen feet (including space for building frontage, walking space and traffic buffering.
- Street crossings and intersections. Slower vehicle speeds and shorter crossing distances improve safety. Pedestrians should be accommodated at all intersection legs wherever possible and transit stops located closest to street crossings. Along streets that feature on-street parking, curb extensions (bulb-outs) at intersections and midblock crossing locations slow traffic entering and exiting the street, reduce the crossing distance, and make it easier for pedestrians to see and be seen by motorists. For cyclists, another innovation is the "Bicycle Box"- at a signalized intersections to provide a waiting area for cyclist, allowing faster starts from a stand-still, and allowing cyclists to make left turns and move and sort amongst themselves into the bike lanes.

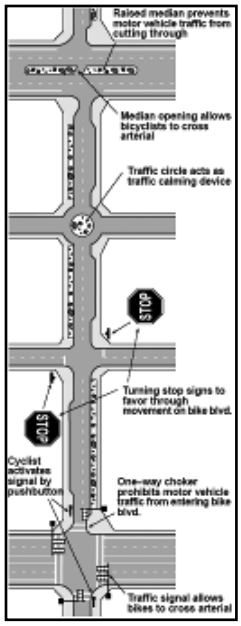
Traffic Calming and Street Design

Intervening to change an undesirable street situation often requires multiple strategies beyond engineering. In the

6 Handy, Paterson and Butler, 2004, Best Practices in Street Connectivity, PAS Report, Planners Press

7 The regional government of Portland Oregon, Metro, requires street connectivity in its Regional Transportation Plan and in the development codes and design standards of its constituent local governments as follows: local and arterial streets be spaced no more than 530 feet apart (except where barriers exist), bicycle and pedestrian connections must be made (via pathways or on road right of ways) every 330 feet), Cul de sacs (or dead-end streets) are discouraged and can be no longer than 200 feet, and have no more than 25 dwelling units.

Features of a "bicycle boulevard."
Source: Bruce Appleyard



Source: Oregon Bicycle and Pedestrian Plan: An Element of the Oregon Transportation Plan, 2nd ed. (Salem: Oregon Department of Transportation, 1995), 77, http://www.oregon.gov/ODOT/HWY/BIKEPED/docs/or_bicycle_ped_plan.pdf

traffic safety field, efforts to motivate people to adopt safer, healthier practices are usually referred to as the Es and include Education and Encouragement, as well as Enforcement and Engineering. Seatbelt use is a good example that shows how the Es work. First, seatbelts are installed (Engineering). Encouraging their use requires both the carrot—Education and Encouragement—as well as the stick—Enforcement, such as making it illegal to not to wear a seatbelt. Encouraging people to walk or bike will require a similar strategy that incorporates the additional Es.4 This section focuses on engineering, and provides additional resources for implementing education, encouragement, and enforcement techniques.

Traffic calming is primarily an engineering strategy. High volumes of speeding traffic on neighborhood streets degrade their livability and community building capacity. High traffic speeds also make these streets unsafe.5 Slowing traffic should be the primary engineering goal. Hindering access is attractive to decision makers, because it can cost effectively remove traffic from the area, but may lead to longer vehicle trips and care should also be taken to accommodate emergency responders. For more information see Appleyard, B. 2005. Home in The Zone: Creating Livable Streets in the US. Planning Magazine, October.

These issues need to be balanced, depending on the context of the street network. The table at right provides some of the general categories and specific examples of traffic calming measures.

Building on the abovementioned physical design characteristics of safe, livable and inviting streets for pedestrians and cyclists, has been a highly supportive movement calling to "Complete the Streets", focused on helping local and state governments adopt policies supportive of completing/retrofitting and routinely accommodating the abovementioned livable streets components.

For more detailed information, see Complete the Streets Coalition website at www.completestreets.org/policies.html, who outline the following main principle of a Complete Streets program:

- Complete streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street.
- Creating complete streets means changing the policies and practices of transportation agencies.
- A complete streets policy ensures that the entire right of way is routinely designed and operated to enable safe access for all users.
- Transportation agencies must ensure that all road projects result in a complete street appropriate to local context and needs.

Furthermore, the Complete the Streets Coalition website at outlines the critical elements of a Good Complete Streets Policy:

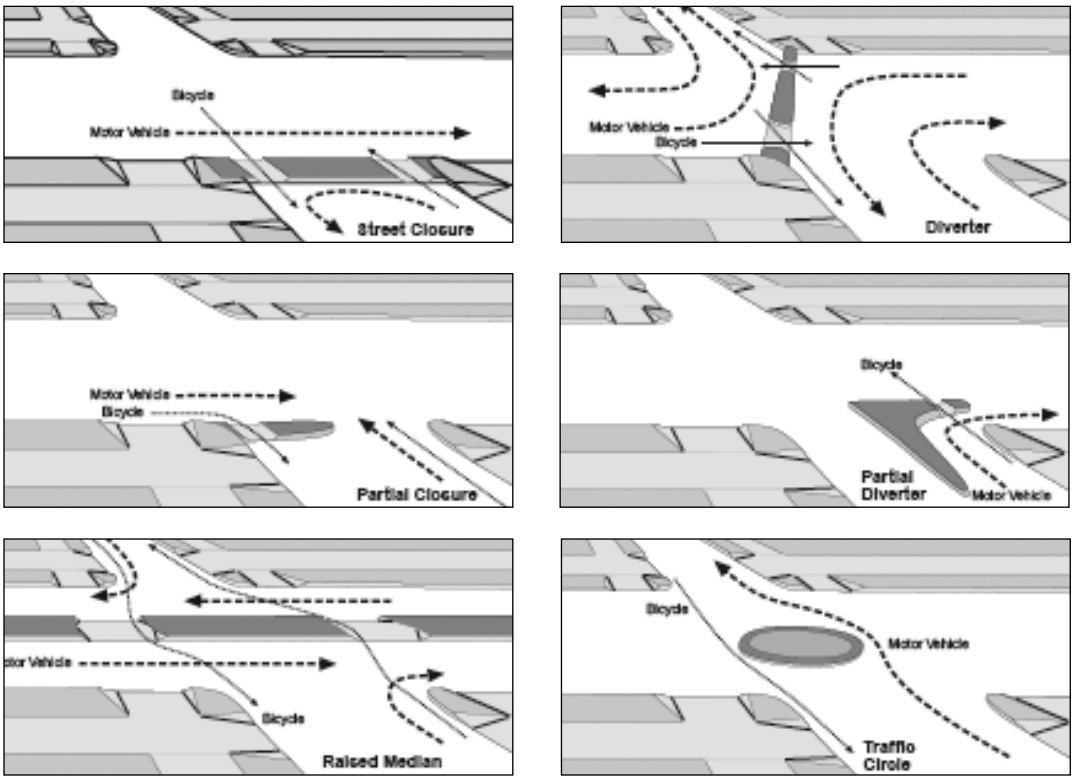
- Specifies that 'all users' includes pedestrians, bicyclists, transit vehicles and users, and motorists, of all ages and abilities.
- Aims to create a comprehensive, integrated, connected network.

TRAFFIC CALMING CATEGORIES AND SPECIFIC MEASURES

VERTICAL DEFLECTION	VOLUME CONTROL MEASURES	HORIZONTAL DEFLECTION	HORIZONTAL NARROWING
Speed Humps	Diverstive, Restrictive	Traffic Circles	Neckdowns
Speed Tables Raised	Full Closures	Roundabouts	Center Island Narrowings
Crosswalks Raised	Half Closures	Chicanes	Chokers
Intersections Textured	Diagonal Diverters	Realigned Intersections	
Textured Pavements	Median Barriers		

Source: "Traffic Calming Measures." www.trafficcalming.org/measures2.html, accessed on June 18, 2006
For more information, see www.ite.org/traffic

BELOW ARE CERTAIN TRAFFIC CALMING MEASURES THAT ALSO ACCOMMODATE BICYCLISTS



Measures for Diverting Traffic While Accommodating Bicyclists (and Pedestrians)
Source: Wisconsin DOT at www.dot.wisconsin.gov/projects/state/docs/bike-facility.pdf

Measures for Calming Traffic while facilitating bicycle travel

- Recognizes the need for flexibility: that all streets are different and user needs will be balanced.
- Is adoptable by all agencies to cover all roads.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.
- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Directs the use of the latest and best design standards.
- Directs that complete streets solutions fit in with context of the community.
- Establishes performance standards with measurable outcomes.

And finally, the Complete the Streets Coalition website states that an effective complete streets policy should prompt transportation agencies to:

- Restructure their procedures to accommodate all users on every project.
- Re-write their design manuals to encompass the safety of all users.
- Re-train planners and engineers in balancing the needs of diverse users.
- Create new data collection procedures to track how well the streets are serving all users.

An example of a local "Complete the Streets" ordinance is Seattle's, found at: http://clerk.ci.seattle.wa.us/~scripts/nphbrs.exe?d=CBOR&s1=115861.cbn.&Sect6=HITOFF&l=20&p=1&u=/~public/cbor2.htm&r=1&f=G

ENDNOTES

1 Richard K. Untermann, Accommodating the Pedestrian: Adapting Towns and Neighborhoods for Walking and Bicycling (New York: Van Nostrand Reinhold, 1984).

2 Marc Schlossberg, A. Weinstein Argrawal, et al. "How Far, by Which Route, and Why? A Spatial Analysis of Pedestrian Preference" (paper given at the Transportation Research Board Annual Conference, Washington, D.C., January 21–25, 2007).

3 The space occupied by a bicycle and its rider is relatively modest. Generally, bicycles are between 24 and 30 inches wide from one end of the handlebars to the other. An adult tricycle or a bicycle trailer, on the other hand, is approximately 32 to 40 inches wide.

4 Appleyard, B. 2003. Planning Safe Routes to School Planning Magazine. VOLUME: PAGE.

5 Appleyard, D. 1981.

6 For more information on Traffic Calming:

Ewing, Reid. 1999. Traffic Calming: State of the Practice. ITE/FHWA. August. www.ite.org/traffic/tcstate.htm#tcsop

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Appendix C. RESEARCH & TECHNICAL DOCUMENTS
iv. Planning for Safety

What is strategic safety planning?

Strategic safety planning, which has also been called "safety conscious planning," is a relatively new area of concern. It is done to assure that road safety becomes an explicit priority in land use and transportation planning, thus establishing a safer transportation network. Some categories of planning that have been identified as having the potential to impact safety are (Roberts, 1991):

The fundamental approach is to do whatever possible at each stage of planning and design of transportation infrastructure to promote safety. This includes:

- Establishing a functional transportation network
- Reducing exposure and the amount of travel
- Reducing the risk associated with travel that does take place
- Reducing the consequences of crashes that do occur.

Throughout this paper, the term 'crash' or 'collision' is typically used, rather than 'accident.' NHTSA—the National Highway Traffic Safety Administration—has been trying to encourage agencies to avoid the term 'accident,' because of the implication that an accident is a purely random event outside of human control.

Strategic safety planning was given a considerable boost by passage of the most recent Federal transportation act, known as SAFETEA-LU.[1] For the first time, states were required to prepare and submit strategic safety plans to the US Department of Transportation. California did so late in 2006. This plan, among other things, sets the state's goal as no more than 1 fatality per 100 million vehicle miles traveled, compared to 1.25 today. There is additional description under agency roles.

Another way that strategic safety planning differs from traditional safety planning is that it is proactive in nature. Traditional safety planning has usually been oriented toward identifying an existing problem in the transportation system (usually a street or highway), and then trying to find solutions, known as "counter-measures." There was typically a long feedback time to incorporate information on what was actually safe and what wasn't into the planning and design process. For example, in the 1950s and 1960s it became clear that the lack of shoulders on high-speed roadways and presence of poles were responsible for a significant number of serious crashes. This eventually led to the design standard of including shoulder areas, and the provision of "break away" poles that were "forgiving" to errant vehicles.

Another problem with the traditional approach is that it fails to typically set goals and objectives for the system, and as a result, may fail to allocate the funds used for safety improvement in the most cost-effective way possible. Like all planning, safety planning needs to evaluate benefits against cost, and optimize both the amount of the investment as well as the specific projects that are invested in.

Strategic safety planning is also a process that needs to involve and coordinate the various actors, described later in this chapter, who are responsible for safe travel. One element of traditional safety planning that still has relevance is the "four E's": engineering, education, enforcement, and emergency services:

Engineering of safety into the design of transportation improvements, as well as correcting known deficiencies

1 The Safe, Accountable, Flexible, Efficient Transportation Equity Act: a Legacy for Users.

Education of motorists, pedestrians, cyclists, and others about how to use the system safely

Enforcement of rules used in the operation of the system to promote safety, such as speed limits, prohibitions on driving under the influence, licensure, and so on.

Emergency Services that provide rapid response to a crash, and appropriate medical services in response to a crash.

Strategic safety planning is also related to many elements of transportation systems management and operation and encompasses a collection of different activities and programs to manage and optimize its value as an "asset" in the most productive possible way, including:

- Traffic detection and surveillance
- Work zone management
- Emergency management
- Automated enforcement
- Traffic incident management
- Roadway weather information
- Traveler information services
- Freeway Service Patrols (FSP)

What should the goals of A STRATEGIC SAFETY plan be?

One national organization (AASHTO, 1997) has suggested the following goals for a strategic highway safety plan (this list excludes those that are already being undertaken today):

- Ensuring drivers are fully licensed and competent
- Sustaining proficiency in older drivers
- Curbing aggressive driving
- Keeping drivers alert[2]
- Increasing driver safety awareness
- Increasing safety belt usage
- Making walking and street crossing safer
- Ensuring safer bicycle travel
- Improving motorcycle safety and increasing motorcycle awareness
- Making truck travel safer
- Reducing vehicle-train crashes
- Keeping vehicles on the roadway
- Minimizing the consequences of leaving the road
- Improving the design and operation of highway intersections
- Reducing head-on and across-median crashes
- Designing safer work zones
- Enhancing emergency medical capabilities to increase survivability
- Improving information and decision-support systems
- Creating more effective processes and safety management systems

Safety's Relationship to the Aging Population

Sonoma County's population is projected grow in the future, leading to increased travel. As was discussed in the Existing Conditions chapter, one of the important demographic changes that will take place over the next 25 years is the aging of the population. Between 2005 and 2035, the median age (the age half the population is older than) of county residents is expected to increase from 39.3 to 44.3 years old. Although this seems like a small change, the percentage of population that is 65 or older will go from 13.4% to 27.6% of the total population. In actual numbers, the growth is even greater: from approximately 64,000 people today, to 157,000 in 2035.3 This is an increase of 145%. This trend could have both favorable and unfavorable effects on transportation safety. Older drivers usually drive fewer miles, but also experience higher collision rates per mile traveled, because of a slowing in reaction time, loss of vision/hearing,

2 The Federal Highway Administration later modified this to drowsy or distracted, to include such concern areas as cell phone use while driving.

3 All estimates from ABAG's Projections 2007 for Sonoma County.

and other physical effects of aging. The older population is also represented disproportionately in pedestrian collisions, because the elderly may be more likely to walk, may have slower walking speeds and lesser abilities to avoid a collision. Statewide, the population 65 and over represented approximately 10% of all injury victims for which age data were available, but almost 23% of all fatalities.

Land uses and development trends

Sonoma County's local jurisdictions have been increasingly emphasizing new development patterns that are pedestrian, bicycle, and transit friendly. To the extent that they can reduce travel by private vehicles, these patterns are a favorable trend in reducing exposure to motor vehicle collisions. Of course, bicycles and pedestrians can be victims of such collisions, but attention to safety details in the plan review process is a positive development.

NHTSA defines a "crash" as any contact with an object, either moving or fixed, at any speed in which kinetic energy is measurably transferred or dissipated. This includes other vehicles, roadside barriers, objects on or off the roadway, pedestrians, cyclists, or animals. Source: The Impact of Driver Inattention on Near-Crash/Crash Risk: An Analysis Using the 100-Car Naturalistic Driving Study Data. Report DOT HS 810 594, April 2006.

NHTSA has been trying to discourage use of the term "accident," which carries with it the implication that the event is random and not within the driver's control. Sometimes in this section, the term collision has been used instead of crash; "crash" and "collision" are used interchangeably.

STREET LIGHTING SAFETY

The following is paraphrased from Wolfgang Homburger, Fundamentals of Traffic Engineering, 15th edition, UC Berkeley Institute of Transportation Studies, 2001, page 28-14:

In 1989, a task force of the Illuminating Engineering Society of North America called, Value of Public Roadway Lighting (New York: Report IES CP31-1989, 1989) concluded that:

Adequate lighting that is properly designed, installed, and maintained can usually significantly reduce nighttime crashes.

On Major streets in urban areas, the greatest benefit from lighting modernization came in the reduction of nighttime pedestrian crashes, by between 45 and 80 percent. The reduction of all types of nighttime crashes was in the range of 21 to 36 percent.

Adequate lighting can reduce specific types of crimes.

A more recent study (BRW, Inc., Safety Impacts of Street Lighting at Isolated Rural Intersections, 1999, prepared for the Minnesota Department of Transportation) concluded that the installation of street lighting at rural intersections is a low cost and very effective strategy for mitigating nighttime crashes, reducing crash frequencies (before vs. after) by 25 to 40 percent, and the crash severity 8 to 26 percent.

Lighting is probably most effective when targeted to specific areas; e.g., Caltrans standard practice on freeways is to illuminate merge and diverge areas, and sometimes curves. On city streets, lighting intersections and locations where pedestrians/bicyclists are likely to cross a roadway are likely to be the most cost-effective locations for lighting.

