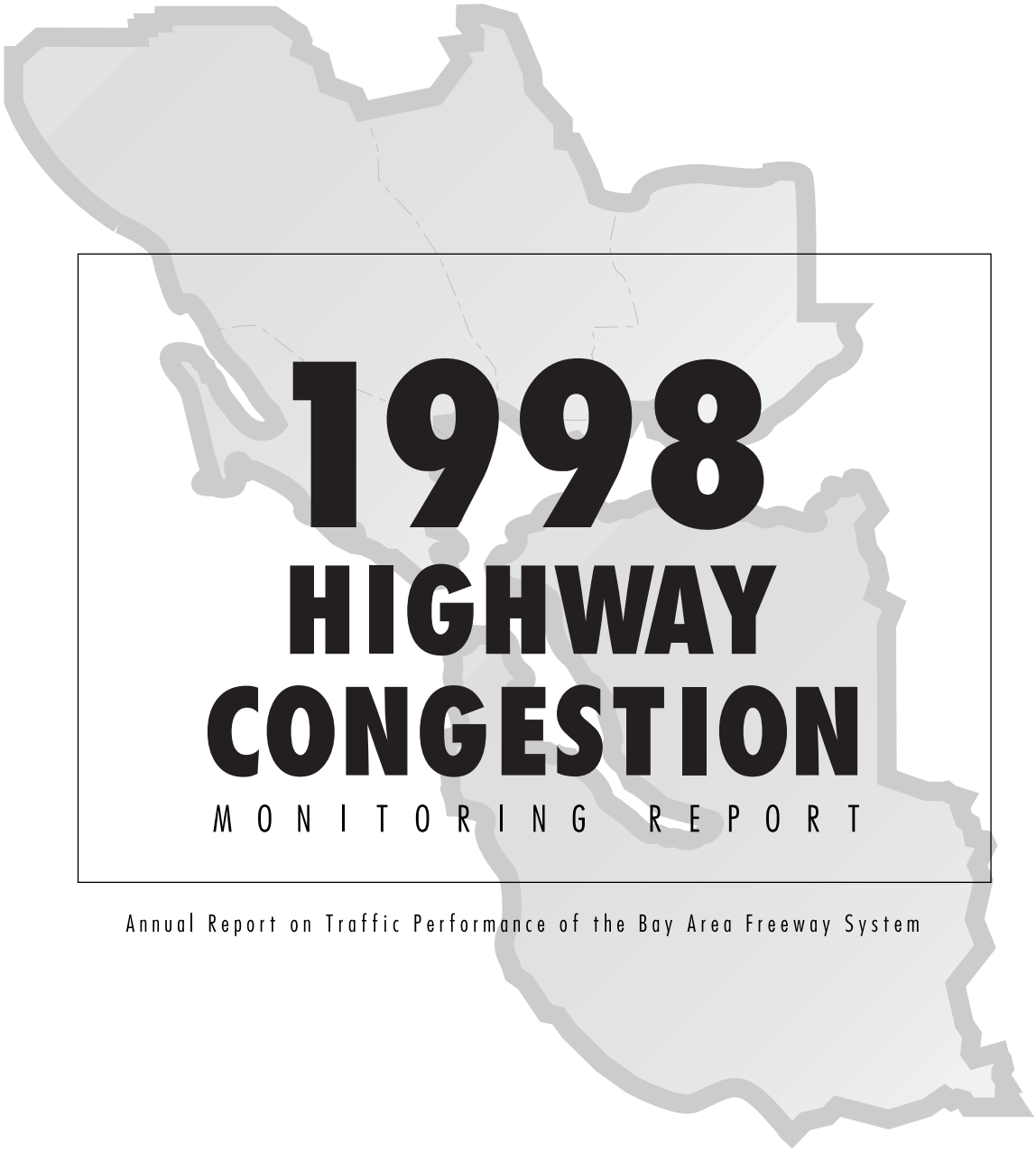


1998 HIGHWAY CONGESTION MONITORING REPORT

Annual Report on Traffic Performance of the Bay Area Freeway System

December 1998

California Department of Transportation
District 4, Oakland
Office of Highway Operations

TABLE of CONTENTS

Caltrans District 4 Highway Congestion Monitoring Program

This report is also available at the Caltrans website at:
http://www.dot.ca.gov/dist4/

Get The Picture. Listen To The Signs.

1998 TRAFFIC PERFORMANCE of the BAY AREA FREEWAY SYSTEM

Congestion on Bay Area freeways increased by 24 percent since the last HICOMP (Highway Congestion Monitoring Program) report was issued two years ago. On a typical weekday in 1998, commuters spent an estimated 112,000 vehicle-hours in congestion, costing motorists about $1,249,000 per day. All counties in the region experienced an increase in congestion, with the greatest increases occurring in Alameda and Santa Clara Counties. Congestion regularly occurs at 145 different freeway locations each day, affecting 327 directional miles of freeway. (A one-mile length of freeway has two directional miles, irrespective of the number of lanes.)

In 1998, construction work was completed on several major highway projects, with corresponding improvements in traffic congestion. The final segments of the I-880 High Occupancy Vehicle (HOV) lanes through Fremont and the Cypress Freeway Replacement Project in Oakland were completed, and three of the new freeway-to-freeway connectors at the 680/24 interchange in Walnut Creek also opened. Along the Eastshore Freeway in Alameda and Contra Costa Counties, the completion of the I-80 HOV lane marked the culmination of almost two decades of planning, design and construction work to bring relief to what has historically been the most congested corridor in the Bay Area. As a result, the morning commute over the Sunol Grade on Highway 680 in Alameda County now holds the distinction of being the worst congestion location in the region.

In spite of the completion of major highway improvements, regional freeway congestion has continued to grow. Overall daily delays in the Bay Area are almost twice the 58,600 vehicle-hours of delay per day recorded ten years ago, when the 1988 HICOMP report was released. At that time, the daily cost of delay was estimated to be $548,000. One of the more apparent effects of increased congestion is the expanded duration of commute periods. In many locations, peak periods now last up to five hours.

