State Highway Congestion Monitoring Program
(HICOMP)

Annual Data Compilation

Caltrans

September 2007

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Foreword

The purpose of the State Highway Congestion Monitoring Program (HICOMP) annual data compilation is to measure congestion occurring on urban area freeways in California. The California Department of Transportation (Department) has been publishing the HICOMP data compilation since 1987.

The congestion information is currently required by statute. In September 2002, the Governor signed into law Assembly Bill 2535 (Diaz) which states:

"The Department shall, within existing resources, collect, analyze, and summarize highway congestion data and make it available upon request to California regional transportation planning agencies, congestion management agencies, and transit agencies."
(California Government Code Section 14032.6)

The 2005 HICOMP data compilation presents congestion data on California urban freeway segments with a history of recurrent congestion. It does not include congestion on other State highways or local surface streets. Non-recurrent congestion such as holiday, maintenance or special-event generated traffic congestion is also not included. This document represents weekday traffic conditions and is useful for finding general trends and making regional comparisons of freeway performance.

Estimates presented herein rely on a limited number of observations. Probe vehicles are driven on congested segments of the urban freeways in the spring and fall in the morning and the evening peak commuter traffic to collect the average daily congestion figures. This is labor intensive and only a minimal number of actual runs are conducted. Actual conditions vary daily and seasonally.

Acronyms

Annual Vehicle Miles of Travel = AVMT

California Department of Transportation = Department

Congested Directional Miles = CDM

Daily Vehicle Hours of Delay = DVHD

Global Positioning System = GPS

Highway Congestion Monitoring Program = HICOMP

High Occupancy Vehicle = HOV

Metropolitan Transportation Commission = MTC

Traffic Accident Surveillance and Analysis System = TASAS

Vehicle Miles of Travel = VMT

1. Introduction

Transportation facility construction and expansion have not kept pace with the growth in travel demand. This has resulted in an increase in urban freeway congestion over the past decade in most of California's metropolitan areas. From the public's perspective, the most noticeable effect of congestion on urban mobility is increased traffic delay. "Rush-hour" traffic in larger cities no longer occurs only during the traditional morning and evening peak periods, but extends into the normal day.

Congestion can be described as either *recurrent* or *non-recurrent*. Recurrent congestion is regular, everyday peak period delays that occur when the capacity of a freeway is exceeded by travel demands and low speeds result. Irregular events such as accidents, sporting events, maintenance, or short-term construction, can cause non-recurrent congestion. The purpose of HICOMP is to present recurrent congestion data, but assumes that non-recurrent congestion is roughly equal to recurrent congestion. In some cases, this document discusses non-recurrent congestion, but only to arrive at an approximation of the impacts of total congestion.

An objective of the Department is to increase the efficiency of existing roads and other transportation facilities to reduce delays. The data compiled in this document helps the Department to meet this objective by identifying the locations and extent of recurrent congestion on California's urban freeways. The HICOMP database provides the information needed to evaluate freeway performance, so the Department can establish priorities and direct resources to areas with the most congestion. Data obtained from congestion monitoring may also be used to evaluate the effectiveness of technologies and strategies used to reduce congestion by comparing the changes in congestion before and after the implementation of new systems and programs.

1.1 Definition of Recurrent Congestion

HICOMP defines recurrent congestion as: a condition lasting for 15 minutes or longer where travel demand exceeds freeway capacity and vehicular speeds are 35 miles per hour (mph) or less during peak commute periods on a typical incident-free weekday. This document uses three parameters to describe recurrent congestion:

1. *Magnitude:* The difference in time between the time it takes to travel a segment at the recorded congested speed and the travel time at 35 mph. Daily vehicle-hours of delay (DVHD) is the term used to express the magnitude of the delay.

2. *Extent:* The length of a freeway segment, by direction, that experiences speeds below 35 mph for 15 minutes or more. Extent is expressed in terms of congested directional miles (CDM). It is important to note that a one-mile stretch of roadway contains two directional miles (one mile for each direction of travel). Directional miles differ from lane-miles, which is the number of lanes in a given direction multiplied by the length of the segment in that direction.

3. *Duration:* The length of time expressed in hours that the directional segment remains congested.

The HICOMP reports the magnitude and extent of congestion. Maps included in this document show the location and duration of congestion for all the Department's districts experiencing congestion on freeways. Districts 1, 2, and 9 are not included in the documents as traffic conditions in those districts lack the congestion magnitude of the other districts.

1.2 Data Collection Methodologies

The Department uses two principal methods to collect congestion data on urban freeways. The most common method is to drive specially equipped cars at regular intervals along freeways during the hours of recurrent peak period congestion. This is called the *floating vehicle* method because the vehicles "float" with the traffic flow. It is also sometimes called the *probe vehicle* method because the vehicles are "probes" in the traffic flow.

A floating vehicle system consists of either a fixed transmission sensor mounted in the engine compartment or a global positioning system (GPS). The transmission sensor or tachometer, counts the number of wheel rotations in one second and sends that data to a laptop computer. Software on the computer then translates this data into meaningful time, distance, and travel speed information. A GPS system uses satellite technology to identify the location of the vehicle. Computer software identifies the freeway, direction of travel, and average speed of the vehicle.

The second method is to use automatic detection that collects data from fixed, regularly spaced electronic sensors embedded in or placed alongside urban area freeways. Currently, over 3,100 directional miles of California's freeways are monitored using automatic detection.

The most common type of automatic detection uses inductive loops (commonly referred to as "loop detectors"). New technologies are also being employed including radar, infrared sensors, and vehicle transponder tags, such as those used for toll roads or bridges.

Exhibit 1-1 shows each district that reports congestion for the HICOMP, the counties monitored in that district, and the type of technology used to collect congestion data. Appendix "A" at the end of this compilation contains a map showing all the Department's districts and the counties that make up those districts.

Exhibit 1-1: Data Collection Methodology by District Reporting HICOMP Results

District (Office Location) Counties Monitored	Floating Car	Automatic Detection
District 3 (Marysville) El Dorado, Placer, Sacramento	**100%**	
District 4 (Oakland) Alameda, Contra Costa, Marin, San Francisco San Mateo, Santa Clara, Solano, Sonoma	**100%**	
District 5 (San Luis Obispo) Monterey, San Luis Obispo Santa Cruz, Santa Barbara	**100%**	
District 6 (Fresno) Fresno, Kern	**100%**	
District 7 (Los Angeles) Los Angeles, Ventura	**6%**	**94%**
District 8 (San Bernardino) Riverside, San Bernardino	**82%**	**18%**
District 10 (Stockton) San Joaquin, Stanislaus	**100%**	
District 11 (San Diego) San Diego	**11%**	**89%**
District 12 (Irvine) Orange	**100%**	
Average	**59%**	**41%**

The raw field data, combined with hourly traffic volumes, are converted into average DVHD and CDM. The following formula produces the total delay associated with each segment:

Daily vehicle hours of delay = V × D × T

Where,
V = Volume in vehicles per hour = Number of lanes × Vehicles per hour per lane (VPHPL)[1],
D = Duration of congestion in hours and
T = Travel time (in hours) to cover a given distance under congested conditions minus the travel time at 35 mph.

[1] VPHPL is the design of a road segment. Most districts use a value of 2,000 VPHPL, although District 4 (Oakland) has been using a value of 2,200 VPHPL since 1995.

2. Statewide Summary

Since last year's HICOMP data compilation, California urban freeway recurrent congestion increased by three percent from 513,539 DVHD to 530,091 DVHD. The CDM of urban area freeways showed an increase of around six percent over the same period, growing from 1,916 in 2004 to 2,028 in 2005.

Exhibits 2-1 through 2-4 summarize these congestion results for each district:

- Daily vehicle-hours of delay (Exhibit 2-1)
- Congested directional miles (Exhibit 2-2)
- Total directional miles (Exhibit 2-3)
- Congested directional miles to total directional miles (Exhibit 2-4)

As shown in Exhibit 2-1, delay statewide increased to 530,091 DVHD in 2005 compared to 513,539 in 2004. Districts 7 (Los Angeles) and 11 (San Diego) show declines in delay, no change was reported in District 5 (San Luis Obispo) because of a lack of data collection, and the remaining districts all show increases in congestion.

Two districts make up 57 percent of all DVHD in California. District 7 accounts for around 31 percent of all delay, while District 4 contributes another 26 percent. Districts 11 and 12 account for 30 percent of delay, and the remaining districts contribute about 13 percent.

Exhibit 2-2 shows the CDM for each district. The CDM statewide grew by six percent from last year to 2,028 miles in 2005. District 12 contributed the most to this increase by adding 64 CDM between 2004 and 2005 (34 percent increase), District 8 added 32 miles (33 percent increase), District 3 added 24 CDM (20 percent increase), and District 4 added 17 miles (4 percent increase). District 11 declined by 42 miles (13 percent decrease), and District 6 declined by 16 miles (42 percent decrease). District 7 makes up 33 percent of all congested miles statewide with District 4 adding 20 percent. The Southern California Districts 11 and 12 make up 27 percent of CDM with the remaining districts making up the remaining 20 percent.

Exhibit 2-3 shows total urban area freeway directional miles for each district. Between 1995 and 2005, statewide total directional miles grew by 294 miles (nearly seven percent). This increase is due to a number of factors; principally because new freeway miles were built and existing urban road miles were upgraded to "freeway" status. In 1995, the Department restructured district boundaries to match county lines. This change meant that some districts “lost” miles that were allocated to other districts. District 10 was most affected by this change.

Exhibit 2-4 illustrates the extent to which congestion is present on the State’s freeway network. These results are calculated by taking the CDM (Exhibit 2-2) and dividing by the total directional miles (Exhibit 2-3).

As shown in Exhibit 2-4, 44 percent of the State's total urban freeway miles in 2005 were congested during typical peak hours, which is three percent higher than in the year 2004. Two-thirds of District 12’s urban freeway miles were congested during peak hours. Around 62

percent of District 7's urban freeway miles were congested, and 61 percent of District 11's urban freeway miles were congested during peak hours. For each of the remaining districts, less than 45 percent of all urban freeway miles were congested during peak hours.

Exhibit 2-5 and Exhibit 2-6 display the delay and congested mile trends for each district. Exhibit 2-5 shows that District 7 leads the State in DVHD, but delay in District 4 grew rapidly between 1994 and 2000. Between 2000 and 2003, District 4's delay declined dramatically, but has increased since that time. District 12 has been showing consistent delay increases since 2001.

Exhibit 2-6 shows District 7 accounting for the most CDM with District 4 showing steady growth between 1994 and 2000. Unlike its delay, District 4's CDM has remained somewhat flat since the year 2000. District 11's CDM grew dramatically during the late 1990s, but has shown relatively flat growth on average since the year 2000.

As illustrated in Exhibit 2-7, statewide DVHD generally grew steadily between 1987 and 2000. Since 2000, growth in both delay and CDM has remained relatively flat.

Exhibit 2-8 shows how counties compare in 2004 and 2005 in terms of delay. The top ten most congested counties remained largely unchanged since last year with Los Angeles, Orange, San Diego, and Alameda counties remaining the most congested. Riverside and Santa Clara Counties switched positions in 2005 and San Bernardino moved into the list replacing San Mateo County.

Exhibit 2-9 shows approximate costs that congestion imposes on Californians. It is assumed that non-recurrent congestion is equal to recurrent congestion. Therefore, total delay is twice the measured recurrent delay. In 2005, the estimated delay cost California drivers and passengers more than $18.9 million per day in lost time and excess fuel consumption. This estimated delay added 530 tons of emissions to the air, compared to what would have been emitted at un-congested speeds. These estimates are based on the most recent available data.

Exhibit 2-10 shows changes in annual vehicle miles traveled (VMT) from 1987 to 2005 on highways operated by the State. Despite fluctuations in congestion levels, the State's VMT has increased steadily since the late 1980s.

Exhibit 2-1: Daily Vehicle-Hours of Delay by District 1995-2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Percent of Statewide 2005
District 3	3,172	3,356		7,809	8,907	10,896	16,200	14,872	13,226	17,712	21,830	4%
Annual % Change	19%	6%		53%	14%	22%	49%	-8%	-11%	34%	23%	
District 4	68,500	90,000		112,000	128,300	177,600	155,500	147,900	121,800	124,190	135,700	26%
Annual % Change	13%	31%		12%	15%	38%	-12%	-5%	-18%	2%	9%	
District 5	n/a			2,020	2,598	5,154	6,016	5,937	6,453	6,453	6,453	1%
Annual % Change				23%	29%	98%	17%	-1%	9%	0%	0%	
District 6	223			75	257	334	522	508	507	292	296	0%
Annual % Change	0%			-31%	245%	30%	56%	-3%	0%	-42%	1%	
District 7	132,162			142,857	128,623	166,294	171,438	165,861	178,491	171,438	165,141	31%
Annual % Change	3%			3%	-10%	29%	3%	-3%	8%	-4%	-4%	
District 8	13,231			29,368	33,384	38,244	32,901	36,601	30,035	27,480	35,284	7%
Annual % Change	2%			30%	14%	15%	-14%	11%	-18%	-9%	28%	
District 10	n/a			2,711	3,292	3,930	3,340	4,127	4,064	3,685	5,010	1%
Annual % Change					21%	19%	-15%	24%	-2%	-9%	36%	
District 11	34,215			42,354	44,203	51,712	58,027	64,595	67,163	65,768	62,796	12%
Annual % Change	0%			7%	4%	17%	12%	11%	4%	-2%	-5%	
District 12	63,973			78,906	78,796	71,286	66,522	71,376	83,002	96,522	97,581	18%
Annual % Change	0%			7%	0%	-10%	-7%	7%	16%	16%	1%	
Totals	315,476			418,100	428,360	525,450	510,467	511,777	504,741	513,539	530,091	100%
Annual % Change	4%			10%	2%	23%	-3%	0%	-1%	2%	3%	

No statewide report developed

Exhibit 2-2: Urban Area Freeway Congested Directional Miles by District 1995-2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Percent of Statewide 2005
District 3	55	60		98	83	95	121	112	124	121	145	7%
Annual % Change	2%	9%		28%	-15%	14%	28%	-8%	11%	-2%	20%	
District 4	268	284		327	338	390	379	369	339	394	411	20%
Annual % Change	29%	6%		7%	3%	15%	-3%	-3%	-8%	16%	4%	
District 5	n/a			19	16	41	38	42	53	53	53	3%
Annual % Change				33%	-17%	159%	-6%	9%	28%	0%	0%	
District 6	13			2	13	9	20	16	23	38	22	1%
Annual % Change	18%			-49%	645%	-27%	113%	-17%	42%	65%	-42%	
District 7	556			566	566	617	664	620	648	648	669	33%
Annual % Change	0%			1%	0%	9%	8%	-7%	5%	0%	3%	
District 8	97			90	99	168	106	121	97	98	130	6%
Annual % Change	-24%			-3%	10%	71%	-37%	14%	-20%	1%	33%	
District 10	n/a			19	27	20	51	51	46	40	52	3%
Annual % Change					39%	-27%	159%	1%	-9%	-14%	31%	
District 11	69			125	172	289	273	269	326	334	292	14%
Annual % Change	5%			22%	38%	69%	-6%	-1%	21%	3%	-13%	
District 12	133			204	295	269	254	233	212	190	254	13%
Annual % Change	-4%			15%	45%	-9%	-6%	-8%	-9%	-10%	34%	
Totals	1,191			1,449	1,608	1,898	1,905	1,832	1,867	1,916	2,028	100%
Annual % Change	2%			7%	11%	18%	0%	-4%	2%	3%	6%	

