2.1 Transportation

This chapter describes the current transportation conditions and examines the effects of the transportation projects and land use pattern included in the proposed Plan on travel conditions in 2040. The study area consists of the existing and proposed elements of the transportation system for the nine-county Bay Area, including highways, local roads, rail, bus and ferry transit, and bicycle and pedestrian facilities. This chapter evaluates the impacts related to transportation such as changes in travel times, accessibility to jobs, traffic congestion, vehicle miles traveled per capita, and transit utilization that may result from the implementation of the proposed Plan.

Environmental Setting

EXISTING REGIONAL TRANSPORTATION CONDITIONS (2010)

The Bay Area features a large and complex transportation network, allowing for multimodal access across the region. The transportation system includes interstate and state highways, local arterial roadways, local streets and roads, public transit systems, bicycle and pedestrian facilities, seaports, and airports; when combined, these facilities allow for the movement of people and goods throughout the region. The various elements of the Bay Area transportation system are described below.

Note that all of the existing conditions data for transportation reflects travel patterns and infrastructure for the baseline year of 2010. More information about the selection of this baseline analysis year is provided in Part 1 of this EIR.

Roadway Network: The Bay Area currently contains over 1,300 directional miles of limited-access highways, which include both interstates and state highways. These facilities form the backbone of the transportation system, providing access to major employment centers and to destinations outside of the Bay Area. In addition to providing mobility for automobiles, these facilities also support express/transbay bus services and freight movement. The major limited-access highways in the Bay Area are listed in **Table 2.1-1** on the following page. In addition, the Bay Area has over 33,000 directional miles of arterials and local streets, providing more localized access to individual communities. Together, these roadway facilities accommodate nearly 17 million vehicle trips a day. **Figure 2.1-1** depicts the major roadway facilities in the Bay Area.

(Note that directional miles cited above are defined as miles of roadway in a single direction. For example, a one-mile-long, bidirectional segment of roadway would be two directional miles of roadway.)

TABLE 2.1-1: MAJOR LIMITED-ACCESS HIGHWAYS IN THE BAY AREA

Route	*Highway Limits*[1]		*Bay Area Counties Served*[2]
Interstate 80	San Francisco	Teaneck, NJ	SF, ALA, CC, NAP, SOL
Interstate 280	San Francisco	San José	SF, SM, SCL
Interstate 380	San Bruno	South San Francisco	SM
Interstate 580	San Rafael	Tracy	MRN, CC, ALA
Interstate 680	Fairfield	San José	SOL, CC, ALA, SCL
Interstate 780	Vallejo	Benicia	SOL
Interstate 880	Oakland	San José	ALA, SCL
Interstate 980	Oakland	Oakland	ALA
Interstate 238	San Leandro	Castro Valley	ALA
Interstate 505	Dunnigan	Vacaville	SOL
U.S. Route 101	Olympia, WA	Los Angeles	SON, MRN, SF, SM, SCL
State Route 1	Leggett	Dana Point	SON, MRN, SF, SM
State Route 4	Hercules	Markleeville	CC
State Route 12	Sebastopol	San Andreas	SON, NAP, SOL
State Route 17	San José	Santa Cruz	SCL
State Route 24	Oakland	Walnut Creek	ALA, CC
State Route 29	Upper Lake	Vallejo	NAP, SOL
State Route 37	Novato	Vallejo	MRN, SON, NAP, SOL
State Route 85	Mountain View	San José	SCL
State Route 87	San José	San José	SCL
State Route 92	Half Moon Bay	Hayward	SM, ALA
State Route 160	Sacramento	Antioch	SOL, CC
State Route 237	Mountain View	Milpitas	SCL
State Route 242	Concord	Concord	CC

Notes:

1. Reflects the overall route limits, rather than the limits of the limited-access segment.
2. County abbreviations used: ALA (Alameda), CC (Contra Costa), Marin (MRN), NAP (Napa), San Francisco (SF), San Mateo (SM), Santa Clara (SCL), Solano (SOL), and SON (Sonoma).

Figure 2.1-1

Major Road Facilities

Data Source: Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 5 10 20 Miles

1 in = 16 miles

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Public Transit Systems: There are over 11,500 transit route miles of service including heavy rail (BART), light rail (Muni Metro and VTA Light Rail), commuter rail (Caltrain and ACE), diesel and electric buses, cable cars, and ferries. Transit in the Bay Area accommodates almost 1.6 million boardings a day, primarily through four major operators (Muni, BART, AC Transit, and VTA). These four operators provide the most frequent service in the urban core of the Bay Area; a complete list of the major public transit operators is shown in **Table 2.1-2**. Amtrak also provides long-distance rail services to the Bay Area via the Capitol Corridor, San Joaquin, Coast Starlight, and California Zephyr lines—connecting the region to the Central Valley, Southern California, the Pacific Northwest, and the Midwest. **Figure 2.1-2** shows the areas served by each of the Bay Area transit operators.

TABLE 2.1-2: MAJOR PUBLIC TRANSIT OPERATORS IN THE BAY AREA

Transit System	*Mode*	*Average Weekday Ridership*[1]	*Bay Area Counties Served*
Muni	Local/express bus Light rail Cable car	666,000	MRN, **SF**, SM
BART	Heavy rail	369,000	**ALA**, **CC**, **SF**, **SM**
AC Transit	Local/transbay bus	198,000	**ALA**, **CC**, SCL, SF, SM
VTA	Local/express bus Light rail	135,000	ALA, **SCL**, SM
SamTrans	Local/express bus	45,000	SCL, SF, **SM**
Caltrain	Commuter rail	40,000	**SCL**, **SF**, **SM**
Golden Gate Transit/ Marin Transit	Local/express bus Ferry	29,000	CC, **MRN**, SF, **SON**
County Connection	Local/express bus	12,000	ALA, **CC**
Santa Rosa CityBus	Local bus	10,000	**SON**
Tri Delta Transit	Local/express bus	8,000	**CC**
Wheels	Local/express bus	6,000	**ALA**, CC
Sonoma County Transit	Local/express bus	5,000	**SON**
SolTrans[2]	Local/express bus	5,000	CC, **SOL**
WestCAT	Local bus Express/transbay bus	4,000	**CC**, SF
WETA[3]	Ferry	4,000	**ALA**, **SF**, **SM**, **SOL**
ACE	Commuter rail	3,000	**ALA**, **SCL**
FAST	Local/express bus	3,000	CC, **SOL**
Union City Transit	Local bus	2,000	**ALA**
VINE	Local/express bus	2,000	**NAP**, SOL
Petaluma Transit	Local bus	1,000	**SON**
Vacaville City Coach	Local bus	1,000	**SOL**

TABLE 2.1-2: MAJOR PUBLIC TRANSIT OPERATORS IN THE BAY AREA

Transit System	*Mode*	*Average Weekday Ridership*[1]	*Bay Area Counties Served*
Rio Vista Delta Breeze	Local/express bus	< 1,000	CC, **SOL**

Note: Primary counties served by operator are marked in **bold**.

1. Reflects FY 2010-2011 ridership data; rounded to the nearest 1,000 daily riders.
2. Includes prior services in Benicia and Vallejo (Benicia Breeze and Vallejo Transit [bus only]).
3. Includes preexisting ferry services (Alameda/Oakland Ferry and Vallejo Transit [ferry only]).

Source: Statistical Summary of Transit Operators, MTC, June 2012.

Figure 2.1-2

Transit Lines & Areas Served by Transit

Data Source: Metropolitan Transportation Commission, 2012;
Dyett & Bhatia, 2013

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Bicycle and Pedestrian Facilities: The availability of non-motorized facilities in the Bay Area supports the region's transportation, air quality, health, and livability goals. In addition to pedestrian facilities, such as paths and sidewalks, which exist throughout the region, the Bay Area has an extensive local system of bikeways. The California Highway Design Manual defines three classes of bikeways:

- Class I Bikeway (Bike Path): completely separated right-of-way for exclusive use of bicycles and pedestrians
- Class II Bikeway (Bike Lane): dedicated lane for bicycle travel on a street or highway
- Class III Bikeway (Bike Route): shared lane for bicycle travel on a street or highway

Under the California Highway Design Manual definitions, the Bay Area has 700 miles of Class I facilities, over 2,000 miles of Class II facilities, and over 1,300 miles of Class III facilities. **Figure 2.1-3** shows the location of the various bikeways through the Bay Area.