This annual report documents the traffic performance of the freeway system within the nine counties of the San Francisco Bay Area. The information is based on the Caltrans District 4 Office of Highway Operations travel time inventory for the year 1998. The purpose of compiling this data is to identify locations of recurrent traffic congestion and to document the magnitude of this congestion.

The Highway Congestion Monitoring Program (HICOMP) database provides information useful in evaluating freeway performance for the purpose of establishing priorities and directing resources towards the areas most impacted. This data may also be used to evaluate effectiveness of the various strategies used to reduce congestion by comparing congestion before and after their implementation.

HICOMP reports have been issued every year since 1981, except 1985 and 1997. No report was issued in 1997 due to staff reductions for this effort. ***Caltrans District 4 would like to express its appreciation to the Metropolitan Transportation Commission and the Congestion Management Agencies of the Bay Area counties for their support in obtaining funding to produce the 1998 report.***

Alameda County

Daily congestion in Alameda County increased by 18% since 1996, or about 6,400 more vehicle-hours of delay per day county-wide. The morning commute on southbound Route 680 over the Sunol Grade now ranks as the worst congestion location in the Bay Area, although average daily delays there grew only modestly since 1996, increasing by 270 vehicle-hours of delay. Morning peak period conditions continue to worsen on westbound Route 92 over the San Mateo Bridge, where daily delay grew by 1,380 vehicle-hours in the last two years. An even greater increase occurred on Route 84 over the Dumbarton Bridge, where congestion during the morning commute increased by more than 1,790 vehicle-hours per day. The duration of congestion on both bridges increased by several hours at the approaches to the toll plazas.

Westbound Route 80 approaching the Bay Bridge Toll Plaza experienced a significant decrease in congestion during weekday morning peak periods due to the completion of the I-80 HOV lane, although this corridor continues to be one of the most congested in the Bay Area. On eastbound Route 80, congestion during the afternoon peak periods increased significantly in 1998. This increase was due in part to changes in lane configurations to accommodate the completion of the Cypress Freeway connectors and the eastbound I-80 HOV lane. Congestion has begun to occur during the morning peak periods on northbound Route 880 approaching the Bay Bridge toll plaza. Congestion on Route 980, however, has been eliminated due to the opening of the Cypress Freeway replacement. Motorists on southbound Route 880 through Hayward and Fremont experienced improved conditions during the morning commute, with congestion decreasing by 1,350 vehicle-hours per day due to the completion of the carpool lane and activation of ramp metering.

Contra Costa County

County-wide, the overall magnitude of congestion increased 12% in comparison to conditions in 1996. Delays in eastern Contra Costa County increased by 30%, where there was a significant increase in congestion on Route 4 in Pittsburg during both the morning and afternoon commutes, and on Route 680 in Concord/Walnut Creek during the morning commute. On Route 680, congestion was reduced in the northbound direction after the completion of several widening projects, but increased in the southbound direction due to continuing construction activities at various locations. Traffic congestion patterns along the Route 680 corridor will continue to change in 1999 as ongoing projects are completed. Evening peak period delays on eastbound Route 24 have largely been eliminated with the opening of the widened connector to northbound Route 680. Congestion along Route 80 in Contra Costa county decreased as a result of the opening of the HOV lanes in both directions.

Marin County

Congestion in Marin County increased by 14% between 1996 and 1998. The increase was mostly on southbound Route 101 from Novato to central San Rafael during the morning peak period and on westbound Route 580 approaching Route 101 during the evening peak period. Congestion decreased, however, on northbound Route 101 between Sir Francis Drake Boulevard and Route 580 due to the opening of an auxiliary lane.

In July 1998, the HOV lane hours were extended on Southbound Route 101 during the morning peak period and on northbound Route 101 during the evening peak period. The public response was very negative, due to the perception that the extended hours caused the increased traffic congestion recorded during the fall of 1998. As a result, the original hours were restored in December. Studies conducted before and after the change in hours do not bear out this perception.

Napa County

There was no significant freeway congestion in this county.

San Francisco County

Freeway congestion in San Francisco increased only moderately compared to 1996, growing by about 400 vehicle-hours per day. This increase was partly due to increased freeway demand resulting from the re-opening of the Central Freeway. During the morning peak period, the commute on Route 101 in the vicinity of Hospital Curve (at the Army Street interchange) worsened in both directions. Motorists headed toward the Bay Bridge during the afternoon commute period also experienced more congestion.

San Mateo County

Overall delay in San Mateo County increased by about 2,800 vehicle-hours compared to 1996, representing a net increase of about 40% over the last two years. Eastbound congestion on the San Mateo-Hayward Bridge continues to increase during the evening peak period, accounting for approximately one-third of the total added congestion in San Mateo County. Other areas experiencing significant increased congestion include the morning commutes on southbound Route 101 between San Bruno and Burlingame and on southbound Route 280 from Daly City to Route 380. New recurrent congestion was observed on northbound Route 280 between Sandhill Road and Woodside Road during the evening peak period.

Santa Clara County

Congestion in Santa Clara County increased by about 8,800 vehicle-hours of delay compared to the year 1996, representing an increase of about 43% in the two-year period. Most of this increase occurred during the evening commute, with southbound Route 101 between Great America Parkway and Tully Road, and northbound Route 101 from Route 237 to University Avenue experiencing the greatest changes. Several locations on Route 87 and Route 680 also experienced large increases in delay during the evening peak, as did southbound Route 280 from Page Mill Road to Magdalena. Congestion in the morning commute period grew as well, but only moderately.

Solano County

An increase in congestion was recorded on northbound Route 680 near the 80/680 interchange during the evening peak period, as well as at the approaches to the toll plazas at the Carquinez and Benicia-Martinez Bridges.

