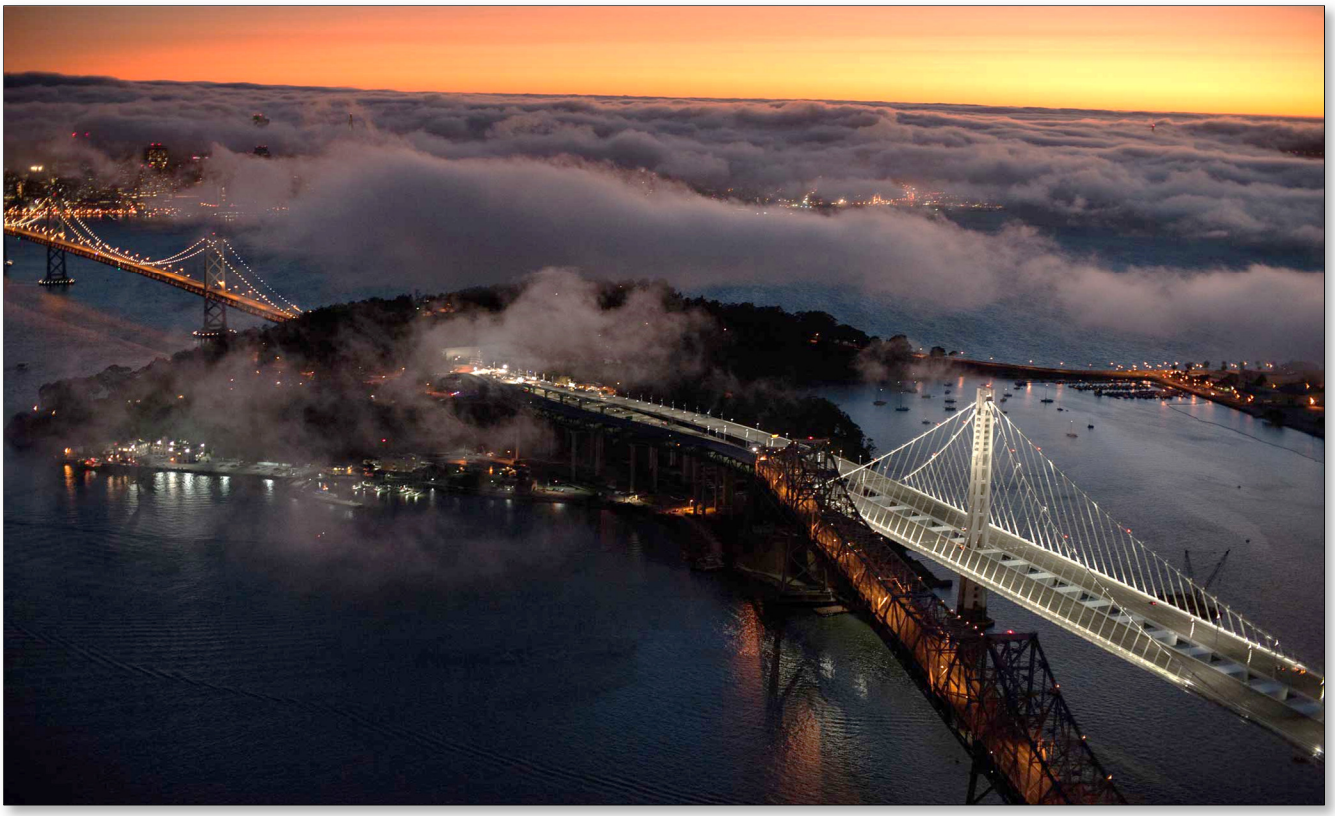
Transportation Concept Report

I-80 San Francisco-Oakland Bay Bridge (SFOBB)

District 4

June 2017



California Department of Transportation

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability

Approvals:

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Stakeholder Acknowledgement

District 4 is pleased to acknowledge the contributions of stakeholders and partner agencies in development of this Transportation Concept Report (TCR). Essential information on corridor issues, needs and improvement strategies are primarily based on various plans developed or being developed by local and regional agencies including the Metropolitan Transportation Commission (MTC), the counties of Alameda and San Francisco, the Alameda County Transportation Commission (Alameda CTC), the San Francisco County Transportation Authority (SFCTA), the cities of Oakland, Emeryville and San Francisco and the Alameda-Contra Costa Transit District (AC Transit). These plans help inform the concept of the I-80 San Francisco-Oakland Bay Bridge Corridor.

This TCR will be posted on the Caltrans Corridor Mobility website at:
http://www.dot.ca.gov/hq/tpp/corridor-mobility/

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MISSION
Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability.

VISION
A performance-driven, transparent and accountable organization that values its people, resources and partners, and meets new challenges through leadership, innovation and teamwork.

GOALS
Safety and Health - *Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities.*
Stewardship and Efficiency - *Money counts. Responsibly manage California's transportation-related assets.*
Sustainability, Livability and Economy - *Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.*
System Performance - *Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.*
Organizational Excellence - *Be a national leader in delivering quality service through excellent employee performance, public communication, and accountability*.

ABOUT THE TRANSPORTATION CONCEPT REPORT

System Planning is the long-range Transportation Planning process for the California Department of Transportation (Caltrans). The System Planning process fulfills Caltrans statutory responsibility as owner/operator of the State Highway System (SHS) (Gov. Code §65086) by identifying deficiencies and proposing improvements to the SHS. Through System Planning, Caltrans focuses on developing an integrated multimodal transportation system that meets Caltrans goals of safety and health, stewardship and efficiency, sustainability, livability and economy, system performance, and organizational excellence.

The System Planning process is primarily composed of: the District System Management Plan (DSMP), the Transportation Concept Report (TCR), the Corridor System Management Plan (CSMP), and the *DSMP Project List*. The DSMP is a long-range strategic policy and planning document that focuses on maintaining, operating, managing, and developing the transportation system. The Transportation Concept Report (TCR) is a multi-jurisdictional planning document that identifies the existing and future route conditions as well as future needs for each route on the SHS, and informs the DSMP Project List. The CSMP is a more complex document that identifies future needs within corridors experiencing or expected to experience high levels of congestion. The DSMP Project List is a long-range list of conceptual, planned, and partially programmed SHS transportation projects used to recommend projects for funding. These System Planning products are also intended as resources for stakeholders, including regional and local agencies and the general public.

The TCR includes detailed review of all transportation modes in the corridor and if applicable, their current and projected levels of operation. Land use, community characteristics, and environmental assessments are described to show a corridor's context and where applicable, are called out as Key Corridor Issues. The TCR also includes Caltrans suggestions for optimizing transportation modes in relation to system preservation, efficiency and expansion. The Corridor Concept, with consideration for various transportation issues, factors and needs, presents the long-term vision for a route during a 25-year planning horizon. Planned and programmed projects from the State Highway Operations and Protection Program (SHOPP), State Transportation Improvement Program (STIP), the Regional Transportation Plan (RTP), Countywide Transportation Plans (CTPs) and local plans are included in this document as well as project proposals to help inform the Caltrans Project Initiation Document (PID) and project development process.