Seaports and Airports: The Bay Area is served by five seaports, which provide the opportunity for intermodal transfers to trucks and railcars. The Port of Oakland, the largest of the five, is the third largest U.S. seaport on the West Coast (after the Ports of Los Angeles and Long Beach). Other seaports include the Port of San Francisco, the Port of Richmond, the Port of Benicia, and the Port of Redwood City. These seaports are supported by freight railroad services operated by Union Pacific (UP) and Burlington Northern Santa Fe (BNSF).

The Bay Area is also served by three major international airports: San Francisco International Airport (SFO), Oakland International Airport (OAK), and Norman Y. Mineta San José International Airport (SJC). Each of these airports provides mobility for people and freight nationally and internationally. The region is also served by one smaller airport with limited commercial service, Charles M. Schulz Sonoma County Airport (STS), as well as numerous smaller general aviation airports.

Regional Travel Patterns: In summary, the Bay Area transportation system offers numerous modes and routes for the movement of people and goods. **Table 2.1-3** provides key metrics regarding Bay Area travel behavior in 2010, the most recent year of detailed U.S. Census data for the San Francisco Bay Area.

TABLE 2.1-3: BAY AREA TRAVEL BEHAVIOR, 2010

Daily[1] Transit Boardings	1,581,000
Daily Vehicle Trips[2]	16,912,000
Daily Vehicle Miles of Travel (VMT)[b]	149,046,000
Daily[1] Vehicle Miles of Travel[2] per Capita[3]	20.8
Daily Vehicle Hours of Recurring Delay	266,000
Daily Vehicle Hours of Recurring Delay (Freeways)	141,000
Daily Vehicle Hours of Recurring Delay (Expressways and Arterials)	58,000
Daily Vehicle Hours of Recurring Delay (Other Facilities)	67,000
Daily Vehicle Hours of Non-Recurrent Delay[4]	108,000
Total Daily Vehicle Hours of Delay	**374,000**
Average Total Delay per Vehicle (Minutes)	**4.6**

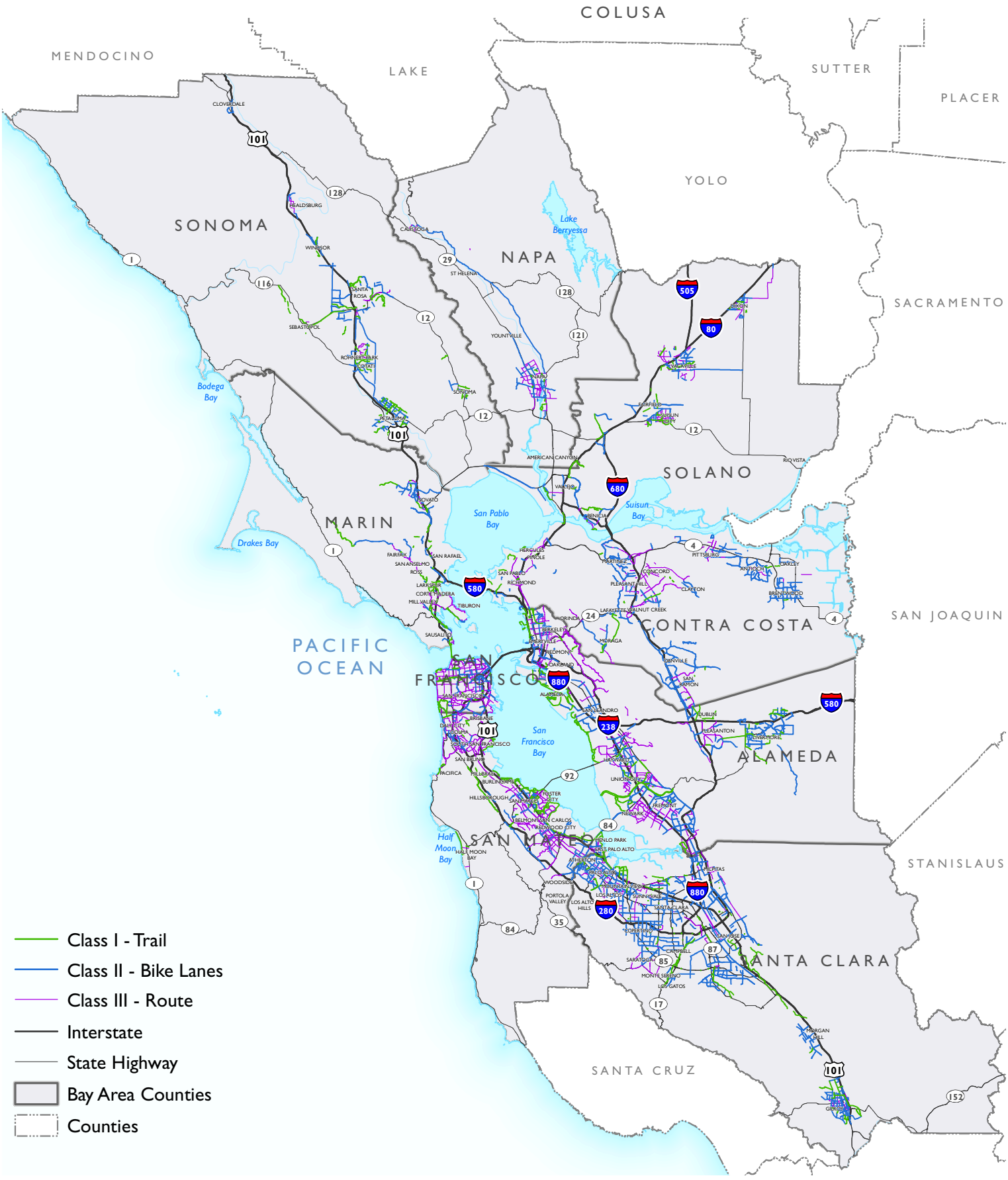
Notes:

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area Supplemental Reports.
4. Only includes non-recurrent delay on freeway facilities.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Figure 2.1-3

Bicycle Facilities



Data Source: Metropolitan Transportation Commission, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Cal-Atlas Geospatial Clearinghouse, 2012; Tom Tom North America, 2011; Dyett & Bhatia, 2012.

0 5 10 20 Miles

1 in = 16 miles

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Vehicle Miles Traveled

Cars, buses, and commercial vehicles travel about 149 million miles a day on the Bay Area freeways and local roads (which is equivalent to about 21 vehicle miles traveled per day per person). Vehicle miles traveled (VMT) is a term used throughout this EIR and refers to the number of vehicle miles traveled within a specified geographic area during a given period of time. One vehicle traveling one mile constitutes one vehicle mile, regardless of its size or the number of passengers. VMT is a common measure of roadway use and economic activity. The region's per capita VMT is the total VMT divided by the population of the Bay Area; basically, it is a measure of the vehicle miles each person travels on average. In general, per capita VMT data correlate with various economic and lifestyle factors. Per capita VMT tends to increase as a result of greater overall economic activity in the region, higher levels of per-household auto ownership, and greater demand for single-family homes in suburban locations.

Roadway Congestion and Delay

Delay on Bay Area roads and freeways amounts to over 374,000 hours per weekday. Delay is the time difference between travel under congested conditions and travel at posted speed limit. Recurrent delay arises from fluctuations in demand (such as rush hour traffic), the manner in which the facility is operated, and the physical layout of the roadway. Approximately 29 percent of weekday roadway delay is considered non-recurrent, which is caused by collisions, vehicle breakdowns, and other random events (such as inclement weather and debris). The magnitude of non-recurrent delay depends on the nature of the incident: a vehicle collision is likely to cause more delay than a vehicle pulled over on the shoulder.

Daily Trips

Of the trips made by Bay Area residents, 30 percent are for work, 14 percent for college or school, and 14 percent for shopping, as shown below in **Table 2.1-4**. The average one-way commute distance for the region is about 13 miles, as shown in **Table 2.1-5**. San Francisco residents have the shortest average one-way commute distance (6.9 miles), while Contra Costa County residents have the longest average one-way commute distance (17.4 miles). The core counties of the region (San Francisco, San Mateo, Alameda, and Santa Clara) have commute distances less than the regional average, while the more suburban and rural outer counties (Contra Costa, Solano, Napa, Sonoma, and Marin) have commute distances greater than the regional average.