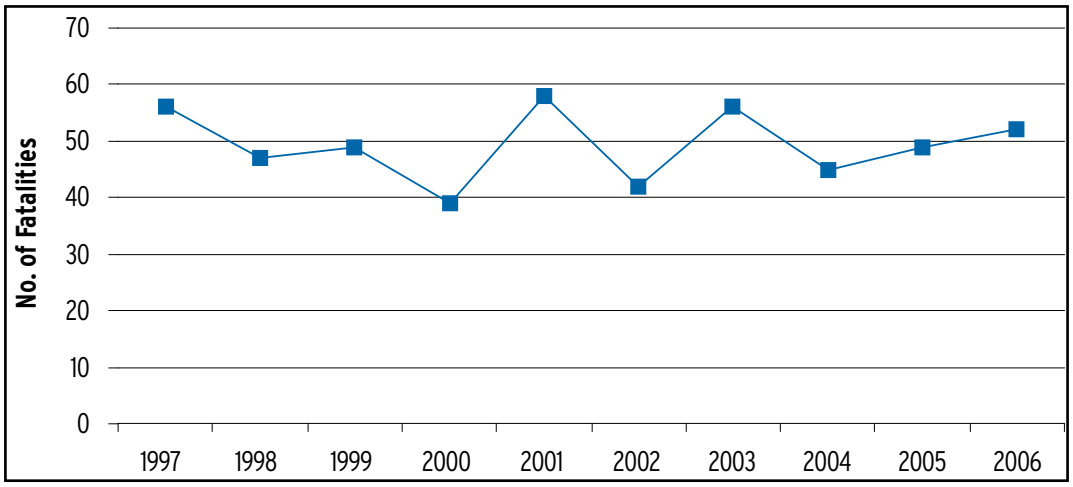
Dimensions of the Existing Safety Problem

The Safety Situation in 2006

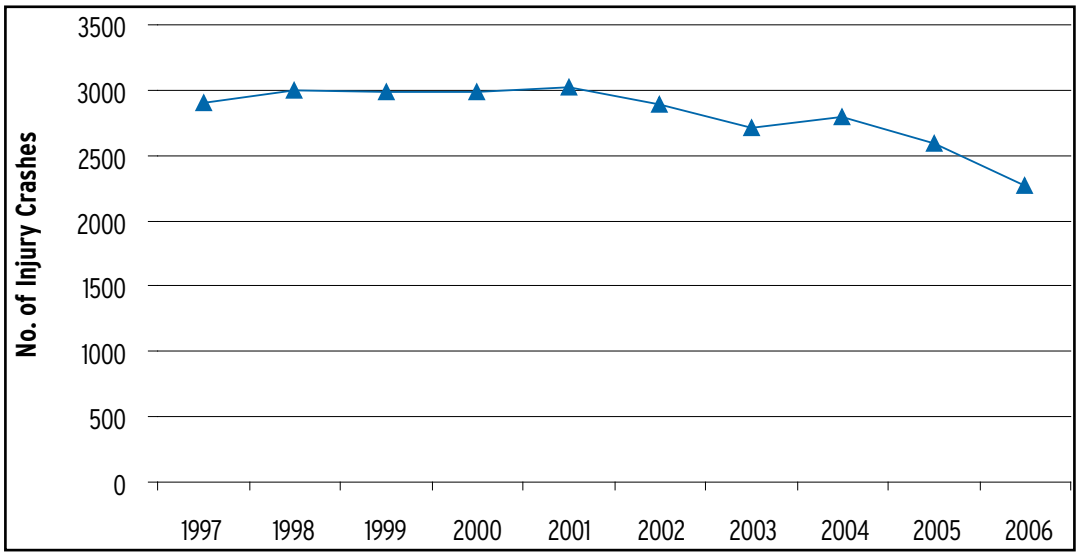
In 2006 (the most recent year for which data are available), Sonoma County experienced 52 motor vehicle involved collisions killing 54 people.

There were 2,267 crashes causing injury to at least one party, and 3,967 recorded property damage only (PDO) crashes (CHP, 2007). The number of PDO crashes is almost certainly understated to a considerable degree, as discussed in the

ANNUAL MOTOR VEHICLE RELATED FATALITY COLLISIONS, 1997-2006 **SOURCE: CHP, SWITRS DATA**



ANNUAL INJURY COLLISIONS IN SONOMA COUNTY, 1997-2006 **SOURCE: CHP, SWITRS DATA**

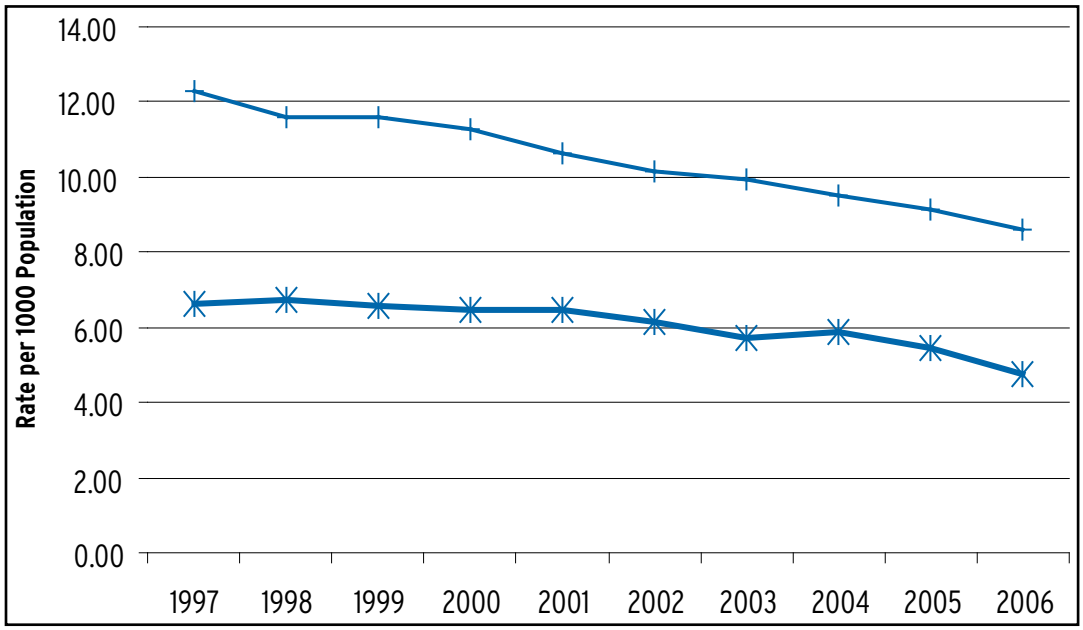


area of data needs. Alcohol was involved in approximately one-third (17) of the fatal crashes, and 13% of the injury crashes. Of the 52 fatal crashes that took place, 8 involved pedestrians, 3 involved bicyclists, and 11 involved a motorcyclist. There were 106 pedestrian involved injury collisions and 155 bicycle involved injury collisions.

Geographically, the distribution of serious crashes was very uneven. Several jurisdictions had no fatalities, e.g., Cloverdale, Cotati, Healdsburg, and Sebastopol. Santa Rosa and Petaluma each had three fatalities. The unincorporated areas of the County had the highest number of fatal incidents—24 on County roads and 19 on State highways in unincorporated areas. In total, 83% of all fatalities took place in unincorporated areas, even though the unincorporated area has approximately one-third of the total population, and represents probably 55-60% of the road mileage.

Although there are many reasons for this lopsided distribution of incidents, there are probably a few key factors responsible. Motorists often travel at higher speeds on county roadways than city streets, the roads are often narrower, they are built to lower levels of design standards due to the road's vintage and physical characteristics, they may be unlighted, and

REPORTED INJURY CRASH RATE PER 1000 POPULATION
NATIONAL IN UPPER LINE; SONOMA COUNTY IN LOWER LINE



additional features may come into play (e.g., terrain, sight distances). As noted in the section on Existing Conditions, the County is responsible for more than half the road mileage in the County. When a crash does occur, its detection and the time needed for first responders to arrive on the scene is often greater than in cities, and emergency medical care farther away.

The geographic distribution of injury crashes is not quite as skewed as the fatalities, but is still significant: 38% took place in unincorporated areas. Overall, Sonoma County's fatality rate was close to but slightly above the statewide average (1.33 per 100 million VMT vs. 1.25 statewide).

Trucks were involved in six fatal and 72 injury incidents in 2006, accounting for six fatalities and 89 injuries. Motorcycles were involved in 11 fatalities and 180 injuries. An increasing number of motorcyclist fatalities nationwide has been a recent safety concern; the trend may be partly attributable to more "baby boomers" purchasing motorcycles who are relatively inexperienced in operating them[4]; and to increasing gas prices that are encouraging more people to turn toward this fuel-efficient mode of transportation. Because of the scenic nature of its roads, Sonoma County is also an attractive destination area for motorcyclists to come to.

Trends Over Time

Although the discussion in the paragraphs above focused on data from the most recent year available, collisions can vary considerably from one year to the next. This is particularly true of fatalities, and as the size of the area analyzed (intersection, city, countywide) gets smaller there tends to be more variation from year to year. Generally, several years of data are used to establish trends. The chart on page 158 shows the trend in fatalities during the past 10 years, which has more or less been stable despite a growth in population. Generally it is hovered at 49 per year, with no clear trend in either direction.

Injury collisions, in contrast, have shown a more favorable downward trend. Although the trend was flat from 1997-2001, averaging 2,800 per year in the past decade, since 2001 there has generally been a decline despite population and VMT

4 News reports can be found at www.startribune.com/local/27115354.htm and www.washingtonpost.com/wp-dyn/articles/&460-2005Apr21.html

THE HIGH COST OF CRASHES

Although no true cost can be placed on the loss of life, or even the suffering caused by an injury, the Federal Highway Administration and CHP have suggested that the following values be used in assessing the costs of collisions and allow for balancing these costs against the cost of remedial measures:

TYPE OF CRASH	COST PER CRASH
Killed	$3,357,000
Injured	
Severely	$232,000
Other Visible Injury	$46,000
Complaint of Pain	$25,000
Property Damage Only	$3,000
Source: CHP 2007, Table 7C	

Using these figures, the cost of fatal crashes in Sonoma County, in 2006, is more than $181 million–or more than 9 times as much revenue as was generated by Measure M in that same year. The total cost of crashes in Sonoma County in 2006 is more than $335 million–or more than 17 times as much revenue as was generated by Measure M in that same year. On a per capita basis, this is equal to a cost of approximately $725 per person per year. These costs attempt to capture direct costs of things that are measurable, such medical care, EMS response, lost wages; they are unable to capture the less tangible costs of things like pain and suffering.

growth. In 2006 there were 2,267 injury incidents that injuring 3,230 people.

Traffic Congestion as a Safety Issue

Although not widely recognized, traffic congestion is also a traffic safety problem. Congestion slows speeds and may therefore reduce the severity of crashes, but it is also likely to increase their number. Some evidence from data on Highway 101 indicates that a very high proportion of the collisions are rear-end, possibly due to the stop-and-go nature of traffic during much of the day, and/or unexpectedly encountering stopped traffic. More severe crashes may occur when a vehicle rear-ends another at high speed, for example, when one vehicle is waiting to make a left turn and is struck from behind by another. There is also anecdotal evidence that increased congestion leads to more aggressive driving behaviors, popularly known as 'road rage,' that may ultimately result in more crashes.

Traffic incident management is also critically important to reducing non-recurring traffic congestion. When a collision occurs, the time taken to identify and clear it can make a critical difference in the amount of resulting congestion, particularly where a lane or lanes are blocked. Even short blockages–15 minutes or less–can result in the persistence of significant traffic congestion. Truck crashes are particularly problematic, because they often block multiple lanes of traffic and take much longer to clear than smaller vehicles.

Reducing traffic congestion–and providing a smoother, more "expected" and even flow of traffic–can reduce collision rates.

SAFETY PLANNING PRINCIPLES

There are four general principles that guide strategic safety planning: establishing a functionally classified street system (which is already done throughout the County); minimizing exposure; minimizing risk; and minimizing consequences.

Establishing a Functionally Classified Network of Streets and Highways

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Most travel involves movement through a network of roads. It becomes necessary then to determine how this travel can be channelized within the network in a logical and efficient manner. Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a highway network.

Different types of facilities have greatly varying crash rates. Freeways typically have low fatality rates in terms of vehicle miles traveled and despite their higher speeds, because they physically separate high-speed vehicle traffic from pedestrians and bicycles; usually have barriers in opposing traffic directions; and control all access. What are the worst? A bit more on the other classifications.

Minimizing Exposure

The goal here is to work with planners to achieve:

- A reduction of the amount of travel, including the need to travel and the distance, through efficient land use and transportation plans.
- Increased use of modes with better safety per passenger mile traveled, e.g., public transit.

Minimizing Risk

The reduction or minimization of risk relates to two important factors:

- Reducing driver workload, through reducing traffic friction and the speed and volume of conflict between movements. Examples include congestion reduction, as well as use of more "T" intersections, which are inherently safer than four-leg intersections.
- Improving the predictability of the driving task, through the provision of positive guidance, consistency, and improved visibility.

Minimizing Consequences

The reduction or minimization of consequences of crashes is an important consideration in safer highway design. There is potential for planners to contribute in this regard:

- By planning roads to achieve safe and appropriate travel speeds
- Protecting vulnerable road users, e.g., by separating pedestrian and bicycles from other traffic (sidewalks and bike lanes)
- Providing a forgiving roadside, e.g., separation from trees, slopes, and drainage features near the edge of the pavement
- Providing for efficient emergency response routes

Stakeholders

Numerous parties are involved in safety planning; some of the key participants are described in the table on page 163. This table is not intended to be exhaustive, but only highlights the key roles played by a variety of different actors in the transportation safety system. What is obvious from the table is that in many cases the roles and responsibilities of various actors overlap; in such cases there may be potential for cooperation and cross-education between the actors.

HOW SAFETY DATA ARE COLLECTED

All local governments in California are required to participate in the Statewide Integrated Traffic Records System, known as SWITRS. Peace officers fill out a standardized form, which is submitted, to the CHP for data entry. These forms are then merged into a statewide database. Summary information is available on the web. Some jurisdictions also maintain their own collision records system (e.g., Santa Rosa) for internal use and analysis.

There are some limitations about the data that should be understood:

- Accuracy of crashes and crash rates depends on timely submission of the data. Typically, data are complete for only approximately two years in arrears (in this case, 2006 is the latest complete dataset available).
- Forms are filled out only when the crash occurred in public right of way (or a vehicle departed the public right of way prior to the crash). Crashes on private property are generally excluded. This is generally not a significant limitation.
- Data are generally geographically referenced to roadways and intersections, e.g.. "40 feet north of Main Street and Old Redwood Highway." Errors in the field form (e.g., misspellings or mis-measurement of distances) can lead to commensurate inaccuracies in the final database. There may be opportunities to improve field equipment to improve the accuracy of data, such as through use of GPS technology.
- Although the database includes almost all motor vehicle-related fatalities, the percentage of crash type reported is usually commensurate with its severity. Studies indicate that some injury crashes, especially the less severe variety, go unreported. Property damage only collisions are generally conceded to be greatly under-reported; some California jurisdictions, because of scarcity of staffing, will not submit a police report to SWITRS for PDO collisions.
- Increasing demands on law enforcement has meant less time available to enforce traffic rules, to write crash reports, or to analyze available SWITRS.

THE ROLE OF THE SCTA

There are several ways that SCTA can play an important role in achieving the

TRAFFIC CONGESTION AS A SAFETY ISSUE "ROAD RAGE"

'Road rage,' also known as aggressive driving, has been a popular topic of discussion for more than a decade. Unfortunately, hard data is difficult to get on this phenomenon, in part because there's no uniform definition of what constitutes aggressive driving, which also means no information recorded by peace officers in making collision reports (the closest classification an officer could use is "following too close" to another vehicle, although this doesn't capture all aggressive driving incidents).

There has also been debate whether the media has magnified this topic beyond its importance, but there is a perception that it is on the increase. A USA/CNN/Gallup poll in 1997 found that 75% of drivers polled believe other drivers were driving more aggressively than five years before. Only 13% said that they personally were driving more aggressively. Arguably, the perception of increased aggressiveness could also be a result of the media attention paid to it.

There is generally a consensus that aggressive driving may be a result of drivers spending more hours commuting, more stressful lives (more activities scheduled than there is time to reasonably accomplish), and increased traffic congestion. However, for the reasons noted above, there is still debate regarding whether this phenomenon is increasing or not. The types of behaviors that mark aggressive driving– e.g., following too closely, excessive lane changing, driving on shoulders, unsafely cutting into short gaps in traffic–are more likely to be exhibited under congested driving conditions than free-flowing traffic. Excessive speed, which may also be considered an indication of aggressive driving, is more likely to occur when there is little or no congestion, because it is not possible under heavy congestion. Frustration caused in slow moving traffic might lead drivers to increase their speed in areas that are more free flowing, however, possibly as a way to compensate for the time lost in a congested area.

Additional information can be found at:
www.aaafoundation.org/resources/index.cfm?button=agdrtext

goal of a 25% reduction in traffic fatalities and collisions. Among them are:

- Acting as an Effective Safety Advocate. This includes advocacy of safety conscious planning at all levels (local, regional, and state), and potentially revising investment decisions to put greater weight on projects and programs that will improve safety.
- Convening Stakeholders and Building Strategic Alliances. This includes government and non-governmental organizations (e.g., auto insurance companies). Strategic alliances that identify common elements in promoting all these interests will promote the potential for success of the safety plan. Often, these groups are managed with relatively little interaction between them, because of the compartmentalization of government functions.
- Integrating, Improving, and Sharing Information. Examples of these kinds of activities include conferences between constituent agencies; providing training to peace officers or traffic engineers; providing grants to improve the analysis of data (e.g., software acquisition for collision analysis software). This could also include sharing "best practices" in an informal setting (e.g., a meeting where lunch is provided) among practitioners. Data on traffic collisions also tends to vary widely; the knowledge, skills, ability, and time to devote to collision reports can vary widely among peace officers.
- Empowering Practitioners. Practicing planners are often not actively involved in road safety activities yet their role is important. It is critical to make it as easy as possible for practitioners to undertake safety conscious planning and encourage a multi-disciplinary approach to enhance the final product.
- Advocating for Grants/External Funding. Because Congress has made safety a priority (and is likely to continue to do so in the next federal transportation re-authorization bill), there are several categories of funding available to public agencies.
  - Highway Safety Improvement Program (HSIP)
  - High-Risk Rural Roads Program (HRRRP)
  - Safe Routes to Schools
  - Section 402 Community Highway Safety Grants

Conclusions and next steps

This chapter on incorporating safety in the transportation planning process represents a beginning rather than an

ACTORS INVOLVED IN TRAFFIC SAFETY IN CALIFORNIA

WHO	WHAT THEY DO (KEY OR TYPICAL ROLES)
Planners	Depending on specialty, may review subdivision site plans; provide support to decisionmakers in investment decisions; long term plans for roads and other transportation systems.
Traffic Engineers	Design transportation facilities; assist with investment decisions; review and analyze crash data. Select traffic controls (including signals); signage; striping; and setting speed limits on local streets. *
City police and Sheriffs	Enforce traffic laws on local streets and roads; review and analyze crash data; respond to collisions. Decisions about where and when to deploy officers.
CHP	Primary traffic law enforcement on state highways and some County roads under contract; first response to collisions on state highways; maintain SWITRS database and reports statewide. Commercial vehicle inspections (including school buses). Decisions about where and when to deploy officers.
Fire Departments and EMS Personnel	First response to medical emergencies on all types of roads. Suppress vehicle fires.
Hospitals/Clinics	Emergency room and follow-on medical care for crash victims.
Schools	Education of students in traffic safety; establishing safe routes to schools (typically in concert with traffic engineers); provision of crossing guards in some locations.
Caltrans	Design, construction, and maintenance of state highways. Operation of freeway traffic management centers, most traffic signals and traffic controls on state highways. Setting speed limits on state highways.*
Department of Motor Vehicles	Driver licensure and suspension issues; driver education and testing; vehicle safety.
SCTA	Advocacy; for safety and funding convening stakeholders; integrating, improving and sharing information.
SMART/NCRA	Railroad grade crossings and education
Non-Governmental Organizations	These diverse groups promote traffic safety; examples include AAA, auto insurance companies, professional organizations (e.g., Institute of Transportation Engineers), National Safety Council, and so on.