Other policies that guided the development of this document include the Caltrans Strategic Management Plan (2015-2020), Assembly Bill (AB) 32, Senate Bill (SB) 375, SB 391, SB 743, SB 486, SB 32, the California Transportation Plan 2040 (CTP 2040), Complete Streets – Integrating the Transportation System (DD 64 R2), Caltrans Smart Mobility Framework (SMF), the Statewide Transit Strategic Plan (STSP), the California Freight Mobility Plan (CFMP) and the Caltrans Interregional Transportation Strategic Plan (ITSP). Information on these efforts can be found at:

Caltrans Strategic Management Plan:	http://www.dot.ca.gov/perf
AB 32:	https://www.arb.ca.gov/cc/ab32/ab32.htm
SB 375:	http://www.arb.ca.gov/cc/sb375/sb375.htm
SB 391:	http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100SB391
SB 743:	http://www.dot.ca.gov/hq/tpp/offices/omsp/SB743.html
SB 486:	http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB486
SB 32:	https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB32
CTP 2040:	http://www.dot.ca.gov/hq/tpp/californiatransportationplan2040/2040.html
Complete Streets:	http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets.html
SMF:	http://www.dot.ca.gov/hq/tpp/offices/ocp/smf.html
STSP:	http://www.dot.ca.gov/hq/MassTrans/statewide-transit.html
CFMP:	http://www.dot.ca.gov/hq/tpp/offices/ogm/cfmp.html
ITSP:	http://www.dot.ca.gov/hq/tpp/offices/omsp/system_planning/itsp.html

CORRIDOR CONCEPT

The facility concept for the Interstate (I-) 80 San Francisco-Oakland Bay Bridge (SFOBB) segment of I-80 is to maintain the current ten to twenty lane freeway facility. No capacity increasing projects have been proposed and recommended strategies focus on operational and multimodal improvements instead. This concept is consistent with the route functioning as an Interstate freeway as well as with Caltrans strategic goals to protect the State's investment in the I-80 SFOBB Corridor (Corridor) while recognizing financial and environmental constraints. More details about this concept are provided in the report. There are a number of recently completed or currently on-going efforts to identify improvement strategies for the Corridor due to the important role the Corridor plays in the Bay Area transportation network. These efforts include the Metropolitan Transportation Commission's (MTC) Bay Bridge Forward initiative, the Core Capacity Transit Study and the Plan Bay Area 2040 Regional Transportation Plan update as well as the Alameda-Contra Costa Transit District's (AC Transit) Bay Bridge Transbay Comprehensive Operations Analysis. These efforts help inform the near, mid and long-term facility concept for the I-80 SFOBB Corridor. Strategies identified in these efforts are focused on operational and multimodal improvements to be consistent with the region's objectives and goals as well as those of the Caltrans Strategic Management Plan.

CORRIDOR OVERVIEW

For the purpose of this TCR, the I-80 SFOBB Corridor has been divided into four segments. See Table 1 below and Figure 1 on the next page for corridor segmentation.

Table 1. *SFOBB Corridor Segmentation*

Segment	Location Description	County, Route	County, Route
1	US 101 to SFOBB (begin)	SF 3.84	SF 5.50
2	SFOBB (begin) to SFOBB (end)	SF 5.50	ALA 1.54
3	SFOBB (end) to Toll Plaza	ALA 1.54	ALA 2.70
4	Toll Plaza to I-80/I-580	ALA 2.70	ALA 3.30

Figure 1. *SFOBB Corridor Overview*

ROUTE DESCRIPTION

The I-80 SFOBB Corridor is approximately eight miles in length. It begins at United States (US) 101 in San Francisco County and ends in Alameda County near the I-80/I-580 distribution structure in Emeryville. It is classified as an Interstate freeway and functions as a gateway to San Francisco connecting US 101 to I-80, I-580 and I-880 in the East bay. The nearly five-mile long SFOBB has an eastern and a western span that are connected by the Yerba Buena Island (YBI) through the Yerba Buena Tunnel. Treasure Island is connected to YBI to the north. The new self-anchored suspension eastern span, which was opened to traffic in 2013 to replace its seismically vulnerable two deck predecessor, has a single deck with ten lanes equally divided between the two directions. There is also a shared bicycle/pedestrian path south of the vehicular lanes on the eastern span. The western span has two decks, with five westbound (WB) lanes on the upper deck and five eastbound (EB) lanes on the lower deck, transitioning to a single deck on the east side of YBI. The bridge toll plaza is located in the westbound direction east of the bridge in Oakland with twenty lanes, including two High-Occupancy Vehicle (HOV) lanes and two HOV/bus only lanes.

Due to its length and complexity, District 4 has divided I-80 into three segments and has developed corridor planning documentation for each segment. This document covers the first of the three. From the eastern edge of the SFOBB Corridor, I-80 continues east through Alameda, Contra Costa (I-80 West) and Solano Counties (I-80 East) before leaving District 4 at the Yolo County line. Table 2 below lists these three documents.

Table 2. *System Planning Documents for I-80*

Corridor Segments	Corridor Limits	Document
1	US 101 to I-80/I-580/I-880 distribution structure	I-80 SFOBB TCR (Draft)
2	SFOBB Toll Plaza to CC/SOL County Line – Carquinez Bridge	I-80 West CSMP (completed 2010)
3	Carquinez Bridge to SOL/Yolo County Line	I-80 East CSMP (completed 2010)

*CSMP - Corridor System Management Plan

ROUTE DESIGNATIONS AND CHARACTERISTICS

I-80 is designated as part of the Eisenhower Interstate System on the National Highway System and is functionally classified as an Interstate on the California Road System (CRS). This portion of I-80 is eligible to be part of the State Scenic Highway network.

The 2015 Interregional Transportation Strategic Plan (ITSP) identifies eleven "Strategic Interregional Corridors" in the State. The ITSP defines Strategic Interregional Corridors as having varying level of freight and recreational travel, while providing communities access to local and interregional markets, recreational designations, emergency response and disaster recovery activities, and vital medical and social services. They are the transportation corridors that link the regions of the State together and support our diverse economic and social needs. The I-80 SFOBB Corridor is located within the San Jose/San Francisco Bay Area – Sacramento – Northern Nevada Corridor, one of the Strategic Interregional Corridors. The route is designated as a Priority Interregional Highway. Table 3 on the next page summarizes the route designations and characteristics for the I-80 SFOBB Corridor.

Table 3. *I-80 SFOBB Route Characteristics*

Segment #	1	2	3	4
Freeway & Expressway	Yes	Yes	Yes	Yes
National Highway System	Yes	Yes	Yes	Yes
Interregional Road System	Yes	Yes	Yes	Yes
Strategic Interregional Corridor Road System	San Jose/San Francisco Bay Area – Sacramento – Northern Nevada – Interregional Strategic Corridor			
Federal Functional Classification	Interstate Freeway	Interstate Freeway	Interstate Freeway	Interstate Freeway
National Highway Freight Network (NHFN)	Primary Highway Freight System (PHFS)	Primary Highway Freight System (PHFS)	Primary Highway Freight System (PHFS)	Primary Highway Freight System (PHFS)
California Freight Mobility Plan (CFMP) Designation	CFMP Tier 1	CFMP Tier 1	CFMP Tier 1	CFMP Tier 1
Surface Transportation Assistance Act (STAA)	National Network	National Network	National Network	National Network
Regional Transportation Planning Agency	MTC	MTC	MTC	MTC
Congestion Management Agency	SFCTA*	SFCTA, Alameda CTC	Alameda CTC**	Alameda CTC
Terrain	Flat	Bridge	Flat	Flat
Lifeline Route	Yes	Yes	Yes	Yes
Scenic Route	Eligible	Eligible	Eligible	Eligible

* San Francisco County Transportation Authority ** Alameda County Transportation Commission

LAND USE AND COMMUNITY CHARACTERISTICS

The I-80 SFOBB Corridor connects the counties of San Francisco and Alameda just east of Yerba Buena/Treasure Island. The County of San Francisco has designated Yerba Buena/Treasure Island and the Eastern South of Market Area (SOMA) neighborhoods of San Francisco as two of the Priority Development Areas (PDAs) in the City as defined by the Association of Bay Area Governments (ABAG). PDAs are locally-designated areas within existing communities that have been identified and approved by cities or counties for future growth in the form of improved accessibility to transit, jobs, shopping and other services. The Treasure Island and Eastern SOMA Neighborhood PDAs contain plans for residential, retail and improved circulation and transit connectivity.