TABLE 2.1-4: TYPICAL WEEKDAY DAILY PERSON TRIPS BY PURPOSE, 2010

Purpose	*Trips*	*% of Total*
Commute to Work	7,130,000	30%
Commute to College	573,000	2%
Commute to School	2,687,000	11%
At Work	1,661,000	7%
Eating Out	990,000	4%
Escort	2,380,000	10%
Shopping	3,190,000	14%
Social	702,000	3%
Other	4,278,000	18%
Total[1]	**23,592,000**	**100%**

Note: Daily metrics are measured for a typical weekday.

1. Only reflects intraregional personal trips.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

TABLE 2.1-5: AVERAGE ONE-WAY COMMUTE DISTANCE (IN MILES) BY COUNTY, 2010

County of Residence	*Commute Distance*
Alameda	13.5
Contra Costa	17.4
Marin	15.6
Napa	17.0
San Francisco	6.9
San Mateo	12.9
Santa Clara	11.0
Solano	15.6
Sonoma	16.6
Bay Area	**13.0**

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012

Travel Trends: Transportation Modes, Travel Time to Work, and Commute Patterns

According to the U.S. Census, Bay Area residents use a range of transportation modes to get to their workplaces, as shown below in **Table 2.1-6**. While approximately four in five Bay Area residents rely on an automobile to get to work on a typical day, 10 percent of residents rely on public transit and 4 percent either walk or bike to work.

Over the past two decades, the share of workers driving alone to work has been fairly constant. Carpooling has decreased in popularity over the past decade, declining from 13 percent in 1990 to 11 percent in 2010. While transit mode share has remained constant over the past 20 years, bicycling to work has become much more popular in the past decade. Finally, the percentage of Bay Area residents working from home has nearly doubled since 1990.

TABLE 2.1-6: BAY AREA RESIDENT WORKERS CATEGORIZED BY MEANS OF TRANSPORTATION TO WORK, 1990-2010

Year	*1990*	*2000*	*2010*
Drive Alone	2,105,000	2,248,000	2,243,000
% of Total	68%	68%	68%
Carpool	400,000	427,000	354,000
% of Total	13%	13%	11%
Transit	294,000	321,000	333,000
% of Total	10%	10%	10%
Walk	112,000	106,000	112,000
% of Total	4%	3%	3%
Bike	32,000	36,000	50,000
% of Total	1%	1%	2%
Other	37,000	36,000	35,000
% of Total	1%	1%	1%
Work at Home	105,000	133,000	194,000
% of Total	3%	4%	6%
Total Workers	**3,086,000**	**3,306,000**	**3,321,000**

Source: U.S. Census 1990 and 2000; American Community Survey 2010.

Significant variability in mode shares exists between Bay Area counties, as shown below in **Table 2.1-7**. San Francisco County is the obvious exception, with the highest transit mode share (34 percent) in the region. In contrast to other counties, where four in five commuters rely on the automobile, less than half of San Francisco commuters use auto-based transportation. This leads to significantly higher mode shares for walking, biking, and transit. Four other counties have significant transit mode shares—Alameda, San Mateo, Contra Costa, and Marin. Higher transit mode shares in these locations is partly explained by their proximity to San Francisco job centers—strong transit connections to/from that county provide a competitive alternative to driving (given the high cost of parking and significant congestion that makes auto travel less desirable).

TABLE 2.1-7: BAY AREA RESIDENT COMMUTE MODE SHARES BY COUNTY, 2010

Mode	*Drive Alone*	*Carpool*	*Transit*	*Walk*	*Bike*	*Other*	*Work at Home*
Alameda County	67%	11%	11%	3%	1%	1%	6%
Contra Costa County	69%	13%	9%	1%	1%	1%	6%
Marin County	68%	10%	7%	5%	1%	0%	9%
Napa County	79%	10%	1%	3%	0%	1%	5%
San Francisco County	36%	8%	34%	9%	3%	2%	7%
San Mateo County	70%	11%	8%	3%	1%	1%	5%
Santa Clara County	78%	10%	3%	2%	2%	1%	5%
Solano County	77%	14%	2%	2%	0%	1%	4%
Sonoma County	76%	10%	2%	2%	1%	1%	8%
Bay Area Total	**68%**	**11%**	**10%**	**3%**	**1%**	**1%**	**6%**

Source: American Community Survey 2010.

While the average travel time to work increased between 1990 and 2000, it has declined since 2000 as shown in **Table 2.1-8**. The average one-way commute duration for the Bay Area increased by 7 percent between 1990 and 2010, from 25.6 minutes in 1990 to 27.4 minutes in 2007. However, since 2000, there has been a 7 percent decline in commute duration. The major downturn in the regional (and national) economy during this period certainly played a significant factor in reducing congestion. Between 2000 and 2010, Alameda and Marin counties each experienced a substantial reduction in travel time to work—11 and 13 percent, respectively.

TABLE 2.1-8: AVERAGE TRAVEL TIME TO WORK, 1990 - 2010

County of Residence	*One-Way Trip Duration (minutes)*				
	1990	*2000*	*2010*	*Change 1990-2010*	*Change 2000-2010*
Alameda	25.8	30.8	27.4	+6%	-11%
Contra Costa	29.3	34.4	32.5	+11%	-6%
Marin	28.4	32.3	28.0	-1%	-13%
Napa	21.4	24.3	24.3	+14%	0%
San Francisco	26.9	30.7	30.3	+13%	-1%
San Mateo	24.0	27.0	24.5	+2%	-9%
Santa Clara	23.3	26.1	24.3	+4%	-7%
Solano	28.2	31.8	28.6	+1%	-10%
Sonoma	24.1	26.8	25.8	+7%	-4%
Bay Area	**25.6**	**29.4**	**27.4**	**+7%**	**-7%**

Source: U.S. Census 1990 and 2000; American Community Survey 2010.

A high proportion of Bay Area residents continue to commute outside their county of residence to jobs in other counties. **Table 2.1-9** shows the number of workers who live and work in the same county as well as the number of residents who commuted to other counties for work from 1990 to 2010. In 1990, approximately 26 percent of the region's workers commuted outside their resident county for work. This share has increased to nearly 28 percent by 2010. At the county level, Alameda, San Francisco, and Santa Clara counties all saw their share of resident workers commuting elsewhere increase between 1990 and 2010. The other counties saw an increasing number of resident workers working in their counties. The decentralization of regional job centers offers a partial explanation for this trend.

There is also a certain amount of commuting into the Bay Area from counties outside of the region that currently occurs. Specifically, there are an estimated 116,000 workers (about 3.4 percent of employees) who currently commute into the Bay Area. In part, the existing in-commute can be explained by the significant difference in the median housing costs of the counties of origin for the commuters and the Bay Area counties in which they work. For example, some workers in the Bay Area currently commute into the region from San Joaquin County where the median housing price between 2006 and 2010 was $318,600, compared to $637,000 in the Bay Area region, or half the price.[1]

It has been suggested that, if sufficient housing opportunities were provided in the Bay Area, the existing in-commute would be greatly reduced. However, it is important to acknowledge that many of the commuters that travel to the Bay Area for work may actually prefer to live outside of the Bay Area for various reasons (not just the reduced cost of housing). Thus, even if sufficient housing opportunities were provided in the Bay Area, there would still be commuting into the region.

[1] U.S. Census Bureau, 2006-2010 American Community Survey.

TABLE 2.1-9: BAY AREA RESIDENT WORKERS COMMUTE PATTERNS BY COUNTY, 1990 - 2007

	Live and Work in Same County			*Live Here, Work Elsewhere*			*% Resident Workers Commuting Out*		
County	*1990*	*2000*	*2010*	*1990*	*2000*	*2010*	*1990*	*2000*	*2010*
Alameda	446,000	454,000	460,244	187,000	225,000	218,090	30	33	32
Contra Costa	240,000	255,000	276,776	161,000	187,000	186,956	40	42	40
Marin	73,000	79,000	73,769	52,000	48,000	43,256	41	38	37
Napa	38,000	44,000	48,248	13,000	13,000	13,062	25	23	21
San Francisco	307,000	322,000	334,383	75,000	97,000	103,431	20	23	24
San Mateo	202,000	206,000	213,589	145,000	148,000	139,095	42	42	39
Santa Clara	710,000	728,000	703,011	86,000	101,000	109,663	11	12	13
Solano	97,000	99,000	111,490	61,000	75,000	67,141	39	43	38
Sonoma	156,000	184,000	182,501	35,000	41,000	36,514	18	18	17
Bay Area	**2,270,000**	**2,371,000**	**2,404,011**	**815,000**	**935,000**	**917,208**	**26**	**28**	**28**

Source: U.S. Census 1990 and 2000; American Community Survey 2010.