* Within limits set by the State Legislature in the California Vehicle Code.

end. It recommends as a primary goal adopting California's goal of a 25% reduction in the fatality rate (to less than one per 100 million VMT). Further, this plan recommends a goal of a 25% reduction in injury crashes per VMT by 2020.

Transportation plans ideally work to improve all forms of transportation, including roadways, freight, transit, and pedestrian and bicycle facilities. Multimodalism is a critical aspect of safety planning, because when exposure to roadways and traffic congestion is minimized, safety improves. The strategic safety planning process needs to consider a range of transportation agencies in the county and consider a wide range of strategies and involvement of actors that support and promote the '4E' process. By providing mobility alternatives to the auto, transit reduces VMT, resulting in fewer traffic incidents, injuries and fatalities. Encouraging transit ridership among the groups with the highest crash rates, such as young and old drivers, can improve safety. Guaranteed ride home programs at events can help prevent impaired driving.

Elements such as sidewalk, pedestrian crossings, bicycle paths, and bicycle parking that support successful transit service also enhance bicycle use and walking, thus reducing VMT. Safe access to and egress from park-and-ride lots contributes to safe transit use. Concerted action on all of these fronts can lead to a safer Sonoma County travel experience in the future.

References

American Association of State Highway and Transportation Officials (AASHTO, 1997). Strategic Highway Safety Plan. September.

Caltrans (2006). California Strategic Highway Safety Plan. Sacramento: California Department of Transportation.

CHP, California Highway Patrol. Statewide Integrated Traffic Records System (SWITRS) Data, 2006. Available online at www.chp.ca.gov/switrs/#section6.

Federal Highway Administration, US Department of Transportation (2007). Transportation Planner's Safety Desk Reference. Report FHWA-HEP-07-005. January.

Roberts, Kelvin (1991). "Fundamentals of Safety Planning." Institute of Transportation Engineers, District 6 Annual Meeting Proceedings.

There are also a number of publications available from:
www.safety.transportation.org
www.roadwaysafety.org

National Safety Council: www.nsc.org

Appendix C. RESEARCH & TECHNICAL DOCUMENTS

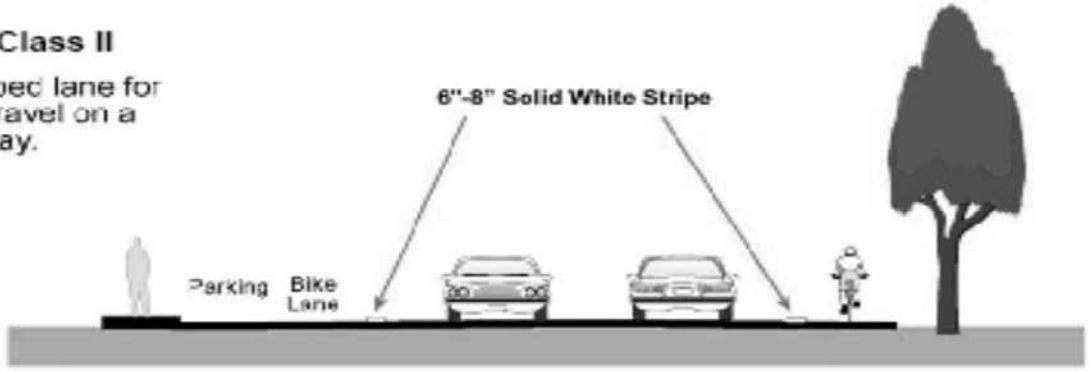
v. Bicycle Facility Types

Shared Use Path – Class I

Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with crossflow minimized.

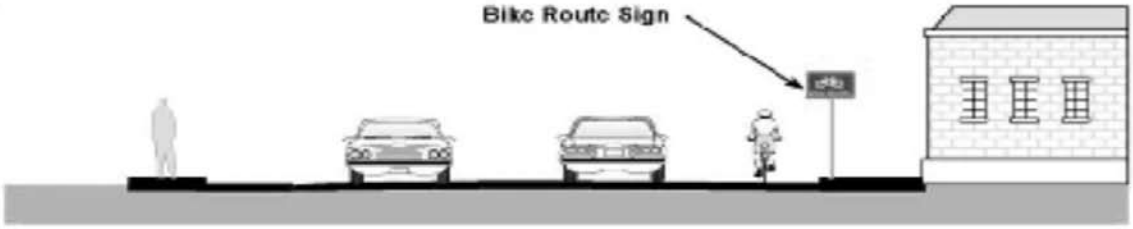
Bike Lane – Class II

Provides a striped lane for one-way bike travel on a street or highway.



Bike Route – Class III
Signed Shared Roadway

Provides for shared use with pedestrian or motor vehicle traffic, typically on lower volume roadways.



Appendix C. RESEARCH & TECHNICAL DOCUMENTS
vi. Sonoma County Travel Model Update & Analysis

TECHNICAL MEMORANDUM

Sonoma County Travel Model 2007-2008 Update

CTP Modeling–Scenario Analysis, Technical Summary

INTRODUCTION

The Comprehensive Transportation Plan (CTP) update includes a performance assessment of six "Visioning Scenarios". These scenarios represent potential sets of transportation projects and policies and are organized into groups of similar improvements and policies. Scenario projects and policies have been identified in previous plans such as local general plans, short range transit plans, previous CTP, and the Regional Transportation Plan. A fuel pricing sensitivity test is also applied to each scenario (low/baseline growth fuel cost, and high/peak oil fuel cost) to account for possible high future transportation fuel costs. Scenarios were presented to SCTA committees (Technical Advisory Committee, Technical Advisory Committee–Modeling Subcommittee, Planning Advisory Committee, Citizen's Advisory Committee, CTP Ad Hoc Steering Committee) for feedback and approval. Final approval of the six scenarios was made by the SCTA board in July, 2007.

The six scenarios representing different future transportation improvement alternatives are evaluated based on a set of scenario performance measures. Performance measures are criteria used to provide quantitative measures that can be used to assess how well the objectives and goals of the plan are being meet, and to support the development of policy and overall CTP decision making process. They have been applied in the CTP at a programmatic level by looking at groups of projects or transportation policies. Performance measures can also be used to monitor plan performance and to measure progress towards meeting plan goals.

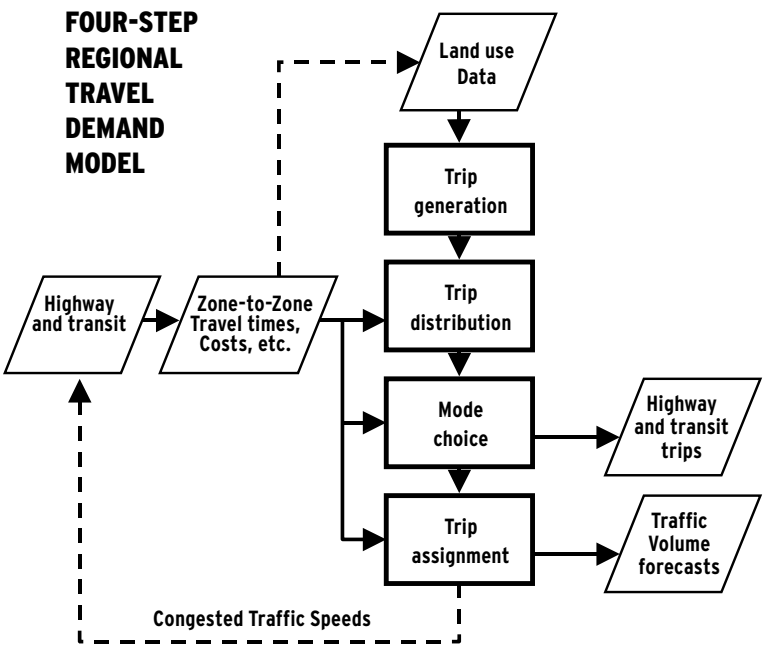
Performance benchmarks have been set for each of these performance areas to use as a measuring stick for how close scenarios are able to meet performance thresholds in measurement areas. Potential mitigation strategies are recommended where scenarios fall short of performance benchmarks.

I. WHY TEST SCENARIOS?

It is important to consider that the decisions and actions that are made today will impact future generations. The future is never certain, but tools are available that allow us to have an idea how our county may look in the next 5, 10, 20, or even 25 years. Land use and transportation models use historical growth and travel data to predict future urban growth, travel demand, and traffic in the future. By using these tools to look at different visions of the future, or transportation scenarios, we can gain insights into what may or may not allow us to achieve our transportation related goals.

In order to develop an understanding of future transportation needs and limitations of the existing transportation system and future transportation improvements, transportation "scenarios" where tested using SCTA's travel demand model. This model (SCTM 07) uses land use, population, and employment data for Sonoma County to estimate trips, travel patterns, traffic volumes, congestion, and mode choice (what transportation mode people are using, i.e. single occupant vehicle, transit, bicycle, etc.).

The results of the scenario analysis are meant to serve as a decision support tool to aid local decision makers in the prioritization of trans-



portation projects and policies. The performance assessment provides an idea of what types of projects and policies will provide the greatest ability to reach SCTA's goals and objectives.

II. THE SONOMA COUNTY TRAVEL MODEL (SCTM 07)

The Sonoma County Transportation Authority (SCTA) uses a combination of digital databases, computer software, and scientific theory to replicate the real world transportation system (roads, intersections, traffic control devices, congestion delays, transit use, road capacity, speed limits) in the Authority's travel demand modeling program.

SCTA's travel demand model can be used to forecast future travel patterns and demand based on changes in the transportation system (new roads, changes in capacity, etc.), land use change (changes in residential densities, or locations, new job sites, etc.), or changing demographics (more or less people in a certain area).

SCTM uses a traditional four-step travel demand modeling process to estimate:

- How much travel is taking place? (Trip Generation)
- Where are people going? (Trip Distribution)
- What travel modes are people using to make their trips? (Mode Choice)
- What routes/facilities are being used? (Trip Assignment)

1. Data Requirements:

The two basic inputs for applying the travel demand model are:

- Land use inputs, representing estimates of current and future development; and
- Transportation inputs, including the current transportation network and planned changes (increases or decreases in capacity, new roads or highways, new transit lines)

These inputs are housed in a countywide land use database and are assembled and updated in conjunction with local jurisdictions.

2. Four-Step Modeling Process:

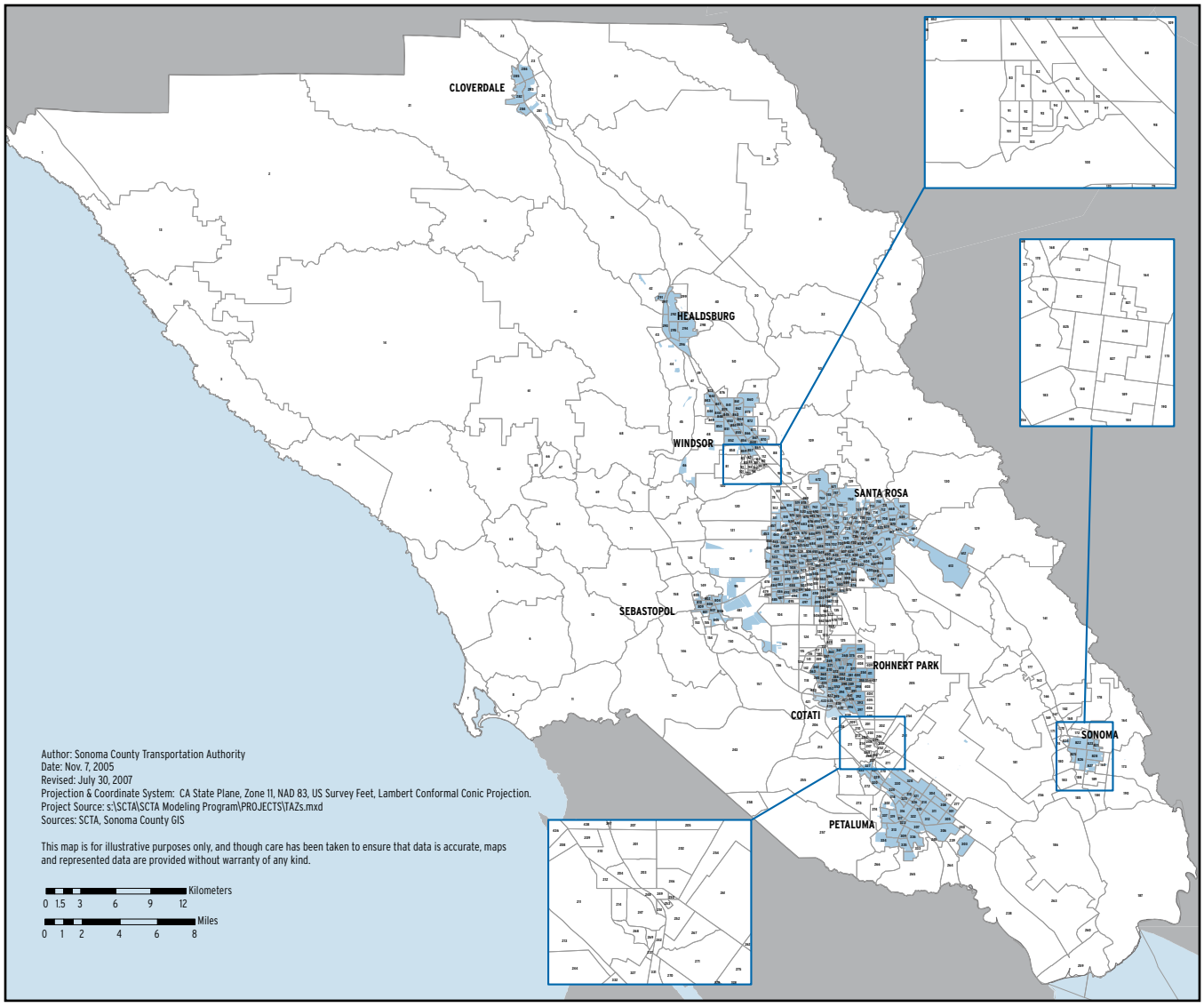
SCTA uses the traditional, four-step travel demand model process to replicate and forecast countywide travel behavior. These four steps are: Trip Generation, Trip Distribution, Mode Choice, and Trip Assignment steps.

TRIP GENERATION: HOW MUCH TRAVEL?

Sonoma County is first divided into over 700 traffic analysis zones (TAZs). A zone could be as small as a few city blocks (such as central Santa Rosa) or as large as 100 square miles in rural areas (such as northwestern Sonoma County).

The travel demand model estimates the number of trips going to and from each zone. Trips are divided by purpose—work trips, shopping trips, etc. Each of these zones attracts and produces a certain number of trips based on the amount of residential and commercial development in the zone. Zones with high levels of residential development

SCTA TRAFFIC ANALYSIS ZONES Sonoma County Traffic Model (SCTM)



produce many trips, zones with high levels of commercial, office, or industrial development attract many trips.

The output of this step is a list of TAZs and the number of different types of trips produced by and attracted to each zone.

TRIP DISTRIBUTION: WHO GOES WHERE?

The trip distribution step allocates produced trips to the zones that they are attracted to. For example, after the model estimates the number of commute trips produced by a zone in Windsor, this step matches these produced trips to other zones around the region, such as zones in Santa Rosa or other regional employment centers. These linkages are called origin/destination pairs.

A mathematical gravity model is used to determine where trips are distributed. The larger two zones are in terms of employment and/or population, and the closer they are in distance, the more trips will likely be generated between them.

This step produces an origin/destinations table, which is a matrix showing the number of trips moving between the different zones.

MODE CHOICE: HOW DO PEOPLE TRAVEL?

In the third step of the four-step modeling process the model uses observed travel mode usage rates to estimate which proportion of total trips made are made using different modes of transportation (drive alone, carpool, transit, walk, bike, etc.)

The output of this step is a breakdown of what travel modes are being used for trips within the region.

TRIP ASSIGNMENT: WHAT ROUTES DO PEOPLE TAKE?

In this final step, the model selects the best path for travelers to take. The model assumes people will take the fastest route, avoiding traffic and congestion where possible. Each trip is examined and a best path is determined while minimizing the time and distance needed to travel from zone to zone.

The final product of this step of the travel demand modeling process is a transportation network (representing generalized countywide roadway, transit, and other transportation facilities) with attached future travel demand for specific road sections.