No statewide report developed

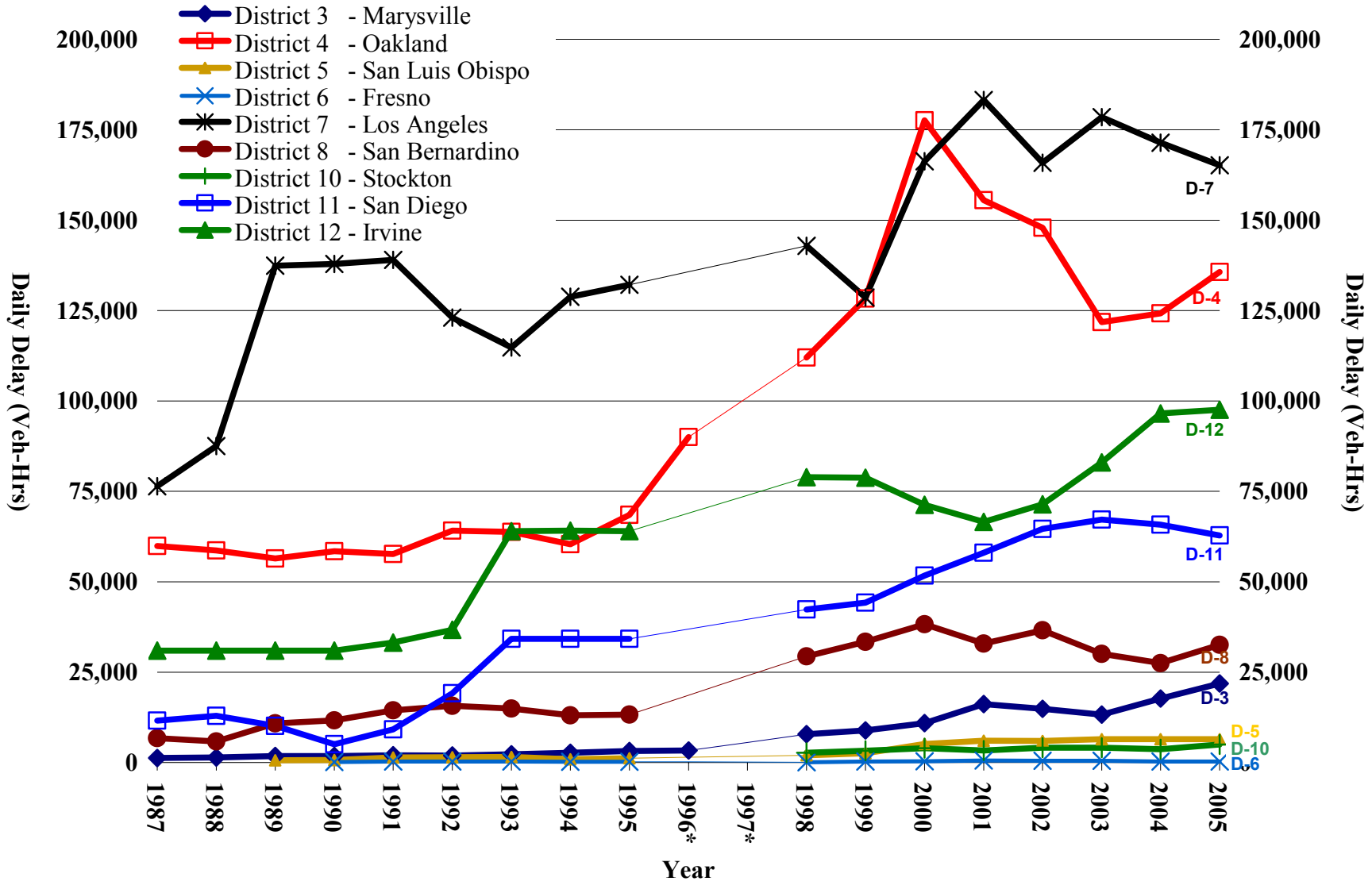
Exhibit 2-3: Urban Area Freeway Total Directional Miles by District 1995-2005

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Percent of Statewide 2005
District 3	319	319	319	319	319	317	317	320	325	325	325	7%
Annual % Change	0%	0%	0%	0%	0%	-1%	0%	1%	2%	0%	0%	
District 4	1,064	1,064	1,064	1,075	1,075	1,074	1,074	1,074	1,104	1,104	1,104	24%
Annual % Change	6%	0%	0%	1%	0%	0%	0%	0%	3%	0%	0%	
District 5	226	226	226	226	226	226	226	226	229	229	229	5%
Annual % Change	22%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	
District 6	239	239	239	241	255	260	268	268	269	269	269	6%
Annual % Change	15%	0%	0%	1%	6%	2%	3%	0%	0%	0%	0%	
District 7	1,059	1,059	1,059	1,061	1,061	1,065	1,065	1,075	1,085	1,085	1,085	23%
Annual % Change	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	
District 8	523	526	526	542	542	542	555	572	572	572	572	12%
Annual % Change	8%	0%	0%	3%	0%	0%	2%	3%	0%	0%	0%	
District 10	170	170	178	178	178	178	182	182	185	185	185	4%
Annual % Change	-37%	0%	5%	0%	0%	0%	2%	0%	2%	0%	0%	
District 11	449	453	453	458	458	464	464	464	478	478	478	10%
Annual % Change	-5%	1%	0%	1%	0%	1%	0%	0%	3%	0%	0%	
District 12	291	315	340	357	376	376	376	376	386	386	386	8%
Annual % Change	5%	8%	8%	5%	5%	0%	0%	0%	3%	0%	0%	
Totals	4,340	4,370	4,403	4,457	4,489	4,503	4,527	4,557	4,634	4,634	4,634	100%
Annual % Change	2%	1%	1%	1%	1%	0%	1%	1%	2%	0%	0%	

Exhibit 2-4: Congested Directional Miles to Total Directional Miles by District 1995-2005

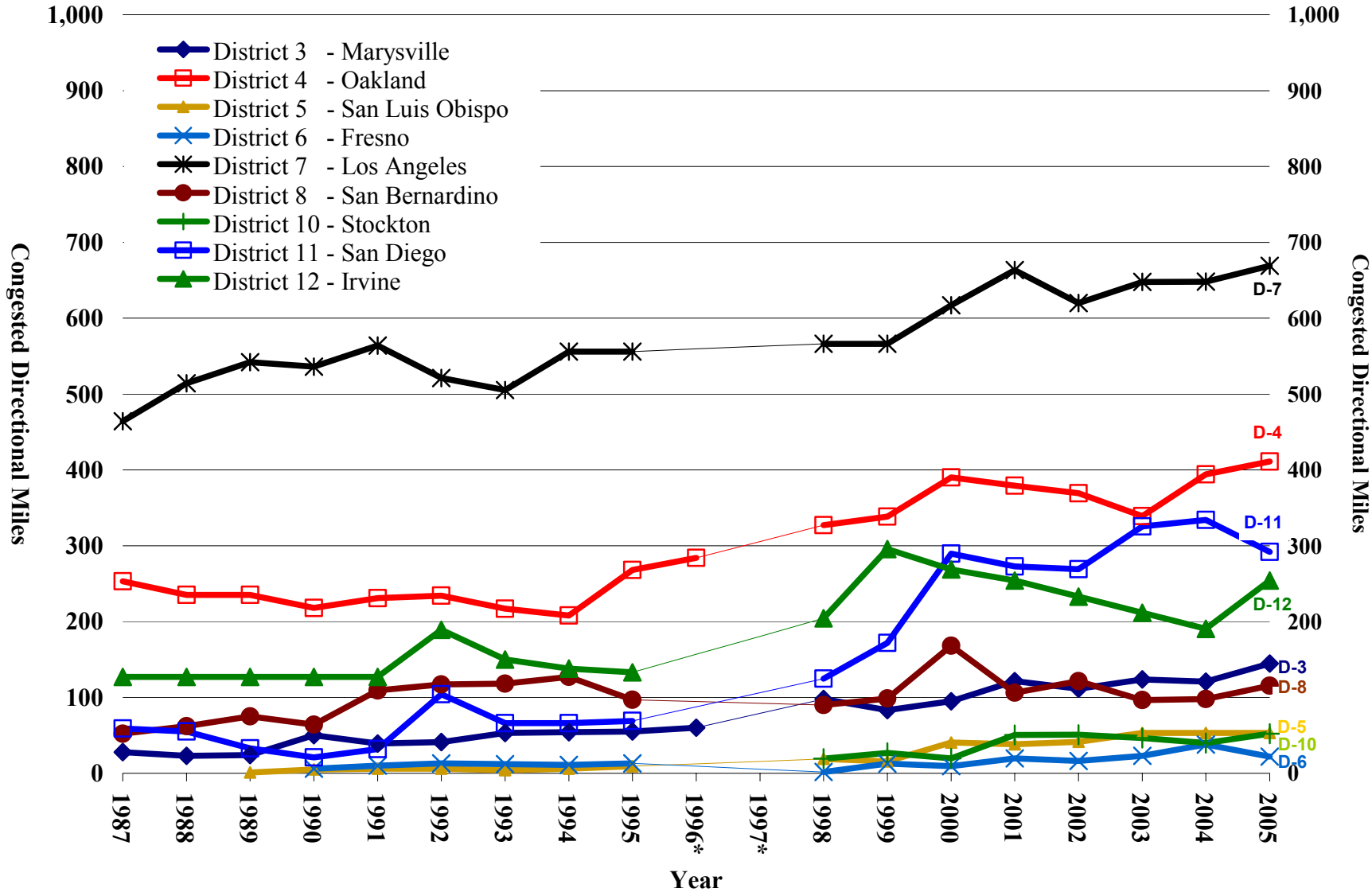
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
District 3	17%	19%	No statewide report developed	31%	26%	30%	38%	35%	38%	37%	44%
District 4	25%	27%		30%	31%	36%	35%	34%	31%	36%	37%
District 5	n/a			8%	7%	18%	17%	18%	23%	23%	23%
District 6	5%			1%	5%	4%	7%	6%	9%	14%	8%
District 7	53%			53%	53%	58%	62%	58%	60%	60%	62%
District 8	19%			17%	18%	31%	19%	21%	17%	17%	23%
District 10	n/a			11%	15%	11%	28%	28%	25%	22%	28%
District 11	15%			27%	38%	62%	59%	58%	68%	70%	61%
District 12	46%			57%	79%	71%	68%	62%	55%	49%	66%
Totals	27%			33%	36%	42%	42%	40%	40%	41%	44%

Exhibit 2-5: Daily Vehicle-Hours of Delay Trends by District 1987-2005



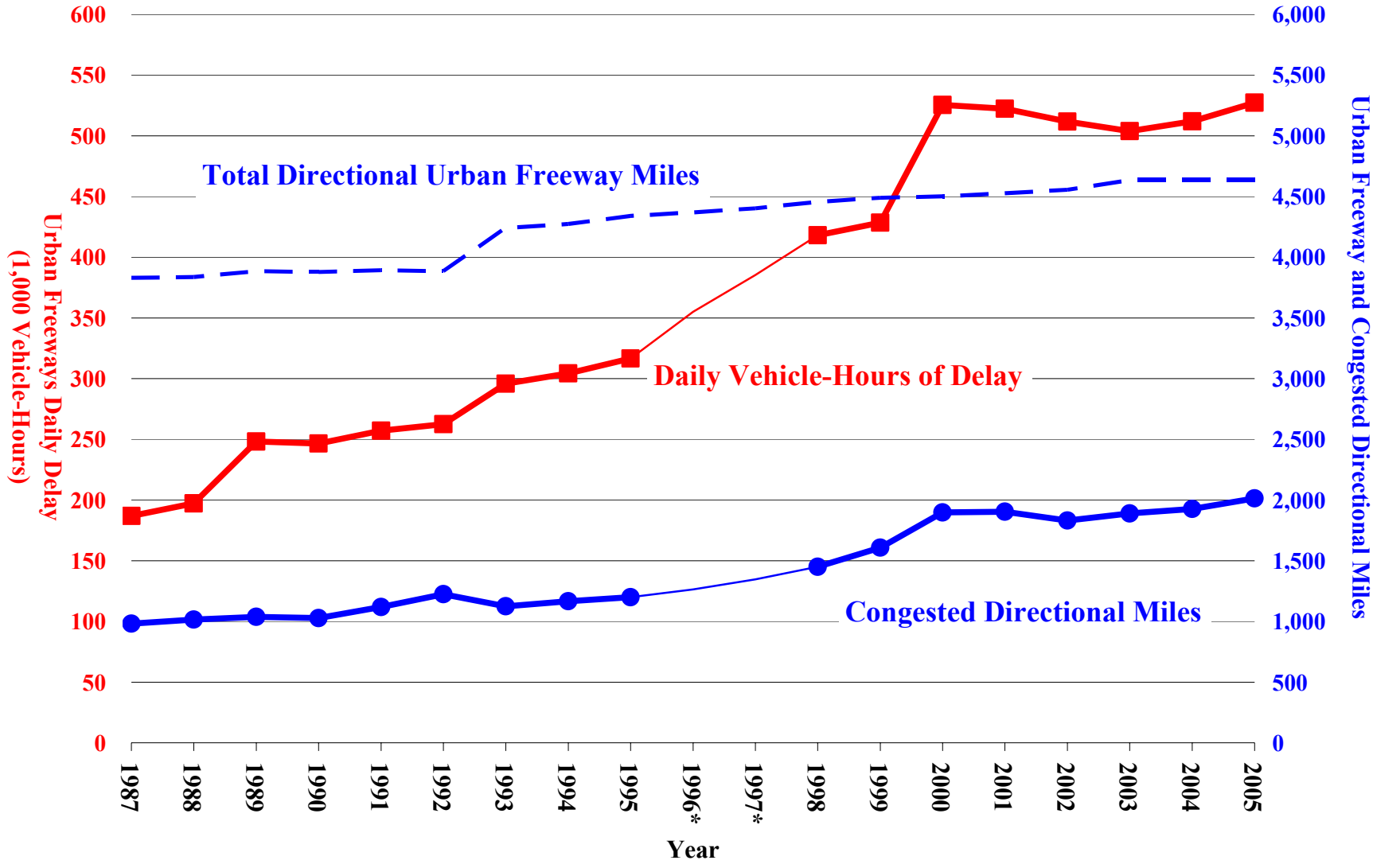
* No statewide HICOMP reporting was done in 1996 and 1997. Districts 3 and 4 produced district reports in 1996.

Exhibit 2-6: Congested Directional Mile Trends by District 1987-2005



* No statewide HICOMP reporting was done in 1996 and 1997. Districts 3 and 4 produced district reports in 1996.

Exhibit 2-7: Statewide Vehicle-Hours of Delay and Congested Directional Miles 1987-2005



* No statewide HICOMP reporting was done in 1996 and 1997.

Exhibit 2-8: Daily Delay and Congested Directional Miles County Rankings 2004 vs. 2005

Rank		Caltrans District	County	Daily Vehicle-Hours of Delay		Congested Directional Miles	
2005	2004			2005	2004	2005	2004
1	1	7	Los Angeles	164,891	170,965	655.5	639.5
2	2	12	Orange	97,581	96,522	254.1	190.3
3	3	11	San Diego	62,796	65,768	291.9	333.9
4	4	4	Alameda	52,300	50,540	120.5	124.0
5	6	8	Riverside	25,327	20,807	75.3	66.4
6	5	4	Santa Clara	23,900	22,910	91.4	90.0
7	7	4	Contra Costa	21,600	18,520	71.6	75.0
8	8	3	Sacramento	19,721	15,500	129.4	103.7
9	9	4	San Francisco	10,700	8,860	24.7	21.0
10	12	8	San Bernardino	9,958	6,673	54.4	31.5
11	11	4	Marin	9,800	7,410	21.4	20.0
12	10	4	San Mateo	7,600	7,800	45.2	32.0
13	13	4	Sonoma	7,100	5,320	26.5	21.0
14	15	10	San Joaquin	4,863	3,383	44.4	31.7
15	14	5	Santa Cruz	4,030	4,030	17.9	17.9
16	16	4	Solano	2,700	2,830	9.7	11.0
17	17	5	Santa Barbara	2,110	2,110	25.1	25.1
18	18	3	Placer	1,896	1,772	9.0	10.0
19	22	6	Fresno	296	292	22.0	37.9
20	23	5	Monterey	280	280	5.3	5.3
21	19	7	Ventura	250	473	13.5	8.5
22	24	3	Yolo	190	134	3.8	2.1
23	21	10	Stanislaus	147	302	7.7	8.3
24	25	5	San Luis Obispo	33	33	4.9	4.9
25	20	3	El Dorado	23	306	2.3	5.0
26	26	6	Kern	0	0	0.0	0.0
			Totals*	**530,091**	**513,539**	**2,028**	**1,916**

* - County numbers may not add to total due to rounding.