Sonoma County

Average daily traffic congestion in Sonoma County was about 55% heavier in 1998 than in 1996. Congestion on Route 101 north of the Route 101/12 interchange in Santa Rosa increased during the evening commute period, and two new congestion locations were recorded on: (1) northbound Route 101 north of Route 12/101 interchange and, (2) on southbound Route 101 south of Route 12/101 interchange, during the morning peak period. There was an increase in congestion on southbound Route 101 near Lakeville Highway in Petaluma during the morning peak period.

TEN WORST CONGESTION LOCATIONS in 1998 *

	County-Route, direction, peak, limits of congestion	Delay (veh-hrs)	1996 rank
1	Ala-680, southbound, A.M.; Sunol Rd to south of Route 262	7,240	2
2	Ala/CC-80, westbound, A.M.; Appian Way to Ala/SF Co. line	5,840	1
3	SM/Ala-92, eastbound, PM.; Foster City Blvd to Route 880	3,730	6
4	Mrn-101, southbound, A.M.; So. Novato Blvd to Route 580	3,240	5
5	Ala-880, southbound, A.M.; Auto Mall Parkway to Dixon Landing Rd	3,030	3
6	Ala-84, westbound, A.M.; Newark Blvd to Dumbarton Bridge Toll Plaza	2,920	17
7	SCl-101, southbound, P.M.; Great America Parkway to 13th Street	2,880	15
8	SCl-237, eastbound, P.M.; North First St to Route 880	2,570	4
9	CC-680, southbound, A.M.; Geary Rd to Route 24	2,390	7
10	SF-80, eastbound, P.M.; 80/101 interchange to Sterling St	2,230	8

* *These "rankings" are somewhat subjective in that the congestion locations shown are for routes in which continuous stop & go conditions occur with few, if any, breaks in the queue. Thus, corridors which have equally severe delays but where congestion is broken into several segments may rank lower in this type of comparison.*

Locations from 1996 Ten Worst list not appearing on 1998 list

1996 rank	County-Route, direction, peak, limits of congestion	1998 rank
9	SM-101, northbound, P.M.; Whipple Ave to Third Ave	13
10	Mrn-101, northbound, P.M.; Route 1 to San Pedro Rd	27

METHODOLOGY

The information contained in this report represents *average* freeway traffic conditions on a typical weekday in 1998. On many routes, there is substantial day-to-day variation in travel conditions. Congestion can be either recurrent or non-recurrent. Recurrent congestion is generally typified by everyday rush-hour stop & go conditions, occurring when the demand for the freeway's capacity is exceeded. Non-recurrent congestion is caused by incidents, maintenance work or construction activities where normal capacity is temporarily reduced, or holidays or special events where peak demands are higher than normal. Non-recurrent congestion is not included in this inventory.

The primary purpose of the program is document freeway traffic conditions; it is not the intention of this program to determine the specific causes of congestion at individual locations. Thus, specific bottleneck locations are not identified in this report. In addition, traffic conditions on conventional highways, expressways, and local streets are not recorded as part of this program. A more detailed description of the data collection and analysis methodology is provided in a September 1996 report by the Caltrans District 4 Office of Highway Operations entitled "Congestion Monitoring Procedures & Guidelines."

DEFINITION OF CONGESTION

Congestion is defined as a condition where the average speed drops below 35 mph for 15 minutes or more on a typical weekday. Three parameters are used in this report to describe the congestion.

1) **MAGNITUDE** is the difference in travel time between 35 mph and the lower congested speed, expressed in terms of daily vehicle-hours of delay.

2) **EXTENT** is the length of freeway segment, by direction, experiencing speeds below 35 mph for 15 minutes or more, expressed in terms of directional miles of congestion.

3) **DURATION** is the length of time a freeway segment remains congested, expressed in hours, as shown in Exhibits 2 and 3.

DATA COLLECTION

The "floating car" method is used to gather field data on freeway congestion. Cars equipped with a laptop computer that records speeds, distances, and times are driven along the section of the freeway under study. Trips are generally spaced 15 to 30 minutes apart, and are made on segments approximately seven miles long. Monitoring is conducted during peak commute periods, generally Tuesday through Thursday, and at least twice per year (usually in the Spring and Fall). This provides a data set which allows the calculation of average congestion conditions for each route segment. The data collected are reduced and plotted on travel time and speed profile charts, a sample of which is shown in Exhibit 1. Shown on each chart are a schematic layout of the freeway section, the worst-case speed profile for each direction, and a graph showing the variation of travel time over the entire section during each peak period for each direction.

ANALYSIS

An estimate is made of the aggregate delay for each freeway segment in which congestion occurs. Calculations are based on the delay data gathered from the floating car runs and estimated bottleneck capacities. This essentially provides a single numerical value which combines the total number of vehicles affected and the overall amount of congestion. It should be noted that the estimates are based on a limited number of observations, and it can be expected that the actual delay may vary. At many locations, the delay varied considerably from day to day as well as seasonally.

The average daily "cost" of congestion is developed using a combination of travel time and excess fuel costs. Travel time costs are based on $0.15 per minute per vehicle. The excess fuel cost is based on an estimate of 1.719 gallons of fuel for each vehicle-hour of delay. Both factors are based on uniform statewide values, and are adjusted periodically for inflation. No adjustments have been made to account for higher costs of living in certain areas of the state.

Capacities of 2,200 vehicles per hour per lane (vphpl) were used for most bottlenecks. This value is based on direct field observations at numerous freeway bottlenecks throughout the Bay Area, and is indicative of the more aggressive driving behavior seen in many urban areas throughout the country. Bottleneck capacities of 1,800 vphpl were used in HICOMP reports through 1991, and 2,000 vphpl until 1995.