REGULATORY SETTING

Federal Statutes

Moving Ahead for Progress in the 21st Century (MAP-21)

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law in July 2012 and reauthorized the federal highway and public transportation programs for fiscal years 2013 and 2014 for a total of $105 billion, holding funding flat relative to prior years. However, the bill marks a notable departure from prior surface transportation acts in several respects, most notably its short duration, elimination of earmarks, consolidation of programs, and introduction of performance measures into the federal transportation policy framework. While the bill retains many of the larger highway and transit programs of its predecessor—the Safe Accountable, Flexible, Efficient Transportation Equity Act, known as SAFETEA—it eliminates almost 100 smaller programs and distributes a much larger share of funds by formula (93 percent compared to 83 percent under SAFETEA).

Metropolitan Planning General Requirements

Under MAP-21, the U.S. Department of Transportation (USDOT) requires that metropolitan planning organizations, such as MTC, prepare long-range transportation plans (RTPs) and update them every four years if they are in areas designated as "nonattainment" or "maintenance" for federal air quality standards. Prior to enactment of MAP-21, the primary federal requirements regarding RTPs were included in the metropolitan transportation planning rules—Title 23 CFR Part 450 and 49 CFR Part 613. MAP-21 makes a number of changes to the statutes that underpin these regulations, and revisions to the regulations are expected to be made in early 2013. Key federal requirements for long range plans include the following:

- RTPs must be developed through an open and inclusive process that ensures public input; seeks out and considers the needs of those traditionally under served by existing transportation systems; and consults with resource agencies to ensure potential problems are discovered early in the RTP planning process;
- RTPs must be developed for a period of not less than 20 years into the future; RTPs must reflect the most recent assumptions for population, travel, land use, congestion, employment, and economic activity;
- RTPs must have a financially constrained element, transportation revenue assumptions must be reasonable, and the long range financial estimate must take into account construction-related inflation costs;
- RTPs must include a description of the performance measures and performance targets used in assessing the performance of the transportation system;
- RTPs must include a system performance report evaluating the condition and performance of the system with respect to performance targets adopted by the state that detail progress over time;
- RTPs may include multiple scenarios for consideration and evaluation relative to the state performance targets as well as locally-developed measures.

- RTPs must conform to the applicable federal air quality plan, called the State Implementation Plan (SIP), for ozone and other pollutants for which an area is not in attainment;[2] and
- RTPs must consider planning factors and strategies in the local context.[3]

National Environmental Policy Act

The National Environment Policy Act of 1969 (NEPA) requires federal agencies to assess the possible environmental consequences of projects which they propose to undertake, fund, or approve. While the RTP is not subject to NEPA, individual federally funded programs or projects requiring federal approval will be subject to a NEPA evaluation.

State Statutes

California Transportation Commission Regional Transportation Plan Guidelines

California law relating to the development of the RTPs is primarily reflected in Government Code Section 65080. Pursuant to Government Code section 65080(d), MPOs, such as MTC, that are located in nonattainment areas must update their RTPs at least every four years. If the current RTP is determined to be adequate such that an update is not warranted, the MPO may re-adopt the current RTP.

The RTP Guidelines require that an RTP addresses three distinct elements—a policy element, an action element, and a financial element. In addition, when applicable, RTPs shall be consistent with federal planning and programming requirements and shall conform to the RTP Guidelines adopted by the California Transportation Commission (CTC). The CTC cannot program projects that are not identified in the RTP.

Under Government Code Section 14522, the CTC is authorized to prepare guidelines to assist in the preparation of RTPs. The CTC's RTP guidelines suggest that projections used in the development of an RTP should be based upon available data (such as from the Bureau of the Census), use acceptable forecasting methodologies, and be consistent with the Department of Finance baseline projections for the region. The guidelines further state that the RTP should identify and discuss any differences between the agency projections and those of the Department of Finance. The most recent update to the RTP guidelines was published in 2010, and includes new provisions for complying with Senate Bill 375 (see below), as well as new guidelines for regional travel demand modeling. CTC's detailed guidelines for MPOs can be found at: http://www.catc.ca.gov/programs/rtp/2010_RTP_Guidelines.pdf.

The regional travel demand model guidelines are "scaled" to different sizes of MPO's. MTC is included in the "E" grouping of the MPO's serving the largest populations in the state. The guidelines for regional travel demand modeling are the most ambitious for the "E" group, and include (among many other things):

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[2] See MTC's Draft Transportation Air Quality Conformity Analysis for Plan Bay Area and 2011 Transportation Improvement Program Amendment #11-25 (July 2011) for more information. MTC's web page, http://www.mtc.ca.gov, has more information about the Air Quality Conformity Task Force meetings and materials related to the federal conformity analysis.

[3] For more details on the planning factors, see California Transportation Commission, Regional Transportation Guidelines, 2010.

- Guidelines and standards for validation and sensitivity testing of the model;
- Transition to an activity-based demand model;
- Participate in peer review every 10 years; and
- Build a microeconomic land use model as soon as is practical.

MTC has relied on an activity-based travel demand model (Travel Model One) and a microeconomic land use model (UrbanSim) for the development of this EIR. The aforementioned CTC guidelines and standards for model validation and sensitivity testing are being followed.

Senate Bill 375

The Sustainable Communities and Climate Protection Act of 2008 (California Senate Bill 375) has diversified the areas of study from past RTPs to include land use impacts and climate change issues. At the same time, past statutes on RTPs continue to govern these integrated RTP/SCS planning efforts. Specifically, Senate Bill 375 (SB 375) requires MPOs to prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing and transportation planning. The SCS must identify a transportation network that is integrated with the forecasted development pattern for the plan area and will reduce GHG emissions from automobiles and light trucks in accordance with targets set by the California Air Resources Board. *Chapter 2.5: Climate Change* includes a more in-depth discussion of SB 375 and its implications for Plan Bay Area.

Senate Bill 1339

Senate Bill 1339 authorizes MTC and BAAQMD (the Bay Area Air Quality Management District) to jointly adopt a commute benefit ordinance that requires major Bay Area employers to offer their employees certain types of commute benefits, such as pre-tax contributions towards public transit passes or commute shuttle services. The bill authorizes MTC and BAAQMD to implement the program through 2017, at which point state legislative action would be required to continue the ordinance.

Regional and Local Statutes

Transportation 2035

Transportation 2035 was the previous RTP adopted by MTC in 2009. The proposed Plan builds upon this effort by incorporating an even more focused growth pattern built upon the Priority Development Area framework and by increasing the region's commitment to "Fix It First" (a longstanding MTC policy to prioritize discretionary funding for maintenance and operations of the region's existing transportation assets). As a result of SB 375, the proposed Plan shifted previously voluntary goals, such as greenhouse gas reduction, to become statutory targets of the planning effort.

Congestion Management Agency Transportation Plans

Each of the nine Bay Area counties has a Congestion Management Agency (CMA) designated to manage traffic congestion through implementation of multimodal transportation projects. These agencies work with MTC to advance road, bicycle, pedestrian, and transit projects in line with regional objectives. In addition, many CMAs develop county transportation plans that should be consistent with the Regional

Transportation Plan adopted by MTC; many of these CMAs intend on updating their countywide plans following the adoption of Plan Bay Area. The most recent county transportation plans are listed below.