Exhibit 2-9: 2005 Excess Fuel Consumption, Travel Cost, and Emissions Due to Congestion

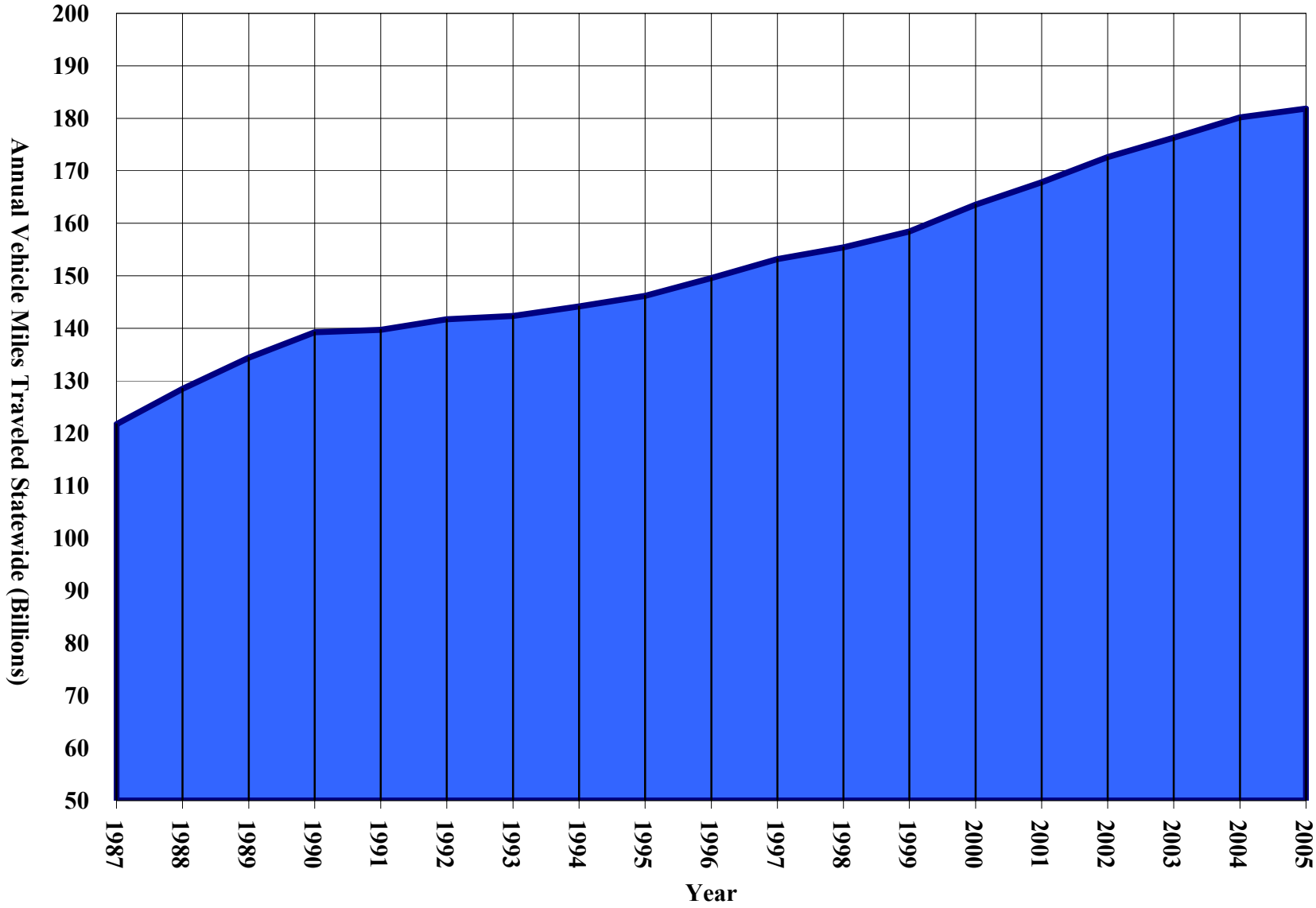
Indicator \ District	3	4	5	6	7	8	10	11	12	Total
Total Daily Delay (Vehicle-Hours)	43,661	271,400	12,907	591	330,283	70,569	10,019	125,591	195,162	1,060,182
Average Vehicle Occupancy [1]	1.00	1.10	1.00	1.10	1.10	1.10	1.10	1.00	1.10	
Estimated Daily Person-Hours of Delay [1]	43,661	298,540	12,907	650	363,311	77,625	11,021	125,591	214,678	1,147,985
Excess Fuel Consumed per Day (Gallons) [2]	75,053	466,537	22,187	1,016	567,756	121,307	17,223	215,891	335,483	1,822,453
Total User Cost per Day (Dollars) [3]	$736,759	$4,920,660	$217,795	$10,717	$5,988,243	$1,279,455	$181,657	$2,119,304	$3,538,411	$18,993,001
Total Emissions per Day (Tons) [2]	22	136	6	0.3	165	35	5	63	98	530

(1) Average Vehicle Occupancy (AVO) estimates are used to calculate the daily person-hours of delay (Total Daily Delay x AVO). The person-hours of daily delay estimates are then used to calculate the total user cost per day. AVOs used in the HICOMP are the "home-to-work" trip estimates from the 2000-2001 California Statewide Household Travel Survey. Caltrans, June 2002. This is the most recent data available. The next such report will be produced in the year 2010.

(2) Fuel Efficient Traffic Signal Management Evaluation (Institute of Transportation Studies): 1,000 vehicle-hours of delay results in 1,719 gallons of wasted fuel and 1/2 ton of emissions.

(3) Total user cost includes cost of travel time and cost of excess fuel. The average cost of travel time per person-hour of delay in 2005 is estimated to be $12.56. This figure is based on the average auto and truck costs of travel from the California Lifecycle Benefit/Cost Analysis Model weighted by VMT by vehicle type. The cost of fuel is estimated at $2.51 per gallon, the average monthly price (weighted by monthly "vehicle miles traveled" estimates from Caltrans) for regular unleaded gasoline as reported by the California State Automobile Association (CSAA) monthly gas survey for the year 2005.

Exhibit 2-10: California State Highway Vehicle Miles Traveled (VMT) 1987-2005



3. District and County Level Findings and Analysis

This chapter presents the 2005 findings by district. The results are presented in three formats:

1) A district summary table presenting total district-wide delay and county sub-totals, 2) a chart showing the district trends over time for delay and congested miles, and 3) two maps showing the location and duration of freeway segments where congestion was measured. The first map shows congested locations for the morning peak commute period and the second map shows the results for the evening peak commute period.

3.1 District 3: Sacramento Area

Exhibit 3-1 summarizes weekday recurrent congestion in District 3 during 2005 compared to 2004. Exhibit 3-2 presents trends in DVHD and CDM for the district. Exhibits 3-3 and 3-4 are maps showing the location and duration of morning and evening peak period congestion.

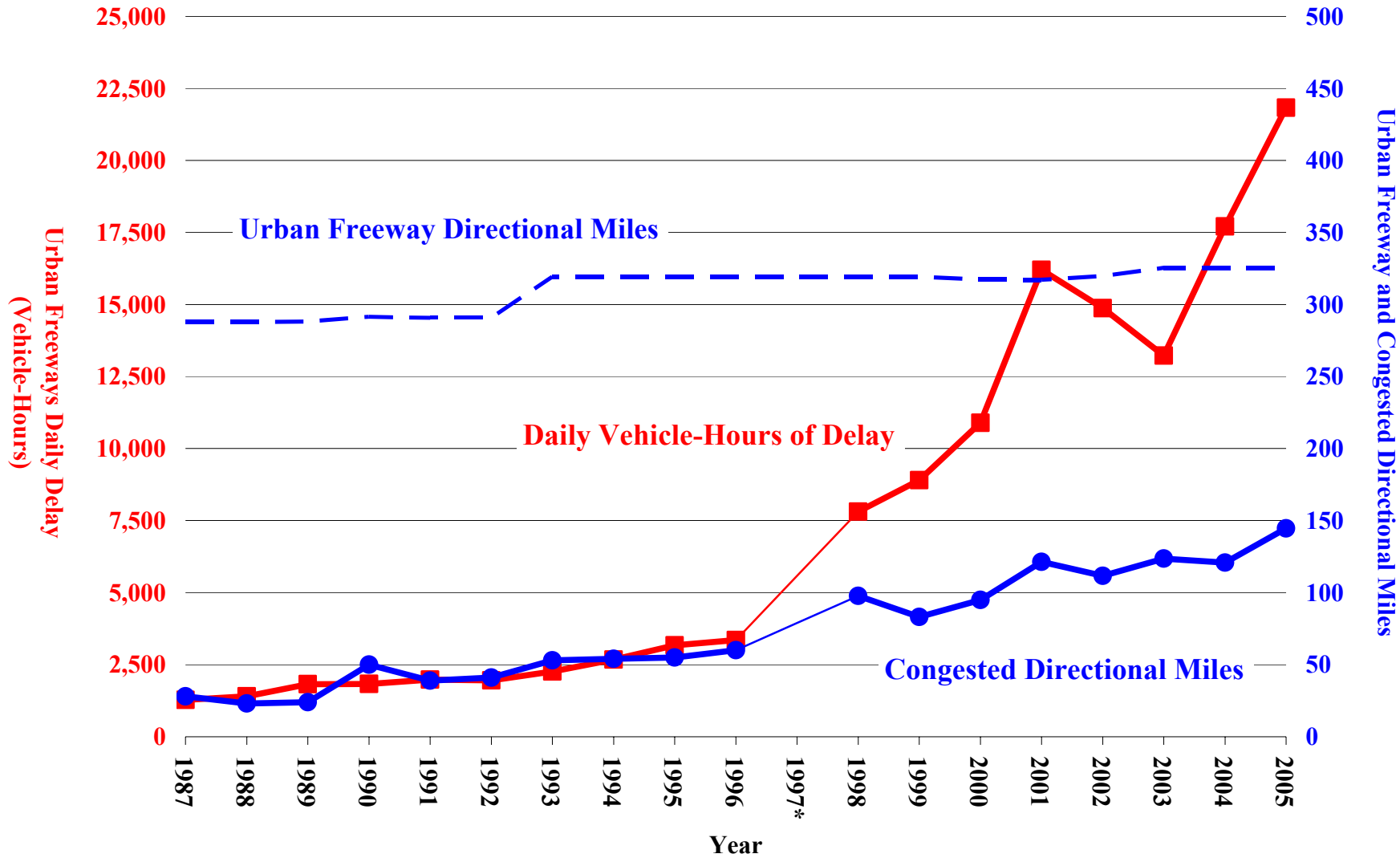
Both the 2004 and 2005 data used in this data compilation are based on the fall floating vehicle data collection efforts. Prior to 1998, delay estimates were based on both spring and fall floating vehicle data.

In 2005, the total DVHD was 21,830, compared to 17,712 reported for 2004 (a 23 percent increase). The CDM were nearly 145 miles in 2005, (a 20 percent increase) over the 121 miles reported in 2004.

Exhibit 3-1: District 3 Highway Congestion Summary

District 3	2004	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	17,712	21,830	**23%**	**4%**
El Dorado	306	23	-93%	
Placer	1,772	1,896	7%	
Sacramento	15,500	19,721	27%	
Yolo	134	190	42%	
Congested Directional Miles	120.8	144.5	**20%**	**7%**
El Dorado	5.0	2.3	-54%	
Placer	10.0	9.0	-10%	
Sacramento	103.7	129.4	25%	
Yolo	2.1	3.8	81%	
Total Urban Area Freeway Directional Miles	325.4	325.4		
Congested Miles/ Total Urban Freeway Miles	37%	44%		

Exhibit 3-2: District 3 Congestion Trends 1987-2005



* No HICOMP reporting performed.