The urban landscape of San Francisco features mid to high-rise mixed use residential-commercial structures as well as notable landmarks such as AT&T Park (the San Francisco Giants Stadium), Moscone Convention Center, Transbay Transit Terminal and the Ferry Building.

Since its decommissioning in 1996, Yerba Buena/Treasure Island has become home to the 11th District of the U.S Coast Guard, the Department of Homeland Security SAFE Port Act Interagency Operations Center (IOC) and Vessel Traffic Service (VTS) facility and the U.S Department of Labor, Job Corps Campus. Also evidence of its long military history has left the island with complexes of multi-unit residential housing now used for active Coast Guard and Section 8 voucher housing, vacant or underutilized large warehouses, commercial and industrial space, and undeveloped parcels. However there are plans for up to 8,000 new homes, 500 hotel rooms and up to 240,000 square feet of retail-commercial space to be built over the next 25 years. The City of San Francisco intends to mitigate the impact of vehicle trips generated by the development by adding ferry service and congestion pricing.

Alameda County has designated the low lying marshlands from the Oakland anchorage of the SFOBB east to the end of the corridor as Priority Conservation Areas (PCAs), defined by ABAG as open space that provides agricultural, natural resource, scenic, recreational, and/or ecological values and functions. These areas are

identified through consensus by local jurisdictions and park/open space districts as lands in need of protection due to pressure from urban development or other factors. Remaining adjacent land uses include SFOBB supportive maintenance and operations infrastructure, East Bay Utility Municipal District (EBMUD) Water Treatment Facility, the Port of Oakland, Union Pacific and BNSF rail yards as well as radio tower access roads and the SFOBB Bay Trail bicycle-pedestrian path. Currently the Port is constructing a new Intermodal railyard and a two million square foot, 330-acre Global Trade and Logistics Complex, that once completed, will allow the Port to attract first-call inbound liner services that can only be currently accommodated by the Port of Los Angeles-Long Beach.

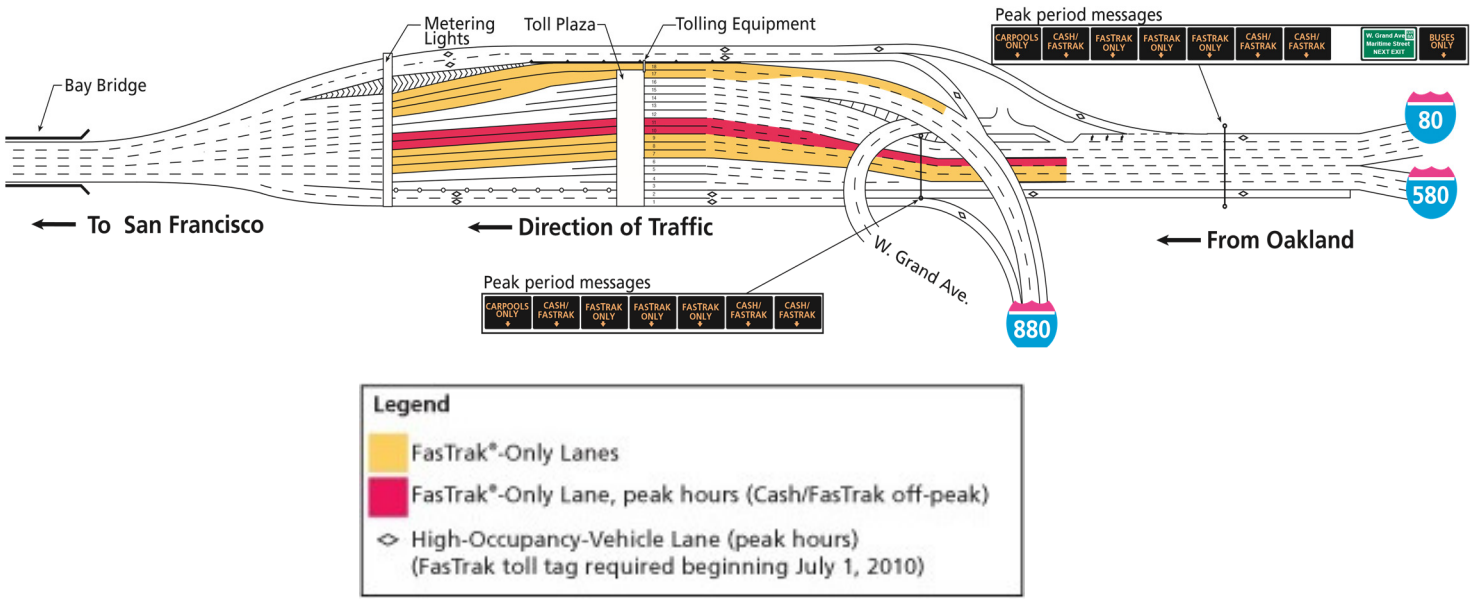
Figure 2. *SFOBB PDA/PCA Locations*

SYSTEM CHARACTERISTICS

The 4.9-mile long SFOBB features two spans connected by the Yerba Buena Tunnel. The west span connecting San Francisco and Yerba Buena Island is a two-deck suspension span with five general purpose lanes in each direction with westbound traffic on the upper deck and eastbound traffic on the lower deck. Traffic on both the upper and lower decks travel on a polyester concrete surface composed of polyester resin, sand and rock aggregate. The Willie L. Brown Jr. east span connecting Yerba Buena Island and Oakland is a single deck ten-lane self-anchored suspension bridge with causeways on either end. All traffic travels on the same polyester concrete as the west span. Shoulder widths vary along the Corridor. The elevated structures west of the reconstructed western approach have little or no shoulders while the more recently reconstructed segments including the western approach and SFOBB east span segments feature shoulders with standard width as well as breakdown/enforcement areas. The Corridor features Vehicle Detection System (VDS), Ramp Metering (RM), Closed Circuit TV (CCTV), Changeable/Dynamic Message Signs (C/DMS), and Highway Advisory Radio (HAR) TMS elements. During periods of high traffic volumes, freeway mainline metering is activated in the westbound direction just west of the toll plaza. 3+ HOV/Bus only lanes are not metered. MTC's Freeway Service Patrol (FSP) and Caltrans towing vehicles are available seven days a week, 24 hours a day in order to assist California Highway Patrol (CHP) and Caltrans manage unplanned incidents such as collisions by removing disabled vehicles and assisting Caltrans during unscheduled maintenance along the Corridor.