- Alameda County Transportation Commission: 2012 Alameda Countywide Transportation Plan
- Contra Costa Transportation Authority: 2009 Countywide Comprehensive Transportation Plan
- San Francisco County Transportation Authority: San Francisco Transportation Plan 2035
- Santa Clara Valley Transportation Authority: Valley Transportation Plan 2035
- Solano Transportation Authority: 2009 Comprehensive Transportation Plan 2035 Update
- Sonoma County Transportation Authority: 2009 Comprehensive Transportation Plan for Sonoma County

The remaining three CMAs do not develop such plans on a regular basis, but they still play a major role in implementing regional transportation priorities:

- City/County Association of Governments of San Mateo County
- Napa County Transportation and Planning Agency
- Transportation Authority of Marin

Local Agency General Plans

State law requires cities and counties to adopt general plans, which must include a transportation element. The transportation element describes the acceptable operating standards, levels of service, classifications, and transportation related goals of a given city or county; it is typically a multimodal section that addresses roads, public transit, bicycle facilities, and pedestrian facilities. This EIR does not explicitly identify localized traffic issues that might be the focus of a city's general plan; rather, it will deal with issues of overall system performance from a regional perspective.

Impact Analysis

SIGNIFICANCE CRITERIA

According to CEQA Guidelines, Appendix G, a project will generally have a significant effect if it would conflict with an applicable plan or policy establishing measures of effectiveness for performance of the circulation system, or if it would conflict with an applicable congestion management program. This definition is somewhat limited for the purposes of this program-level EIR. Therefore, a more expansive set of criteria has been defined to determine whether the transportation improvements and land use pattern in the proposed Plan will have a significant adverse effect on future regional mobility in the Bay Area. Criteria are focused on accessibility by all modes, traffic/congestion, vehicle miles traveled per capita, and transit capacity.

Implementation of the proposed Plan would have a potentially significant adverse impact if it results in:

Criterion 1: A substantial increase in per-trip travel time for commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

Criterion 2: A substantial increase in per-trip travel time for non-commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

Criterion 3: A substantial increase in per capita VMT on facilities experiencing level of service (LOS) F compared to existing conditions during AM peak periods, PM peak periods, or during the day as a whole (LOS F defines a condition on roads where traffic substantially exceeds capacity, resulting in stop-and-go conditions for extended periods of time). A substantial increase in LOS F-impacted per capita VMT is defined as greater than 5 percent.

Criterion 4: A substantial increase in per capita VMT compared to existing conditions. A substantial increase in per capita VMT is defined as greater than 5 percent.

Criterion 5: An increased percent utilization of regional transit supply resulting in an exceedence of transit capacity at AM peak hours, at PM peak hours, or for the day. An exceedance is defined as passenger seat-mile demand for any transit technology being greater than 80 percent of passenger seat-miles supplied by transit operators.

These criteria reflect revisions made to the draft significance criteria included in the Notice of Preparation (NOP) as a result of the scoping process. Criteria 1 and 2, which focus on the per-trip travel time to reach jobs and other key destinations, replaced the initial proposal to measure the number of jobs within a fixed travel time. The draft significance criterion included in the NOP would have measured how many employment opportunities the average Bay Area resident could reach in a given number of minutes; however, this criterion exhibited several major limitations. First, it was overly influenced by the growth in population and jobs, meaning that it failed to illuminate any travel time impacts due to the significant growth in job opportunities. Second, it did not address the spatial match between different individuals and different job types; for example, if a low-income household lived in close proximity to numerous high-income/high-knowledge technology jobs, the proximity of these jobs has minimal direct benefit for the low-income residents' employment prospects as their skill set would make them unlikely to be employed at those sites (leading to a longer commute to reach their actual lower-income employment site).

By substituting per-capita commute and non-commute travel times as significance criteria in lieu of the jobs-based criterion, the limitations above have been addressed. The revised significance criteria are also more relevant to Bay Area travelers, as they better capture actual travel experiences by looking at travel times between travelers' forecasted home and work locations. The revised criteria also address non-commute impacts not reflected in the initial jobs-based measurement included in the NOP. These significance criteria are considered for each of the primary travel modes—auto, transit, and bicycle/pedestrian—responding to comments received in the scoping process to specifically analyze multimodal impacts (in particular, public transit).

In addition, Criterion 3 was revised to reflect per capita congested VMT under LOS F conditions, rather than just total VMT. This more appropriately captures the individual impacts of traffic congestion on a typical Bay Area traveler, rather than primarily being a reflection of the population growth that generally correlates with total VMT metrics.

Finally, Criterion 5, which measures the impacts of the proposed Plan on transit capacity constraints, was added as a result of comments received from transportation agencies during the EIR scoping process. This criterion addresses issues related to transit crowding, when transit demand exceeds the supply of seats available on a given transit mode, including local bus, light rail, ferry, express bus, heavy rail (BART), and commuter rail.

METHOD OF ANALYSIS

The EIR analysis was based on transportation and land use forecasts developed using the MTC/ABAG integrated model. This forecasting tool combined the travel demand forecasting model, known as Travel Model One, with the land use forecasting model, known as UrbanSim. Additional information on these tools can be found in *Chapter 1.2: Overview of the Proposed Plan Bay Area.*

The integrated model produced all of the key outputs used in assessing the significance of transportation impacts, such as vehicle miles traveled (VMT), vehicle hours of delay (VHD), and accessibility, as well as other outputs such as volume to capacity ratios and level of service.

EIR alternatives were analyzed using this model by adding transportation improvements (for example, those listed in *Chapter 1.2: Overview of the Proposed Plan Bay Area*) on top of the region's existing transportation infrastructure; land use policies were also tested to examine how they affect population and employment distributions. By incorporating these land use and transportation network changes into the model, it is possible to forecast the impacts of each alternative on regional travel behavior.

References

The Summary of Predicted Traveler Responses and Summary of Predicted Land Use Responses supplemental documents, released in March 2013, provide detail regarding the modeling assumptions and outputs for Plan Bay Area. These reports provide further information on modeling methodologies, as well as data summary tables for key horizon years. These summary reports, as well as other model development and validation documents, can be obtained on the OneBayArea website at www.onebayarea.org.

YEAR 2040 CONDITIONS UNDER THE PROPOSED PLAN

In order to assess potential impacts, this analysis first compares existing transportation conditions with the future conditions under the proposed Plan in terms of projected trips, projected travel modes and vehicle travel, and proposed transportation supply. These transportation indicators, model inputs and/or outputs that are not depicted in the impact analysis tables, facilitate understanding of the analyses and conclusions. They are provided for transparency in order to illuminate some of the underlying causes of the transportation impacts forecasted.

As the proposed Plan incorporates demographic forecasts, land use patterns, and transportation investments, cumulative impacts are analyzed, reflecting the combined effects of these elements.

However, regional population and job growth are the most significant drivers of transportation trends and impacts over the lifespan of the proposed Plan; more Bay Area residents and employees lead to greater demand for all forms of transportation. Apart from these demographic trends, the proposed Plan's inclusion of significant transit capacity increases, coupled with minimal expansion of the highway system, leads to a slight shift from automobile travel to public transit and non-motorized modes.

Demographic Trends

The proposed Plan relies on population and employment forecasts developed by ABAG; these forecasts form the basis for analyzing transportation impacts of the proposed Plan. The projections indicate that the region's population is expected to grow by 30 percent over the next three decades, while the region's employment is forecasted to increase by 33 percent over the same time period. While auto ownership per household is expected to decline by 2 percent, the total number of automobiles in the region would increase as a result of this household growth, as reflected in **Table 2.1-10**.

The expected level of population and job growth leads to a greater number of commute and non-commute trips in the coming decades. The proposed Plan is designed to address this expected growth in travel demand through transportation infrastructure improvements and land use strategies.

TABLE 2.1-10: BAY AREA DEMOGRAPHIC FORECASTS (2010-2040)

	2010	*2040*	*Numerical Change*	*Percent Change*
Total Population[1]	7,091,000	9,196,000	2,105,000	+30%
Total Employment	3,385,000	4,505,000	1,120,000	+33%
Employed Residents	3,269,000	4,350,000	1,081,000	+33%
Total Households	2,608,000	3,308,000	700,000	+27%
% of Households with Zero Autos	9%	11%	+2%	N/A
% of Households with One Auto	33%	33%	0%	N/A
% of Households with Multiple Autos	58%	56%	-2%	N/A
Average Vehicles by Household	1.78	1.75	-0.03	-2%

Note:

1. Population statistics reflect the total Bay Area population able to travel on the region's transport network; it does not include immobile, involuntary populations such as prison inmates.