Table 1

TOTAL DISTRICT DAILY DELAY

District 4 Highway Congestion Monitoring Program

	1998	1997	1996	1995	1994	1993	1992
Daily Delay (vehicle-hours)	**112,000**	—	90,000	68,500	60,400	63,800	64,100
Change from prior year	**+24%**	—	+31%	+14%	-5%	-1%	+11%
No. of congested directional miles	**327**	—	284	268	208	217	234
Change from prior year	**+15%**	—	+6%	+29%	-4%	-7%	+1%
Cost per day	**$1,249,000**	—	$841,000	$641,000	$565,000	$597,000	$600,000

Table 2

DAILY DELAY BY COUNTY

District 4 Highway Congestion Monitoring Program

	1998	1997	1996	1995	1994	1993	1992
Alameda	**41,800**	—	35,400	25,600	18,800	19,400	21,000
Contra Costa	**14,000**	—	12,500	13,400	15,100	16,500	12,700
Marin	**7,200**	—	6,300	4,900	6,700	5,500	5,300
San Francisco	**6,900**	—	6,500	6,700	7,700	7,700	9,400
San Mateo	**9,800**	—	7,000	3,100	1,400	1,400	1,900
Santa Clara	**29,300**	—	20,500	13,000	8,800	12,800	13,100
Solano	**400**	—	70	130			
Sonoma	**2,800**	—	1,800	1,700	1,900	500	600

NOTES

(1) No HICOMP report was prepared in 1997.

(2) Daily delays were based on an estimated bottleneck capacity of 1,800 veh/hour/lane from 1988 through 1991. From 1992 to 1995, a bottleneck capacity of 2,000 veh/hour/lane was used. A bottleneck capacity of 2,200 has been used since 1996.

(3) Through 1994, congestion data was collected for Santa Cruz County, and was not collected for Solano County. Beginning in 1995, data was collected for Solano County, but not for Santa Cruz County.

Table 3

DIRECTIONAL MILES of CONGESTION BY COUNTY

District 4 Highway Congestion Monitoring Program

	1998	1997	1996	1995	1994	1993	1992
Alameda	**83**	—	85	76	53	57	59
Contra Costa	**56**	—	51	51	52	54	52
Marin	**22**	—	19	20	17	17	20
San Francisco	**20**	—	20	23	16	17	22
San Mateo	**33**	—	27	20	16	14	18
Santa Clara	**93**	—	70	61	41	51	60
Solano	**1**	—	1	2			
Sonoma	**19**	—	11	15	14	5	3
TOTALS	**327**	—	284	268	208	217	234

NOTE

(1) No HICOMP report was prepared in 1997.

(2) Through 1994, congestion data was collected for Santa Cruz County, and was not collected for Solano County. Beginning in 1995, data was collected for Solano County, but not for Santa Cruz County.

Table 4A

AM PEAK PERIOD CONGESTION LOCATIONS

Ordered by County and Route

COUNTY	ROUTE	DIR	DELAY(veh-hr)	LOCATION
ALA	24	E	770	Broadway to Caldecott Tunnel
ALA	24	W	610	Broadway to Route 580
ALA	84	S	2920	Newark Blvd to Dumbarton Bridge Toll Plaza
ALA	92	W	1540	Route 880 to Industrial Blvd & at Toll Plaza
ALA	238	N	150	Route 580 to Route 185
ALA	580	W	1200	Vasco to Route 84 & Livermore to El Charro
ALA	580	W	250	Redwood Rd to Route 238
ALA	580	W	290	MacArthur to Fruitvale
ALA	580	W	350	Route 24 to Route 80
ALA	680	S	7240	Sunol Rd to south of Route 262
ALA	880	N	1840	South of W. Grand Ave to Bay Bridge Toll Plaza
ALA	880	N	340	High St to Oak St
ALA	880	N	610	Alvarado to Route 92
ALA	880	S	960	Route 238 to Route 92
ALA	880	S	250	Whipple to Alvarado
ALA	880	S	420	Decoto/Rte 84 to Mowry
ALA	880	S	3030	Auto Mall Parkway to Dixon Landing
CC	4	W	380	Bailey Rd to Willow Rd
CC	4	W	1020	Lone Tree Way to Railroad Rd
CC	24	W	510	Camino Pablo to Fish Ranch Rd
CC/ALA	80	W	5840	Route 4 to Ala/SF County Line
CC	242	S	1180	Concord Ave to Route 680
CC	680	N	30	At Rudgear Rd
CC	680	S	1020	Rudgear Rd to Sycamore Rd
CC	680	S	2390	Geary Rd to Route 24
CC	680	S	1540	Concord/Contra Costa Blvd to Route 242
MRN	101	S	80	At Sir Francis Drake Blvd
MRN	101	S	3240	South Novato Blvd to Route 580
MRN/SF	101	S	1360	Sausalito to Golden Gate Bridge Toll Plaza
SCL	17	N	310	Lark Ave to Camden Ave
SCL	85	N	1700	Route 280 to Fremont Ave & at Route 101
SCL	101	N	420	Cochrane Rd to Burnett Ave
SCL	101	N	140	At Tully Road
SCL	101	N	1250	Route 280 to Route 880
SCL	101	N	550	Guadalupe Pkwy to Montague Expwy
SCL	101	N	160	Ellis St to Rte 85
SCL	101	S	230	Ellis St to Lawrence Expwy

Table 4A

AM PEAK PERIOD CONGESTION LOCATIONS

Ordered by County and Route

COUNTY	ROUTE	DIR	DELAY(veh-hr)	LOCATION
SCL	280	N	60	At Route 101
SCL	280	S	60	At Saratoga Ave
SCL	680	N	300	King Rd to Mckee Rd
SCL	880	N	1040	Bascom Ave to Brokaw Rd
SCL	85	N	270	At Bernal Rd (metered connector from NB 101)
SCL	237	E	170	At Mathilda Ave & at North First St
SCL	237	W	530	Route 880 to Zanker Ave
SCL	280	N	400	Route 87 to Route 880
SCL	280	N	680	Saratoga Ave to Foothill Expwy
SF	80	E	260	Route 101 to Sterling St
SF	101	N	800	From Alemany to Army St
SF	101	N	40	South Van Ness to Fell St
SF	101	S	690	Army St to Harney Way
SF	280	N	160	Geneva Ave to Route 101
SF	280	N	110	At Route 101 and at 4th St and 6th St off-ramps
SM	92	W	40	Route 101 & at Alameda De Las Pulgas
SM	101	N	480	Route 92 to Third Ave
SM	101	S	520	Route 92 to Hillsdale Blvd
SM	101	S	220	At Poplar Ave
SM	101	S	450	San Bruno Ave to Millbrae Ave
SM	101	S	150	At Old Bayshore Blvd
SM/SCL	101	S	1050	Woodside Rd to Route 85
SM	280	S	70	Farm Hill Blvd to Woodside Rd
SM	280	S	750	John Daly Blvd to Route 380
SON	101	N	190	Todd Rd to Route 12
SON	101	S	1240	Old Redwood Hwy to South Petaluma Blvd
SON	101	S	260	College Ave to Route 12