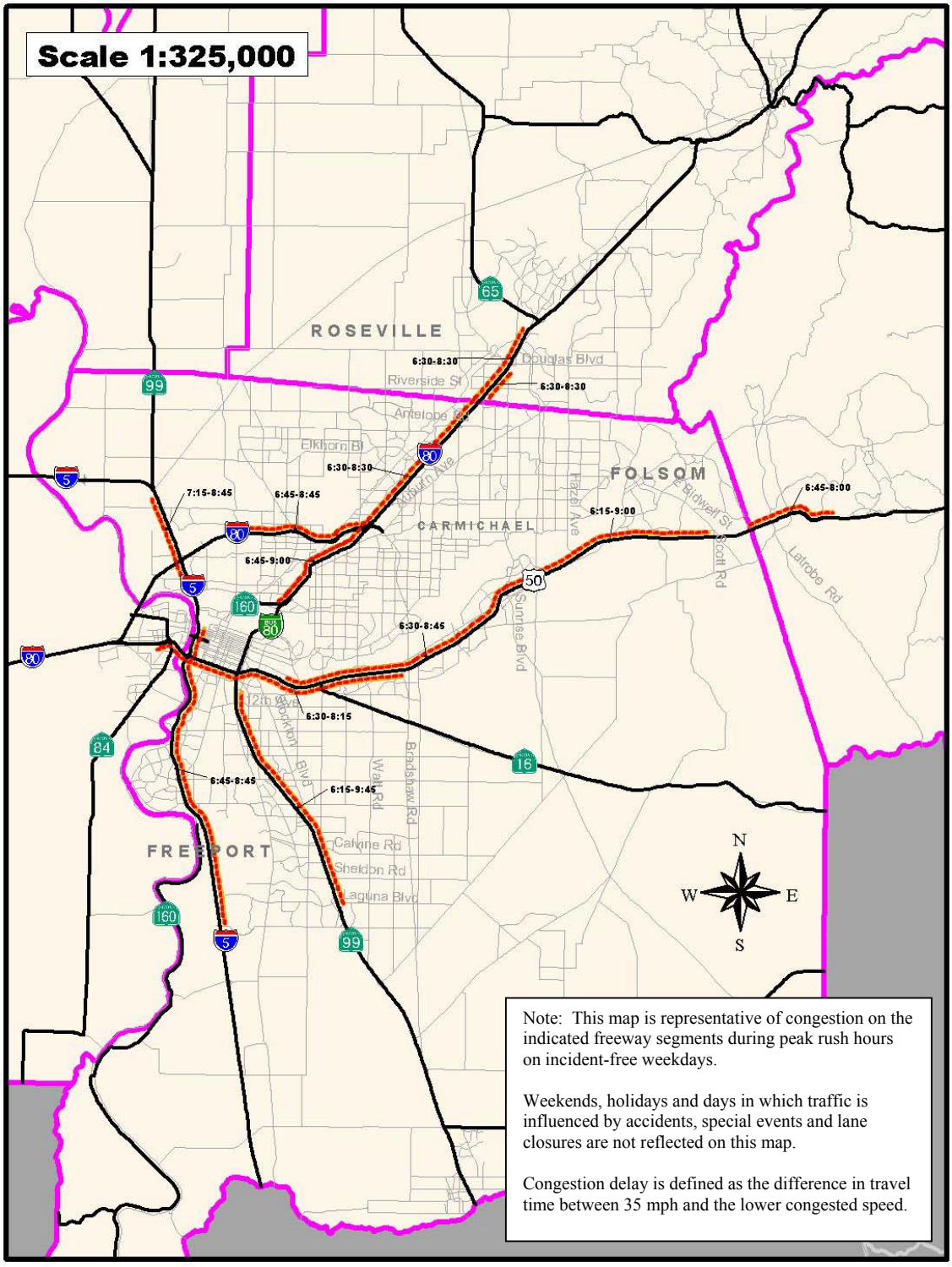


EXHIBIT 3-3
DISTRICT 3
SACRAMENTO AREA
2005 MORNING CONGESTION MAP

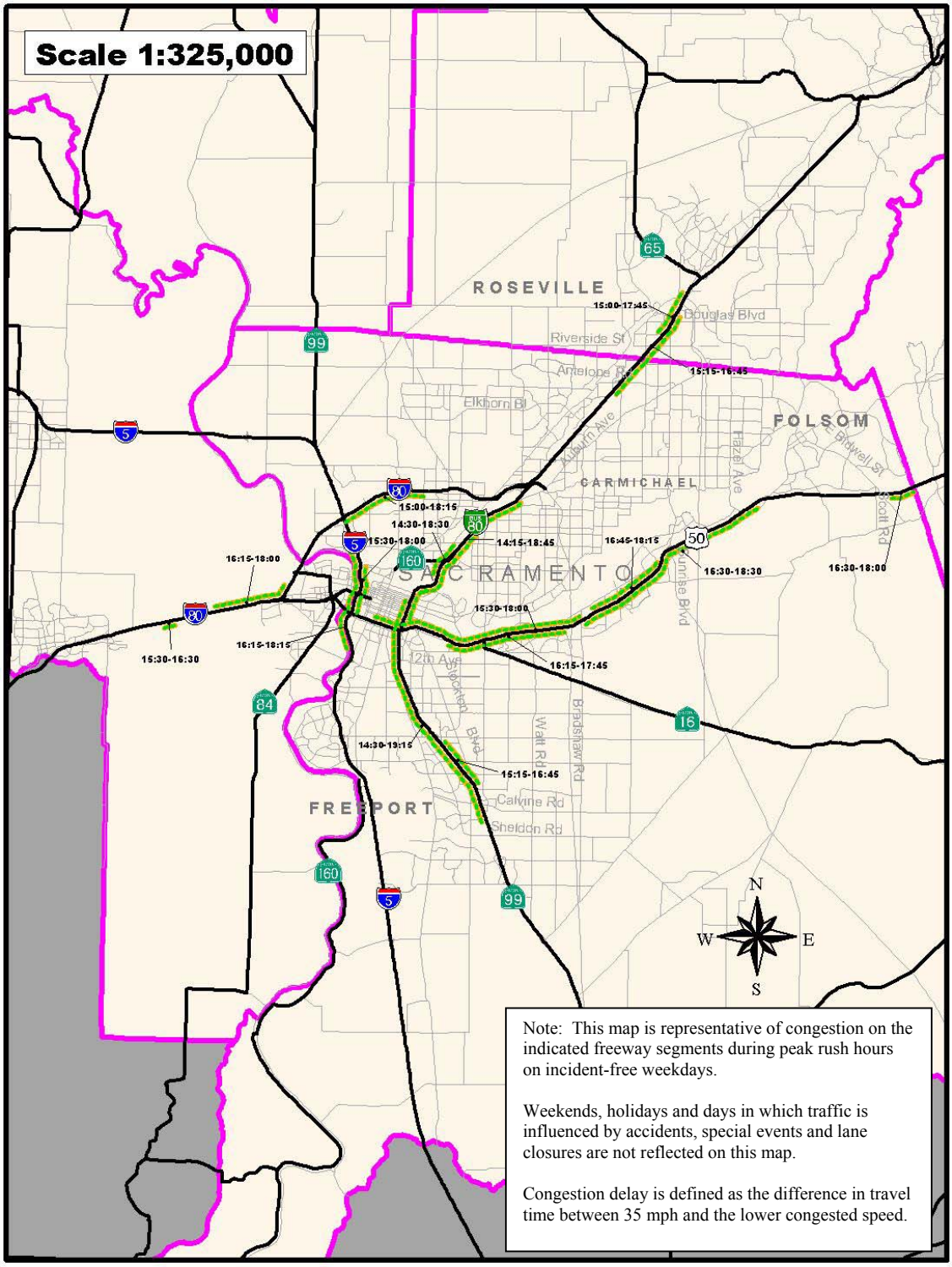


EXHIBIT 3-4
DISTRICT 3
SACRAMENTO AREA
2005 EVENING CONGESTION MAP

3.2 District 4: San Francisco Bay Area

Exhibit 3-5 summarizes weekday recurrent congestion in District 4 during 2005 compared to 2004. Exhibit 3-6 presents trends in DVHD and CDM for the district. Exhibits 3-7 and 3-8 are maps showing the location and duration of morning and evening peak period congestion.

District 4 collects data in both the spring and fall seasons for the statewide HICOMP. District 4's most congested locations were collected using GPS-equipped floating vehicles during the spring and fall season of 2005 by consultants hired by the Department's regional partner, the Metropolitan Transportation Commission (MTC). The MTC's consultant, with the Department's guidance and review, develops delay estimates.

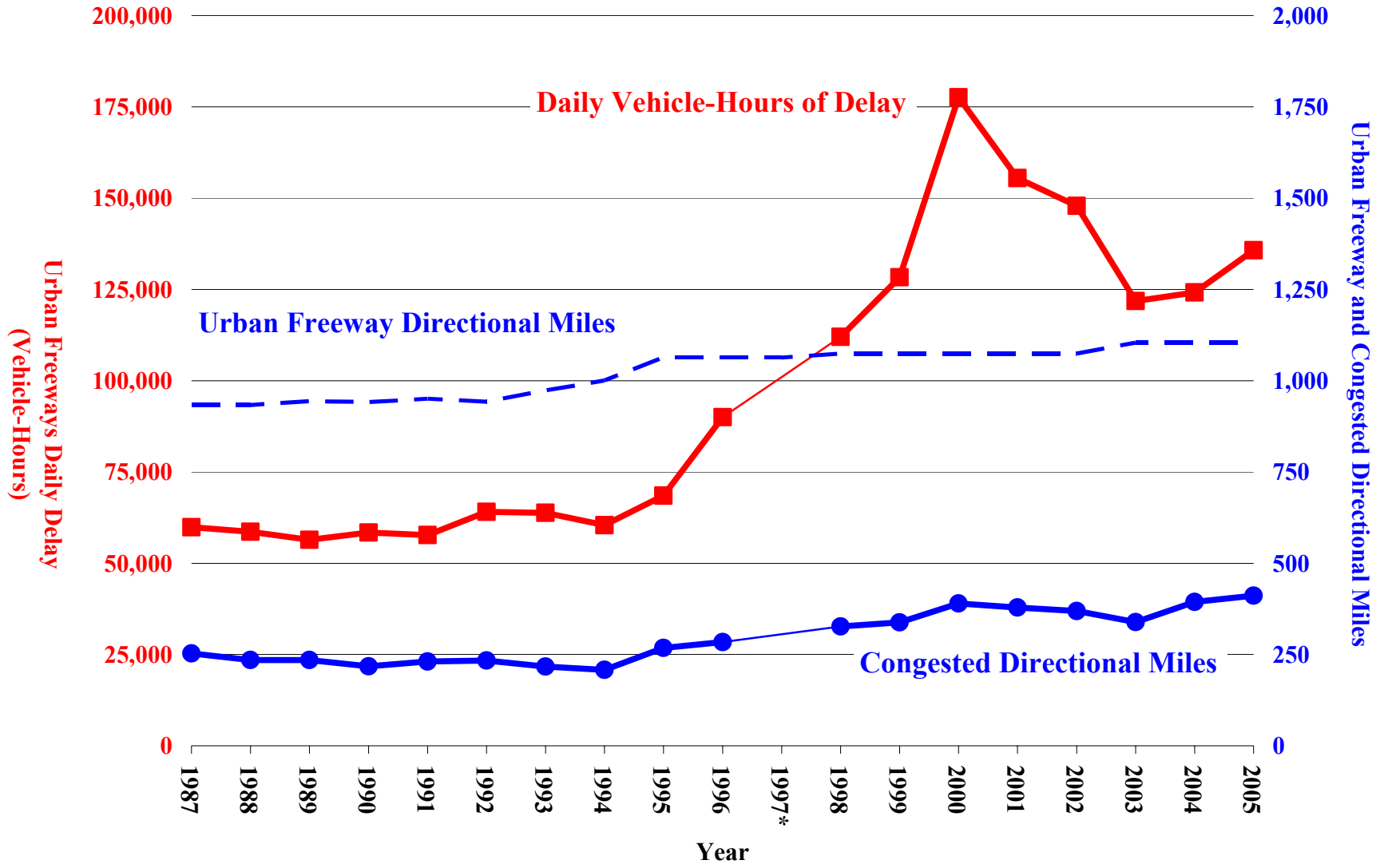
In 2005, the total DVHD was 135,700 compared to 124,190 reported for 2004 (a nine percent increase). The CDM were 411 miles in 2005, (four percent increase) from 2004.

Exhibit 3-5: District 4 Highway Congestion Summary

District 4	2004	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	124,190	135,700	**9%**	**26%**
Alameda	50,540	52,300	3%	
Contra Costa	18,520	21,600	17%	
Marin	7,410	9,800	32%	
Napa	0	0	n/a	
San Francisco	8,860	10,700	21%	
San Mateo	7,800	7,600	-3%	
Santa Clara	22,910	23,900	4%	
Solano	2,830	2,700	-5%	
Sonoma	5,320	7,100	33%	
Congested Directional Miles	394.0	411.1	**4%**	**20%**
Alameda	124.0	120.5	-3%	
Contra Costa	75.0	71.6	-5%	
Marin	20.0	21.4	7%	
Napa	0.0	0.0	n/a	
San Francisco	21.0	24.7	17%	
San Mateo	32.0	45.2	41%	
Santa Clara	90.0	91.4	2%	
Solano	11.0	9.7	-12%	
Sonoma	21.0	26.5	26%	
Total Urban Area Freeway Directional Miles	1,104.3	1,104.3		
Congested Miles/Total Urban Freeway Miles	36%	37%		

Note: County numbers may not sum to district totals due to rounding.

Exhibit 3-6: District 4 Congestion Trends 1987-2005



* No HICOMP reporting performed.

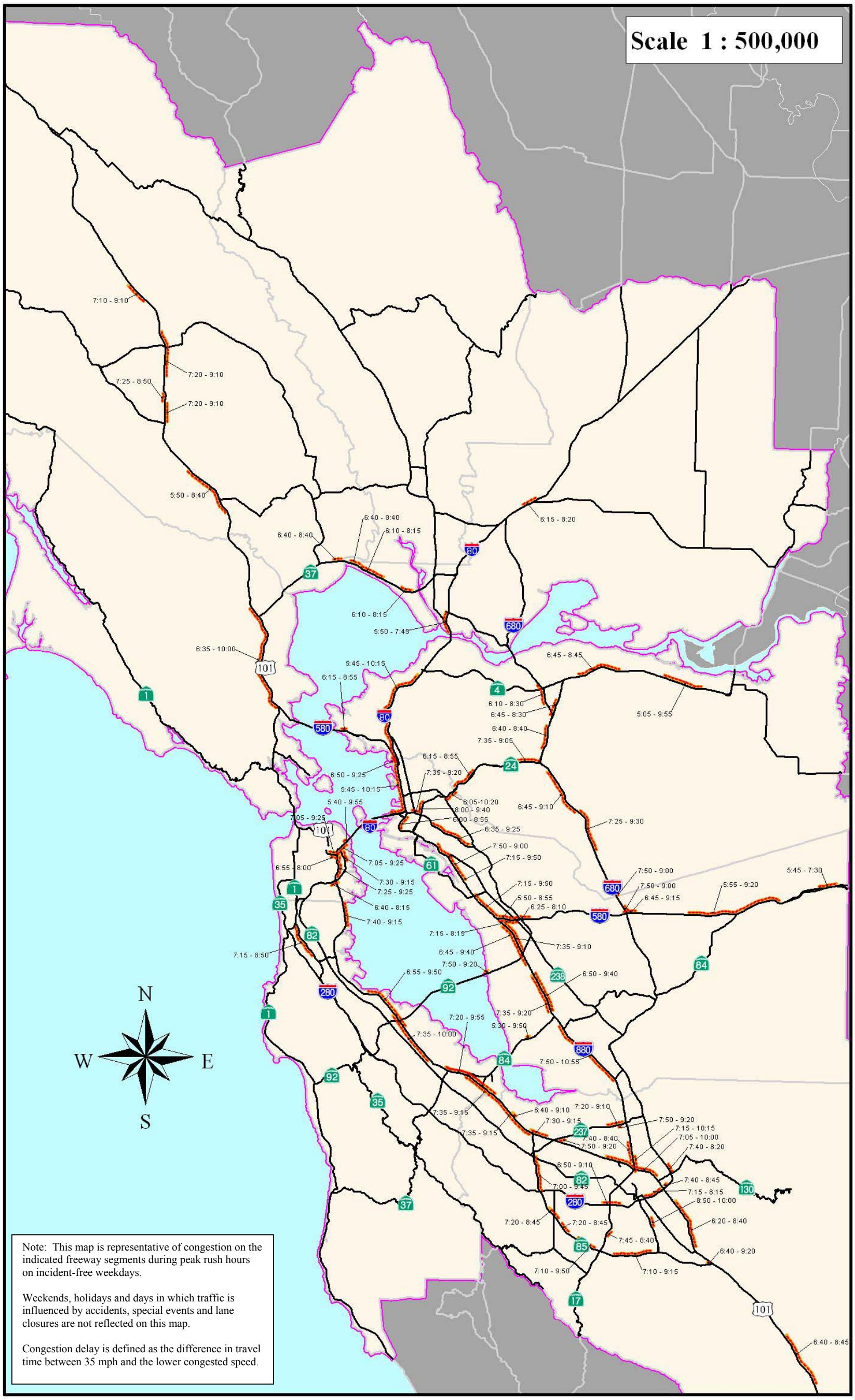


EXHIBIT 3-7
DISTRICT 4
SAN FRANCISCO BAY AREA
2005 MORNING CONGESTION MAP

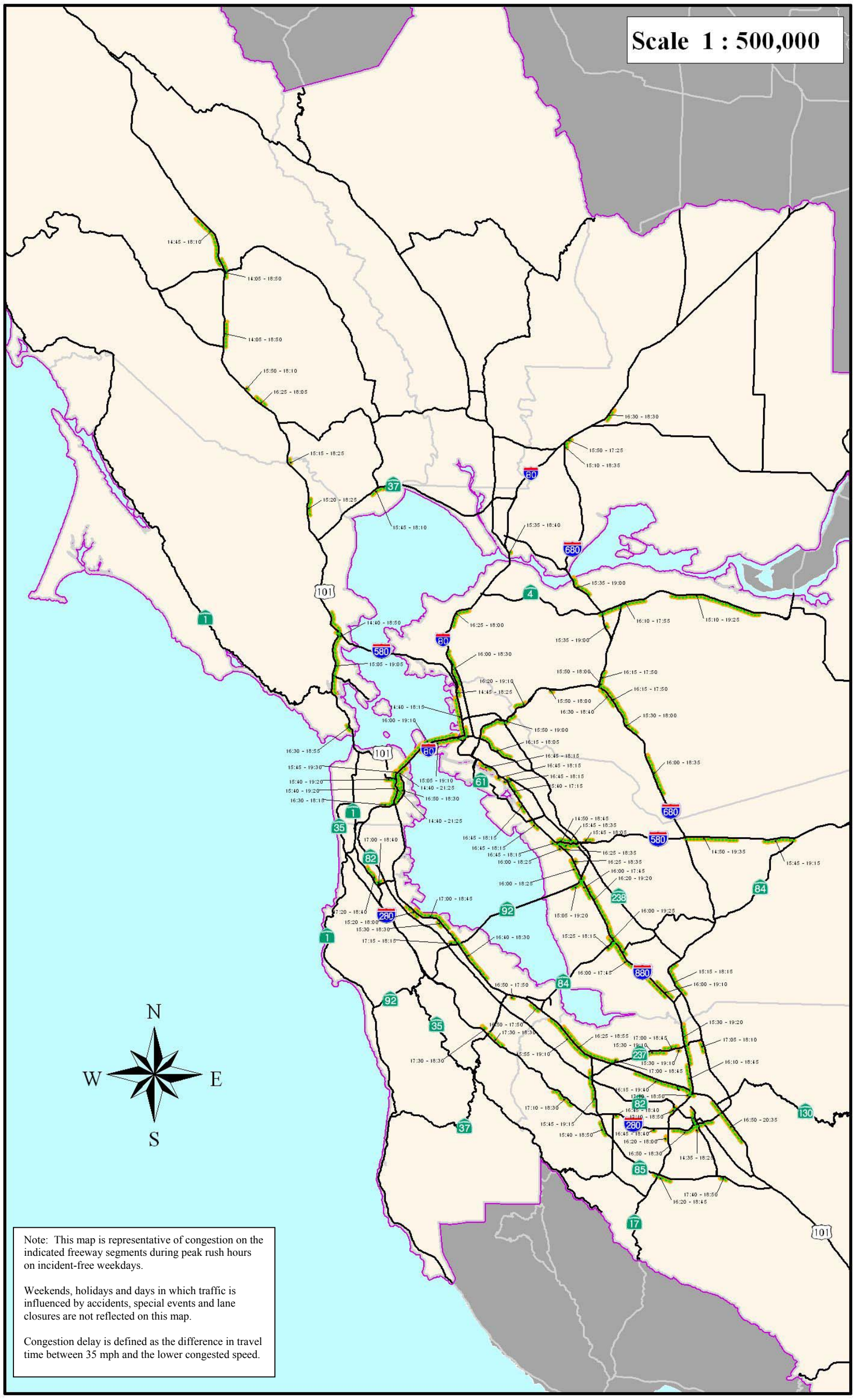


EXHIBIT 3-8
DISTRICT 4
SAN FRANCISCO BAY AREA
2005 EVENING CONGESTION MAP

3.3 District 5: Central Coast Area

Exhibit 3-9 summarizes weekday recurrent congestion in District 5 during 2005 compared to 2004. Exhibit 3-10 presents trends in DVHD and CDM for the district. Exhibits 3-11 and 3-12 are maps showing the location and duration of morning and evening peak period congestion.