Sources: Association of Bay Area Governments, 2012; Metropolitan Transportation Commission Travel Forecasts, 2012.

Proposed Transportation System Capacity Increases

As discussed in *Chapter 1.2: Overview of the Proposed Plan Bay Area*, the transportation system improvements in the proposed Plan are primarily focused on maintaining and operating the existing transportation system. This investment strategy reflects the relatively mature state of the Bay Area's roadway and transit systems. The proposed Plan also includes a set of major transit capital improvements, including BART to San José, Caltrain electrification, and bus rapid transit lines in the region's urban core. These transit investments were identified as a result of a rigorous performance assessment process and align closely with the proposed land use pattern emphasizing focused growth in the region's locally-identified Priority Development Areas. Finally, the proposed Plan includes a limited amount of funding for targeted

roadway capacity increases, including bottleneck relief at congested interchanges and the development of a Regional Express Lane Network.

Maintenance and operations projects will not affect people's travel behavior, and system efficiency programs (other than the Freeway Performance Initiative that directly impacts freeway and arterial operations) tend to affect travel behavior in subtle and localized ways that are generally difficult to assess in a regional analysis. Projects that expand transportation system capacity will have the greatest impact on travel behavior and are considered in detail in this EIR analysis. As shown in **Table 2.1-11**, capacity increases as a result of the proposed Plan are primarily a result of transit expansion and frequency improvement projects, as well as a more limited increase in roadway capacity across the region.

Roadway Network: The region's existing roadway network is composed of about 20,751 lane-miles, with 31 percent of those miles on freeways and expressways and 69 percent of those miles on arterials and collectors (**Figure 2.1-1** from earlier in this chapter illustrates the major existing Bay Area roadway facilities). Compared to existing conditions, the proposed Plan adds three percent to the total roadway lane-miles. A significant component of the roadway capacity increases is the Regional Express Lanes Network, which builds new high-occupancy/toll (HOT) lanes on many of the region's most congested freeway corridors. Highway widening projects, including capacity improvements to SR-4 in eastern Contra Costa County, US-101 in the North Bay, and I-680 in eastern Alameda County and eastern Contra Costa County, are responsible for the remainder of the freeway capacity increases.

Public Transit Systems: Transit seat-miles, a measure of transit capacity, are the miles that transit vehicles travel multiplied by the number of seats in each vehicle. The existing transit network (2010 conditions) consists of three dominant modes: heavy rail (e.g., BART—39 percent of seat-miles), local bus (30 percent of seat-miles), and commuter rail (e.g., Caltrain—13 percent of seat-miles). Daily transit seat-miles will increase by 27 percent from existing conditions due to the transit expansion and frequency improvement projects included in the proposed Plan. The largest increases in seat-miles in the proposed Plan are for heavy rail transit which adds 12,609,000 seat-miles from 2010 conditions (a 29 percent increase) and for commuter rail transit which adds 8,379,000 seat-miles from 2010 conditions (a 58 percent increase). These specific significant increases are primarily the result of projects such as BART to San José, eBART, SMART, and Caltrain Electrification/Frequency Improvements.

TABLE 2.1-11: TRANSPORTATION SYSTEM CAPACITY (2010-2040)

	2010	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Freeway Lane-Miles	5,495	6,056	561	+10%
Expressway Lane-Miles	1,019	1,132	113	+11%
Arterial Lane-Miles	8,710	8,749	39	0%
Collector Lane-Miles	5,528	5,502	-26[2]	0%
Total Roadway Lane-Miles	**20,751**	**21,438**	**687**	**+3%**
Daily[1] Local Bus Seat-Miles	34,477,000	37,828,000	3,351,000	+10%
Daily Express Bus Seat-Miles	7,560,000	9,050,000	1,490,000	+20%
Daily Light Rail Seat-Miles	8,114,000	10,781,000	2,667,000	+33%
Daily Heavy Rail Seat-Miles	44,134,000	56,743,000	12,609,000	+29%
Daily Commuter Rail Seat-Miles	14,463,000	22,842,000	8,379,000	+58%
Daily Ferry Seat-Miles	4,612,000	7,099,000	2,487,000	+54%
Total Daily Transit Seat-Miles	**113,361,000**	**144,344,000**	**30,983,000**	**+27%**

Notes:

1. Daily metrics are measured for a typical weekday.
2. Decrease in lane-miles is a result of general-purpose lanes being converted to bus-only facilities.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Regional Travel Patterns

When comparing year 2040 conditions under the proposed Plan to existing conditions, daily vehicle trips increase by 22 percent and daily transit use increases by 93 percent. Note that the increases in total regional travel activity are primarily due to projected regional growth in population, jobs, and workers; investments in transportation infrastructure and implementation of the proposed land use pattern are only minor contributors to changes in total regional travel activity. However, as the analysis of the proposed Plan considers cumulative regional impacts, Bay Area population and employment growth are fundamental components of those impacts.

Table 2.1-12 displays vehicle hours of delay by facility type (i.e., freeways, expressways, arterials) and the breakdown of recurrent and non-recurrent delay. Overall, total vehicle hours of delay are forecasted to increase through year 2040 under the proposed Plan. Arterials and expressways will experience a larger increase in recurrent vehicle hours of delay relative to freeways (79 percent increase compared to a 48 percent increase). Non-recurrent delay on freeways will increase by 36 percent over existing conditions assuming implementation of the proposed Plan.

TABLE 2.1-12: BAY AREA TRAVEL BEHAVIOR, 2010-2040

	2010	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Daily[1] Transit Boardings	1,581,000	3,054,000	1,473,000	+93%
Daily Vehicle Trips[2]	16,912,000	20,677,000	3,765,000	+22%
Daily Vehicle Miles of Travel (VMT)[2]	149,046,000	179,408,000	30,362,000	+20%
Daily[1] Vehicle Miles of Travel[2] per Capita[3]	20.8	19.6	-1.2	-6%
Daily Vehicle Hours of Recurring Delay (overall)	266,000	409,000	143,000	+54%
Daily Vehicle Hours of Recurring Delay (Freeways)	141,000	208,000	67,000	+48%
Daily Vehicle Hours of Recurring Delay (Expressways and Arterials)	58,000	104,000	46,000	+79%
Daily Vehicle Hours of Recurring Delay (Other Facilities)	67,000	97,000	30,000	+45%
Daily Vehicle Hours of Non-Recurrent Delay[4]	108,000	147,000	39,000	+36%
Total Daily Vehicle Hours of Delay	**374,000**	**556,000**	**182,000**	**+49%**
Average Delay per Vehicle (Minutes)	**4.6**	**5.6**	**1.0**	**+22%**

Notes:

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue is found in the Plan Bay Area EIR technical appendices.
4. Only includes non-recurrent delay on freeway facilities.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Daily Trips by Mode

Growth in households and employment leads to a greater number of trips in the region. As a result of the demographic forecasts, the total number of trips made by residents of the Bay Area (known as person trips) is expected to increase over the life of the proposed Plan. As shown in **Table 2.1-13**, the total number of person-trips in the region increases from 23.6 million daily person trips today to 29.4 million under the proposed Plan. This represents a 25 percent increase in person trips compared to existing conditions. This increase, while significant, is lower than the rates of household growth, employment growth, and population growth over the life of the proposed Plan.

When combined with proposed Plan transportation infrastructure investments, the proposed changes in the regional land use pattern have the potential to shift individuals' travel mode choice decisions. **Table 2.1-13** also identifies the share of regional travel activity in year 2040 relying on single-occupant vehicles, carpooling, public transit, walking, and bicycling to reach daily destinations. While the year 2040 shares of the various travel modes remain relatively similar to existing year 2010 conditions, a slight increase in

transit and non-motorized modes is evident. Transit mode share increases from 5 percent to 7 percent by 2040 as a result of the proposed Plan, while walking and bicycling increase from 11 percent to 13 percent by 2040.