SCENARIO PERFORMANCE ASSESSMENT: TESTING THE SCENARIOS

I. CTP GOALS

As discussed earlier in this document, the Sonoma County Transportation Authority has set the following goals for the 2008 CTP update:

- Maintain the existing transportation system
- Relieve Congestion
- Reduce Emissions
- Plan for Safety & Health

The CTP scenario analysis can provide insights into what kind of transportation policy or types of projects can help SCTA achieve these goals. The first three goals (Reduce Greenhouse Gas emissions, Maintain the existing transportation system, and Relieve congestion) are measurable using the SCTM and have been used to guide the development of the performance targets, or benchmarks, discussed below.

II. PERFORMANCE TARGETS

The following performance measures, or benchmarks, will be used to assess how well each set of scenario assumptions performs:

- Green House Gas (GHG) production,
- Vehicle Miles Traveled (VMT), and
- Person Hours of Delay (PHD).

Policies, projects, and strategies that produce positive results in one or more performance measure area have the potential to negatively impact other measures. Congestion reduction, for example, will often encourage more driving and longer trips, thereby driving VMT and GHG emissions up. Care should be taken to account for possible unexpected side effects certain strategies may have on other benchmark areas.

An additional performance measure/benchmark has been included in the CTP to measure success in maintaining the transportation system:

- Pavement Condition Index (PCI) (measure of roadway condition).

This measure will not be measured by the travel demand model, but current PCI data can be compared to future PCI to measure progress in this area.

Performance Measures:

ENVIRONMENT/GLOBAL WARMING–GREENHOUSE GAS EMISSIONS (GHG):

In Sonoma County the transportation sector contributes roughly 60% of all county greenhouse gas emissions. In 2007, transportation GHG production

equaled 2,762,612 tons per year (CO2e), up from 2,067,563 tons produced (CO2e) in 1990.1 The California Global Warming Solutions Act (AB32) mandates that CO2 and other greenhouse gas emissions be reduced to 1990 levels by the year 2020. All Sonoma County Jurisdictions have set a more ambitious goal of reducing GHG emissions to 25% below 1990 levels by 2015 (1,550,672 tons/year CO2e). The Bay Area region has set a longer term goal of reducing regional GHG emissions to 40% below 1990 levels by 2035 (1,240,538 tons/year CO2e).

This measure is directly related to CTP goal: Reduce Emissions. Making progress in other benchmark and CTP goal areas (reducing VMT, Congestion, and shifting travel modes to non single occupant vehicles) and continued technological advances to improve fuel economy, reduce emissions, and improve efficiencies will help SCTA and local jurisdictions meet these goals.

BENCHMARK: REDUCE GHG EMISSIONS TO 25% BELOW 1990 LEVELS BY 2015, AND 40% BELOW 1990 LEVELS BY 2035.

USE OF THE SYSTEM–VEHICLE MILES TRAVELED (VMT):

VMT, vehicle miles traveled or miles traveled by a vehicle, is a standard measure of transportation activity and use of the road/highway system. VMT can be used to provide a measure of automobile trip frequency, automobile trip length, and vehicle occupancy rates. This measure can be used to assess success in meeting plan goals: Maintain the System, Relieve Congestion, and Reduce Emissions. Since transportation GHG emissions are tied directly to the burning of fossil fuels, there is a strong connection between VMT and the production of GHG emissions such as CO2 and particulates. The amount of GHG emissions can be partially mitigated by higher vehicle fuel standards and cleaner burning fuels, but reducing overall VMT has the potential to significantly reduce GHG emissions, as well as decreasing congestion, improving mobility, and extending the life of the countywide transportation system. California State Bill 375 originally called for reducing VMT to 10% below current levels by 1990 (the bill has been amended to direct CARB to establish GHG reduction targets for metro areas). MTC (Metropolitan Transportation Commission, the transportation oversight authority for the San Francisco Bay Area) has adopted this measure as one of the goals for the Regional Transportation Plan update.

The VMT reduction benchmark may seem quite conservative when compared to the GHG reduction benchmark. This represents the difficultly in actually reducing the number and length of trips people are making. GHG reduction includes reducing VMT, but can also be addressed by shifting travel modes, using more efficient vehicles, and by using cleaner fuels, and achieving more aggressive reductions in GHG emissions should be easier due to the breadth of possible reduction methods.

Current (2007) VMT per person averages 23.12 miles/day in the county and would need to fall to an average of 20.8 miles/day by 2035 to meet this goal.

BENCHMARK: REDUCE VMT PER CAPITA BY 10% BELOW CURRENT LEVELS (2005) BY 2035.

CONGESTION–PERSON HOURS OF DELAY (PHD):

In a recent survey conducted as part of the CTP update, Sonoma County residents identified traffic congestion as an important public concern. Traffic congestion and its impacts significantly affect Sonoma County's economic performance and quality of life. Travel demand routinely exceeds highway capacity during peak periods in urban and rural portions of the county. Other non-regular events

1 Data from the Climate Protection Campaign 2005 May 2008 Status Report, HPMS (Highway Performance Management System) Annual VMT data, and GHG eCO2 productions based on output from CACP software.

such as crashes, vehicle breakdowns, road work, adverse weather conditions, railroad crossings, large trucks loading/unloading in urban areas, and other factors such as sub-optimal signal timing cause temporary capacity losses, cause additional backups on already congested road networks. The impacts of congestion include delay, reduced mobility, and reduced reliability of the transportation system. One measure of this congestion is Person Hours of Delay (PHD). PHD represents the average number of hours that travelers are delayed in traffic per year or day due to recurring congestion and incidents, such as breakdowns and crashes.

This measure can be used to assess success in meeting plan goals: Relieve Congestion, and Reduce Emissions. PHD provides a direct measure of traffic congestion and time lost because of travel delay, and increased congestion reduces efficiency of the transportation system and the vehicles using it, increasing GHG impacts during congested periods.

The Metropolitan Transportation Commission (MTC) has adopted the California Governor's Strategic Growth Initiative congestion reduction goal of a 20% decrease in person hours of delay below current levels by 2035. This goal could be met by implementing the measures presented in the CTP travel improvements matrix and should concentrate on improvements that have the potential to reduce congestion directly, decrease VMT, increase vehicle occupancies, and make the transportation system more efficient. This benchmark represents a reduction from current 53,226, daily person hours of delay in 2005 to 42,580 daily person hours of delay by 2035.

BENCHMARK: REDUCE PERSON HOURS OF DELAY 20% BELOW TODAY'S LEVELS (2005) BY 2035.

4. MAINTAIN THE SYSTEM– PAVEMENT QUALITY INDEX (PCI):

Transportation funding shortages and aging transportation infrastructure are contributing to the continued degradation of the countywide road network. Many jurisdictions defer needed preventative maintenance due to budget shortfalls and increasing competition for transportation and general fund dollars. Local jurisdictions use field survey information and software provided by the Metropolitan Transportation Commission to compile a Pavement Quality Index value for roadways under their jurisdiction.

It is most cost efficient to maintain a road at a higher PCI, with the optimum PCI being 80. Current countywide and local PCIs are below the optimal PCI level (the exception being the City of Sonoma).

This measure is meant to measure success in achieving CTP goal: Maintain the System.

BENCHMARK: IMPROVE COUNTYWIDE PCI TO 80 BY 2035, WITH A MINIMUM ROAD PCI OF 70 BY 2035.

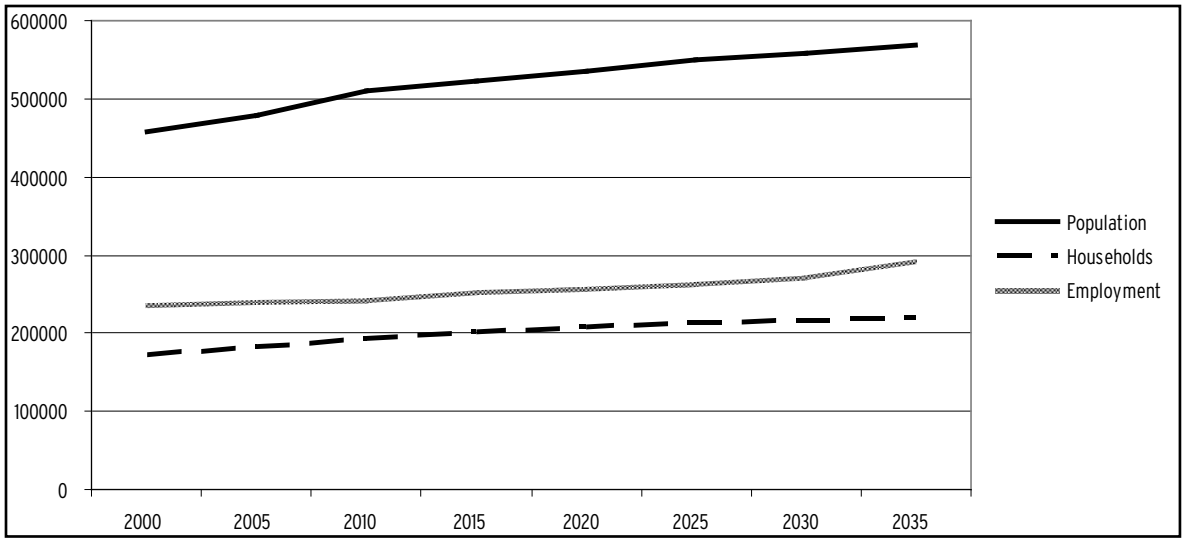
Benchmarks represent a quantification of CTP goals and illustrate SCTA's commitment to making progress in these areas. The benchmark levels represent reasonable, yet aggressive targets in CTP goal areas. The SCTA has never before established this level of detail in benchmarking or targets so this is precedent setting in many regards. No determination has been made as to how implementing strategies to achieve the benchmarks might create fiscal impacts.

III. SCENARIO ANALYSIS/ PROJECTED CONDITIONS

Introduction

Staff and consultants have used real world traffic counts and travel survey data to validate the SCTM and ensure model accuracy. Following the successful

PROJECTED SONOMA COUNTY POPULATION AND EMPLOYMENT GROWTH



model validation, scenario assumptions were coded into the model and the model was run to provide data to measure the performance of each scenario.

The performance measures VMT, VHD, and GHG were output for each scenario or set of modeling assumptions. These numbers allow the performance of each scenario to be measured and compared, and to determine which of these measures are most effective in reaching SCTA's CTP goals.

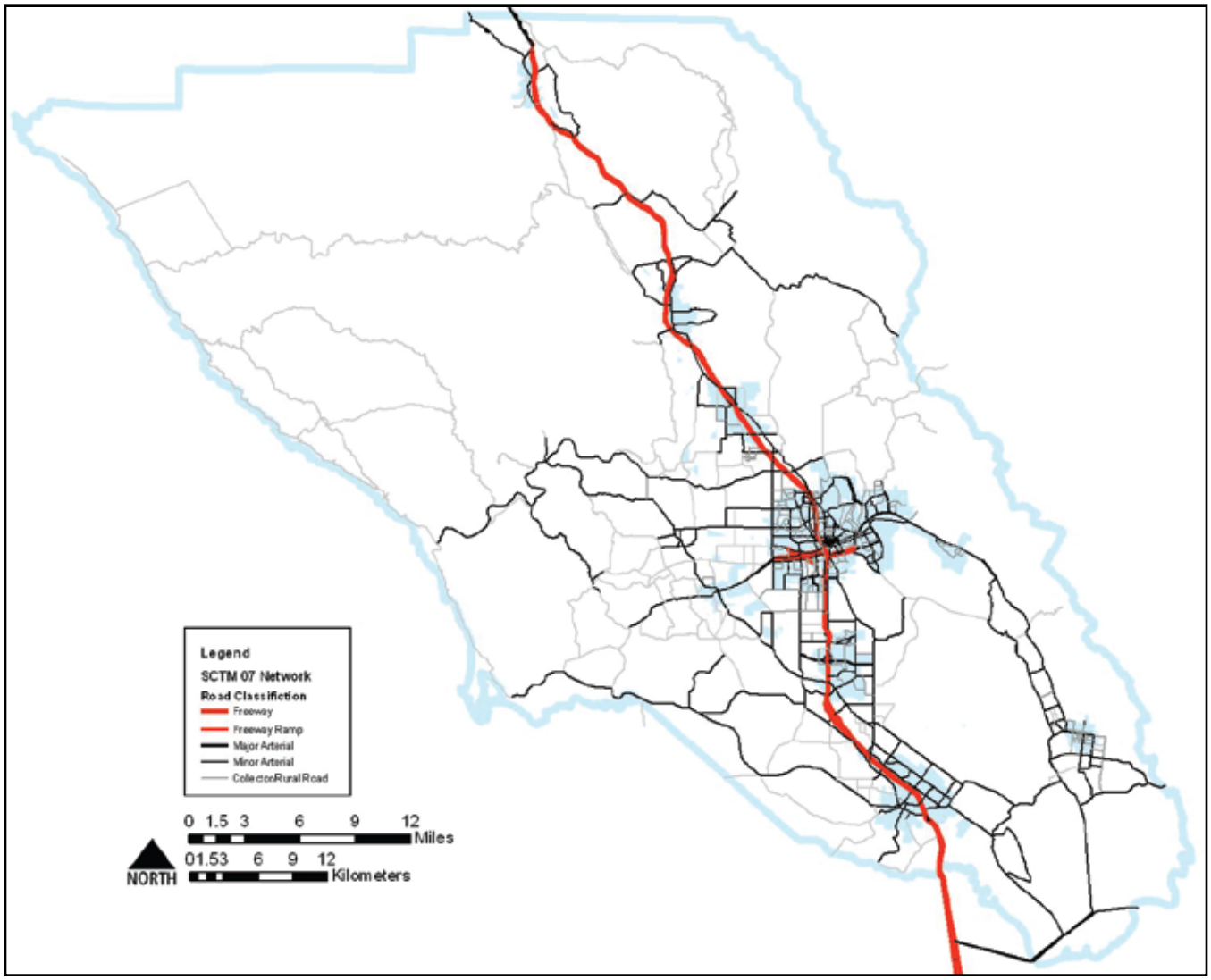
Baseline Demographic and Transportation System Assumptions

The socio-economic forecasts for the CTP analysis are based on the Association of Bay Area Government's (ABAG) Projections 2005 with adjustments based on local forecasts and the release of ABAG's Projections 2007. ABAG population and employment forecasts were used as control totals for jurisdictions and county planning areas. Staff worked with local planning agencies to allocate future growth to traffic analysis zones within jurisdictional boundaries or county planning areas using these control totals. Analysis years are 2005 for the base year and 2035 for the future year planning horizon.

Population and employment are projected to rise steadily from 2005 to 2035. Sonoma County's 2005 population of 478,800 is projected to increase to 568,900 by 2035 (an increase of 90,100 persons, a 19% total increase or just under 1% increase per year. The 2005 number of county jobs (220,460) is projected to grow to 344,290 by 2035 (an increase of 123,830 jobs, a 56% total increase, or nearly 2% increase per year). Population and job growth are projected to be centered on the Highway 101 corridor and focused on existing urbanized areas. Average household size was 2.57 persons per household in 2005, which is projected to drop to 2.53 persons per household in 2035.

The SCTM generalizes the countywide transportation facilities as a transportation network. The 2005 model networks are based on networks created as part of the development of the original Sonoma County Travel Model (SCTM), Santa Rosa Travel Model, and Rohnert Park Travel Model, and have been updated based on Petaluma and Windsor Model networks. Additional network detail has been added based on input from local staff and based on updated traffic analysis zone boundaries.

SCTM MODEL NETWORK



Baseline Pricing Assumptions

The following pricing assumptions are used for the six model scenarios (the pricing VMT reduction scenario and comprehensive scenarios add additional per/mile costs to simulate congestion pricing or a VMT/carbon tax and increased parking costs):

Base Future Fuel Costs: Base future fuel cost assumptions are that gasoline costs will increase from the 2005 average of $2.52 per gallon (current/2008 average $4.25 gallon) to $7.47 per gallon in 2035 in today's dollars. This fuel price increase is expected to be generally offset by increases in future vehicle fuel economies. 2035 vehicle fuel economy is expected to increase from 19.86 miles per gallon to 32.15 miles per gallon in 2035.

Tolls: Toll costs are projected to keep pace with inflation (no increase or decrease in toll amounts).

Parking: Parking costs are assumed to keep pace with inflation.

Transit Fares: Transit fares are assumed to keep pace with inflation.

Scenario Discussion

SCTA planning staff, with the assistance of SCTA advisory committees and the CTP Ad Hoc Committee, developed six scenarios representing what the future countywide transportation system could

look like in 2035. Scenarios represent different transportation improvement strategies that could be employed to meet CTP goals. Each of these scenarios can be compared to the results of the existing conditions model run and performance targets/benchmarks to evaluate the value of each set of scenario assumptions.

Many of these scenarios would be difficult to implement given current and expected funding that is available for transportation projects in the county. New funding sources would need to be found or scenario measures would need to be scaled back in order to make them financially and/or logistically feasible.

A description of each scenario and existing or current (2005) conditions is included below. Detailed scenario assumptions may be found in Attachment A: CTP Scenario Assumptions.

EXISTING CONDITIONS:

The Sonoma County Travel Model has been validated using 2005 and newer traffic count and land use data. The existing conditions model run replicates current travel conditions in the county and can be used to assess how future travel conditions change under different sets of scenario assumptions.

Scenario Performance:

VMT: Total base year vehicle miles traveled per person is 23.12 miles traveled per day.

PHD: Total Base year daily person hours of delay is 53,226 hours.

GHG emissions: 2,549,042 pounds of CO2E are generated in the model base year of 2005. This represents a higher level of GHG gas production than observed 1990 levels.

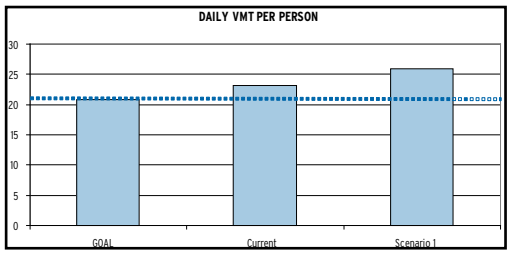
Current levels in benchmark areas are considerably higher than targets in the base year of 2005.