TABLE 4B
PM PEAK PERIOD CONGESTION LOCATIONS
Ordered by County and Route

COUNTY	ROUTE	DIR	DELAY(veh-hr)	LOCATION
ALA	24	E	1590	Broadway to Caldecott Tunnel
ALA/SF	80	E	840	At Route 580
ALA	80	E	1840	Route 580 to Gilman St
ALA	80	W	400	University to Route 580/880 interchange
ALA	80	W	490	At Bay Bridge Toll Plaza
ALA	84	N	90	At Route 880
ALA	238	N	150	At Route 580/238 interchange
ALA	238	S	310	Route 880 to Hesperian Blvd
ALA	580	E	210	Oakland Rd to Coolidge Ave
ALA	580	E	1700	Foothill to El Charro Rd
ALA	580	W	220	Strobridge to Route 238
ALA	680	N	480	At Scott Creek & at Durham
ALA	880	N	180	W. Grand Ave to Bay Bridge Toll Plaza
ALA	880	N	820	Route 262 to Auto Mall Parkway
ALA	880	N	590	At Stevenson & Thornton to Fremont
ALA	880	N	1220	Alvarado to Tennyson
ALA	880	N	720	Route 92 to Hesperian Blvd
ALA	880	S	420	Fremont to Decoto
ALA	880	S	300	Hegenberger Road to Hesperian Blvd
CC	4	E	620	Route 242 to Port Chicago Highway
CC	4	E	1120	Bailey Rd to Loveridge Rd
CC	24	E	530	First St to Route 680
CC	24	W	380	Gateway Blvd to Fish Ranch Rd
CC	80	E	740	Central Ave to Route 4
CC	680	N	210	Bollinger Canyon Rd to Sycamore Rd
CC	680	N	50	Rudgear Rd to Route 24
CC	680	N	150	Route 24 to Treat Blvd
CC	680	N	1130	Arthur Rd to Benicia-Martinez Bridge Toll Plaza
CC	680	S	300	No. Main St. to Route 24
MRN	101	S	900	Waldo Tunnel to Golden Gate Bridge Toll Plaza
MRN	101	N	1130	Paradise Drive to Villa/Lincoln Ave
MRN	101	N	750	De Long Ave to Redwood Sanitary Rd
MRN	580	W	590	At Route 101
SCL	17	S	70	At Lark Ave
SCL	85	S	110	At Union Ave
SCL	85	S	110	Saratoga Ave to Winchester Blvd
SCL	85	S	590	Stevens Creek Blvd to De Anza Blvd

TABLE 4B
PM PEAK PERIOD CONGESTION LOCATIONS
Ordered by County and Route

COUNTY	ROUTE	DIR	DELAY(veh-hr)	LOCATION
SCL	85	S	1050	Evelyn Ave to Fremont Ave
SCL	87	S	1290	Route 280 to Alma Ave & at Curtner Ave
SCL	101	S	1030	Route 85 to Scheller Rd
SCL	101	N	190	Montague Expwy to Great America Pkwy
SCL	101	N	370	Route 237 to Route 85
SCL/SM	101	N	1140	Middlefield Way to University Ave
SCL	101	S	1270	San Antonio Rd to Route 85
SCL	101	S	2880	Great America Pkwy to 13th St
SCL	101	S	700	Route 280/680 to Tully Rd
SCL	237	E	2570	North First St to Route 880
SCL	237	W	310	Lawrence Expwy to Route 101 & at Zanker Rd
SCL	280	N	290	11th St to Route 87
SCL	280	N	600	Meridian Ave to Route 880
SCL	280	S	80	Route 87 to 11th St
SCL	280	S	390	Moorpark Ave to Southwest Expwy
SCL	280	S	110	Route 85 to De Anza Blvd
SCL	280	S	790	Page Mill Expwy to Magdalena Ave
SCL	680	N	1230	Landess Ave to Scott Creek Rd
SCL	680	S	1100	Route 237 to Mckee Rd
SCL	880	N	950	Montague Expwy to Dixon Landing & at Route 101
SCL	880	S	1230	Great Mall Pkwy to Brokaw Rd
SCL	880	S	340	Route 101 to Bascom Ave
SF	80	E	2230	Route101 to Sterling St
SF	80	W	190	Fremont St to Route 101
SF	101	N	970	Route 280 to Route 80
SF	101	N	60	Route 80 to Fell St
SF	101	S	80	South Van Ness to Route 80
SF	280	S	290	Route 101 to Monterey
SF	280	S	160	6th St to Pennsylvania Ave
SM/ALA	92	E	3730	Foster City Blvd to Route 880
SM	92	W	290	Route 101 to Hilldale Blvd & at Ralston Ave
SM	101	N	260	At Broadway
SM	101	N	780	Whipple Ave to Ralston Ave
SM	101	N	930	Route 92 to Third Ave
SM	101	S	90	At Poplar Ave
SM	101	S	150	Woodside Rd to Marsh Rd & at Willow Rd
SM	101	S	510	Millbrae Ave to Broadway