TABLE 2.1-13: TYPICAL WEEKDAY DAILY PERSON TRIPS, BY MODE

Purpose	*2010*		*2040 Plan*	
	Trips	*% of Total*	*Trips*	*% of Total*
Drive Alone	11,717,000	50%	14,020,000	48%
Carpool	8,052,000	34%	9,433,000	32%
Transit	1,186,000	5%	2,151,000	7%
Walk	2,383,000	10%	3,429,000	12%
Bike	254,000	1%	393,000	1%
Total Trips[1]	**23,592,000**	**100%**	**29,426,000**	**100%**

Note:

1. Excludes commercial and interregional trips.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

SUMMARY OF IMPACTS

The proposed land use pattern and transportation investments in the proposed Plan would reduce vehicle miles traveled per capita by shifting some trips from single-occupant vehicle travel or carpool travel to public transit or non-motorized modes, while at the same time increasing the utilization of public transit services (within year 2040 capacity constraints). However, as a result of population and employment growth expected in the Bay Area, average per-trip travel times are expected to increase and the number of per capita vehicle miles traveled in extremely congested conditions would increase as well. These effects are primarily a result of the demographic trends, while the land use and transportation components of the proposed Plan reduce impacts of regional growth.

Of the five significance criteria considered, significant impacts are only forecast for one criterion: per capita vehicle miles traveled in extremely congested conditions. The four other criteria—commute travel times, non-commute travel times, per capita vehicle miles traveled, and transit utilization—all have impacts that are forecasted to be less than significant.

Implementation of transportation projects and land use developments in the proposed Plan will be phased over many years, so local impacts will be different from year to year. As transportation and land use development projects advance from planning into implementation, short-term impacts, such as delays to travelers, would be created by congestion in and around construction zones. At a regional and programmatic level over the entire planning period, the sum of these discrete short-term effects are considered less than significant. However, large numbers of construction projects occurring at the same time, or one local area experiencing construction of many projects consecutively, could result in localized delay impacts that are significant. These must be evaluated at the project level as more information about the timing, design, scope, and construction program are available.

IMPACTS AND MITIGATION MEASURES

Impacts on the transportation network are generally regional in nature. Localized impacts are expected to vary depending on the proximity to local and regional transportation improvements, as well as land use changes on the neighborhood level. All impacts in this section necessarily consider the combination of demographic, land use, and transportation impacts and are by definition cumulative. Therefore, these impacts are not addressed separately.

Impact

2.1-1 Implementation of the proposed Plan could result in a substantial increase in per-trip travel time for commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

Projected changes in per-trip commute travel time from 2010 to 2040 are the result of several factors, including transportation network improvements, more focused growth patterns shifting a greater share of the population into the urban core, and greater demand for travel as a result of higher levels of population and employment. Compared to existing conditions, average projected commute travel times are expected to increase by three percent under the proposed Plan, as shown in **Table 2.1-14**. However, this slight increase is considered less than significant (a five percent increase is considered significant).

No individual travel mode experiences a significant impact on its commute travel time as a result of the proposed Plan. However, auto modes (drive alone and carpool) are expected to experience small travel time reductions, while transit and bicycle modes are forecasted to be minimally impacted by slightly greater travel times. This result is primarily due to mode shift expected from the proposed Plan. As more individuals decide to rely on modes with longer average travel times (such as transit), the average commute travel time for the region tends to increase. While the mode shift can lead to a congestion reduction benefit that reduces average travel times for autos, it may lengthen the commutes of a relatively small number of travelers. Decreased travel times for driving commutes are also a result of the proposed Plan's land use strategy, which places a high priority on moving jobs and households closer together. This leads to shorter average distances between home and employment and therefore shorter auto commute travel times.

This impact is considered less than significant (LS).

TABLE 2.1-14: PER-TRIP COMMUTE TRAVEL TIME[1], BY MODE

Mode	*2010*	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Drive Alone	18.7	18.0	-0.7	-4%
Carpool	14.2	13.7	-0.5	-4%
Transit	44.0	44.3	0.3	+1%
Walk	19.5	19.3	-0.2	-1%
Bike	12.5	12.8	0.3	+2%
All Modes	**19.8**	**20.4**	**0.6**	**+3%**

Note:

1. Travel times are shown in minutes.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Mitigation Measures

None required.

Impact

2.1-2 Implementation of the proposed Plan could result in a substantial increase in per-trip travel time for non-commute travel by any mode over existing conditions. A substantial increase in per-trip travel time is defined as greater than 5 percent.

The forecasted effects of the proposed Plan on non-commute travel times are similar to the commute travel patterns under year 2040 Plan conditions. Impacts of the proposed Plan on per-trip non-commute travel times are less than significant (LS), measuring only two percent greater than existing conditions, as shown in **Table 2.1-15** (a 5 percent increase is considered significant).

While per-trip travel time improvements are forecasted for all modes except biking, the mode shift away from the automobile leads to a higher average per-trip travel time for non-commute purposes. As more individuals decide to rely on modes with longer average travel times (such as transit), the average non-commute travel time for the region tends to increase. While the mode shift can lead to a congestion reduction benefit that reduces average travel times for autos, it may lengthen travel times for a relatively small number of travelers.

This impact is considered less than significant (LS).

TABLE 2.1-15: PER-TRIP NON-COMMUTE TRAVEL TIME,[1] BY MODE

Mode	*2010*	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Drive Alone	11.6	11.4	-0.2	-2%
Carpool	11.4	11.3	-0.1	-1%
Transit	36.2	35.5	-0.7	-2%
Walk	18.3	18.1	-0.2	-1%
Bike	11.0	11.1	0.1	+1%
All Modes	**12.7**	**12.9**	**0.2**	**+2%**

Note:

1. Travel times are shown in minutes.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012

Mitigation Measures

None required.

Impact

2.1-3 Implementation of the proposed Plan could result in a substantial increase in per capita VMT on facilities experiencing level of service (LOS) F compared to existing conditions during AM peak periods, PM peak periods, or during the day as a whole (LOS F defines a condition on roads where traffic substantially exceeds capacity, resulting in stop-and-go conditions for extended periods of time). A substantial increase in LOS F-impacted per capita VMT is defined as greater than 5 percent.

The EIR evaluates the change in the amount of per capita automobile travel on facilities experiencing the worst level of service (LOS) and the hours of congestion experienced by motorists. **Table 2.1-16** displays per capita vehicle miles of travel (VMT) by time period and by LOS. LOS reflects traffic density on a range from A to F based on the volume to capacity (V/C) ratio for roadway facilities.

Under the proposed Plan, per capita VMT on severely congested facilities (LOS F) would increase compared to existing conditions. Congested per capita VMT would increase by 29 percent during the AM peak hours, by 71 percent during the PM peak hours, and by 51 percent for the day as a whole. These roadway traffic service levels reflect the impact of total VMT growth far exceeding the growth of roadway capacity.

TABLE 2.1-16: PER-CAPITA DAILY VEHICLE MILES OF TRAVEL BY LEVEL OF SERVICE (2010-2040)

LOS[1] (V/C Ratio)	*2010*	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
AM Peak Period (6 AM to 10 AM)				
A-C (< 0.75)	4.19	3.70	-0.50	-12%
D-E (0.75-1.00)	1.05	1.16	0.10	+10%
F (> 1.00)	**0.06**	**0.08**	**0.02**	**+29%**
Total	5.31	4.93	-0.37	-7%
PM Peak Period (3 PM to 7 PM)				
A-C (< 0.75)	4.68	4.11	-0.57	-12%
D-E (0.75-1.00)	1.20	1.35	0.15	+12%
F (> 1.00)	**0.06**	**0.10**	**0.04**	**+71%**
Total	5.94	5.56	-0.39	-7%
Daily				
A-C (< 0.75)	18.27	16.56	-1.71	-9%
D-E (0.75-1.00)	2.45	2.88	0.44	+18%
F (> 1.00)	**0.12**	**0.19**	**0.06**	**+51%**
Total	20.84	19.63	-1.21	-6%

Note:

1. LOS (level of service) measures traffic density with a range of A to F. LOS A-C reflect free-flow conditions with minimal delay. LOS D-E reflect somewhat congested conditions with some possible delays. LOS F reflects very congested conditions with significant volumes greater than roadway capacity, leading to significant delays.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

The proposed Plan works to minimize congestion impacts through a number of regional policies and investment strategies, including:

- Implementation of significant transit capacity increases along fixed guideways to provide congestion-immune alternatives to freeway and arterial corridors (including projects such as BART Metro, BART to San José, Central Subway, Van Ness Bus Rapid Transit, Geary Bus Rapid Transit, and East Bay Bus Rapid Transit);
- Expansion of the Freeway Performance Initiative to go beyond existing freeway ramp meters to focus heavily on signal coordination along congested arterials;
- The proposed land use pattern, which would emphasize focused growth in Priority Development Areas and shorten commute distances by bringing jobs and housing closer together; and
- Continued funding of the OneBayArea Grant (OBAG) program to accelerate development initiatives in Priority Development Areas through infrastructure improvements.