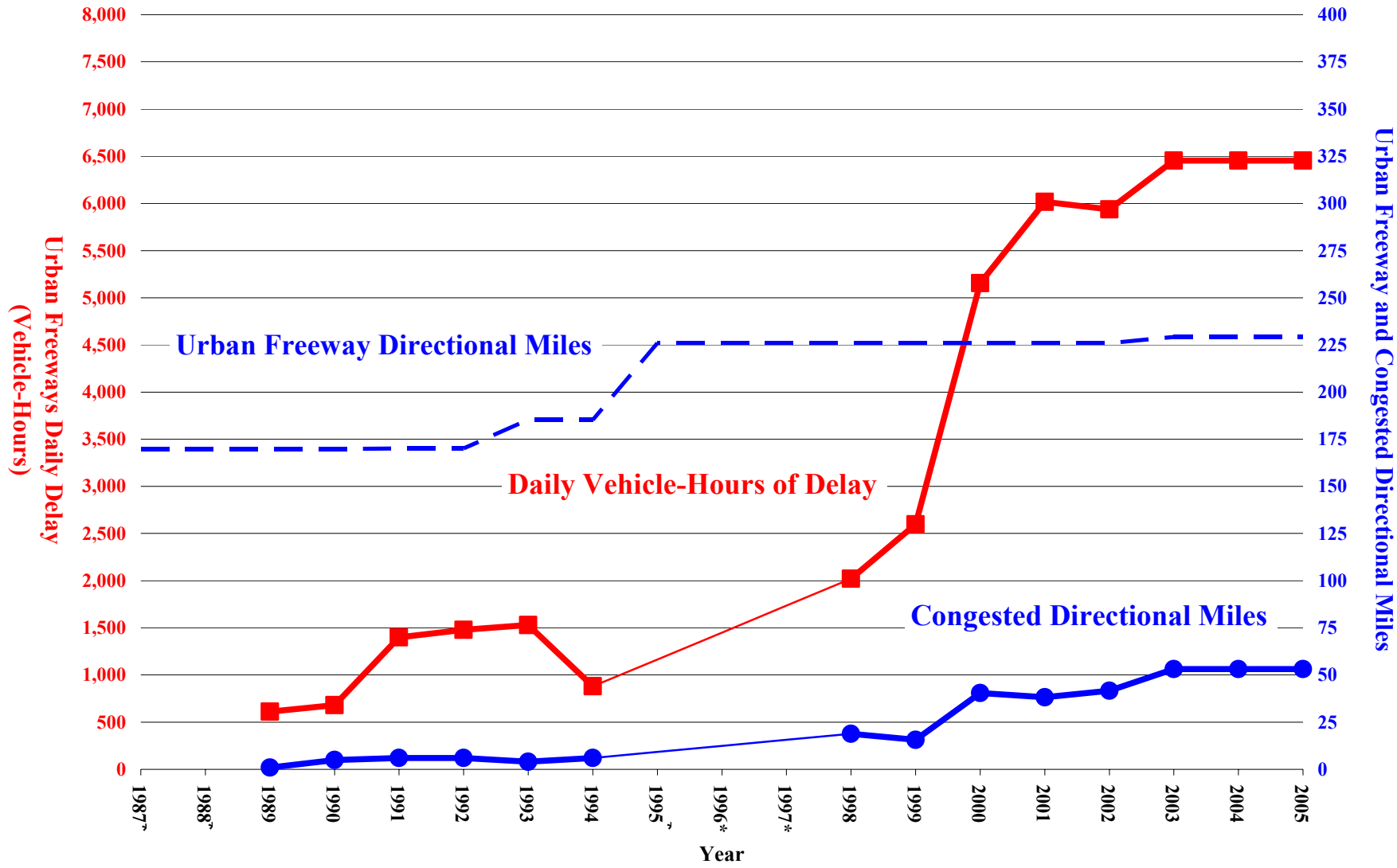
In 2005, the total DVHD was assumed to be 6,453 hours, the same as in 2004 since no new data collection was performed. The CDM was assumed to be 53 miles in 2005, the same as in 2004.

Exhibit 3-9: District 5 Highway Congestion Summary

District 5	2004*	2005*	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	6,453	6,453	**0%**	**1%**
Monterey	280	280	0%	
San Luis Obispo	33	33	0%	
Santa Barbara	2,110	2,110	0%	
Santa Cruz	4,030	4,030	0%	
Congested Directional Miles	53.1	53.1	**0%**	**3%**
Monterey	5.3	5.3	0%	
San Luis Obispo	4.9	4.9	0%	
Santa Barbara	25.1	25.1	0%	
Santa Cruz	17.9	17.9	0%	
Total Urban Area Freeway Directional Miles	229.1	229.1		
Congested Miles/Total Urban Freeway Miles	23%	23%		

* Daily vehicle-hours of delay and congested directional miles in 2004 and 2005 were estimated.

Exhibit 3-10: District 5 Congestion Trends 1989-2005



* No HICOMP reporting performed.

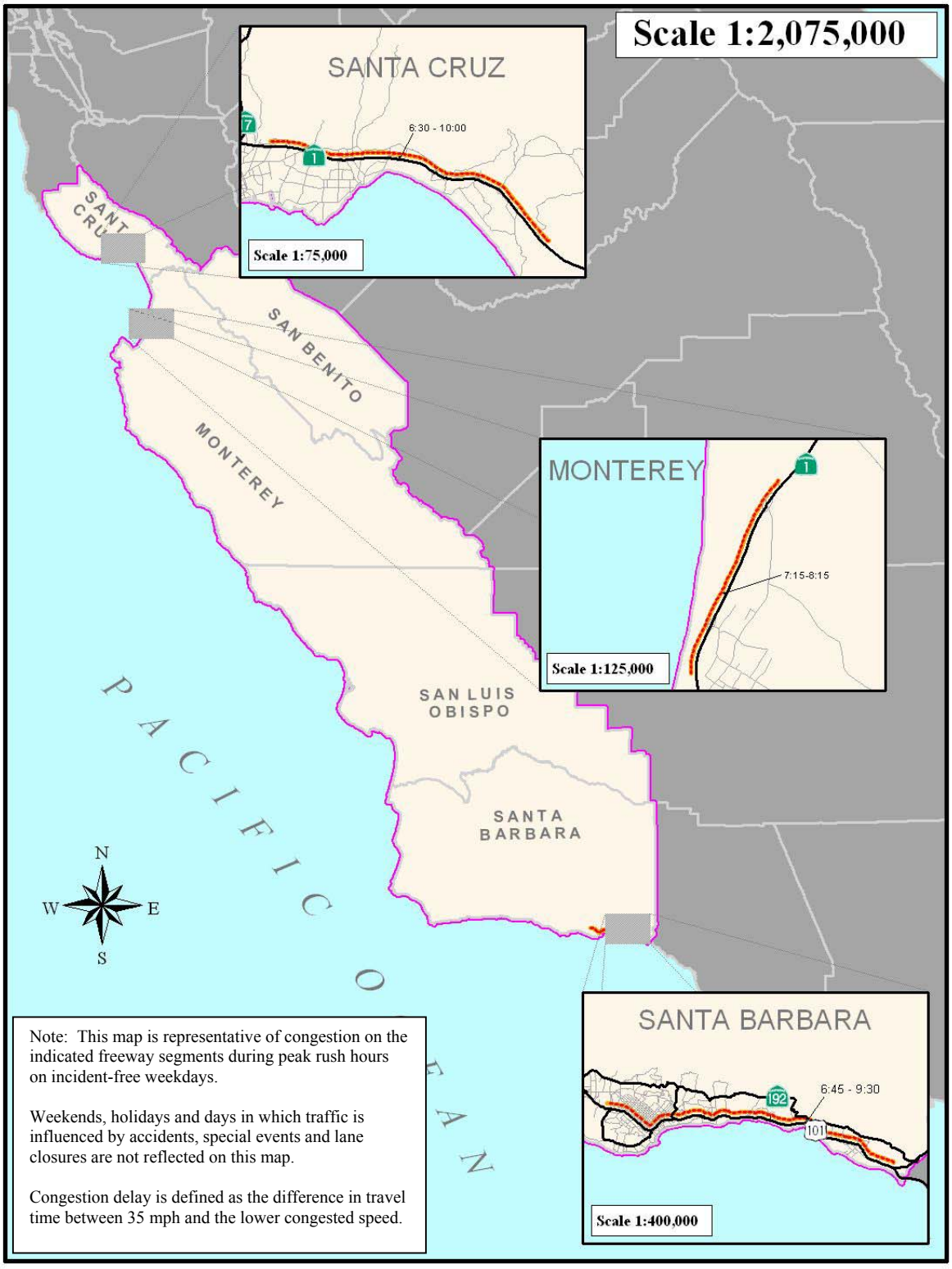


EXHIBIT 3-11
DISTRICT 5
CENTRAL COAST AREA
2005 MORNING CONGESTION MAP

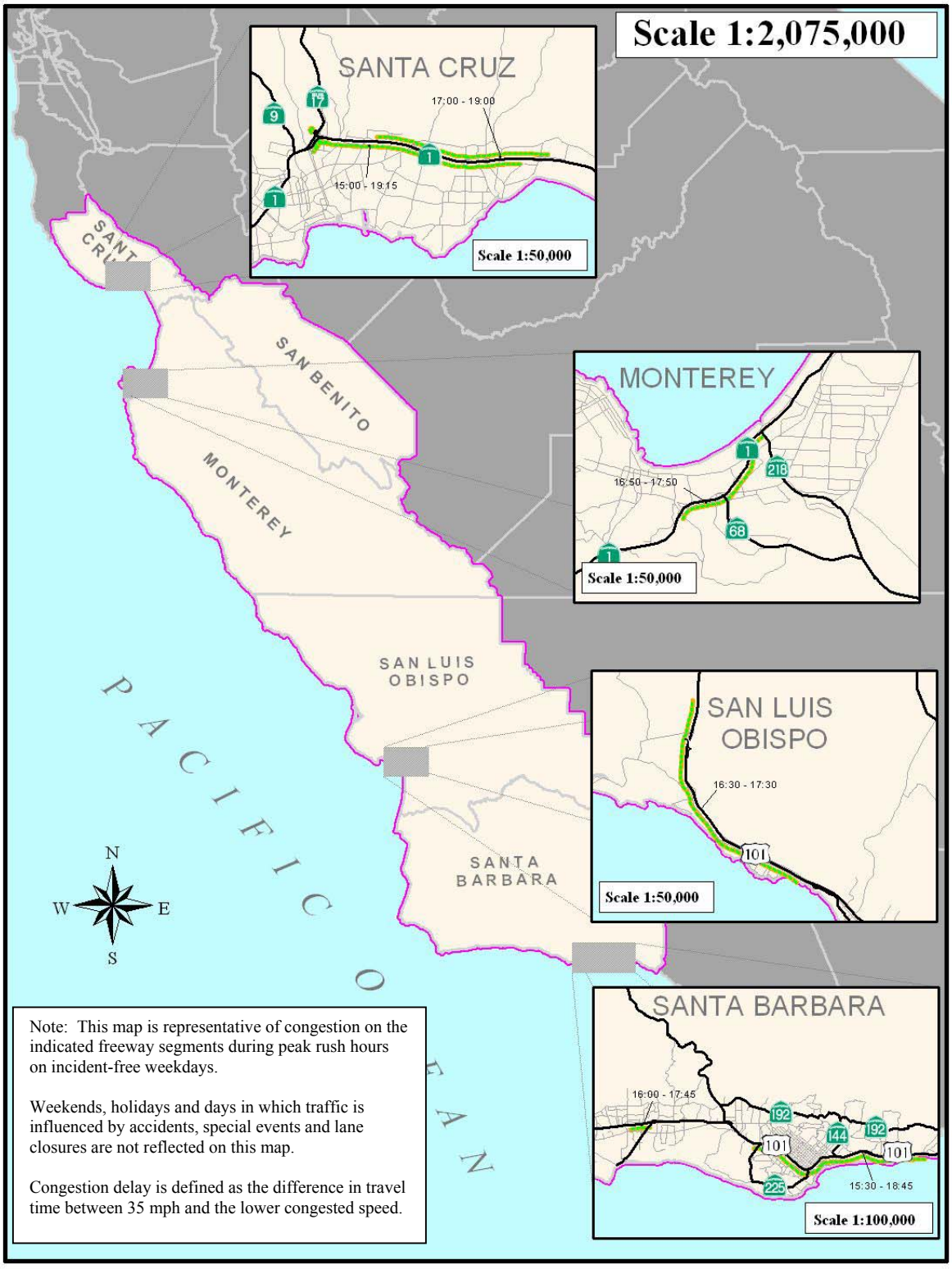


EXHIBIT 3-12
DISTRICT 5
CENTRAL COAST AREA
2005 EVENING CONGESTION MAP

3.4 District 6: Fresno Area

Exhibit 3-13 summarizes weekday recurrent congestion in District 6 during 2005 compared to 2004. Exhibit 3-14 presents trends in DVHD and CDM for the district. Exhibits 3-15 and 3-16 are maps showing the location and duration of morning and evening peak period congestion.

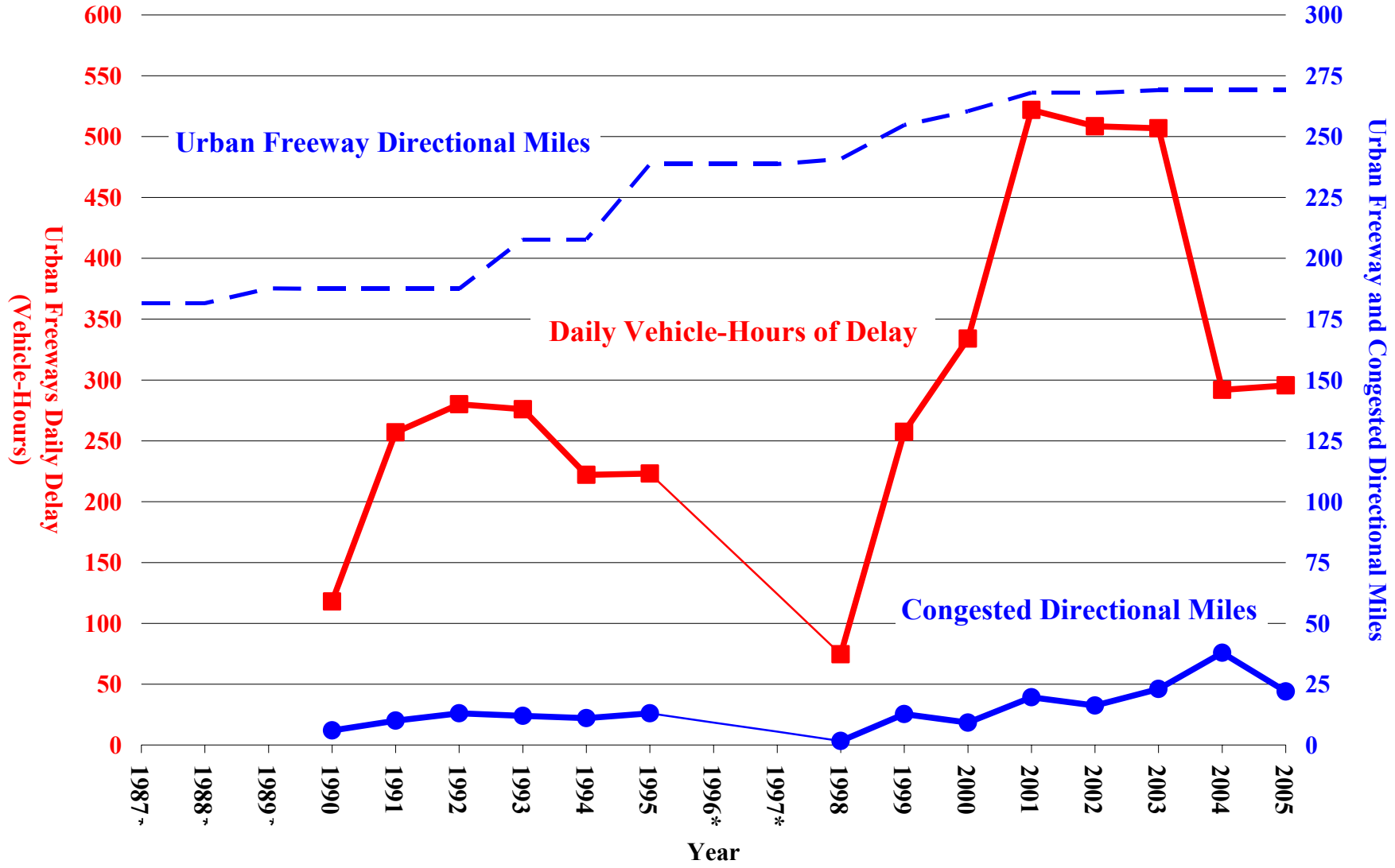
The 2004 and 2005 District 6 results in this data compilation are based on floating vehicle data collected in the fall season of each year.