Tolls are collected in the westbound direction at the SFOBB Toll Plaza at PM 2.70 between the touchdown of the eastern span and the I-80/I-580/I-880 distribution structure. There are twenty lanes in the westbound direction at the Toll Plaza including nine full-time cash only lanes, five full-time Fastrak lanes, four full-time HOV/Bus Lanes and two peak period only Fastrak lanes (Cash/Fastrak off-peak). See Figure 3 for lane configuration at the Toll Plaza.

Figure 3 *SFOBB Toll Plaza Configuration*



NON-MOTORIZED FACILITIES

Pedestrians and bicyclists are prohibited from the lanes and shoulders of the SFOBB. However, pedestrian and bicycle access along the 2.2-mile SFOBB east span between Oakland and Yerba Buena island on a separated facility is provided by the recently completed Bay Bridge Trail, also known as the Alex Zuckerman Bicycle/Pedestrian Path located south of the eastbound lanes of the SFOBB. The 15 ½ foot wide facility features a bike lane in each direction and a pedestrian lane with pullouts and rest areas. The trail is open seven days a week between 6 AM and 8 PM. It has a 15 mph speed limit and is patrolled by CHP. Fishing from the trail is not allowed.

The trail is accessible on the east via trailheads located at Shellmound Avenue (across from Ikea) in Emeryville, West Grand Avenue in Oakland and 7th and Maritime Street in the Port of Oakland and on the west from Hillcrest Road on Yerba Buena Island. Path users can also access transit services provided by the Alameda-Contra Costa Transit District (AC Transit) in the eastbound direction with a bus stop at the toll plaza. Although there is currently no parking at the trailhead on Yerba Buena Island, a San Francisco County Transportation Authority funded shuttle provides service for pedestrians and bicyclists from the various parking locations on the island. From San Francisco, the San Francisco Municipal Transportation Agency (MUNI) Line 25 provides direct access from the temporary Transbay Terminal to Treasure Island, where passengers can transfer to the San Francisco Bicycle Coalition shuttle.

Caltrans District 4 currently offers a bike shuttle across the SFOBB between the Bay Area Regional Transit District (BART) MacArthur Station located in the median of SR 24 between MacArthur Boulevard and 40th Street in Oakland and Main Street/Bryant Street in San Francisco seven times a days, five days a week.

Operating hours are from 6:20 AM to 6:15 PM at a cost of one dollar for a one-way ticket. Future improvements focus on improving access, wayfinding and expanding the existing bicycle and pedestrian path across the western span and into San Francisco. Figure 4 on the next page displays the various State and local bicycle facilities within and adjacent to the I-80 SFOBB Corridor.

Figure 4. *I-80 SFOBB Corridor Bicycle Facilities*

TRANSIT FACILITY

As listed in Table 4 on the next page, a number of transit services operate within the I-80 SFOBB Corridor.

The Bay Area Rapid Transit District (BART) provide several lines of service seven days a week between stations in Oakland and other East Bay locations and San Francisco and the San Francisco International Airport (SFO), including:

- Richmond - Daly City
- Pittsburg/Bay Point - SFO
- Warm Spring/South Fremont - Daly City
- Dublin/Pleasanton –Daly City

AC Transit and the Western Contra Costa Transit Authority (WestCAT) operate Transbay commuter bus service through the I-80 SFOBB Corridor between the East Bay and the temporary Transbay Terminal in San Francisco. AC Transit provides 32 transbay routes while WestCAT provides two. Service varies between five and seven days a week, while headways vary between 30 minutes and an hour depending on route, the time of day and the day of the week.

The San Francisco Bay Area Water Emergency Transportation Authority (WETA) and Blue and Gold Fleet provides year round weekday and weekend ferry service to San Francisco/South San Francisco from Alameda Main Street/Oakland Jack London Square, Alameda Bay Farm Island and other locations. Seasonal service destinations also include Angel Island and AT&T Park. Headways vary depending on the time of the day as well as event scheduling and in some instances periods of inclement weather. WETA is currently developing a new service between San Francisco and Richmond and has plans for expansion to Berkeley and Hercules.

MUNI provides daily local and regional bus service with connectivity to BART and MUNI light rail service in San Francisco.

Capitol Corridor/Amtrak interregional rail provides service between San Jose and Auburn and beyond and connecting Thruway bus service to San Francisco is available from the Emeryville Station.

Greyhound offers statewide service from the temporary TransBay Terminal.

Figure 5 on page 13 shows where these transit services are located.

Table 4. I-80 *SFOBB Corridor Transit Services*

TCR Segment	Mode & Collateral Facility	Name	Route End Points	Headway	Operating Period	ITS & Technology	Stops	Amenities	Bikes Allowed	Location Description
							Cities			
1-4	Urban Rail	BART	SF Airport/ Richmond/ Dublin-Pleasanton/ South Warm Springs: Fremont/ Pittsburg/ Bay Point	Med	Daily	ETA-ETD*	Alameda/ Contra Costa/ San Francisco/ San Mateo/ Santa Clara Counties	Bike Space	Y	West Oakland, Embarcadero, Powell, Civic Center Stations
1-4	Transbay/ Night Owl	AC Transit/ WestCAT	San Pablo/ Hercules/ Hayward/ Oakland/ San Francisco	Med	5-7 Days a week	Real-time	Alameda/ Contra Costa / San Francisco Counties	Bike Racks, Wifi	Y	Temporary Transbay Terminal
1-4	Regional Ferry Service	WETA/Blue and Gold Fleet	Alameda/ Oakland/ Vallejo//So. San Francisco	Med	Daily	Real-time	Emeryville/ Oakland	Bike Racks	Y	
1/2	Local Bus/Light Rail	MUNI	Yerba Buena Island/ San Francisco	Med	Daily	Real-time	San Francisco County	Bike Racks	Y	Temporary Transbay Terminal/ The Embarcadero
1-4	Intercity Rail	Capitol Corridor	Auburn/ Sacramento/ Oakland/ Emeryville/ San Francisco	Med	Daily	Real-time	Sacramento /Yolo/Solano/Contra Costa/ Alameda Counties	Bike Racks, Wifi	Y	Thruway Bus Service between Emeryville and San Francisco
1-4	Intercity Bus Service	Greyhound Bus Lines	Reno NV/Las Vegas NV. Medford OR.	Med	Daily	Real-time	Oakland, San Francisco, Berkeley	Bike Racks, Wifi	Y	Oakland, San Francisco

* ETA-ETD: Estimated time of arrival and estimated time of departure

Figure 5. *Transit Map*

FREIGHT FACILITIES

The I-80 SFOBB Corridor serves as a gateway for the flow of commerce and economic activity in and out of the western United States. I-80 is designated as a Primary Highway Freight System (PHFS) route on the National Highway Freight Network (NHFN) as authorized by the federal Fixing America's Surface Transportation Act (FAST Act). I-80 is a Surface Transportation Assistance Act (STAA) national network route. It is also included in the Tier 1 State Freight Network on the 2014 California Freight Mobility Plan, representing highways with moderate to high truck volumes and providing connectivity to and between key freight gateways and regions. The route provides access to and from the Port of Oakland and the Port of San Francisco. Goods handled by these ports include containers, bulk-agricultural products, automobiles, boats, wind turbines, steel, vegetable oil and sand. This combined with local service and delivery traffic to and from various neighborhood shops, small scale retail grocery stores, service businesses and large scale nationally branded retail outlets along the route accounts for the majority of freight traffic along the SFOBB Corridor. Trucks account for less than three percent of total vehicle Annual Average Daily Traffic (AADT), with approximately 45 percent of those trucks having five axles or more.