TABLE 4B
PM PEAK PERIOD CONGESTION LOCATIONS
Ordered by County and Route

COUNTY	ROUTE	DIR	DELAY(veh-hr)	LOCATION
SM	280	N	180	Sandhill Rd to Woodside Rd
SM	280	N	460	Crystal Springs Ave to Westborough Blvd
SM	380	W	110	Route 101 to Route 280
SOL	80	E	270	At Carquinez Bridge Toll Plaza
SOL	680	N	120	Cordelia Rd to Route 80
SON	101	N	510	Santa Rosa Ave to College Ave
SON	101	S	560	Mendocino Ave to Corby Ave

TABLE 5
SUMMARY of DAILY DELAY and CONGESTED LENGTH
Ordered by Route

ROUTE	DAILY DELAY (vehicle-hours)			DIRECTIONAL MILES of CONGESTION		
	A.M.	P.M.	TOTAL	A.M.	P.M.	TOTAL
1						
4	1,400	1,740	3,140	8.5	6.9	15
12						
13						
17	390	70	460	1.7	0.4	2
24	1,890	2,500	4,390	3.7	6.7	10
29						
37						
80	6,100	7,000	13,100	10.6	16.6	27
84	2,920	90	3,010	2.3	0.3	3
85	1,970	1,860	3,830	4.4	5.8	10
87		1,290	1,290	0.0	2.9	3
92	1,580	4,020	5,600	2.6	9.7	12
101	13,520	15,260	28,780	47.5	52.2	100
237	700	2,880	3,580	3.0	4.9	8
238	150	460	610	1.2	1.4	3
242	1,180		1,180	1.8		2
280	2,290	3,350	5,640	16.1	16.1	32
380		110	110		0.9	1
505						
580	2,090	2,720	4,810	6.2	6.3	13
680	12,520	4,770	17,290	24.5	22.1	47
780						
880	8,410	6,770	15,180	18.0	21.1	39
980						
TOTALS	**57,110**	**54,890**	**112,000**	**152**	**174**	**327**

CONTACTS

Caltrans District 4 Highway Congestion Monitoring Program

Albert Yee ..... (510) 286-4542
District Office Chief, Office of Highway Operations

Peter Lau ..... (510) 286-6157
District Branch Chief

Marvin Maltez ..... (510) 286-4646
District 4 Hicomp Coordinator

Area A *(San Francisco, northwestern Alameda & Contra Costa Counties)*

Rod Oto ..... (510) 286-4540
District Branch Chief

Jun Magbitang ..... (510) 286-4650
Area A Hicomp Coordinator

Area B *(southern & eastern Alameda County)*

Peter Lau ..... (510) 286-6157
District Branch Chief

Marvin Maltez ..... (510) 286-4646
Area B Hicomp Coordinator

Area C *(San Mateo, Santa Clara Counties)*

H. David Seriani ..... (510) 286-4653
District Branch Chief

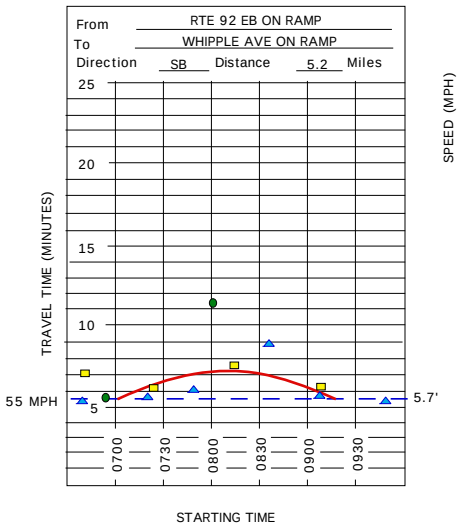
Adolfo Zepeda ..... (510) 286-4636
Area C Hicomp Coordinator

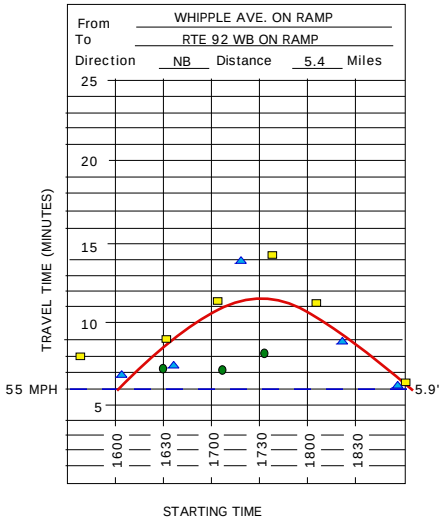
Area D *(Marin, Napa, Sonoma, Solano, eastern Contra Costa Counties)*