In 2005, the total DVHD was 296 compared to the 292 hours reported for 2004. The CDM was almost 22 miles in 2005, a 16-mile decrease from the 38 miles reported in 2004. District 6's DVHD and CDM numbers were relatively small. Therefore, any small change for 2005 may translate to large changes.

Exhibit 3-13: District 6 Highway Congestion Summary

District 6	2004	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	292	296	**1%**	**0%**
Fresno Kern	292 -	296 -	1% n/a	
Congested Directional Miles	37.9	22.0	**-42%**	**1%**
Fresno Kern	37.9 -	22.0 -	-42% n/a	
Total Urban Area Freeway Directional Miles	269.1	269.1		
Congested Miles/Total Urban Freeway Miles	14%	8%		

Exhibit 3-14: District 6 Congestion Trends 1990-2005



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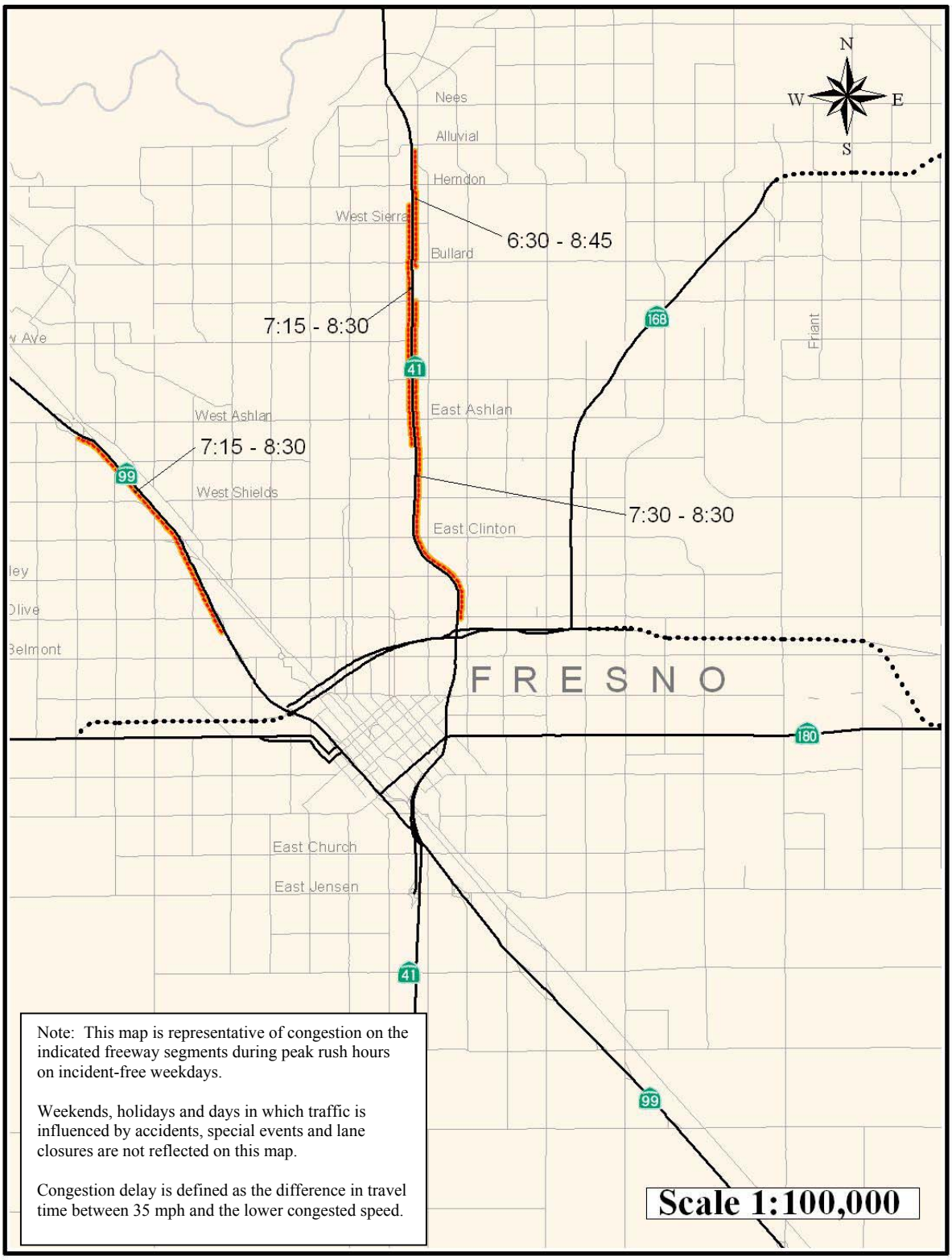


EXHIBIT 3-15
DISTRICT 6
FRESNO AREA
2005 MORNING CONGESTION MAP

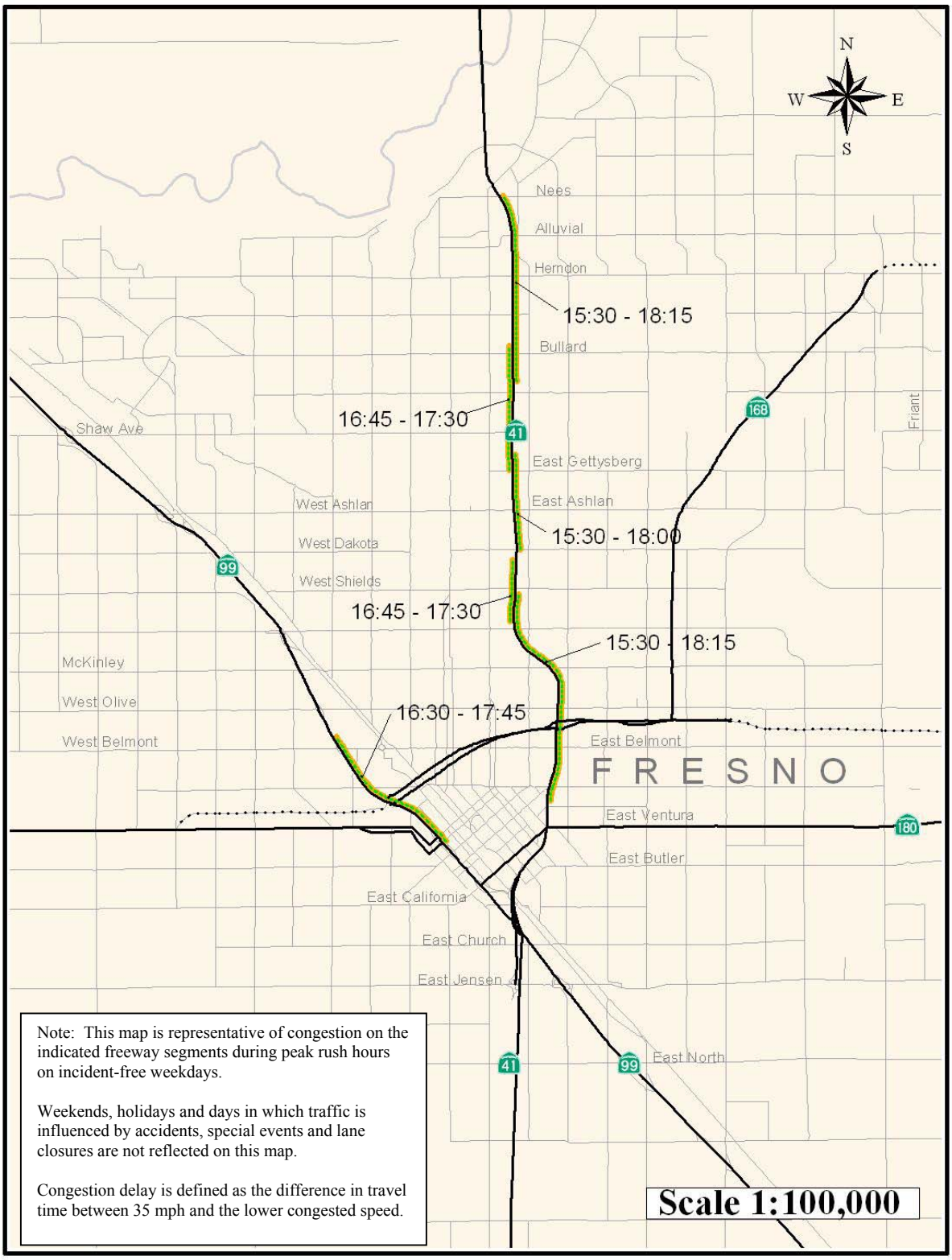


EXHIBIT 3-16
DISTRICT 6
FRESNO AREA
2005 EVENING CONGESTION MAP

3.5 District 7: Los Angeles-Ventura Area

Exhibit 3-17 summarizes weekday recurrent congestion in District 7 during 2005 compared to 2004. Exhibit 3-18 presents trends in DVHD and CDM for the district. Exhibits 3-19 and 3-20 are maps showing the location and duration of morning and evening peak period congestion.

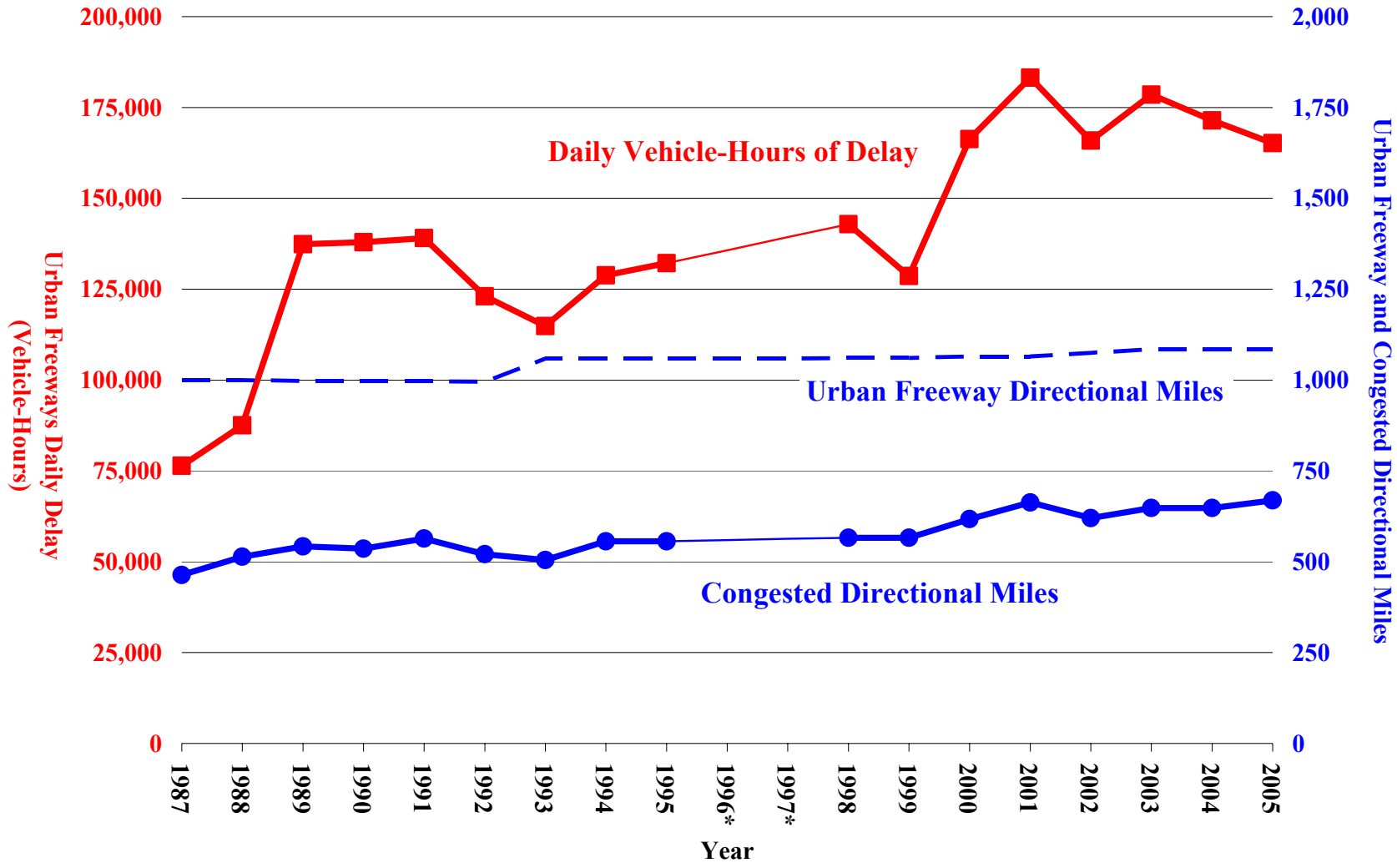
Both the 2004 and 2005 data used in this data compilation are based on data retrieved from automatic detectors. Floating car data from the fall season of 2003 was also used to fill in gaps where no automatic detection is available. Those areas have not been monitored since that time, so the congestion levels are assumed to be roughly equivalent from year to year. Prior to 1998, delay estimates were based on both spring and fall automatic detection data.

In 2005, the total DVHD was 165,141 compared to 171,438 hours reported for 2004 (a four percent decrease). The CDM increased from 648 miles in 2004 to 669 miles in 2005 (an increase of three percent).

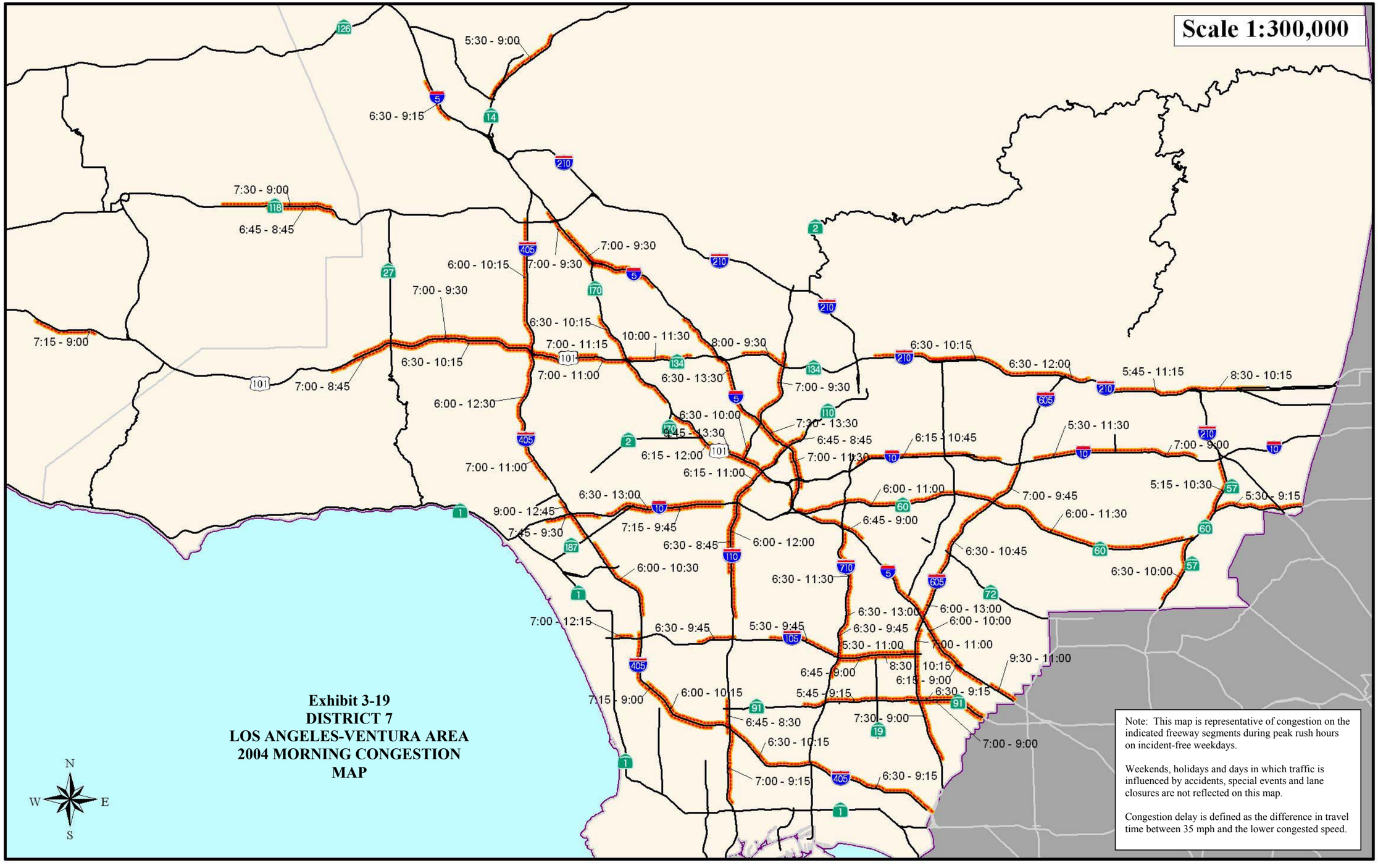
Exhibit 3-17: District 7 Highway Congestion Summary