ENVIRONMENTAL CONSIDERATIONS

The purpose of the environmental scan is to conduct a high-level identification of potential environmental factors that may require future analysis in the project development process. This information does not represent all environmental considerations that exist within the Corridor vicinity. Caltrans supports reducing environmental impacts from the transportation system as an overall strategic objective. One of Caltrans sustainability objectives is to achieve an 80 percent reduction in greenhouse gas emissions below 1990 levels by 2050. A summary of the environmental factors included in this scan is displayed in Figure 6 on the next page. It can be seen that portions of the I-80 SFOBB Corridor are located within the San Francisco Bay low lands, marshes and wetlands, with numerous species of concern along the Corridor such as the Cormorants that were removed from the old east span. Caltrans is currently in the process of removing the remaining piers of the old east span. It should be noted that potential Section 4(f) lands in the Corridor include parks and recreational areas, publicly owned wildlife and waterfowl refuges and historic sites of national, state, or local significance.[1] Not all parks and recreation areas are considered Section 4(f) lands however.

[1] http://www.calands.org/

Figure 6. *Environmental Factors*

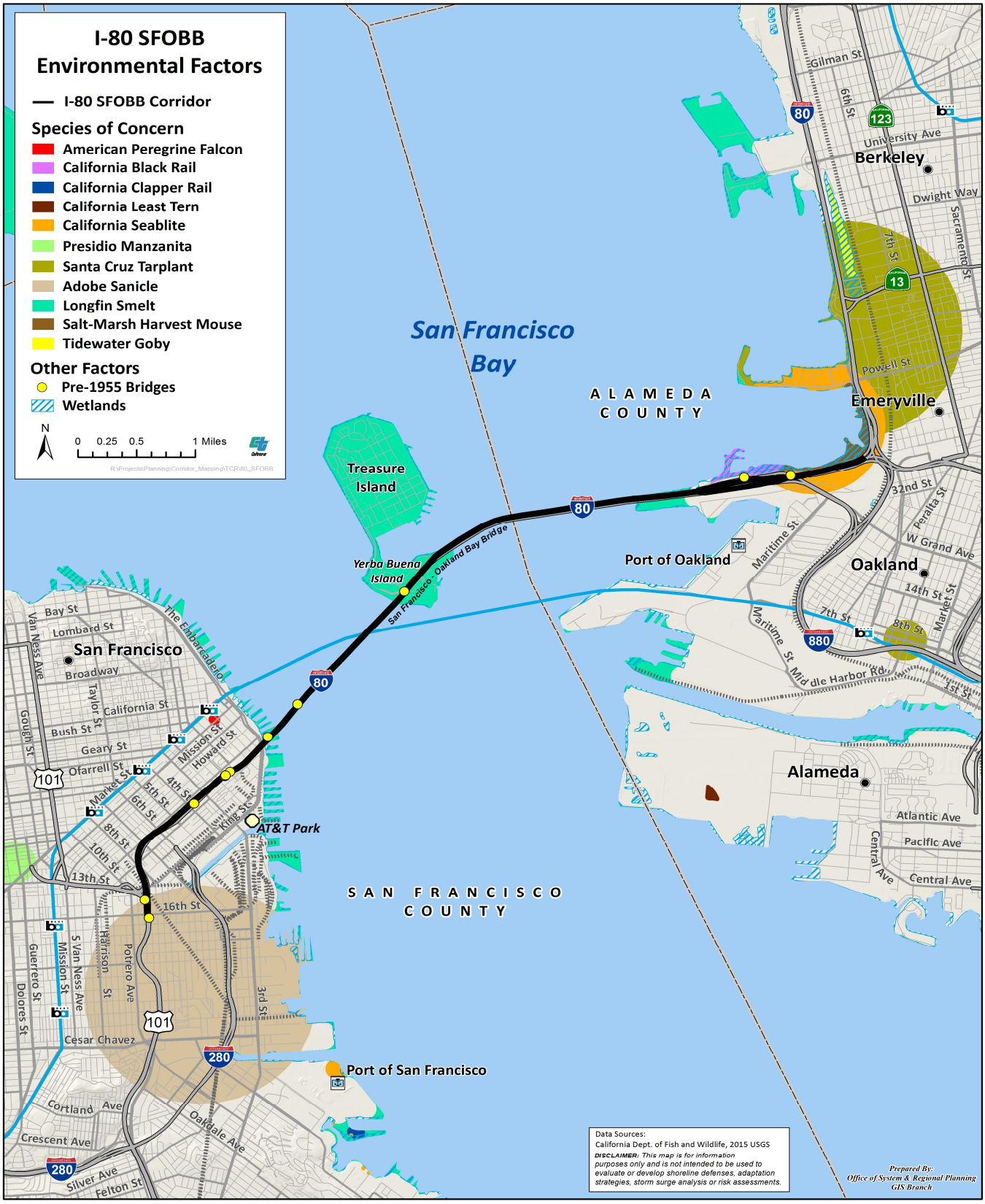


Figure 7 below displays locations along the I-80 SFOBB Corridor that could be affected by a 16 and 55-inch rise in the sea level. Executive Order (EO) S-13-08 (November 2008) and the State of California Sea-Level Rise Interim Guidance Document (October 2010) directs all State agencies planning construction projects in areas vulnerable to sea level rise to begin planning for potential impacts by considering a range of sea level rise scenarios for the Years 2050 and 2100. Project Initiation Documents (PID) will investigate whether future projects can avoid or mitigate any identified risks associated with climate change. Although EO S-13-08 allows for some exemptions for routine maintenance projects and or projects programmed for construction through 2013, the intent is to plan ahead to assess project vulnerability and reduce anticipated risks associated with sea level rise.

Figure 7. *Sea Level Rise*

CORRIDOR PERFORMANCE

The I-80 SFOBB Corridor serves both local, regional and interregional commuter trips as well as truck and transit trips. Roughly 260,000 Annual Average Daily Trips (AADT) were made across Segment 3 of the Corridor in 2015 with roughly two to three percent of these vehicles being trucks. During the morning and evening commute peak periods in 2015, traffic volumes ranged between 6,000 and over 10,000 vehicles per hour, with the highest volumes experienced during the AM peak period westbound into the San Francisco County. Over the course of an average weekday, westbound and eastbound traffic operates at a Level of Service (LOS) that fluctuates between C and D outside of the AM and PM peak periods. For the majority of the PM peak period, the I-80 SFOBB Corridor operates at LOS D with short periods in LOS E before reaching LOS F in both directions between the hours of 4:00 AM and 6:00 PM.