Michael W. Church ..... (510) 286-4642
District Branch Chief

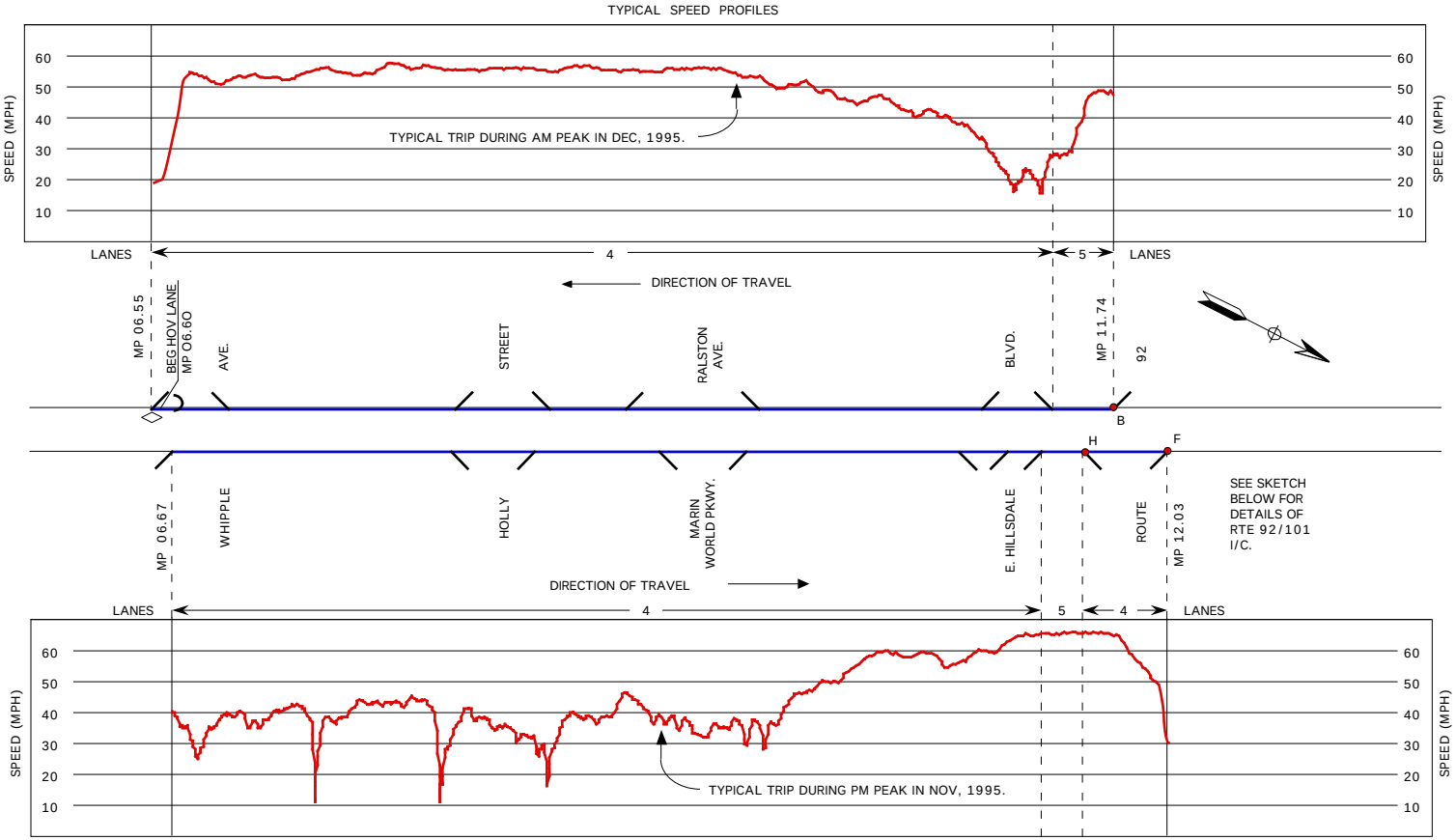
Roberto Fuertes ..... (510) 286-4620
Area D Hicomp Coordinator

OBSERVED TRAVEL TIMES





TYPICAL SPEED PROFILES



HORIZ. SCALE : 1" = 1 MILE

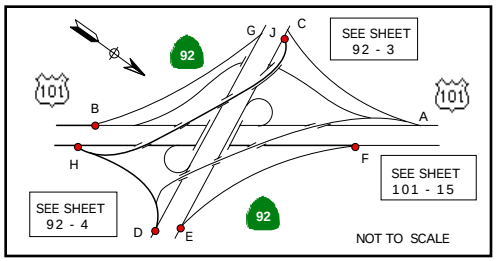
Notes

1.- Unless otherwise indicated, travel times at all other hours are normally delay free

2.- ◇ Left lane HOV lane. (Carpools & buses only) 5-9 AM & 3-7 PM, M-F. SB.

3.- Travel times at Rte 101/92 I/C.