District 7	2004	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	171,438	165,141	**-4%**	**31%**
Los Angeles	170,965	164,891	-4%	
Ventura	473	250	-47%	
Congested Directional Miles	648.0	669.0	**3%**	**34%**
Los Angeles	639.5	655.5	3%	
Ventura	8.5	13.5	59%	
Total Urban Area Freeway Directional Miles	1,084.8	1,084.8		
Congested Miles/Total Urban Freeway Miles	60%	62%		

Exhibit 3-18: District 7 Congestion Trends 1987-2005



* No HICOMP reporting performed.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6:30 - 9:15
7:30 - 9:00
6:45 - 8:45
7:00 - 9:30
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7:00 - 9:30
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6:30 - 10:15
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10:00 - 11:30
8:00 - 9:30
7:00 - 11:00
6:30 - 13:30
7:00 - 9:30
6:00 - 12:30
6:30 - 10:00
7:30 - 13:30
6:45 - 13:30
6:45 - 8:45
6:15 - 12:00
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6:30 - 9:15
Exhibit 3-19
DISTRICT 7
LOS ANGELES-VENTURA AREA
2004 MORNING CONGESTION
MAP
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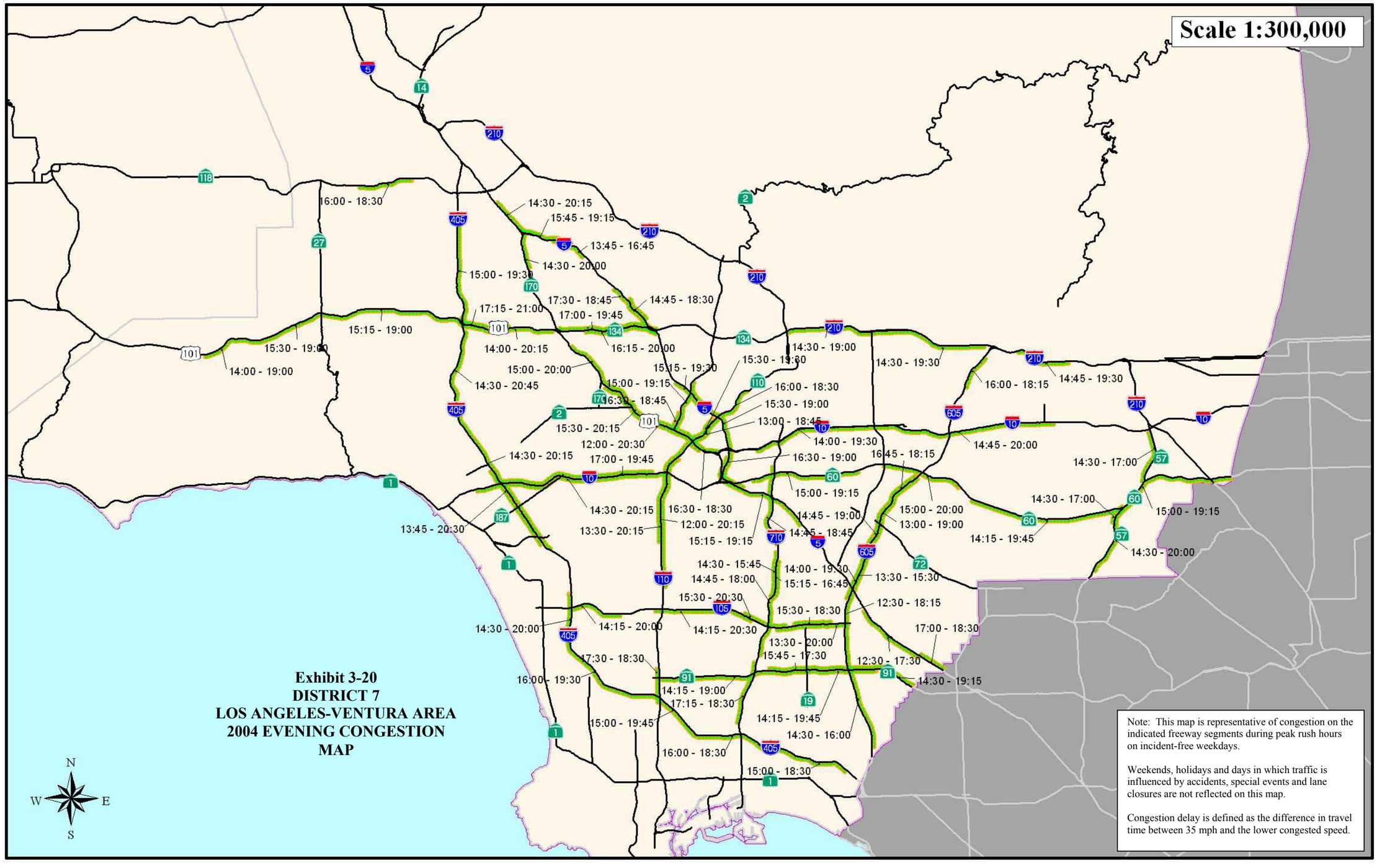
Note: This map is representative of congestion on the indicated freeway segments during peak rush hours on incident-free weekdays.
Weekends, holidays and days in which traffic is influenced by accidents, special events and lane closures are not reflected on this map.
Congestion delay is defined as the difference in travel time between 35 mph and the lower congested speed.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15:00 - 18:30
Exhibit 3-20
DISTRICT 7
LOS ANGELES-VENTURA AREA
2004 EVENING CONGESTION
MAP
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Note: This map is representative of congestion on the indicated freeway segments during peak rush hours on incident-free weekdays.
Weekends, holidays and days in which traffic is influenced by accidents, special events and lane closures are not reflected on this map.
Congestion delay is defined as the difference in travel time between 35 mph and the lower congested speed.

3.6 District 8: San Bernardino-Riverside Area

Exhibit 3-21 summarizes weekday recurrent congestion in District 8 during 2005 compared to 2004. Exhibit 3-22 presents trends in DVHD and CDM for the district. Exhibits 3-23 and 3-24 are maps showing the locations and durations of morning and evening peak period congestion.

The 2005 data results reported in this data compilation are based in large part on spring and fall 2005 data collected by floating vehicles. In 2004, the floating vehicle data was not collected on some segments. Consequently, the results in 2004 were mostly estimated. However, based on the 2005 results, prior year data that had been estimated were adjusted as needed.

Prior to 1998, delay estimates were based on both spring and fall floating vehicle data. Beginning in 2001, District 8 began to use fall automatic detection data to estimate delay for some route segments. Other segments continued to be monitored using floating vehicles.

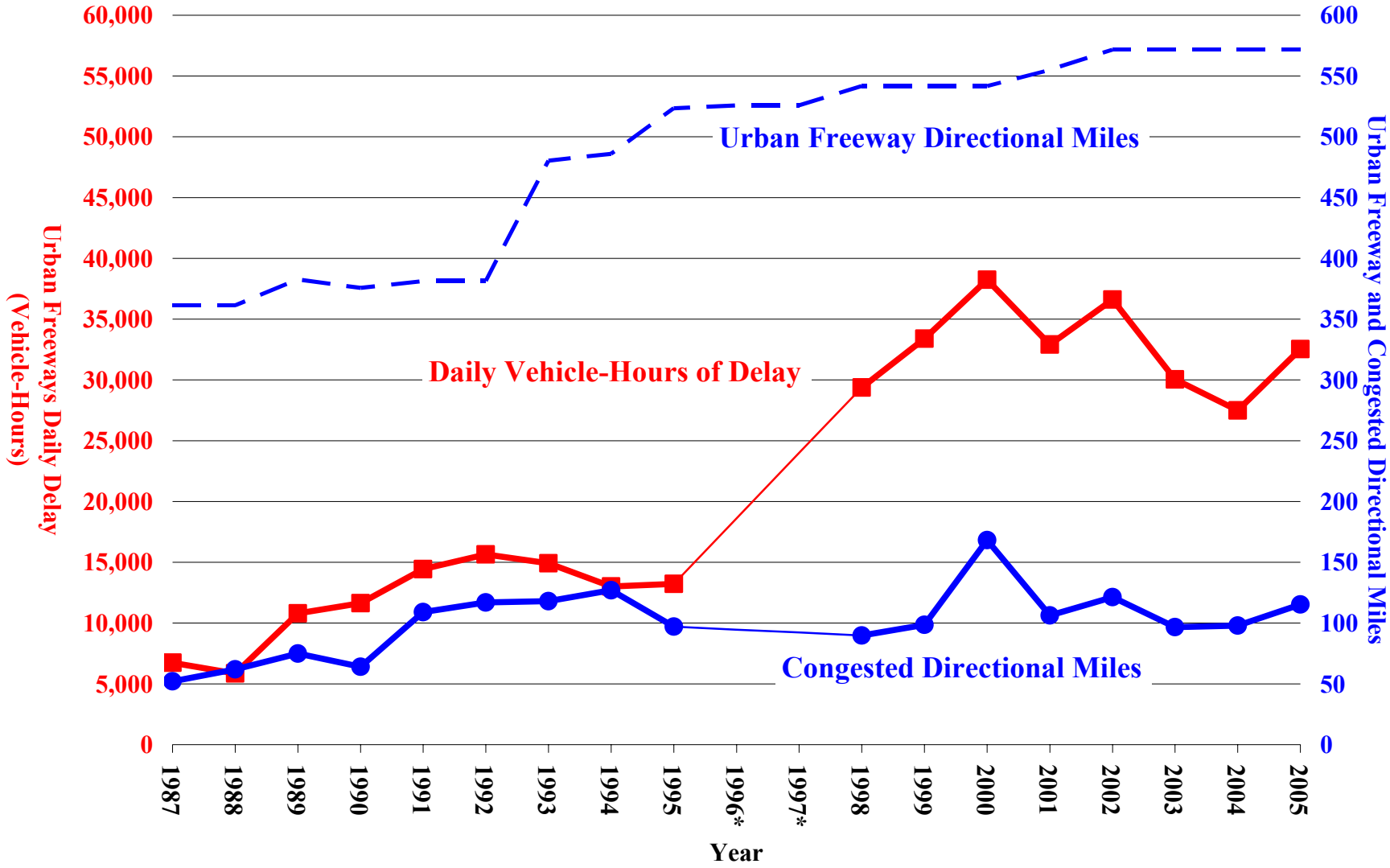
In 2005, the total DVHD was 35,284 hours compared to an adjusted 27,480 hours reported for 2004 (an increase of 28 percent). The CDM increased to nearly 130 miles in 2005 compared to an adjusted 98 miles in 2004 (an increase of 33 percent). The 2004 data was adjusted because it was incomplete and some data was estimated. When comparing the more complete data from 2005 with the data from 2003 and the estimated data from 2004, it was apparent that some adjustment was appropriate.

Exhibit 3-21: District 8 Highway Congestion Summary

District 8	2004*	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	27,480	35,284	**28%**	**7%**
Riverside	20,807	25,327	22%	
San Bernardino	6,673	9,958	49%	
Congested Directional Miles	97.8	129.8	**33%**	**6%**
Riverside	66.4	75.3	13%	
San Bernardino	31.5	54.4	73%	
Total Urban Area Freeway Directional Miles	571.6	571.6		
Congested Miles/Total Urban Freeway Miles	17%	23%		

* Daily vehicle-hours of delay in 2003 and 2004 were estimated for some segments. In 2005, these estimates were revised for segments where 2005 data collection was performed. Congested directional miles assumed to not have changed between 2003 and 2004 for those segments where no data collection was performed.

Exhibit 3-22: District 8 Congestion Trends 1987-2005



* No HICOMP reporting performed.