Several bottlenecks contribute to the heavy congestion within the Corridor. Some of the most noteworthy bottlenecks in the westbound direction are located at the I-880 to I-80 connecting ramp, the Toll Plaza and downstream of the Toll Plaza between the metering lights and where the number of lanes drops from twelve to five. The combination of bottlenecks also results in queues blocking access to the HOV/Buses Only Lanes upstream of the Toll Plaza. Other notable westbound bottleneck locations include where the East Span transitions to a viaduct structure before entering the Yerba Buena Tunnel and the Yerba Buena Tunnel exit onto the West Span.

Traveling in the opposite direction, delays can be attributed to bottlenecks identified at the US 101 to I-80 connecting ramp, the weave-merge segment east of the last San Francisco on-ramp at First Street, the entrance to and exit from the Yerba Buena Tunnel and the bridge touchdown in Oakland. The eastbound traffic is not tolled and there is no mainline meters.

Table 5. *Traffic Performance on State Highway*

	Segment 1	Segment 2	Segment 3	Segment 4
Basic System Operations*				
AADT 2015	179,000	129,000	260,000	147.000
Segment length	1.66	4.906	1.16	.6
VMT 2015 per day	297,140	639,840	301,600	235,200
Truck Traffic 2015*				
Total Average Annual Daily Truck Traffic	4,901	6,707	6,526	2,602
Total Trucks (% of AADT)	2.90	2.58	2.51	1.77
5+ Axle Average Annual Daily Truck Traffic	1,892	2,269	2,945	1,128
5+ Axle Trucks (as % of *AADTT*) (Optional)	38.60%	33.83%	45.13%	43.36%
Peak Hour Traffic Data 2015**				
AM WB Peak Hour Volume	9,224	10,242	6,738	7,640
PM EB Peak Hour Volume	9,038	9,266	9,192	7,625

*Source: 2015 Caltrans Traffic Census ** Source: 2015 Caltrans Performance Measurement System (PeMS) 17.0

REGIONAL PLANNING EFFORTS

There are a number of recently completed or currently on-going efforts led by legislatively mandated agencies, local jurisdictions, MTC, Congestion Management Agencies (CMAs) and transit providers with the goal of identifying short and long-term solutions to better address the transportation needs within the I-80 SFOBB Corridor. Analyses from these efforts were used to inform the Corridor Concept presented in this TCR.

In 2008 Assembly Bill 891 was passed which created The Treasure Island Mobility Management Agency (TIMMA) and gave it tolling authority. The agency was created so that it could operate a tolling program for the redevelopment of Yerba Buena/Treasure Island. In April 2011, along with the release of the Yerba Buena/Treasure Island FEIR, TIMMA adopted the Treasure Island Transportation Implementation Plan (TITIP), which calls on the

TIMMA to implement a congestion tolling program that will charge vehicles for access to and from Yerba Buena/Treasure Island. In addition, the TITIP also describes how TIMMA should use the tolls it collects to collaborate with AC Transit, WETA and SFCMTA to increase accessibility and frequency of transit service in order to make it an more attractive transportation mode to future residents during peak periods. The plan includes additional ferry service to reduce peak headways to less than 50 minutes during weekday peak periods, increasing the frequency of SFMTA local service headways to less than 15 between Yerba Buena/Treasure Island and San Francisco during weekday peak periods and introducing a new SFMTA service to the San Francisco Civic Center area with frequencies less than 12 minutes during the weekday peak periods with service between 5:00 AM and 10:00 PM.

In July 2016, the MTC Board adopted the Bay Bridge Forward initiative. In partnership with Caltrans, AC Transit, WestCAT and WETA, the program's goal was to identify near-term improvements which would improve person throughput, relieve corridor congestion and transit crowding while reducing the number of incidents and level of criteria air pollutants and greenhouse gas emissions along the I-80 SFOBB Corridor. Projects and programs included in the initiative include the integration of the operation and management of the SFOBB corridor, pilot express bus routes, transit signal priority and transportation demand management programs like commuter parking, shared mobility and flexible on-demand transit. In 2016, MTC also initiated a related but separate study, titled the Core Capacity Transit Study in order to identify and prioritize major five, 15 and 25-year investments that target improving transit capacity so that it can meet future transit demand and provide exceptional transit service. The study focused on both WB and EB travel and evaluated current AC Transit Transbay service, BART, WETA, MUNI rail and bus services and Caltrain service along the Peninsula. The improvements identified in the TITIP by the TIMMA, the Bay Bridge Forward initiative and the Core Capacity Transit Study have been incorporated into Plan Bay Area 2040, MTC's 2017 Regional Transportation Plan update and this I-80 SFOBB TCR (See Table 6).

In addition, AC Transit initiated the Bay Bridge Transbay Comprehensive Operations Analysis in January 2017, with the aim to evaluate the existing Transbay service and propose recommendations for future service changes, fare restructuring and capital infrastructure improvements and create an implementation plan in preparation for the move into the new Transbay Transit Center scheduled to open in Winter 2018. Once completed, the recommendations from this Bay Bridge Transbay Comprehensive Operations Analysis will also be incorporated as strategies to help achieve the Corridor Concept of the I-80 SFOBB Corridor.

Table 6. *SFOBB Planned and Programmed Projects*

Seg.	Description	Planned or Programmed	Location	Source
Motorized On Freeway				
2	SHOPP Mobility Program: Traffic Management System replacement and upgrade	Programmed	ALA 1.9-4.0	2016 SHOPP
4	**"Clear I-80"** I-80 redistribution structure: Improve sub-standard vertical clearances on I-80, I-580 and I-880 connecting ramps.	Programmed	ALA 3.32	2018 SHOPP Candidate
1-2	SHOPP Mobility Program: US 101 from I-280 to I-80, On I-80 from US 101 to YBI Substation	Planned	SF 3.95 - 7.8	2015 Ten-Year SHOPP Plan
2-3	SHOPP Mobility Program: SFOBB Toll Plaza Metering	Planned	ALA 0.0 – 2.0	2015 Ten-Year SHOPP Plan
4	SHOPP Drainage Program	Planned	ALA 3.2	2015 Ten-Year SHOPP Plan
1-2	Construct new westbound on- and off- ramps to the new eastern span; Seismically retrofit existing bridge structures.	Programmed	SF 5.54	Plan Bay Area 2040 (PBA 2040)