Despite inclusion of these transportation and land use strategies in the proposed Plan, a potentially significant (PS) impact related to the increase in per capita VMT on facilities already experiencing LOS F would remain. Mitigation measures 2.1(a), 2.1(b), and 2.1(c) are described below.

Mitigation Measures

2.1(a) MTC, in its role as the Bay Area Toll Authority (BATA), shall pursue an additional peak period bridge toll on the San Francisco Oakland Bay Bridge to discourage vehicle travel during weekday peak periods, shifting travelers to other times of day or other modes

2.1(b) MTC and the BAAQMD shall proceed with implementation of the region's commute benefit ordinance authorized by Senate Bill 1339, which affects all major employers (with more than 50 employees), and discourages auto-based commute travel.

2.1(c) MTC shall pursue a policy that requires the implementation of ramp metering throughout the region's highway network as a condition of discretionary funding.

Significance after Mitigation

The increase in per capita VMT on facilities experiencing LOS F represents a significant impact compared to existing conditions. In order to assess whether implementation of these specific mitigation strategies would result in measureable traffic congestion reductions, implementing actions would need to be refined and matched to local conditions in any subsequent project-level environmental analysis.

While the mitigation measures described above commit MTC and ABAG to advance bridge toll and commuter benefit policies to reduce levels of severe traffic congestion, it is not known at this time if these strategies would reduce the impact below the significance threshold of a five percent increase to a less than significant level. Furthermore, MTC and ABAG cannot guarantee that local jurisdictions or employers would implement such policies in the most effective manner possible, given political or financial limitations. For purposes of a conservative analysis, therefore, this impact is determined to remain significant and unavoidable (SU).

Impact

2.1-4 Implementation of the proposed Plan could result in a substantial increase in per capita VMT compared to existing conditions. A substantial increase in per capita VMT is defined as greater than 5 percent.

As shown in **Table 2.1-17**, projected per capita VMT will decrease by 6 percent by year 2040, representing a reduction of 1.2 miles per person per day, even as total VMT increases by 20 percent. This reduction under the proposed Plan is a result of the focused growth land use strategy and transit expansion program, combined with the demographic projections which lead to an increased proportion of non-workers and retirees (who drive significantly fewer miles per day) in future years.

Although the shift to alternative modes is only a few percentage points' difference compared to year 2010 baseline conditions (shown in **Table 2.1-13**), daily VMT per capita will be reduced under the proposed Plan as a result of lower levels of driving in the region. Furthermore, the proposed land use pattern brings travel origins and destinations closer together, reducing the distance required to reach

employment, retail, and service hubs. Therefore, as per-capita vehicle miles traveled will decrease as a result of the Plan, this impact would have no adverse impact (NI).

TABLE 2.1-17: DAILY VEHICLE MILES OF TRAVEL PER CAPITA (2010-2040)

	2010	*2040 Plan*	*Change (2010 to 2040 Plan)*	
			Numerical	*Percent*
Daily[1] Vehicle Miles of Travel (VMT)[2]	149,046,000	179,408,000	30,362,000	+20%
Daily[1] Vehicle Miles of Travel[2] per Capita[3]	**20.8**	**19.6**	**-1.2**	**-6%**

Notes:

1. Daily metrics are measured for a typical weekday.
2. Only reflects interzonal trips (assigned directly to the highway network); includes intraregional, interregional, airport-bound, and commercial vehicle trips.
3. Total daily VMT is calculated using Travel Model One; therefore, to calculate per-capita VMT, it is essential to use simulated population levels to ensure consistency. Simulated population may be slightly different than overall population forecasts for Plan Bay Area EIR alternatives due to slight variability in modeling tools. Further clarification on this issue can be found in the Plan Bay Area EIR technical appendices.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Mitigation Measures

None required.

Impact

2.1-5 Implementation of the proposed Plan could result in increased percent utilization of regional transit supply resulting in an exceedence of transit capacity at AM peak hours, at PM peak hours, or for the day. An exceedance is defined as passenger seat-mile demand for any transit technology being greater than 80 percent of passenger seat-miles supplied by transit operators.

Higher levels of transit ridership forecasted for year 2040 will lead to greater utilization levels for all public transit modes. Even though the proposed Plan includes significant investments that create new transit lines or boost frequencies on existing lines, transit demand rises at a faster rate than new capacity is implemented in the proposed Plan.

As this EIR examines the regional and systemwide impacts of transportation investments and land use shifts, localized capacity issues are not directly addressed here. Importantly, the integrated model used to evaluate and compare alternatives emphasizes evaluation of regional travel patterns and is not calibrated for localized route-by-route analyses. Localized impacts on transit utilization levels will vary depending on neighborhood level changes in land use (both jobs and residents), as well as the magnitude of transit frequency or capacity improvements on a given transit line. While capacity constraints are an existing issue for a small subset of transit lines in high-density locations like San Francisco, and these capacity limitations may continue in the future, they do not represent regional impacts to the overall system. Instead, localized operational capacity issues should be addressed when considering individual projects, rather than on the programmatic level for Plan Bay Area.

As shown in **Table 2.1-18**, in the AM peak period (when demand for transit is greatest), utilization of transit capacity (transit demand divided by transit supply) increases from 28 percent in year 2010 to 44 percent in year 2040; in the PM peak period, utilization increases from 25 percent in year 2010 to 39 percent in year 2040. For the day as a whole, utilization rises from 21 percent in year 2010 to 33 percent in year 2040. Light rail services have the greatest level of demand compared to service levels supplied, followed closely by heavy rail services. Commuter rail service demand approximately triples, but commuter rail services still only fill 17 percent of their total seat-miles.

As the passenger experience is relatively comparable as long as a passenger is able to easily locate a seat, capacity constraints become an issue only if utilization levels exceed 80 percent, meaning that it is difficult or impossible for a passenger to find a seat (and therefore the passenger must stand during the journey). Regional transit utilization levels for all public transit modes, during both peak periods and for the day as a whole, remain well below that threshold. Therefore, year 2040 regional transit capacity would have no adverse impact (NI) on system performance.

TABLE 2.1-18: UTILIZATION OF PUBLIC TRANSIT SYSTEMS, BY MODE (2010-2040)

	2010 Percent Utilization[1]	*2040 Plan Percent Utilization*[1]
AM Peak Period (6 AM to 10 AM)		
Local bus	24%	42%
Light rail[2]	35%	57%
Ferry	19%	23%
Express bus	30%	44%
Heavy rail[3]	40%	57%
Commuter rail[4]	7%	22%
All modes	28%	44%
PM Peak Period (3 PM to 7 PM)		
Local bus	25%	42%
Light rail[2]	34%	59%
Ferry	9%	12%
Express bus	26%	37%
Heavy rail[3]	36%	46%
Commuter rail[4]	5%	20%
All modes	25%	39%
Daily		
Local bus	19%	34%
Light rail[2]	27%	49%
Ferry	8%	13%
Express bus	25%	36%
Heavy rail[3]	27%	36%
Commuter rail[4]	6%	17%
All modes	21%	33%

Notes:

1. Percent utilization measures the passenger seat-miles required by forecasted transit patrons as a percentage of total passenger seat-miles provided by transit operators (i.e. the percentage of seats on transit vehicles filled with passengers). Utilization levels greater than 80 percent reflect conditions where passengers either would have difficulty finding a seat or would have to stand during all or part of their ride.
2. Reflects utilization of Muni Metro and VTA light rail systems.
3. Reflects utilization of BART heavy rail system.
4. Reflects utilization of Caltrain, SMART, Capitol Corridor, and ACE commuter rail systems.

Source: Metropolitan Transportation Commission Travel Demand Forecasts, 2012.

Mitigation Measures

None required.

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