SCENARIO 1. NO BUILD:

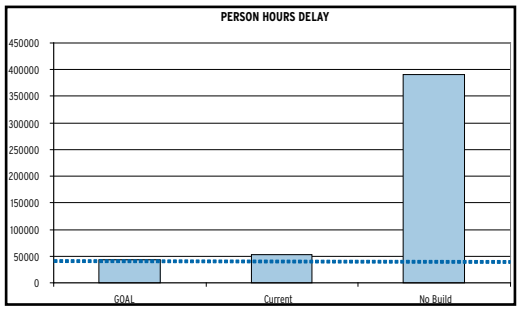
This scenario assumes no further transportation improvements beyond those projects currently underway are made in the future. The baseline 2005 model assumptions are used for this scenario along with the baseline 2035 future land use forecast. This scenario is a representation of a future in which no additional transportation improvements are made, and represents how our current transportation infrastructure would perform under future population and job growth.

Scenario Performance:

VMT: Total Scenario 1 vehicle miles traveled per person is 25.96 miles traveled per day.



PHD: Total Scenario 1 daily person hours of delay represent conditions over seven times more congested than current conditions.



GHG emissions: 2,048,185 pounds of CO2E are generated in the no build scenario. This represents a higher level of GHG gas production than observed 1990 levels, though represents a decrease in emissions from current conditions because of projected vehicle fuel economy increases.

Summary of Benchmark Shortfalls: Future travel in the no build scenario is projected to continue to rise with a 33% increase in travel (VMT), and large increases in congestion. Local arterials

are projected to suffer the most from future congestion. GHG emissions are projected to drop because of predicted vehicle fuel economy improvements, but GHG targets are not met in this scenario.

SCENARIO 2. CTP FINANCIALLY CONSTRAINED OR "BUSINESS AS USUAL" SCENARIO:

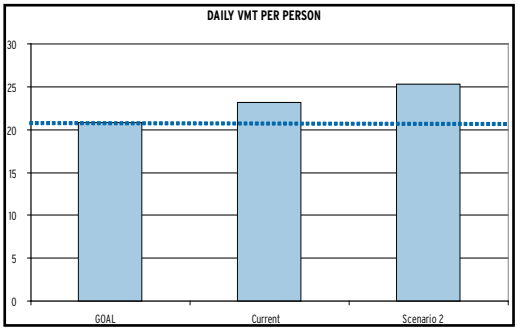
This scenario includes capital improvements listed in the Measure M Strategic Plan, CTP projects that have been funded (listed in the regional RTP), and transit improvements listed in the Measure M Strategic Plan including SMART rail. The scenario uses baseline future land use projections.

Pricing is assumed to follow current trends (includes automobile operating costs, parking costs, tolls, congestion charges, etc). Increases in fuel costs are assumed to be offset by improvements in fuel economy. Tolls, transit fares, and parking costs are assumed to keep pace with inflation, and no congestion charges assumed to be in place.

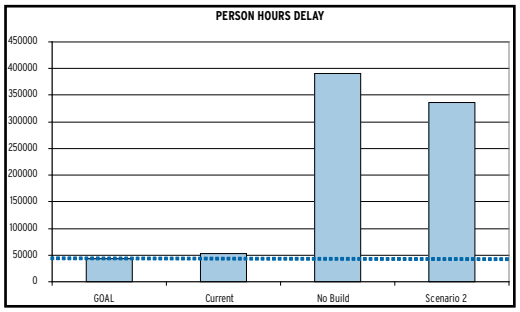
This scenario represents a future in which only currently funded and previously identified projects are added to the countywide transportation system.

Scenario Performance:

VMT: Total scenario 2 vehicle miles traveled per person is 25.34 miles traveled per day. This represents a 12% increase in total VMT per capita, and is 25% higher than the CTP goal of reducing daily VMT per capita to 20.8 miles traveled per day. This scenario shows a slight reduction in VMT from the "No Build" Scenario (2%).



PHD: Total Scenario 2 daily person hours of delay is 337,074 hours of delay daily. This represents slightly less future congestion than under "No Build" future conditions, but still represents large increases over current conditions.



GHG emissions: 1,999,582 pounds of CO2E are generated in 2035 in Scenario 2. This represents a higher level of GHG gas production than observed 1990 levels, though represents a decrease in emissions from current conditions, and "no build" conditions because of projected vehicle fuel economy increases, and VMT decreases.

Summary of Benchmark Shortfalls: This Scenario illustrates the fact that funded capital improvements alone will not provide much future congestion relief, reduce countywide travel, or help county jurisdictions meet GHG emission reduction goals. Slight decreases in VMT, congestion, and GHG emissions are realized, but performance measure benchmarks are far from being met.

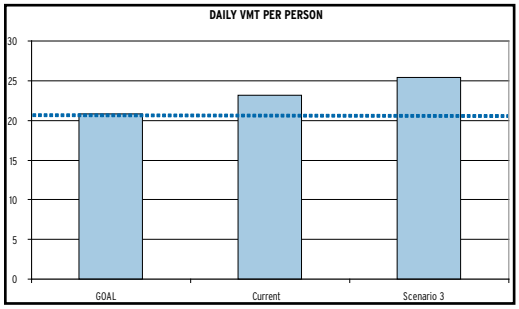
SCENARIO 3. CTP VISION SCENARIO, FINANCIALLY UNCONSTRAINED CAPITAL IMPROVEMENT SCENARIO:

This scenario uses the same assumptions as the CTP Baseline scenario with all CTP projects added. This scenario looks at the entire list of possible proposed projects added to the future transportation system. These projects are considered independent of financial constraints.

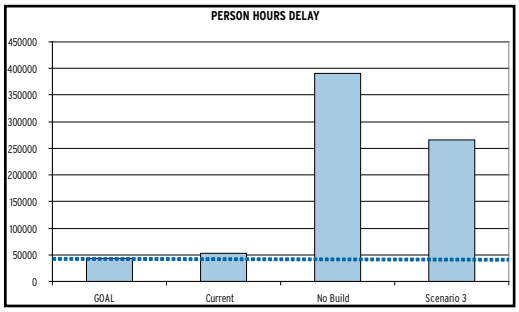
Scenario Performance:

VMT: Total Scenario 3 vehicle miles traveled per person is 25.37 miles traveled per day. This represents a 10% increase in total VMT per capita, and is 22% higher than the CTP goal of reducing daily VMT

per capita to 20.8 miles traveled per day. This scenario shows a slight reduction in VMT from the "No Build" Scenario (2%).



PHD: Total Scenario 3 daily person hours of delay is 265,769 hours of delay daily. This represents less future congestion than under "No Build" future conditions (32% less congestion than under "no build" conditions), but still represents large increases over current congestion levels.



GHG emissions: 2,002,046 pounds of CO2E are generated in 2035 in Scenario 3. This represents a higher level of GHG gas production than observed 1990 levels, though represents a decrease in emissions from current conditions, and "no build" conditions because of projected vehicle fuel economy increases, and VMT decreases.

Summary of Benchmark Shortfalls: Adding additional capacity to the existing roadway system and implementing some transit capacity improvements provide some valuable congestion reduction benefits, but fail to reduce countywide travel (VMT), or GHG emissions to benchmark levels.

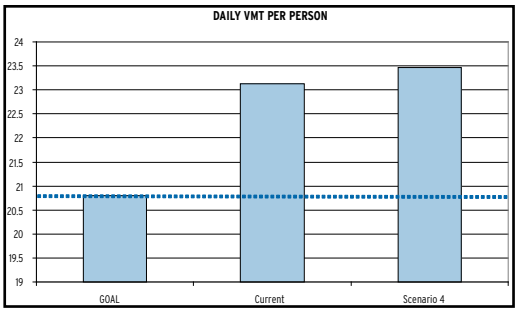
SCENARIO 4. VMT REDUCTION–TRANSIT EXPANSION/SMART GROWTH FOCUSED:

This scenario assumes that future transportation policy and improvements are focused on land use change and transit expansion. All baseline CTP capital improvements and all CTP vision transit projects are included in this scenario. All transit frequencies are assumed to be improved. Express bus service along the Santa Rosa Ave/Mendocino Ave, and Sonoma Ave/Sebastopol Ave corridors are assumed to be in place. Improved SMART rail frequencies and SMART shuttle service is assumed to be added to the transportation system. Transit fares keep pace with inflation. A Port Sonoma Ferry connection with San Francisco is assumed to be in operation. Transit Priority Measures (TPM) are implemented. TPM represents roadway infrastructure that protects the speed and on-time reliability of bus transit. Examples include signal prioritization, dedicated bus/HOV lanes, queue jumpers, left turn bays, etc.

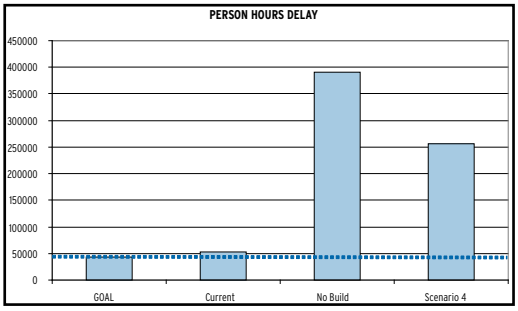
Future land use is assumed to be focused around county Priority Development Areas, rail/transit stations, and locally designated pedestrian or special development districts. Projected population and job growth numbers are constant between this scenario and the baseline growth scenario; growth is just shifted to higher densities in designated smart growth zones. A higher percentage of future development has been allocated at higher densities. Pricing follows current trends as outlined in the baseline scenario.

Scenario Performance:

VMT: Total Scenario 4 vehicle miles traveled per person is 23.47 miles traveled per day. This represents a 1% increase in total VMT per capita from current conditions, and is 13% higher than the CTP goal of reducing daily VMT per capita to 20.8 miles traveled per day. This scenario shows a reduction in VMT from the "No Build" Scenario (10%).



PHD: Total Scenario 4 daily person hours of delay is 256,375 hours of delay daily. This represents less future congestion than under "No Build" future conditions (34% less congestion than under "no build" conditions), but still represents large increases over current congestion levels.



GHG emissions: 1,851,404 pounds of CO2E are generated in 2035 in Scenario 4. This represents a higher level of GHG gas production than observed 1990 levels, though represents a decrease in emissions from current conditions, and "no build" conditions because of projected vehicle fuel economy increases, and VMT decreases.

Summary of Benchmark Shortfalls: Aggressive transit frequency improvement and land use densification provide significant VMT, congestion, and GHG emissions reduction, but fail to reduce countywide travel (VMT), or GHG emissions to benchmark levels.

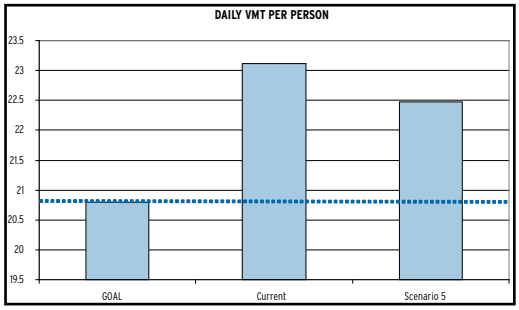
SCENARIO 5. VMT REDUCTION–PRICING POLICY FOCUSED:

This scenario focuses on using pricing measures and policy as a means of reducing travel demand and trip reduction. It includes baseline CTP capital and transit improvements as well as baseline population and job growth assumptions.

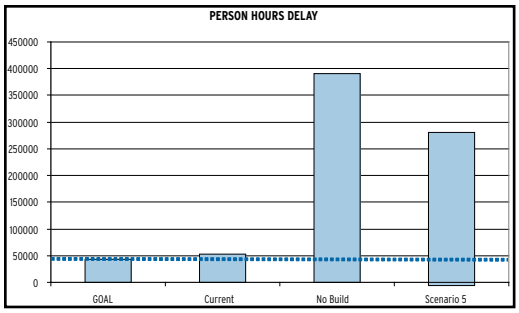
HWY 101 HOV lanes are assumed to be converted to high occupancy toll (HOT) lanes. A .25/mile congestion fee/gas tax is assumed to be in place on congested peak hour roadways. Parking costs for all downtown and large commercial areas is assumed to be set at $1 per hour or at current rates if higher (for peak and off-peak periods). Tolls and transit fares are expected to keep pace with inflation. Per mile cost (operating costs including gas, maintenance and tires, but not including ownership costs such as insurance, depreciation, taxes, etc.) to go from $0.23 per mile ($4.25 per gallon–2008 average) to $1.27 per mile in 2035 ($7.47 per gallon plus $5.50 per trip congestion charge).

Scenario Performance:

VMT: Total Scenario 5 vehicle miles traveled per person is 22.48 miles traveled per day. This represents a slight reduction (3%) in total VMT per capita when compared to current conditions, and is 8% higher than the CTP goal of reducing daily VMT per capita to 20.8 miles traveled per day. This scenario shows a reduction in VMT from the "No Build" Scenario (13%).



PHD: Total Scenario 5 daily person hours of delay is 287,246 hours of delay. This represents less future congestion than under "No Build" future conditions (26% less congestion than under "no build" conditions), but still represent large increases over current congestion levels.



GHG emissions: 1,773,669 pounds of CO2E are generated in 2035 in Scenario 5. This represents a higher level of GHG gas production than observed 1990 levels, though represents a decrease in emissions from current conditions, and "no build" conditions because of projected vehicle fuel economy increases, and VMT decreases.

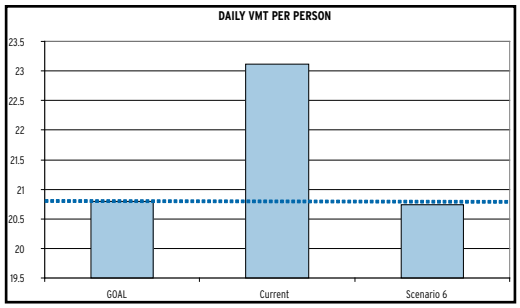
Summary of Benchmark Shortfalls: Pricing measures provide significant VMT reduction and GHG emissions reduction, but perform worse than expanded capital improvement and smart growth/transit emphasis projects at reducing future congestion. No benchmarks are met in this scenario, though significant VMT and GHG emissions reduction is observed.

SCENARIO 6. COMPREHENSIVE/"DO EVERYTHING" SCENARIO:

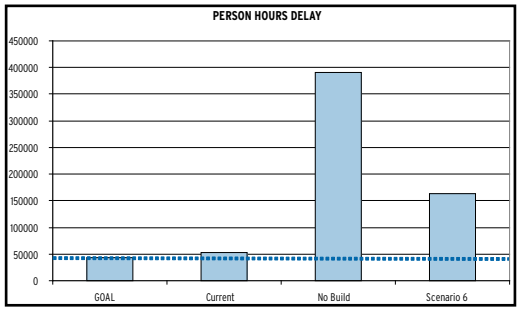
This scenario includes all measures proposed in all previously introduced scenarios, and represents a deployment of all previously considered transportation improvements independent of cost.

Scenario Performance:

VMT: Total Scenario 6 vehicle miles traveled per person is 20.74 miles traveled per day. This represents a 10% reduction in total VMT per capita when compared to current conditions, and meets the CTP goal of reducing daily VMT per capita to 20.8 miles traveled per day. This scenario shows a reduction in VMT from the "No Build" Scenario (20%).



PHD: Total Scenario 6 daily person hours of delay is 163,084 hours of delay. This represents less future congestion than under "No Build" future conditions (58% less congestion than under "no build" conditions), but still represent large increases over current congestion levels and does not meet the benchmark target.



GHG emissions: 1,636,196 pounds of CO2E are generated in 2035 in Scenario 6. This represents a higher level of GHG gas production than observed 1990 levels, though represents a decrease in emissions from current conditions, and "no build" conditions because of projected vehicle fuel economy increases, and VMT decreases. This scenario provides the greatest GHG emission reduction of all the scenarios.

Summary of Benchmark Shortfalls: Implementing a combination of expanded capital improvement, smart/growth transit improvement, and pricing measures provide the greatest VMT reduction, congestion reduction, and GHG emissions reduction benefit observed in all scenarios. The VMT reduction benchmark is met in this scenario and significant progress in congestion reduction and GHG emissions reduction benchmark areas is observed.

SCENARIO COMPARISON

The scenario analysis shows that improving the existing transportation and updating transportation and land use policies as directed by CTP Objectives 2A-2C, and 3A-3D will allow SCTA and county jurisdictions to avoid the transportation impacts that have been demonstrated under the "no build" conditions in this analysis. Following these CTP objectives will also help SCTA meet CTP goals and reach performance benchmarks.

USE OF THE SYSTEM–VEHICLE MILES TRAVELED

The measures included in Scenario 6 were successful at meeting the VMT reduction benchmark. This demonstrates that a balanced transportation improvement program is most successful at reducing future VMT. Pricing, then land use and transit efficiency policies provide the largest VMT reduction benefits (Scenarios 4 & 5).

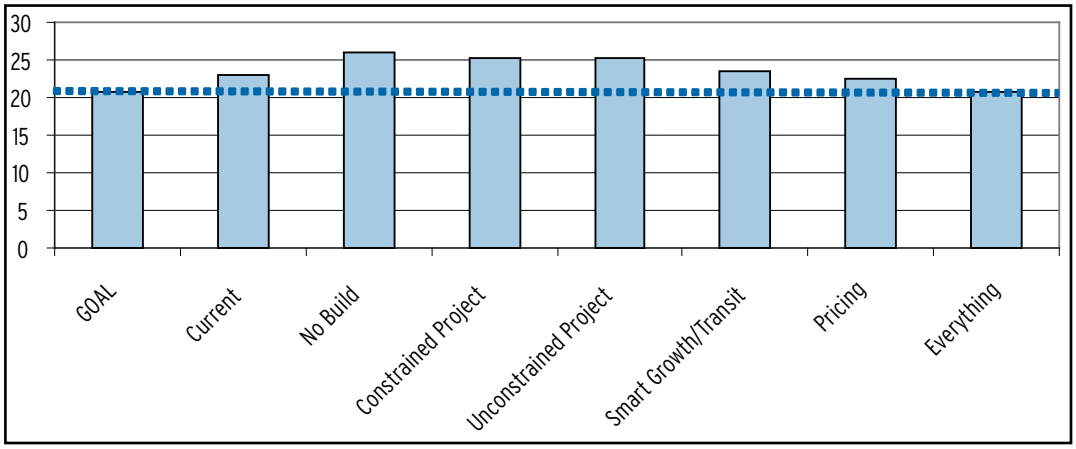
CONGESTION–PERSON HOURS OF DELAY

Scenario 6 is able to come closest to reaching congestion reduction targets. Congestion will continue to grow and be a problem in Sonoma County. The question is how bad will the congestion be and what can we do to ease the pain of future congestion. All measures included in the scenario analysis provide some congestion relief when compared to "no build" conditions. Expansion of the system (scenario 3), land use reform/transit emphasis (scenario 4), and pricing measures (scenario 5) all provide some congestion relief, with a combination of all these measures providing the greatest benefit. Expanding the system has the potential to increase VMT and thereby increasing GHG emissions, so care should be taken when implementing these types of projects and/or policies. Additional measures such as expanded rideshare, carpool, van pool, travel demand management, and telecommute programs (CTP Objective 2B) could shift travel to less congested periods, or more efficient travel modes. CTP Objective 2C calls for the implementation of Traffic Operation Systems (TOS) and improved traffic control systems. These measures can also be implemented to help meet CTP congestion relief performance benchmarks.