	DISTANCE (MILES)	TRAVEL TIME (MIN.)		
		FREE FLOW	AM PEAK	PM PEAK
H to F	0.45			
H to J	0.46			
H to D	0.25			



TRAVEL TIME AND SPEED

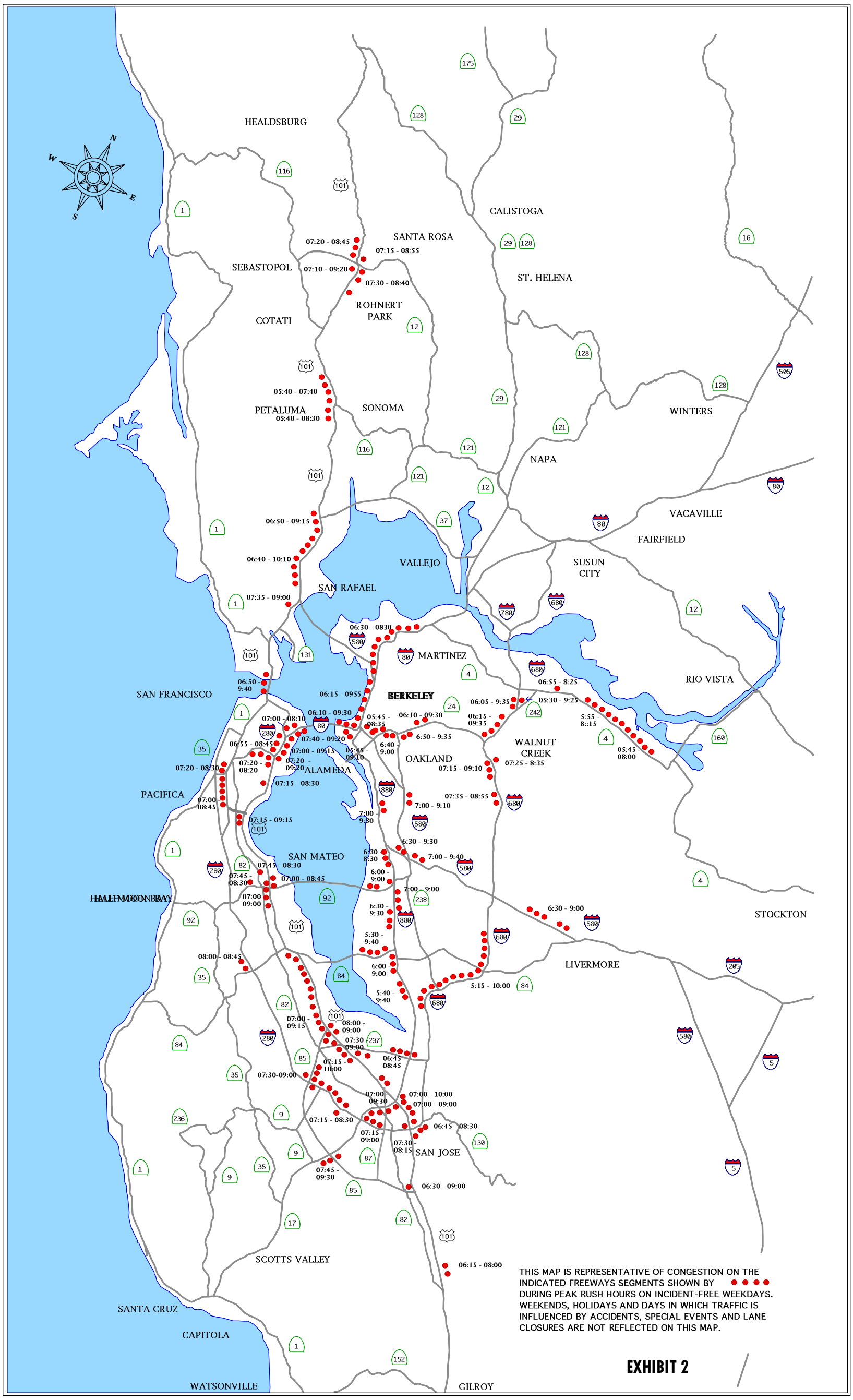
ROUTE: **SM 101**

LIMITS: WHIPPLE AVE. TO RTE 92

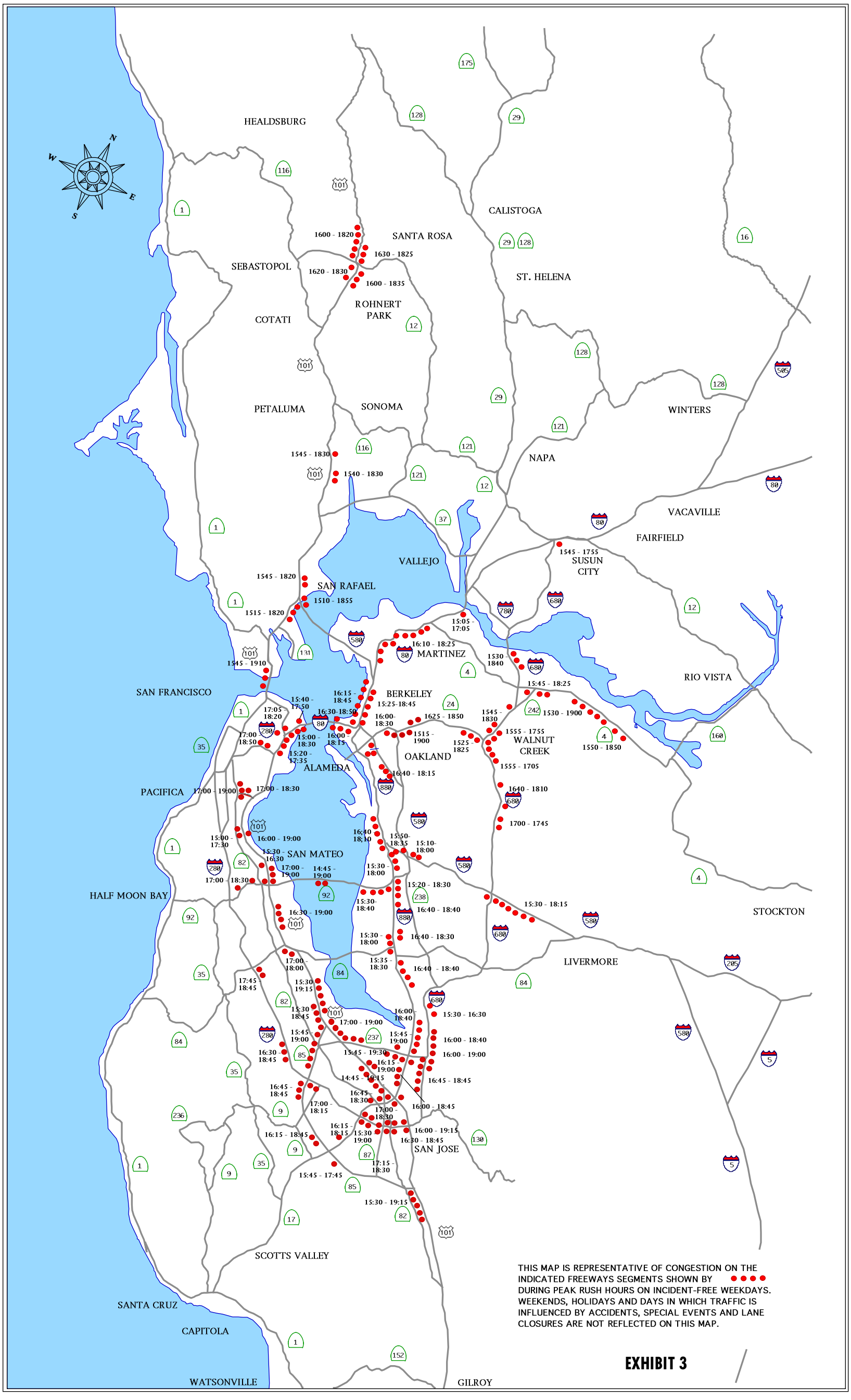
SHEET No: **101 - 14** DATE: **DEC 98**

CALTRANS DIST. 04
OFFICE OF HIGHWAY OPERATIONS

EXHIBIT 1



DISTRICT 4
SAN FRANCISCO BAY AREA FREEWAYS
1998 A.M. CONGESTION MAP



DISTRICT 4
SAN FRANCISCO BAY AREA FREEWAYS
1998 P.M. CONGESTION MAP