3-4	I-80 Express Lanes: Westbound Bay Bridge Approaches: Express Lanes on the four westbound SFOBB bridge approaches: (1) I-80 direct connector from Powell Street to SFOBB metering lights (1.8 miles); (2) I-580 from I-80 junction to metering lights (1 mile); (3) I-880/880S direct connector from 14th Street to metering lights (1.5 miles); (4) West Grand Ave/I-880 direct connector to metering lights (0.7 miles) - convert existing HOV lanes to express lanes	Programmed	ALA 0.00 – 3.32	Plan Bay Area 2040/Bay Bridge Forward
1-4	Active traffic management - upgrades to all existing ramp meters to adaptive, implementing hard shoulder running lanes, contra-flow lanes, queue warning, and ramp modifications; arterial operations - implementation of traditional time-of-day signal timing coordination, adaptive traffic signal control systems, transit signal priority, real-time traffic monitoring devices, ped/bike detection, queue-jump lanes, etc; connected vehicles - pilot deployments of vehicle-to-infrastructure (V2I) strategies; Managed Lanes Implementation Plan - pilot Express Bus service for routes not currently served by operators; expands park-and-ride facilities throughout the region; and supports pilot deployment of shared-mobility solutions.	Programmed	SF 5.54 – ALA 3.32	Plan Bay Area 2040/Bay Bridge Forward
1-4	Replace and rehabilitate the physical ramp meters, induction loops and cameras used to manage traffic real-time and to collect traffic data for planning purposes. This program also maintains and replaces telecommunication networks connecting all field devices with potential to transition from copper lines to fiber optics. Related to the SHOPP program (RTP ID 17-10-0025)	Programmed	SF 5.54 – ALA 3.32	Plan Bay Area 2040/Bay Bridge Forward
1-4	Program for deploying communications infrastructure to increase active traffic management along freight corridors and to/from the Port of Oakland	Programmed	SF 5.54 – ALA 3.32	Plan Bay Area 2040/Bay Bridge Forward
Transit				
4	West Grand HOV/Bus Only Lane – Convert a shoulder of West Grand Avenue on-ramp in Oakland to a bus/high-occupancy vehicle (HOV) lane to enable buses and HOVs direct access to the toll plaza	Programmed	ALA 3.32	Plan Bay Area 2040/Bay Bridge Forward
1-4	Planning and Conceptual Engineering: Advance planning and evaluation of recommendations that emerge from the Core Capacity Transit Study. Examples of projects under consideration include HOV lanes on the Bay Bridge for buses and carpools; BART/Muni/Caltrain tunnel turnbacks, crossover tracks, grade separations, or other operational improvements; and a second transbay transit crossing.	Planned/Future Study	SF 5.54 – ALA 3.32	Plan Bay Area 2040 / Core Capacity Transit Study
1-4	Treasure Island Mobility Management Program: Intermodal Terminal, Congestion Toll, Transit Service, Transit Capital: New ferry service between San Francisco and Treasure Island; AC Transit service between Treasure Island and Oakland; shuttle service on-Island; bike share on-Island; priced-managed parking on-Island; Travel Demand Management program; congestion pricing to the island.	Planned	SF 7.72	Plan Bay Area 2040/TITIP

N/A	Lifeline, Community Based Transportation Program, and Mobility Management: The Lifeline Transportation Program funds priority projects identified by residents in MTC's Communities of Concern through locally crafted Community-Based Transportation Plans. Projects can include community shuttles, transit services, streetscape improvements and bus stop amenities. Additionally, this program includes $90 million for a future mobility management program. Mobility management enables communities to monitor transportation needs and to link individuals to appropriate, cost-efficient travel options	Programmed	SF 7.72	Plan Bay Area 2040/ TITIP
N/A	Regional Transit Capital - Existing Conditions: This program includes capital maintenance and replacement funding for the region's transit operators. Types of projects in this category mostly include replacing vehicles and fixed-guideway assets like rail that have a direct impact on service. To a lesser extent, this program includes station upgrades and replacing other assets that do not directly affect revenue service.	Programmed	SF 7.72	Plan Bay Area 2040 / Core Capacity Transit Study
1-4	Environmental Studies for Bay Bridge Contraflow Lane: This project includes further environmental and planning studies for the proposed Bay Bridge Contraflow lane, which would convert an EB lane on the bottom deck of the Bay Bridge into a peak-period WB lane in the AM period. This lane would likely be used by buses and carpool vehicles.*	Planned	SF 5.54 – ALA 3.32	Plan Bay Area 2040 / Core Capacity Transit Study
N/A	AC Transit Fleet Expansion and Major Corridors: Purchases rolling stock for enhanced transbay, local, or express services.	Programmed	SF 5.54 – ALA 3.32	Plan Bay Area 2040 / Core Capacity Transit Study
N/A	BART Transbay Core Capacity Project: Communication-based train control (CBTC) system to safely enable closer headways and allow BART to operate more frequent service (12 minute frequencies);Expansion of the rail car fleet by 306 vehicles to add cars to existing trains and operate more frequent trains; Added traction power substations to allow more frequent service; Expansion of the Hayward Maintenance Complex (HMC) to provide storage and maintenance capability for the expanded fleet;	Programmed	SF 5.54 – ALA 3.32	Plan Bay Area 2040 / Core Capacity Transit Study
Active Transportation				
1-4	Bay Trail - non toll bridge segments: This program would complete the Bay Trail along the shoreline. This program does not include the segments of the Bay Trail that would cross the Bay via toll bridges.	Planned	SF 5.54 – ALA 3.32	Plan Bay Area 2040/The San Francisco Bay Trail
1-2	San Francisco-Oakland Bay Bridge West Span Bicycle, Pedestrian, and Maintenance Path - Environmental Only: This project continues environmental and design work on the proposed bicycle, pedestrian, and maintenance path on the west span of the Bay Bridge.	Planned	SF 5.54 – ALA 7.72	Plan Bay Area 2040/The San Francisco Bay Trail

* Caltrans has concerns with the feasibility of the contraflow lane concept and will defer our decision until the study is completed.

APPENDICES

APPENDIX A
GLOSSARY OF TERMS AND ACRONYMS

Acronyms

AADT – Annual Average Daily Traffic
AADTT – Annual Average Daily Truck Traffic
AB – Assembly Bill
ABAG – Association of Bay Area Governments
ADA – Americans with Disabilities Act of 1990
ADT – Average Daily Traffic
Alameda CTC – Alameda County Transportation Commission
ATP – Active Transportation Program
BAAQMD – Bay Area Air Quality Management District
BCDC – Bay Conservation and Development Commission
BRT – Bus Rapid Transit
BY – Base Year
Caltrans – California Department of Transportation
CARB – California Air Resources Board
C/CAG – City/County Association of Governments of San Mateo County
CCC – California Coastal Commission
CCTA – Contra Costa Transportation Authority
CEC – California Energy Commission
CESA – California Endangered Species Act
CFAC – California Freight Advisory Committee
CFMP – California Freight Mobility Plan
CMA – Congestion Management Agencies
CMAQ – Congestion Mitigation and Air Quality
CMP – Congestion Management Plan
CSFAP – California Sustainable Freight Action Plan
CSMP – Corridor System Management Plan
CEQA – California Environmental Quality Act
CSS – Context Sensitive Solutions
CTC – California Transportation Commission
CTP – California Transportation Plan
DD – Deputy Directive
DSMP – District System Management Plan
ECA – Essential Connectivity Areas
FAST Act – Fixing America's Surface Transportation Act
FASTLANE – Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies grant program
FHWA – Federal Highway Administration
FSR – Feasibility Study Report
FSTIP – Federal Statewide Transportation Improvement Program
FTA – Federal Transit Administration
FTIP – Federal Transportation Improvement Program
GHG – Greenhouse Gas
GIS – Geographic Information System
HCP – Habitat Conservation Plan