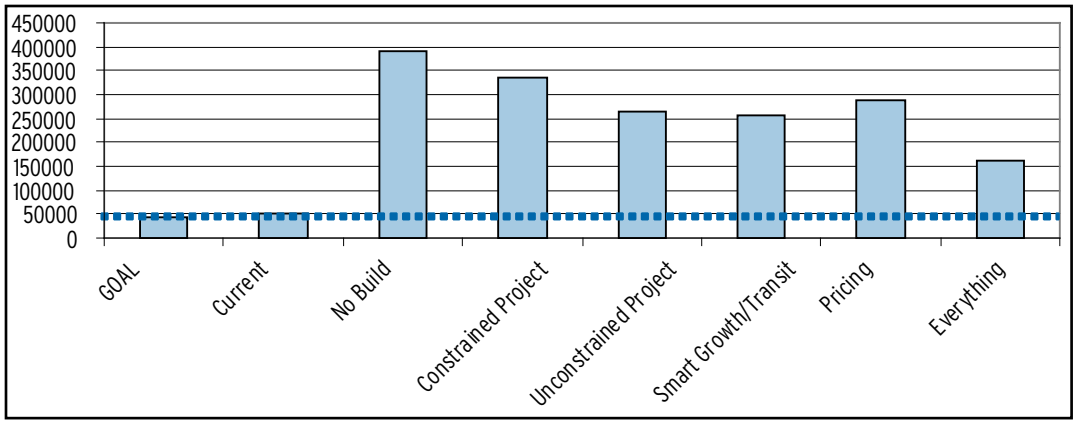
GREENHOUSE GAS EMISSIONS

Scenario 6 is able to come closest to reaching GHG emissions reduction targets, although all scenarios represent progress in this area because of reduced VMT and fuel efficiency improvements. Pricing, then land use and transit efficiency policies provide the largest GHG reduction benefits (Scenarios 4 & 5). Expanded capital improvements (Scenario 2) actually have the potential to increase overall

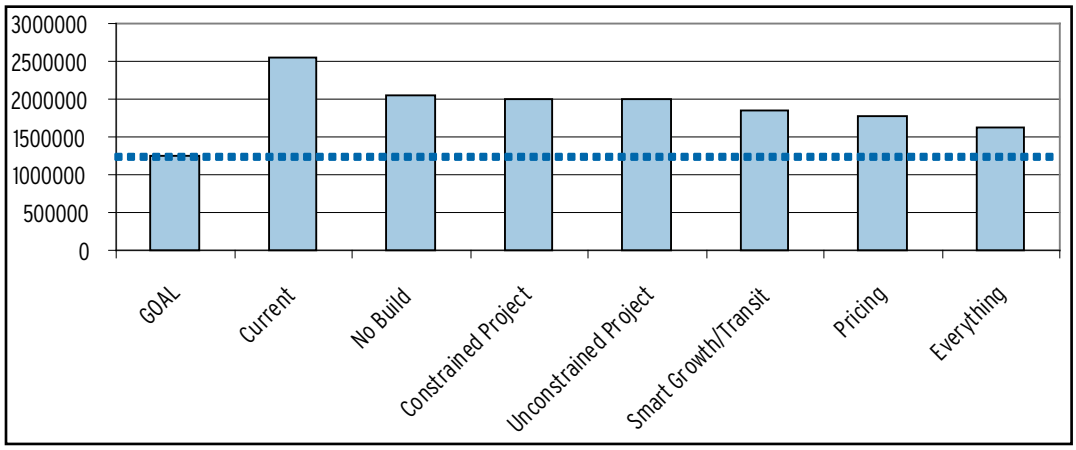
SCENARIO PERFORMANCE–DAILY VMT PER PERSON



SCENARIO PERFORMANCE–ANNUAL PERSON HOURS OF DELAY



SCENARIO PERFORMANCE–TONS OF GREENHOUSE GAS (CO2E) EMISSIONS



GHG emissions. Increasing future vehicle fuel efficiency to an average 36 miles per gallon would allow this benchmark to be met under these scenario conditions.

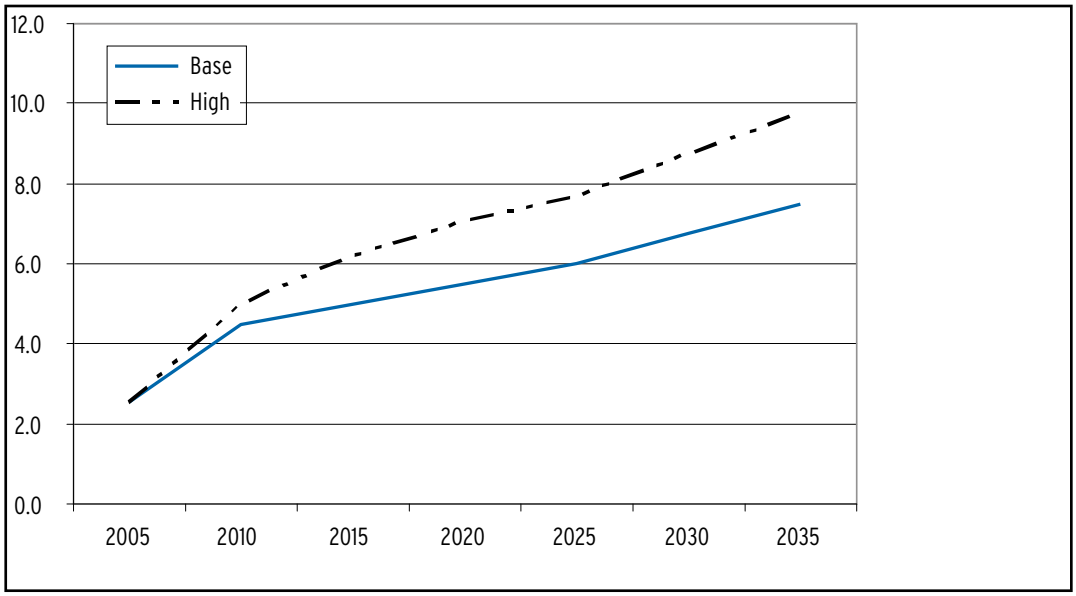
IMPACT OF HIGH FUTURE FUEL COSTS

Automobile operators have been shown to have low sensitivity to changes in the price of gasoline in the short term. Increased expenditures on travel costs, including fuel, cut into saving, real income growth and other spending. Growth in real income, higher fuel efficiencies, and construction of lower cost suburban housing and increased automobile have all contributed to lower fuel cost sensitivities than observed in the past.

Recent research suggests that a 10 percent short term increase in the price of gasoline would reduce consumption by about 0.6 percent. Consumers are much more responsive to persistent gasoline price increases over longer time periods (15+ years). Over the long term consumers are more likely to purchase more fuel efficient vehicles, or move closer to work to help offset increased travel costs. Experts estimate that a permanent 10 percent fuel increase will reduce long term consumption by 4 percent. Researchers have also found that travel speed and delay (caused by congestion or transfers) have similar relationships with total travel and fuel costs.

High future fuel costs, brought on by increasing global demand and peak oil, have the potential to impact future travel behavior. The California Energy Commission (CEC) provides estimates of future High Oil/Fuel costs. CEC

FUTURE FUEL COST ESTIMATES



analysis suggests that future Sonoma County fuel costs could increase from the 2005 average of $2.52 per gallon (current/2008 average $4.25 gallon) to $9.75 per gallon in 2035 in today's dollars (a roughly 30% increase over the $7.47 gallon baseline fuel cost assumption). This 30% increase in projected future fuel costs can be translated into an estimated moderate (5-15%) decrease in VMT, Delay, and GHG emissions across the future year scenarios. Future heightened fuel costs are also predicted to have potential negative economic impacts at the local and national level which could have additional unanticipated impacts on travel behavior and emissions.

CONCLUSIONS

This exercise is intended to provide additional information to decision makers regarding the possible effectiveness of different types of transportation policy and project directions that could be taken to address future transportation needs and to address CTP transportation goals. Other emerging technologies or approaches could also provide benefits that have not been considered in this analysis.

Scenario 6, the "Do Everything" or all measures scenario, has been demonstrated to come closest to meeting CTP benchmarks. The policies and projects represented by this scenario would have the highest likelihood of helping SCTA meet CTP goals. The financial constraints facing SCTA and Sonoma County jurisdictions could make the complete implementation of the measures included in this and other financially unconstrained scenarios very difficult. A balanced approach, as illustrated by this scenario, focusing on strategic capital improvements, land use reform, transit improvement/expansion, and pricing policies has the potential to provide the largest travel reduction, congestion, and GHG emissions reduction benefits.

A number of transportation improvement measures that could help SCTA achieve CTP goals and reach performance benchmarks were difficult to include in this analysis. Measures such as those listed in the Transportation Improvement Measures Matrix, and

CTP Objectives 2A-2C, and 3A-3D, provide additional means for reducing countywide travel (Vehicle Miles Traveled), decreasing congestion (Person Hours of Delay), and reducing greenhouse gas emissions. Many additional measures beyond

those included in this scenario analysis could help SCTA reach performance targets, but are difficult or impossible to analyze using the tools available. A combination of measures included in this scenario analysis supplemented by these un-modeled measures will help SCTA meet CTP goals and objectives.

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ATTACHMENT A: CTP SCENARIO ASSUMPTIONS

Included below is a detailed list of assumptions, by Scenario, used in the CTP Scenario Analysis:

Scenario 1: No Project/"No Build"

This scenario assumes that all reasonably foreseeable projects and programs (i.e., projects that are fully funded, programmed and have cleared the environmental phase) from the adopted 2004 CTP and Regional Transportation Improvement Program are implemented, but that all other projects and programs do not proceed forward.

- Land Use Assumptions:
  The socio-economic forecasts used in the CTP are based on the Association of Bay Area Governments' (ABAG) Projections 2005 with adjustments based on local forecasts and the release of ABAG's Projections 2007. ABAG population and employment forecasts were used as control totals for jurisdictions and County planning areas. Sub-allocation of control totals to traffic analysis zones within jurisdiction boundaries or county planning areas were based on local planning agencies and SCTA staff.
- Pricing:
  - Future Fuel Costs: Assumes that gasoline costs will increase from the 2005 average of $2.52 per gallon (current [2008] average of $4.25 gallon) to $7.47 per gallon in 2035 in today's dollars. This fuel price increase is expected to be generally offset by improvements in vehicle fuel economy.
  - Tolls: Toll costs are assumed to keep pace with inflation (i.e., no increase or decrease in toll amounts).
  - Parking: Parking costs are assumed to keep pace with inflation.
  - Transit Fares: Transit fares are assumed to keep pace with inflation.
  - Congestion Charges: No congestion charges are assumed to be in place.
- Highway/Capital Improvements:
  - U.S. 101: Rohnert Park Expressway to Santa Rosa Avenue—Add one HOV lane in each direction; add a two-lane connector between Wilfred Avenue and Santa Rosa Avenue; add auxiliary lanes between Rohnert Park Expressway Overcrossing and Wilfred Avenue/Golf Course Drive Interchange; add auxiliary lane between Wilfred Avenue and Santa Rosa Avenue Overcrossing; and realign surrounding roadways
  - U.S. 101: Windsor River Road to Steele Lane (Phase A)—Add one HOV lane in each direction
  - U.S. 101: Rohnert Park Expressway to Old Redwood Highway (Phase A)—Add one HOV lane in each direction between Pepper Road and Rohnert Park Expressway; add northbound climbing lane from one mile north of Old Redwood Highway to West Sierra Avenue; add auxiliary lanes between Pepper Road and Rohnert Park Expressway
  - U.S. 101: Marin Sonoma Narrows (Phase 1)—Upgrade Petaluma Blvd. South interchange and frontage roads. Close expressway access.
- Transit Improvements: Maintain existing headways; no ferry service operating out of Port Sonoma.

Scenario 2: Constrained Project

The "constrained" scenario includes capital highway and transit improvements listed in the Measure M Strategic Plan, constrained programs identified in the Metropolitan Transportation Commission's pending Transportation 2035 Plan, and trend-based assumptions for growth and pricing of the transportation system.

- Land Use Assumptions:
  The socio-economic forecasts used in the CTP are based on the Association of Bay Area Governments' (ABAG) Projections 2005 with adjustments based on local forecasts and the release of ABAG's Projections 2007. ABAG population and employment forecasts were used as control totals for jurisdictions and County planning areas. Sub-allocation of control totals to traffic analysis zones within jurisdiction boundaries or county planning areas were based on local planning agencies and SCTA staff. It should be noted that any mode share changes from other Plan assumptions did not result in a change to growth distributions.
- Pricing:

  - Future Fuel Costs: Assumes that gasoline costs will increase from the 2005 average of $2.52 per gallon (current [2008] average of $4.25 gallon) to $7.47 per gallon in 2035 in today's dollars. This fuel price increase is expected to be generally offset by improvements in vehicle fuel economy.
  - Tolls: Toll costs are assumed to keep pace with inflation (i.e., no increase or decrease in toll amounts).
  - Parking: Parking costs are assumed to keep pace with inflation.
  - Transit Fares: Transit fares are assumed to keep pace with inflation.
  - Congestion Charges: No congestion charges are assumed to be in place.
- Highway Capital Improvements: Includes capital improvements listed in Measure M Strategic Plan and projects with funding from other sources.
  - U.S. 101: Wilfred–Rohnert Park Expressway to Santa Rosa Avenue–Add one HOV lane in each direction; add a two-lane connector road between Wilfred Avenue and Santa Rosa Avenue; add auxiliary lanes between Rohnert Park Expressway overcrossing and Wilfred Avenue/Golf Course Drive interchange; add auxiliary lane between Wilfred Avenue and Santa Rosa Avenue overcrossing; and realign surrounding roadways.
  - U.S. 101: North–Windsor River Road to Steele Lane (Phase A)–Add one HOV lane in each direction.
  - U.S. 101: Central–Rohnert Park Expressway to Old Redwood Highway (Phase A)–Add one HOV lane in each direction between Pepper Road and Rohnert Park Expressway; add northbound climbing lane from one mile north of Old Redwood Highway to West Sierra Avenue; add auxiliary lanes between Pepper Road and Rohnert Park Expressway.
  - U.S. 101: Central–Rohnert Park Expressway to Old Redwood Highway (Phase B)–Add one HOV lane in each direction between Pepper Road and Highway 116; add auxiliary lanes between Pepper Road and Highway 116.
  - U.S. 101: North–Windsor River Road to Steele Lane (Phase B)–Add southbound auxiliary lanes between Hopper Avenue and Mendocino Avenue on-ramps; extend auxiliary lanes from north of Steele Lane to Bicentennial Way; modify River Road southbound off-ramp; add collector road between southbound Airport Boulevard on-ramp and southbound Fulton Road off-ramp; modify Airport Boulevard ramps.
  - U.S. 101: Marin-Sonoma Narrows (Future Phases)–Highway 37 to Old Redwood Highway–Add one HOV lane in each direction; add auxiliary lanes; upgrade interchanges; add frontage roads.
  - U.S. 101 ramp metering and fiber optic cable.
- Local Road Improvements: Includes capital improvements listed in Measure M Strategic Plan and projects with funding from other sources.
  - Penngrove and Railroad Ave. Area Improvements
  - Airport Boulevard Interchange and Improvements: Widening Airport Boulevard on both sides of Aviation Boulevard and signalizing the intersection at Aviation Boulevard; widening Brickway Boulevard and extending to Laughlin Road; widening Airport Boulevard from U.S. 101 to Old Redwood Highway; widening Laughlin Road from River Road to Brickway Boulevard and signalizing the intersection of River Road at Laughlin Road; and reconstructing the Airport Blvd-U.S. 101 interchange.
  - Highway 121-116 Intersection and Arnold Drive Improvements: remove

a right turn lane and install a traffic signal at the intersection of Highway 121 and 116; relocate the park- and-ride lot, replace the Yellow Creek bridge; widen the roadway to allow for turn lanes into and out of existing commercial uses; increase capacity of park-and-ride lot from 47 spaces to 94 spaces; Arnold Drive improvements include adding traffic signals and center turn lanes at various locations.

- Old Redwood Highway Interchange: replace Old Redwood Highway-U.S. 101 interchange with wider ramps, wider over-crossing, and improved signalization.
- Hearn Avenue Interchange: widen Hearn Avenue bridge; add turn lanes and widen Santa Rosa Avenue approaches to Hearn Avenue interchange and realign ramps on west side of the interchange.
- Farmers Lane Extension: Construct a new street from intersection of Bennett Valley Road and Farmers Lane to the intersection of Petaluma Hill Road and Yolanda Avenue.
- Mark West Springs Road: add shoulders and turn pockets.
- River Road Improvements: Straighten a curve west of Mirabel Road; add shoulders and right turn pockets.
- Bodega Highway Improvements: Straighten curves near Occidental; add turn pockets where needed.
- Fulton Road Improvements and Fulton Road-Highway 12 Interchange: Add turn lanes; add one through lane in each direction on Fulton Road; construct interchange at Highway 12 and Fulton Road.
- Highway 121 traffic signal system and channelization at 8th Street.
- Healdsburg Bridge.
- Highway 116 (Stage Gulch Road) along Champlin Creek—Realign and widen remaining segments to accommodate pedestrians and bicyclists.
- Highway 116: Elphick Road to Redwood Drive—Rehabilitate and widen (involves realignment, new shoulders, and channelization improvements).
- Interchange improvements at:
  - U.S. 101 and Steele Lane—Increase ramp capacities.
  - U.S. 101 and Arata Lane—Add northbound on-ramp.
  - U.S. 101 and East Washington Street—Reconfigure and realign ramp; additional northbound on-ramp.
  - U.S. 101 and Mill Street—Add northbound off-ramp; add southbound on-ramp.
  - U.S. 101 and Shiloh Road—Signalize southbound off-ramp.
  - U.S. 101 and Dry Creek Road—Increase interchange capacity.
  - U.S. 101 and Bellevue Avenue—Add new diamond interchange.
  - U.S. 101 and River Road—Signalize southbound off-ramp.
  - U.S. 101 and Todd Road.
- Petaluma—Rainier Cross Town Connector/Interchange—Extend Rainier Avenue across U.S. 101 from McDowell to Petaluma Boulevard; add full interchange at U.S. 101 and Rainier Avenue.
- Convert bridges from one-lane to two-lane facilities.

- Transit Improvements: Transit improvements listed in Measure M Strategic Plan and the Sonoma-Marin Area Rail Transit (SMART) passenger rail project (30 minute headways during peak periods, 60 minute headways off-peak). Assume no ferry service operating out of Port Sonoma. Assumes Lifeline, STA, and TDA funding through MTC.

- Increased Frequencies on Santa Rosa CityBus Routes:
  - Route 4–60 to 15 minute headways
  - Route 5–30 to 15 minute headways
  - Route 7–60 to 15 minute headways
  - Route 9–30 to 15 minute headways
  - Route 14–30 to 15 minute headways
  - Route 19–30 to 15 minute headways
  - Mendocino Avenue/Santa Rosa Avenue Rapid Bus–Ten minute headways; same stops as current routes.
  - Montgomery/Sonoma/West Santa Rosa Rapid Bus–Ten minutes headways; same stops as current routes.

Scenario 3: Unconstrained Projects Scenario

This scenario uses the same assumptions as the Constrained Project, with all CTP projects added. This alternative includes the entire list of proposed projects added to the future transportation system. These projects are considered independent of financial constraints.

- Land Use Assumptions: Same as Constrained Project.
- Pricing: Same as Constrained Project.
- Highway Capital Improvements: Includes all capital improvements listed in the Constrained Project.
- Local Road Improvements: Includes all capital improvements listed in the Constrained Project plus the following projects:
  - Old Redwood Highway Improvements: Petaluma to Cotati–Widen to four lanes.
  - Adobe Road Reconstruction–Reconstruct portions of Adobe Road from Highway 116 to Penngrove; widen to three lanes from Casa Grande Road to Old Redwood Highway.
  - Petaluma Hill Road–Widen from Santa Rosa to Roberts; add center turn lane.
  - Snyder Lane–Widen to four lanes from Southwest Boulevard to Keiser Lane.
  - Petaluma Hill Road–Widen and reconstruct from Adobe Road to Kawana Springs Road; add center turn lane.
  - Cloverdale Boulevard/South Interchange Improvement near U.S. 101.
  - East Cotati Avenue: Highway 101 to Snyder Lane–implement arterial management.
  - Bennett Valley Road: Santa Rosa to Grange Road–reconstruct and widen.
  - South Healdsburg Avenue/ Mill Street Improvements.
  - Old Redwood Highway: Hembree Lane to Shiloh Road–Widen to four lanes.
  - Shiloh Road: Hembree Lane to Old Redwood Highway–Widen to four lanes.
  - Windsor River Road–Widen and reconstruct from Windsor Road to Starr Road.
  - Railroad Avenue Improvements: U.S. 101 to Petaluma Hill Road–Widen to 3 lanes.
  - Southern Crossing of the Petaluma River: Copeland Mountain to Caulfield across Petaluma River.
  - Starr Road/Northwest Pacific Railroad (NWPRR) rebuild grade crossing.
  - Dry Creek Road–Safety improvements.

- First Street Improvement—Widen from Crocker Road to Asti Road and install sidewalk.
- Bellevue Avenue Extension—Extend Bellevue to Petaluma Hill Road.
- Todd Road—Reconstruct from Stony Point Road to Llano Road; extend east to Petaluma Hill Road.
- West Sierra Arterial Improvements: Old Redwood Highway to Stony Point Road—Signalize; add bike lanes.
- Davis Street and 6th Street Traffic Signal Installation—Davis Street and 6th Street traffic signal installation; 6th Street undercrossing.
- New Citywide Traffic Signals: Santa Rosa—implement ITS corridors (Mendocino Avenue, Guerneville Road/Steele Lane, Farmers Lane).
- Dutton Meadows—Widen and reconstruct from Hearn Avenue to Bellevue Avenue.
- West Avenue—Reconstruct and widen from Sebastopol Road to South Avenue.
- Old Redwood Highway—Widen to four lanes from Arata Lane to north town limits.
- Old Redwood Highway—Widen to four lanes from Windsor Road to Windsor River Road.
- Shiloh Road—Widen to four lanes from U.S. 101 to Skylane Boulevard.
- Petaluma Boulevard North-U.S. 101 to city limits (approximately 300 feet north of Gossage Avenue).
- Alexander Valley Road—Shoulder widening for bikes and sight distance; eliminate safety issues.
- Calistoga Road: Montecito Boulevard to Highway 12—Traffic calming.
- Lakeville Road—Widen to four lanes from Highway 37 to Highway 116.
- Arnold Drive—Construct center turn lane from Country Club Drive to Madrone Road.
- Highway 12—Widen to three lanes from Los Alamos Road to Pythian Road.
- Arnold Drive—Widen to three lanes from Verano Avenue to Petaluma Street.
- 8th Street East/Highway 121—Increase intersection capacity.
- Farmers/4th Street—Intersection improvements.
- 8th Street East—Widening from Napa Road to Napa Street.
- Intersection Control on Highway 116 at four locations in Sebastopol.
- River Road/Mark West Springs Road—Construct two additional lanes from Brickway Extension to Old Redwood Highway.
- Bellevue Avenue/Ludwig Avenue Connector—Realign Bellevue Avenue from Ludwig Avenue to Stony Point Road.
- Highway 12—Widen to four lanes from Llano Road to South Wright Road.
- Todd Road—Widen from Stony Point Road to Llano Road; extend east to Petaluma Hill Road.
- West College Avenue: Fulton Road to Stony Point Road—Widen to four lanes and reconstruct (includes storm drain).
- Bodega Avenue: Golden Ridge Avenue to Pleasant Hill Road—Improve curb, gutter and sidewalk.
- Highway 116/Healdsburg Avenue: Live Oak Avenue to Hurlbut Avenue—Improve curb, gutter, and sidewalk.
- Stony Point Road (Phase 1)—Widen to six lanes and reconstruct from Highway 12 to approximately 800 feet south of Sebastopol Road.

- Stony Point Road (Phase 2)—Widen to four lanes and reconstruct south of Sebastopol Road to Hearn Avenue.
- Hearn Avenue Realignment (Phase 1)—Add turn lanes and widen to four lanes the Santa Rosa Avenue approaches to the Hearn Avenue interchange; include ITS.
- Hearn Avenue Realignment (Phase 2)—Widen Hearn Avenue to four lanes from the U.S. 101 overcrossing to Dutton Avenue; improve Hearn Avenue and Corby Avenue intersection.
- Hearn Avenue Realignment (Phase 3)—Complete widening of Hearn Avenue overcrossing of U.S. 101 and reconfigure southbound U.S. 101 ramps.
- Sebastopol Road: Olive Street to Dutton Avenue—Upgrade and reconstruct.
- West 9th Street: Dutton Avenue to Morgan Avenue—Widen to four lanes and reconstruct.
- Old Redwood Highway: La Plaza North to Highway 116/Gravenstein Highway—Rehabilitate roadway.
- Five Way Intersection Improvements.
- Neighborhood Traffic Calming Program ($60,000 per year).
- Wilfred Avenue—Widen to four lanes.
- Rohnert Park Expressway—Widen to six lanes.
- Dowdell Avenue—Reconstruct and extend.
- Bodway Parkway Extension.
- State Farm Drive Corridor Improvements—widen to four lanes.
- Commerce Drive Corridor Improvements—widen to four lanes through Rohnert Park.
- City Center Drive Plaza and Pedestrian Improvements.
- Davis Street and 6th Street Traffic Signal.
- College Avenue Improvements: Cleveland Avenue to Morgan Street—widen to four lanes.
- Highway 12—Right-of-way for three lanes.
- Highway 12 at 4th Street.
- Gravenstein Highway/Highway 116: Spooner Park to U.S. 101—Widen to three lanes.
- Highway 116: Elphick Road to Redwood Drive—Rehabilitate and widen (involves realignment, new shoulders and channelization improvements).
- U.S. 101 and Railroad Avenue Interchange: add southbound ramps.
- U.S. 101 and Mendocino Avenue/Hopper Avenue Interchange.
- Traffic Calming on County Rights-of-Way.
- Old Redwood Highway—Widen to four lanes from Shiloh Road to Santa Rosa city limits.
- Old Redwood Highway—Widen to four lanes from Railroad Avenue to Petaluma city limits.
- Fulton Road—Widen to four lanes from Old Redwood Highway to Piner Road.
- Highway 12—Widen to three lanes from Llano Road to Highway 116.
- Bodega Highway—Widen to three lanes from Sebastopol city limits to Jonive Road.
- Stony Point Road—Widen to four lanes from Santa Rosa city limits to Petaluma city limits.
- Santa Rosa Avenue—Widen to four lanes from Todd Road to U.S. 101.
- Ely Road—Add center turn lane from Old Redwood Highway to Petaluma city limits.

- Corona Road—Add center turn lane from Adobe Road to Ely Road.
- Lakeville Highway—Widen to four lanes from U.S. 101 to Highway 37.
- Highway 37—Widen to four lanes.
- Stage Gulch Road—Add center turn lane from Adobe Road to Arnold Drive.
- Highway 12—Add center turn lane from Santa Rosa to Sonoma.
- Arnold Drive—Add center turn lane from Madrone Road to Petaluma Avenue.
- Madrone Road—Add center turn lane from Arnold Road to Highway 12.
- Aqua Caliente Road—Add center turn lane from Arnold Road to Highway 12.
- Verano Avenue—Add center turn lane from Arnold Road to Highway 12.
- Petaluma Avenue—Add center turn lane from Arnold Road to Highway 12.
- Northpoint Parkway—Extend as two-lane facility from Fresno Avenue to South Wright Road.
- Northpoint Parkway—Widen to four lanes from Stony Point Road to Fresno Avenue.
- Fresno Avenue—Extend as two-lane facility from Northpoint Parkway to Finley Avenue.
- Corporate Center Parkway—Widen to four lanes from Northpoint Parkway to Sebastopol Road.
- Stony Point Road—Widen to four lanes from Hearn Avenue to Santa Rosa city limits.
- Maureen Drive: Dutton Avenue to Dutton Meadow—Realign and widen to four lanes.
- Dutton Avenue—Extend to as four-lane facility to existing Dutton Avenue at Hearn Avenue.
- Hearn Avenue—Realign as four-lane facility from Burbank Avenue to Northpoint Parkway.
- Sebastopol Road—Four-lane facility from Dutton Avenue to Stony Point Road.
- Corby Avenue—Widen to four lanes from Baker Avenue to Hearn Avenue.
- Baker Overcrossing of U.S. 101—Widen to four lanes.
- Santa Rosa Avenue—Add one southbound lane from Baker Avenue to Colgan Avenue.
- Petaluma Hill Road—Widen to four lanes from Aston Way to Santa Rosa city limits.
- Kawana Springs Road—Widen to add one westbound lane from Santa Rosa Avenue to Petaluma Hill Road.
- Stony Point Road—Widen to six lanes from 3rd Street to Highway 12.
- West 3rd Street—Widen to four lanes from Senna Drive to Fulton Road.
- West 9th Street—Widen to four lanes from Dutton Avenue to Link Lane.
- Cleveland Avenue—Widen to four-lane facility from College Avenue to West 9th Street.
- Range Avenue—Widen to four lanes from Steele Lane to Russell Avenue.
- Piner Road—Widen to four lanes from Marlow Road to Fulton Road.
- Hopper Avenue—Widen to four lanes from Cleveland Avenue to Coffey Lane.
- Courthouse Square Closure—Close Mendocino Avenue; convert 3rd Street to one-way facility south of Courthouse Square.
- 3rd Street—Widen to six lanes from Morgan Street to B Street.
- Morgan Street—Widen to six lanes from 3rd Street to 5th Street.

  - North Street—Widen to four lanes from Carr Avenue to College Avenue.
  - Franklin Avenue—Widen to four lanes from Lewis Road to North Street.
  - Chanate Road—Widen to four lanes from Humboldt Street to Mendocino Avenue.
- Transit Improvements:
  Transit improvements listed in Measure M Strategic Plan and the Sonoma-Marin Area Rail Transit (SMART) passenger rail project (30 minute headways during peak periods, 60 minute headways off peak). Also include improvements listed in Constrained scenario.
  - Increased Frequencies on Santa Rosa CityBus Routes:
    - Route 1—30 to 15 minute headways
    - Route 2—30 to 15 minute headways
    - Route 3—30 to 15 minute headways
    - Route 6—30 to 15 minute headways
    - Route 8—30 to 15 minute headways
    - Route 10—30 to 15 minute headways
    - Route 11—30 to 15 minute headways
    - Route 12—30 to 15 minute headways
    - Route 15—30 to 15 minute headways
    - Route 16—60 to 15 minute headways
    - Route 17—30 to 15 minute headways
    - Route 18—60 to 15 minute headways
  - Increased Frequencies on Sonoma County Transit Routes:
    - Route 20—80 to 45 minute headways.
    - Route 26—160 to 90 minute headways.
    - Route 30—85 to 45 minute headways.
    - Route 40—95 to 90 minute headways.
    - Route 44/48—50 to 30 minute headways.
    - Route 60—50 to 30 minute headways.
    - Route 62—90 to 60 minute headways.
  - Port Sonoma—Includes basic ferry service operating.

Scenario 4: VMT Reduction Alternative 1 (Transit/Smart Growth Focused)

This scenario assumes that future transportation policy and improvements are focused on land use change and accompanying transit expansion.

- Land Use Assumptions:
  Future land use is assumed to be focused around county Priority Development Areas, rail/transit stations, and locally designated pedestrian or special development districts. Projected population and job growth numbers are constant between this scenario and the Constrained Project; growth is shifted to higher densities in designated smart growth zones. A higher percentage of future development has been allocated at higher densities.
- Pricing:
  Same as Constrained Project. Transit fares keep pace with inflation.
- Highway Capital Improvements:
  Same as Constrained Project.
- Local Road Improvements:
  Same as Constrained Project and Transit Priority Measures (TPM) are implemented. TPM represents roadway infrastructure that protects the speed and on-time reliability of bus transit. Examples include signal prioritization, dedicated bus/HOV lanes, queue jumpers, left turn bays, etc.

- Transit Improvements:
  All baseline CTP capital improvements and all CTP unconstrained transit projects are included in this alternative. All transit frequencies are assumed to be improved. Improved SMART rail frequencies (15 minute peak hour headways, 30 minute off peak headways) and SMART shuttle service is assumed to be added to the transportation system. A Port Sonoma Ferry connection with San Francisco is assumed to be in operation.
  - Increased Frequencies on Sonoma County Transit Routes:
    - Route 10–50 to 30 minute headways
    - Route 12–50 to 30 minute headways
    - Route 14–50 to 30 minute headways
    - Route 28–80 to 50 minute headways
    - Route 32–50 to 40 minute headways
    - Route 42–75 to 60 minute headways
    - Route 64–90 to 60 minute headways

Scenario 5: VMT Reduction Alternative 2 (Pricing Focused)

This scenario focuses on using pricing measures and policy as a means of reducing travel demand and trip reduction. It includes baseline CTP capital and transit improvements as well as baseline population and job growth assumptions.

- Land Use Assumptions:
  Same as Constrained Project.
- Pricing:
  A $0.25 per mile congestion fee/gas tax is assumed to be in place on congested peak hour roadways. Parking costs for all downtown and large commercial areas is assumed to be set at $1.00 per hour or at current rates if higher (for peak and off-peak periods). Tolls and transit fares are expected to keep pace with inflation.
  - Per mile cost (operating costs including gas, maintenance and tires, but not including ownership costs such as insurance, depreciation, taxes, etc.) to go from $0.23 per mile ($4.25 per gallon–2008 average) to $1.27 per mile in 2035 ($7.47 per gallon plus $5.50 per trip congestion charge).
- Highway Capital Improvements:
  Same as Constrained Project expect U.S. 101 HOV lanes are assumed to be converted to high occupancy toll (HOT) lanes.
- Local Road Improvements:
  Same as Constrained Project.
- Transit Improvements:
  Same as Constrained Project (including SMART rail).

Scenario 6: Comprehensive/"Do Everything" Alternative

This scenario includes all baseline capital improvements along with all additional measures proposed in all of the above scenarios to provide for the maximum reduction in VMT.

- Land Use Assumptions:
  Same as Smart Growth/Transit Scenario
- Pricing:
  Same as Pricing Scenario.
- Highway Capital Improvements:
  Includes the cumulative improvements identified in Constrained Project and all other alternatives.
- Local Road Improvements:
  Includes the cumulative improvements identified in Constrained Project and all other alternatives.
- Transit Improvements:
  Includes the cumulative improvements identified in Constrained Project and all other alternatives.

Appendix D. GLOSSARY

GLOSSARY TO TRANSPORTATION TERMS AND ACRONYMS

AASHTO—American Association of State Highway and Transportation Officials: An interest group based in Washington, D.C. Involved in research, advocacy and technical assistance.

ABAG Association of Bay Area Governments: A voluntary association of counties and cities that is the general planning agency for the nine-county San Francisco Bay Area. Also provides demographic, financial, administrative, training and conference services to local governments and businesses. A member sits on MTC.