HOT – High Occupancy Toll lane
HOV – High Occupancy Vehicle lane
HY – Horizon Year
ICM – Integrated Corridor Mobility
IGR – Intergovernmental Review
ITIP – Interregional Transportation Improvement Program
ITS – Intelligent Transportation System
ITSP – Interregional Transportation Strategic Plan
KPRA – Kingpin-to-Rear-Axle
LOS – Level of Service
MAP-21 – Moving Ahead for Progress in the 21st Century
MPO – Metropolitan Planning Organizations
MTC – Metropolitan Transportation Commission
NOA – Naturally Occurring Asbestos
NCCP – Natural Community Conservation Plan
NEPA – National Environmental Policy Act
NHS – National Highway System
NHFN – National Highway Freight Network
NMFN – National Multimodal Freight Network
NVTA – Napa Valley Transportation Authority
PAED – Project Approval/Environmental Document
PBA – Plan Bay Area
PCA – Priority Conservation Area
PDA – Priority Development Area
PFN – Primary Freight Network
PID – Project Initiation Document
PIR – Project Initiation Report
PM – Post Mile
PM 2.5 – Particulate Matter 2.5 micrometers or less in diameter
PM 10 – Particulate Matter 10 micrometers or less in diameter
PSR – Project Study Report
PR – Project Review
PTSF – Percent Time Spent Following
RHNA – Regional Housing Needs Allocation
RTP –Regional Transportation Plan
RTIP – Regional Transportation Improvement Program
RTPA – Regional Transportation Planning Agencies
SACOG – Sacramento Area Council of Governments
SAFETEA-LU – Safe, Accountable, Flexible and Efficient Transportation Equity Act, a Legacy for Users
SB – Senate Bill
SCS – Sustainable Community Strategies
SCTA – Sonoma County Transportation Authority
SFCTA – San Francisco County Transportation Authority
SHOPP – State Highway Operation Protection Program
SHS – State Highway System
SJCOG – San Joaquin Council of Governments
SMF – Smart Mobility Framework
SR – State Route
STA – Solano Transportation Authority
STIP – State Transportation Improvement Program

STP – Surface Transportation Program
STRAHNET – Strategic Highway Network
TAM – Transportation Authority of Marin
TCIF – Trade Corridors Improvement Fund
TCRP – Transit Cooperative Research Program
TEA-21 – Transportation Equity Act for the 21st Century
TCR – Transportation Concept Report
TIGER – Transportation Investment Generating Economic Recovery
TDM – Transportation Demand Management
TMP – Transportation Management Plan
TMS – Transportation Management System
TSN – Transportation System Network
VMT – Vehicle Miles Traveled
VTA – Santa Clara Valley Transportation Authority
VPH – Vehicles per Hour

Definitions

AADT – Annual Average Daily Traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30th. Traffic counting is generally performed by electronic counting instruments moved from location throughout the state in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.

Base Year – The year that the most current data is available to the Districts.

Bikeway Class I (Bike Path) – Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.

Bikeway Class II (Bike Lane) – Provides a striped lane for one-way bike travel on a street or highway.

Bikeway Class III (Bike Route) – Provides for shared use with pedestrian or motor vehicle traffic.

Bikeway Class IV (Separated Bikeway/Cycle Track) – Provides for exclusive use for bicycles by separating bikeway from motor vehicle traffic.

Bottlenecks – A bottleneck is a location where traffic demand exceeds the effective carrying capacity of the roadway. In most cases, the cause of a bottleneck relates to a sudden reduction in capacity, such as a lane drop, merging and weaving, driver distractions, a surge in demand, or a combination of factors.

Capacity – The maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions.

Capital Facility Concept – The 20-25 year vision of future development on the route to the capital facility. The capital facility can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility (Intercity Passenger Rail, Mass Transit Guideway etc.), grade separation, and new managed lanes.

Conceptual Project – A conceptual improvement or action is a project that is needed to maintain mobility or serve multimodal users, but is not currently included in a fiscally constrained plan and is not currently programmed. It could be included in a General Plan or in the unconstrained section of a long-term plan.

Corridor – A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, bicycle, pedestrian, and transit route alignments. Off system facilities are included as informational purposes and not analyzed in the TCR.

Facility Concept – Describe the Facility and strategies that may be needed within 20-25 years. This can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility, Non-capacity increasing operational improvements, new managed lanes, conversion of existing managed lanes to another managed lane type or characteristic, TMS field elements, Transportation Demand Management and Incident Management.

Facility Type – The facility type describes the State Highway facility type. The facility could be freeway, expressway, conventional, or one-way city street.

Freight Generator – Any facility, business, manufacturing plant, distribution center, industrial development, or other location (convergence of commodity and transportation system) that produces significant commodity flow, measured in tonnage, weight, carload, or truck volume.

Horizon Year – The year that the future (20-25 years) data is based on.

Intermodal Freight Facility – Intermodal transport requires more than one mode of transportation. An intermodal freight facility is a location where different transportation modes and networks connect and freight is transferred (or "transloaded") from one mode, such as rail, to another, such as truck.

ITS – Intelligent Transportation System improves transportation safety and mobility and enhances productivity through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent transportation systems encompass a broad range of wireless and wire line communications-based information and electronics technologies to collect information, process it, and take appropriate actions.

LOS – Level of Service is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort, and convenience. Six levels of LOS are generally categorized.

Multi-modal – The availability of transportation options using different modes within a system or corridor, such as automobile, subway, bus, rail, or air.

Peak Hour – The hour of the day in which the maximum volume occurs across a point on the highway.

Peak Hour Volume – The hourly volume during the highest hour traffic volume of the day traversing a point on a highway segment. It is generally between 6 percent and 10 percent of the ADT. The lower values are generally found on roadways with low volumes.

Planned Project – A planned improvement or action is a project in a fiscally constrained section of a long-term plan, such as an approved Regional or Metropolitan Transportation Plan (RTP or MTP), Capital Improvement Plan, or measure.

Post Mile – A post mile is an identified point on the State Highway System. The milepost values increase from the beginning of a route within a county to the next county line. The milepost values start over again at each county

line. Milepost values usually increase from south to north or west to east depending upon the general direction the route follows within the state. The milepost at a given location will remain the same year after year. When a section of road is relocated, new milepost (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "milepost equations" are introduced at the end of each relocated portion so that mileposts on the reminder of the route within the county will remain unchanged.

Programmed Project – A programmed improvement or action is a project in a near-term programming document identifying funding amounts by year, such as the State Transportation Improvement Program or the State Highway Operations and Protection Program.

Route Designation – A route's designation is adopted through legislation and identifies what system the route is associated with on the State Highway System. A designation denotes what design standards should apply during project development and design. Typical designations include but not limited to National Highway System (NHS), Interregional Route System (IRRS), Scenic Highway System,

Rural – Fewer than 5,000 in population designates a rural area. Limits are based upon population density as determined by the U.S. Census Bureau

Segment – A portion of a facility between two points.

TDM – Transportation Demand Management programs designed to reduce or shift demand for transportation through various means, such as the use of public transportation, carpooling, telework, and alternative work hours. Transportation Demand Management strategies can be used to manage congestion during peak periods and mitigate environmental impacts.

TSMO – Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects, describing the system operations and management elements that may be needed within 20-25 years. This can include Non-capacity increasing operational improvements (auxiliary lanes, channelization's, turnouts, etc.), conversion of existing managed lanes to another managed lane type or characteristic (e.g. HOV lane to HOT lane), TMS Field Elements, Transportation Demand Management, and Incident Management.

Urban – 5,000 to 49,999 in population designates an urban area. Limits are based upon population density as determined by the U.S. Census Bureau.

Urbanized – Over 50,000 in population designates an urbanized area. Limits are based upon population density as determined by the U.S. Census Bureau.

VMT – Is the total number of miles traveled by motor vehicles on a road or highway segments.