Accessibility: The extent to which facilities are barrier free and useable by persons with disabilities, including wheelchair users.

ADA Americans With Disabilities Act: Federal civil rights legislation for disabled persons passed in 1990; calls on public transit systems to make their services more fully accessible, as well as to underwrite a parallel network of paratransit service.

Apportionment: A federal budgetary term that refers to a statutorily prescribed division or assignment of funds. It is based on prescribed formulas in the law and consists of dividing authorized obligation authority for a specific program among transit systems.

Appropriation: A federal budgetary term that refers to an act of Congress that permits federal agencies to incur obligations and make payments out of the Treasury for specified purposes. An appropriation act is the most common means of providing budget authority, but in some cases the authorization legislation itself provides the budget authority.

ARB—Air Resources Board, aka CARB: The state agency responsible for adopting state air quality standards, establishing emission standards for new cars sold in the state, and overseeing activities of regional and local air pollution control agencies.

Arterial Street: A major thoroughfare, used primarily for through traffic rather than for access to adjacent land, that is characterized by high vehicular capacity and continuity of movement.

AVL—Automated Vehicle Location System (IVHS term): This computerized system can tell you the answer: It employs satellites and other technologies to track vehicles in a fleet, assisting with dispatching and other applications. Currently used by truckers and courier services, it could be used in the future by transit systems to provide real-time schedule information for patrons, and will help the CHP monitor FSP tow trucks.

BAAQMD—Bay Area Quality Management District: Also known as the Air District. Regulates industry and employers to keep air pollution in check and sponsors programs to clean the air. The Air District works with MTC and the Association of Bay Area Governments on issues that affect transportation, land use and air quality.

BATA—Bay Area Toll Authority: Entity created by the state Legislature to administer the base $1 toll from the Bay Area's seven state-owned toll bridges, a responsibility previously held by the CTC. MTC began operations as BATA on Jan. 1, 1998.

Bay Area Partnership: Often referred to simply as "The Partnership," this is a confederation of the top staff of various transportation agencies in the region (MTC, public transit operators, county CMAs, city and county public works departments, ports, Caltrans, U.S.

DOT) as well as environmental protection agencies. The Partnership works by consensus to improve the overall efficiency and operation of the Bay Area's transportation network, including developing strategies for financing transportation improvements.

Caltrans California Department of Transportation: The state agency that operates California's highway system and intercity rail systems.

Capital Revenues: Moneys dedicated for new projects to cover one-time costs, such as construction of roads, transit lines and facilities, or purchase of buses and rail cars.

CEQA—California Environmental Quality Act of 1970 See EIR.

CHP—California Highway Patrol: State law enforcement agency responsible for highway safety, among other things.

CMA Congestion Management Agency: A countywide agency responsible for preparing and implementing a county's Congestion Management Program. CMAs came into existence as a result of state legislation and voter approval of Prop. 111 in 1990. Subsequent legislation made optional the requirement for counties to have a CMA. Most Bay Area counties still have them.

CMAQ Congestion Mitigation and Air Quality Improvement Program: A federal fund source contained in TEA 21 for projects and activities that reduce congestion and improve air quality, both in regions not yet attaining federal air quality standards and those engaged in efforts to preserve their attainment status.

CNG—Compressed Natural Gas: A clean-burning alternative fuel for vehicles.

Conformity: The ongoing process that ensures the planning for highway and transit systems, as a whole and over the long term, is consistent with the state air quality plans for attaining and maintaining health-based air quality standards; conformity is determined by metropolitan planning organizations (MPOs) and the U.S. Department of Transportation (U.S. DOT), and is based on whether transportation plans and programs meet the provisions of a State Implementation Plan.

CTC California Transportation Commission: A state-level commission, consisting of nine members appointed by the governor, that establishes priorities and allocates funds for highway, passenger rail and transit investments throughout California. The CTC works with the state Business, Transportation and Housing Agency in overseeing Caltrans, and participates in the development of state and federal legislation that affects transportation funding.

Deadhead: The movement of a transit vehicle without passengers aboard; often to and from a garage or to and from one route to another.

DEIR/DEIS See EIR/EIS.

DOT—Department of Transportation: At the federal level, a cabinet agency with responsibility for highways, mass transit, aviation and ports; headed by the secretary of transportation. The DOT includes the FHWA , the FTA and the FAA, among others. There are also state DOTs. (California's is referred to as Caltrans).

Dwell Time: The scheduled time a vehicle or train is allowed to discharge and take on passengers at a stop, including opening and closing doors.

Earmark: A federal budgetary term that refers to the specific designation by Congress that part of a more general lump-sum appropriation be used for a particular project; the earmark can be designated as a minimum and/or maximum dollar amount.

EIR/EIS: Environmental Impact Report/ Environmental Impact Statement An analysis of the environmental impacts of proposed land development and transportation projects; it's an EIR when conducted in response to CEQA , and an EIS when conducted for federally funded or approved projects per NEPA. A draft EIR or draft EIS (DEIR or DEIS:—often they're prepared simultaneously) is circulated to the public and agencies

with approval authority for comment. Like a pollywog whose next stage in life is a frog, a DEIR or DEIS grows up to be a certified FEIR or FEIS that contains responses to public comments and ways to mitigate adverse impacts.

Ethanol: An alternative fuel; a liquid alcohol fuel with vapor heavier than air; produced from agricultural products such as corn, grain and sugar cane.

Fare Box Recovery Ratio: Measure of the proportion of operating expenses covered by passenger fares; found by dividing fare box revenue by total operating expenses for each mode and/or systemwide.

Fare Box Revenue: Value of cash, tickets, tokens and pass receipts given by passengers as payment for rides; excludes charter revenue.

Fare Elasticity: The extent to which ridership responds to fare increases or decreases.

Fare Structure: The system set up to determine how much is to be paid by various passengers using a transit vehicle at any given time.

FHWA Federal Highway Administration: U.S. Department of Transportation agency responsible for administering the federal highway aid program to individual states, and helping to plan, develop and coordinate construction of federally funded highway projects. FHWA also governs the safety of hazardous cargo on the nation's highways.

Fixed Guidway System: A system of vehicles that can operate only on its own guideway constructed for that purpose (e.g., rapid rail, light rail). Federal usage in funding legislation also includes exclusive right-of-way bus operations, trolley coaches and ferryboats as "fixed guideway" transit.

Fixed Route Service: Provided on a repetitive, fixed-schedule basis along a specific route with vehicles stopping to pick up and deliver passengers to specific locations; each fixed-route trip serves the same origins and destinations, unlike demand responsive and taxicabs.

FSP—Freeway Service Patrol: Free, roving tow truck service to aid stranded motorists and help to clear incidents along 100 miles of the region's most congested freeways. A JUMP Start project that is jointly sponsored by the MTC SAFE, Caltrans and the CHP.

FTA Federal Transit Administration: U.S. Department of Transportation agency that provides financial and planning assistance to help plan, build, and operate rail, bus and paratransit systems. The agency also assists in the development of local and regional traffic reduction programs.

Fiscal Year: The yearly accounting period for the federal government which begins October 1 and ends on the following September 30. The fiscal year is designated by the calendar year in which it ends (e.g., FY 94 is from October 1, 1993 to September 30, 1994).

Headway Time: Interval between vehicles moving in the same direction on a particular route.

Highway Trust Fund: The federal trust fund established by the Highway Revenue Act of 1956; this fund has two accounts — the Highway Account and the Mass Transit Account. Trust fund revenues are derived from federal highway-user taxes and fees such as motor fuel taxes; trust fund uses and expenditures are determined by law.

HOV Lane—High-Occupancy-Vehicle Lane: The technical term for a carpool lane, commuter lane or diamond lane.

Intermodal: The term "mode" is used to refer to and to distinguish from each other the various forms of transportation, such as automobile, transit, ship, bicycle and walking. Intermodal refers specifically to the connections between modes.

ISTEA Intermodal Surface Transportation Efficiency Act: Pronounced "Ice Tea," this landmark federal legislation signed into law in 1991 initiated broad changes in the way transportation decisions are made. ISTEA emphasized diversity and balance of modes, as well as the preservation of existing systems before construction of new facilities. ISTEA

expired in 1997, but much of its program structure was carried forward in successor federal legislation (see TEA 21).

ITIP Interregional Transportation Improvement Program: A state funding program intended to address needs that cross metropolitan boundaries. Caltrans nominates and the CTC approves a listing of interregional highway and rail projects for 25 percent of the funds to be programmed in the STIP (the other 75 percent are RTIP funds, see below).

ITS Intelligent Transportation Systems: Technical innovations that apply communications and information processing to improve the efficiency and safety of surface transportation systems. In the Bay Area, ITS initiatives include closed-circuit video monitoring of freeway traffic conditions and the use of automatic vehicle location technology to coordinate traffic signals, speed emergency vehicle response times, and let transit riders know when the next bus or train will arrive.

Lifeline Transportation Network: An MTC initiative to enhance low-income residents' access to key destinations such as job centers, government buildings and medical facilities during both peak commute periods and off-peak hours. While most of the Lifeline network identified by MTC is already served by existing transit routes, some low-income communities and/or destinations are not served by transit or lack service at specific times of day. MTC is working with transit operators and potential funding partners to fill these gaps in the network.

LIFT Low-Income Flexible Transportation: An MTC program that provides financial assistance for services to help low-income residents get to and from work and other locations. Examples of eligible LIFT projects include new and expanded public transit services, transportation to child care centers, development of child care facilities at transit hubs, rideshare activities and "guaranteed ride home" programs.

LOS Level of Service: A report card that rates traffic flow from A (excellent) through F (flunks), and compares actual or projected traffic volume with the maximum capacity of the intersection or road in question.

MPO Metropolitan Planning Organization: A federally required planning body responsible for the transportation planning and project selection in its region; the governor designates an MPO in every urbanized area with a population of over 50,000. MTC is the Bay Area's MPO.

MTC Metropolitan Transportation Commission: The transportation planning, financing and coordinating agency for the nine counties that touch San Francisco Bay.

MTS Metropolitan Transportation System: A defined network of streets and roads, highways, mass transit routes, bikeways, transfer points, airports and seaports considered essential to regional mobility.

Multimodal: Refers to the availability of multiple transportation options, especially within a system or corridor. A multimodal approach to transportation planning focuses on the most efficient way of getting people or goods from place to place, be it by truck, train, bicycle, automobile, airplane, bus, boat or foot.

Nonattainment Area: Any geographic region of the United States that the U.S. Environmental Protection Agency (EPA) has designated as not attaining the federal air quality standards for one or more air pollutants, such as ozone and carbon monoxide.

Operating Funds: Moneys used to fund general, day-to-day costs of running transportation systems. For transit, costs include fuel, salaries and replacement parts; for roads, operating costs involve maintaining pavement, filling potholes, paying workers' salaries, and so forth. Paratransit: Door-to-door bus, van and taxi services used to transport elderly and disabled riders. Sometimes referred to as dial-a-ride service, since trips are made according to demand instead of along a fixed route or according to a fixed schedule.

Paratransit: Comparable transportation service required by the Americans with Disabilities Act (ADA) of 1990 for individuals with disabilities who are unable to use fixed-route transportation systems.

PMS—Pavement Management System: Used in the Bay Area to refer to MTC's computer-assisted program for diagnosing and curing potholes in a timely, cost-effective manner — and preventing them in the first place through judicious maintenance. In wide use among the region's cities and counties.

Program: (1) verb, to assign funds to a project that has been approved by MTC, the state or other agency; (2) noun, a system of funding for implementing transportation projects or policies, such as through the State Transportation Improvement Program (see STIP).

Resolution 3434: An identified list of high-priority rail and express bus improvements to serve the Bay Area's most congested corridors. MTC adopted Resolution 3434 in December 2001 to establish clear priorities for the investment of transit expansion funds.

RTIP Regional Transportation Improvement Program: A listing of highway and transit projects that the region hopes to fund; compiled by MTC every two years from priority lists submitted by local jurisdictions. The California Transportation Commission (CTC) must either approve or reject the RTIP list in its entirety. Once the CTC approves an RTIP, it is combined with those from other regions to comprise 75 percent of the funds in the STIP (see below).

RTP—Regional Transportation Plan: A blueprint to guide the region's transportation development for a 25-year period. Updated every three years, it is based on projections of growth and travel demand coupled with financial projections. Required by state and federal law.

RTPA—Regional Transportation Planning Agency: Regional Transportation Planning Agency: A state-designated agency responsible for preparing the Regional Transportation Plan and the Regional Transportation Improvement Program, administering state funds, and other tasks. MTC is the Bay Area's RTPA.

SAFE Service Authority for Freeways and Expressways: As the region's SAFE, MTC — in partnership with the California Highway Patrol and California Department of Transportation — oversees the installation and operation of call boxes along Bay Area freeways and administers a roving tow truck service to quickly clear incidents from the region's most congested roadways. State legislation in 1987 created the MTC SAFE, which is funded in part through a $1 surcharge on motor vehicle registrations.

SHOPP State Highway Operations and Protection Program: State funding program for highway projects that will inprove traffic safety; preserve bridges, roadways and/or roadsides; increase mobility; or improve facilities related to the state highway system.

SIP State Implementation Plan: Here's a case where one term refers to two different — albeit related — documents. Metropolitan areas prepare regional SIPs showing steps they plan to take to meet federal air quality standards (outlined in the Clean Air Act). Several SIPs make up the statewide plan for cleaning up the air, also known as a SIP.

SOV Single-Occupant Vehicle: A vehicle with one occupant, the driver, who is sometimes referred to as a "drive alone."

SRTP Short-Range Transit Plan: A nine-year comprehensive plan required of all transit operators by federal and regional transportation funding agencies

STA State Transit Assistance: Provides funding for mass transit operations and capital projects.

STIP State Transportation Improvement Program: What the CTC ends up with after combining various RTIPs as well as a list of specific projects proposed by Caltrans. Covering a five-year span and updated every two years, the STIP determines when and if transportation projects will be funded by the state.

STP Surface Transportation Program: One of the key funding programs in TEA 21. STP monies are "flexible," meaning they can be spent on mass transit, pedestrian and bicycle facilities as well as on roads and highways.

System Management: A coordinated series of programs involving MTC and partner agencies such as the CHP and Caltrans to make the region's existing transportation system work more efficiently. These efforts include congestion relief initiatives such as the roadside call box network and roving Freeway Service Patrol tow trucks, and traveler information programs such as the toll-free TravInfo® phone service and the www.transitinfo.org web page.

TCM Transportation Control Measure: A strategy to reduce driving or smooth traffic flows in order to cut auto emissions and resulting air pollution. Required by the Clean Air Act, TCMs for the Bay Area are jointly developed by MTC, the Bay Area Air Quality Management District and ABAG. Examples of TCMs include roving tow truck patrols to clear stalls and accidents from congested roadways, new or increased transit service, or a program to promote carpools and vanpools.

TCRP Traffic Congestion Relief Program: A five-year state transportation investment plan passed by the California Legislature and signed into law by Governor Gray Davis in 2000. The plan originally called for $6.8 billion of spending (with $1.7 billion to the Bay Area) from fiscal 2000-01 to 2005-06, but subsequent refinancing agreements postponed the funding until fiscal 2002-03 to 2007-08.

TDA Transportation Development Act: State law enacted in 1971. TDA funds are generated from a tax of one-quarter of one percent on all retail sales in each county; used for transit, special transit for disabled persons, and bicycle and pedestrian purposes, they are collected by the state and allocated by MTC to fund transit operations and programs. In non-urban areas, TDA funds may be used for streets and roads under certain conditions.

TDM Transportation Demand Management: Low-cost ways to reduce demand by automobiles on the transportation system, such as programs to promote telecommuting, flextime and ridesharing.

TE Transportation Enhancement Activities: A TEA 21 funding category. Ten percent of STP monies must be set aside for projects that enhance the compatibility of transportation facilities with their surroundings. Examples of TE projects include bicycle and pedestrian paths, restoration of rail depots or other historic transportation facilities, acquisition of scenic or open space lands next to travel corridors, and murals or other public art projects.

TEA 21 Transportation Equity Act for the 21st Century: Passed by Congress in May 1998, this federal transportation legislation retains and expands many of the programs created in 1991 under ISTEA. Reauthorizes federal surface transportation programs for six years (1998-2003), and significantly increases overall funding for transportation.

TIP Transportation Improvement Program: This is the primary spending plan for federal funding expected to flow to the region from all sources for transportation projects of all types. MTC prepares the TIP every two years with the assistance of local governments, transit operators and Caltrans. It covers at least a three-year period.

TLC Transportation for Livable Communities: New funding program created by MTC in 1998 to fund small-scale, community- and transit-oriented projects that improve neighborhood vitality.

TOS Traffic Operations System: In the Bay Area, Caltrans and the CHP will monitor traffic flows by means of detectors embedded in pavement and closed-circuit television cameras, quickly dispatching tow trucks and other assistance. Message signs and broadcasts will alert drivers and transit riders to conditions ahead, while ramp metering will control traffic flows. All these devices together comprise the TOS.

TransLink®: MTC's prototype for a universal ticket valid on all transit modes, from BART to buses to ferries. Translink® will be tested in a pilot project involving six Bay Area transit operators beginning in the spring of 2001.

TRO—trip reduction ordinance: This regulation is to limit the number of SOV users in order to stanch polluting emissions. Aimed at employers, TROs have been enacted by local governments in response to CMP requirements, which vary from county to county. Now the BAAQMD has passed an Employer-based Trip Reduction Rule that should result in cities and counties adopting more stringent and more uniform TROs.

U.S. DOT United States Department of Transportation: The federal cabinet-level agency with responsibility for highways, mass transit, aviation and ports; headed by the secretary of transportation. The DOT includes the Federal Highway Administration and the Federal Transit Administration, among others. There are also state DOTs (known as Caltrans in California).

VMT Vehicle Miles Traveled: The more cars there are on the road at the same time in the same area, the worse congestion will be. This term helps pin down the numbers. Reducing the growth of VMT can help ease traffic congestion and improve air quality.

Sources:
Citizen's Guide to the Metropolitan Transportation Commission
American Public Transit Association (APTA)