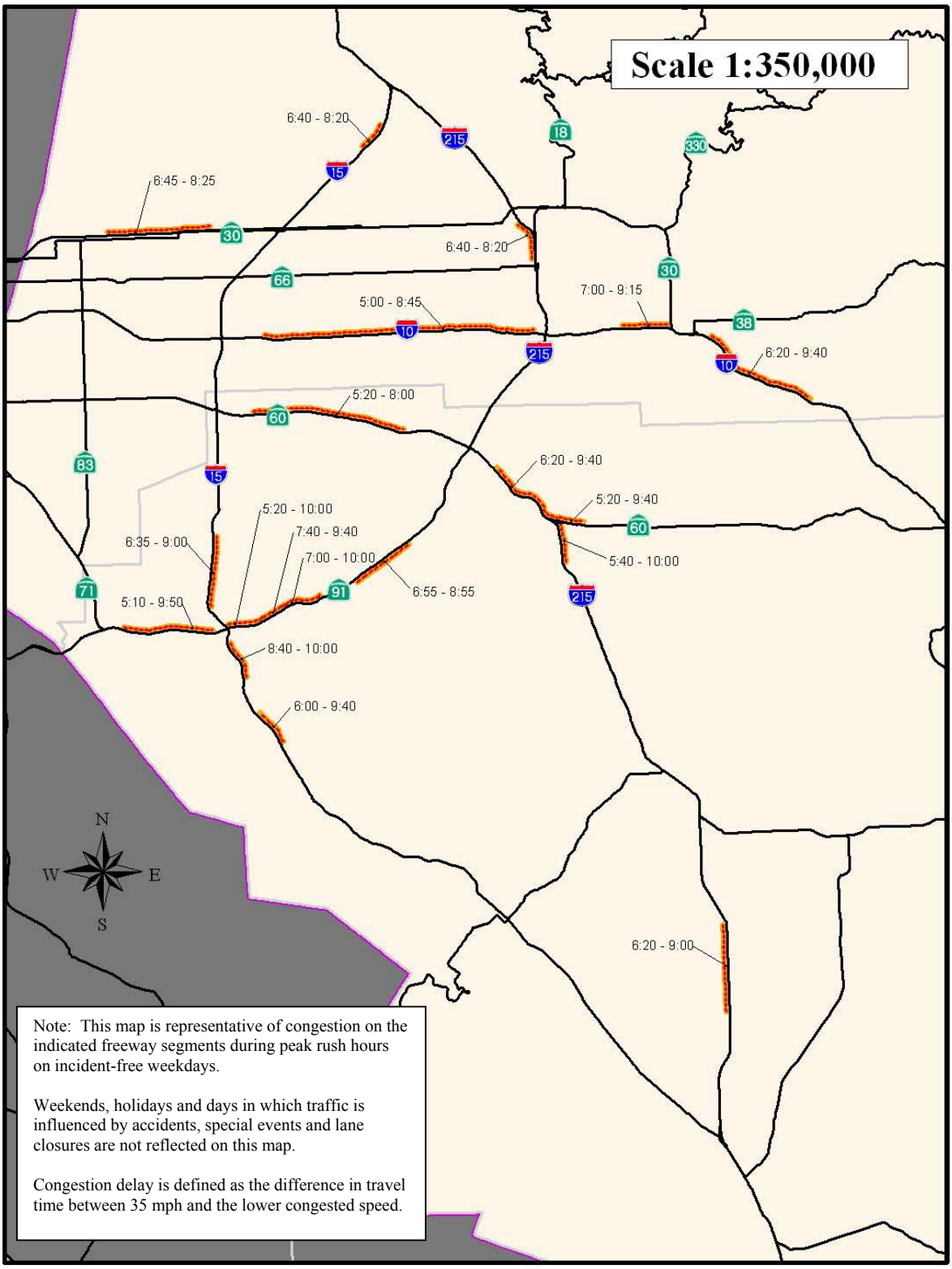


EXHIBIT 3-23
DISTRICT 8
SAN BERNARDINO-RIVERSIDE AREA
2005 MORNING CONGESTION MAP

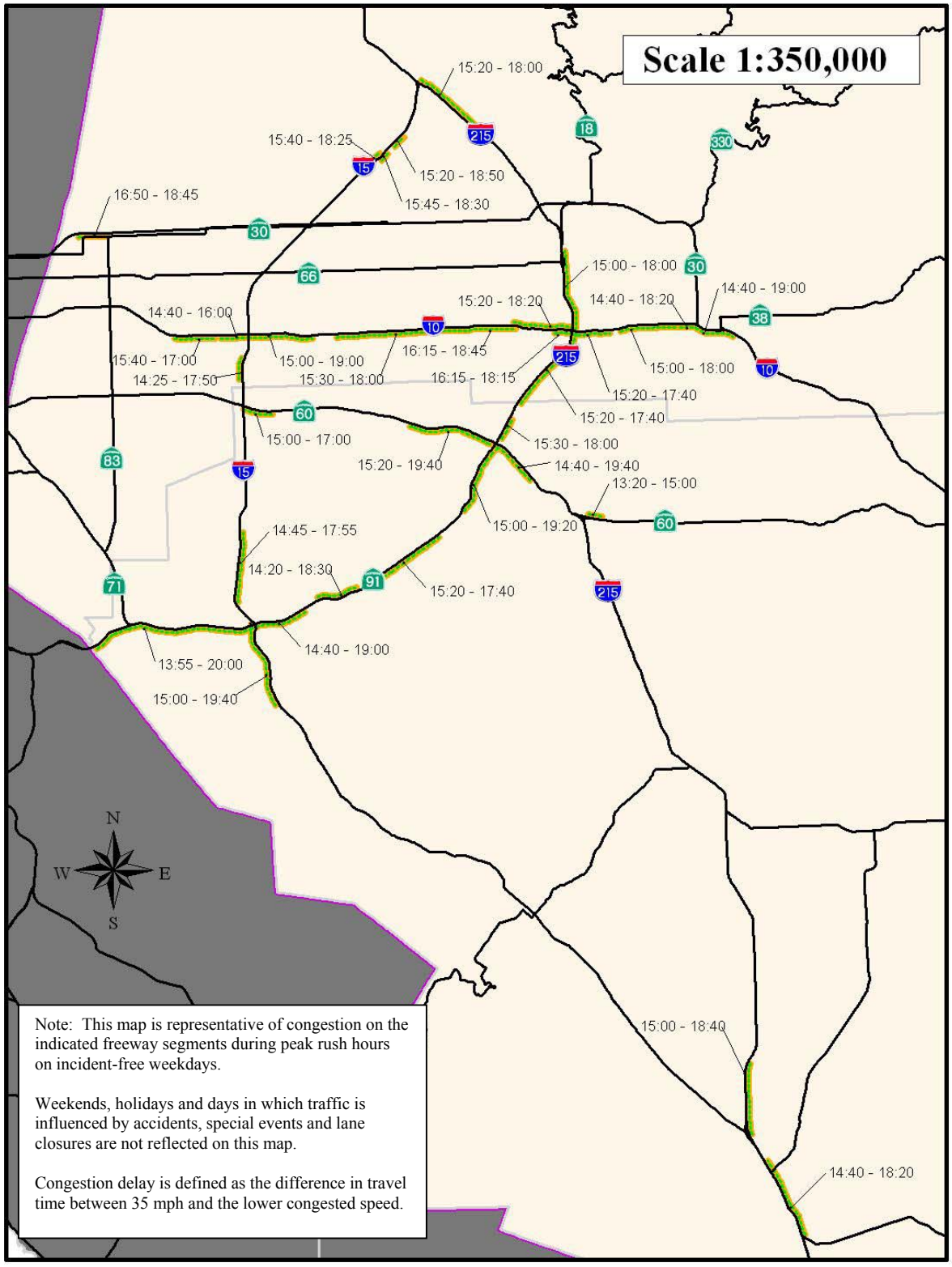


EXHIBIT 3-24
DISTRICT 8
SAN BERNARDINO-RIVERSIDE AREA
2005 EVENING CONGESTION MAP

3.7 District 10: Stockton Area

Exhibit 3-25 summarizes weekday recurrent congestion in District 10 during 2005 compared to 2004. Exhibit 3-26 presents trends in DVHD and CDM for the district. Exhibits 3-27 and 3-28 are maps showing the location and duration of MORNING and EVENING peak period congestion.

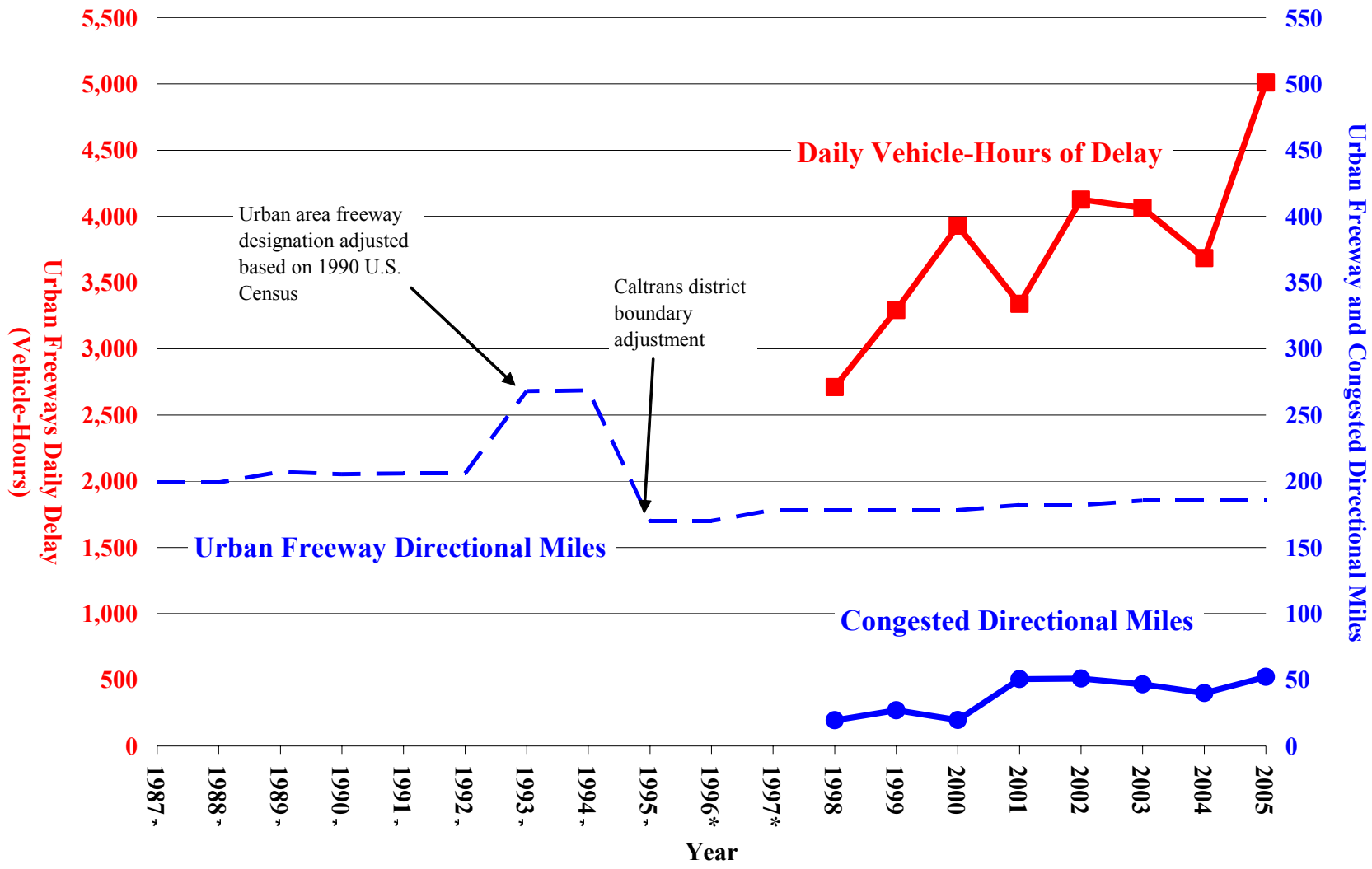
Both the 2004 and 2005 data used in this data compilation are based on fall floating vehicle data collection efforts. District 10 has been monitoring traffic congestion for the HICOMP data compilation since 1998, when recurrent congestion grew to a level to warrant monitoring.

In 2005, the total DVHD was 5,010 compared to 3,685 hours reported for 2004 (a 36 percent increase). The CDM were more than 52 miles in 2005, up 12 miles from 2004 (a 31 percent increase).

Exhibit 3-25: District 10 Highway Congestion Summary

District 10	2004	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	3,685	5,010	**36%**	**1%**
San Joaquin	3,383	4,863	44%	
Stanislaus	302	147	-51%	
Congested Directional Miles	39.9	52.2	**31%**	**3%**
San Joaquin	31.7	44.4	40%	
Stanislaus	8.3	7.7	-7%	
Total Urban Area Freeway Directional Miles	185.4	185.4		
Congested Miles/Total Urban Freeway Miles	22%	28%		

Exhibit 3-26: District 10 Congestion Trends 1998-2005



* No HICOMP reporting performed.

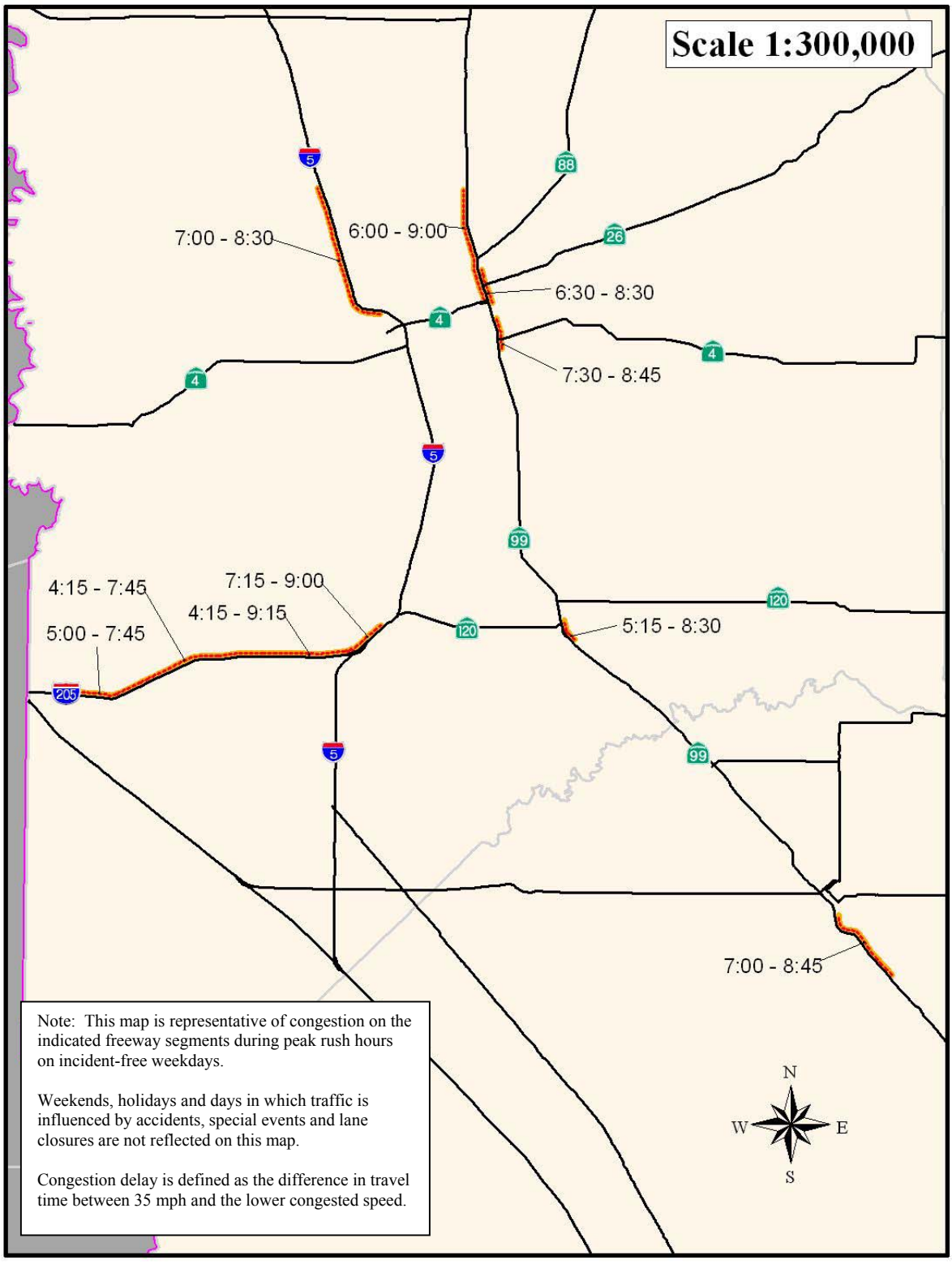


EXHIBIT 3-27
DISTRICT 10
STOCKTON AREA
2005 MORNING CONGESTION MAP

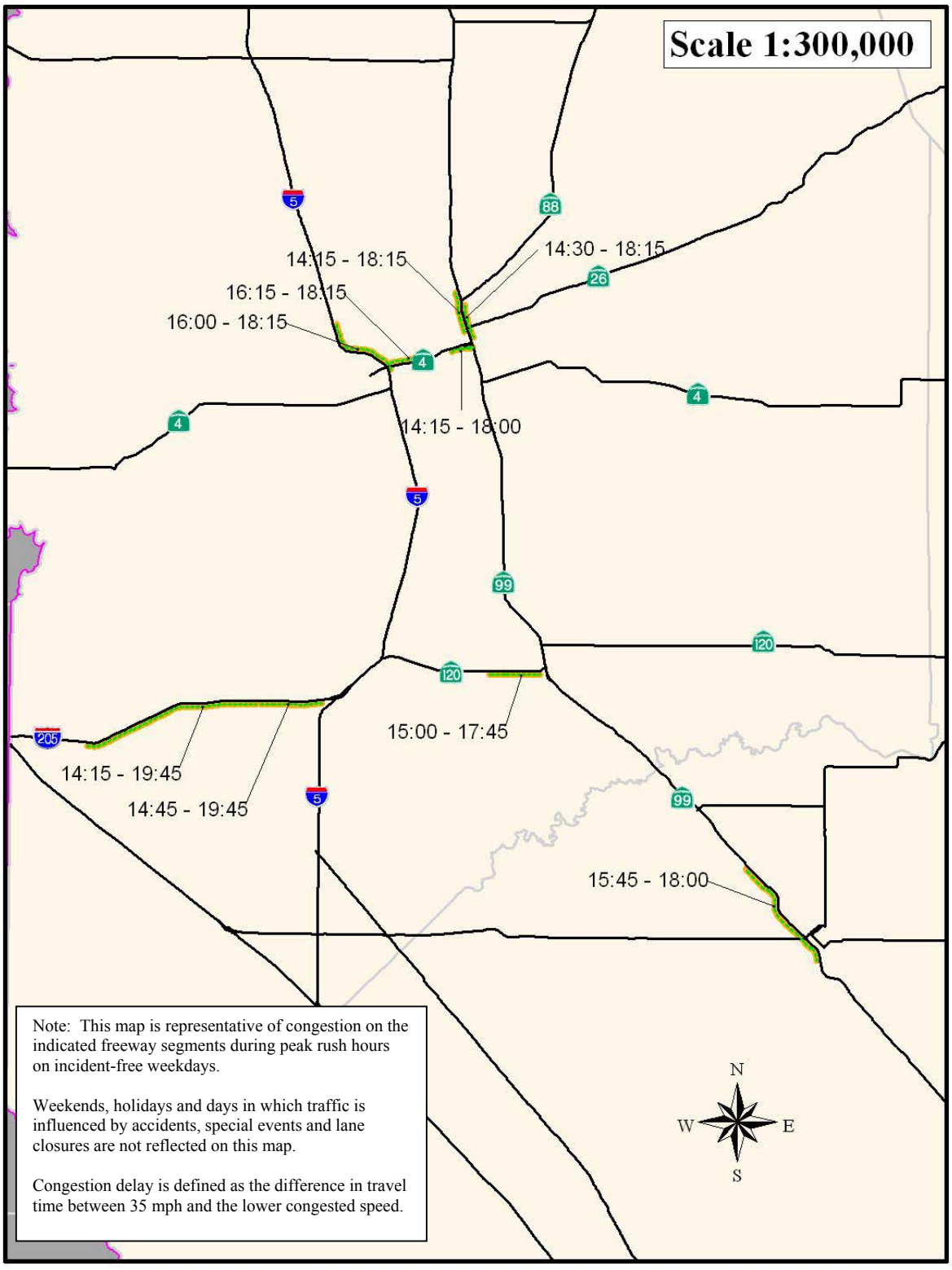


EXHIBIT 3-28
DISTRICT 10
STOCKTON AREA
2005 EVENING CONGESTION MAP

3.8 District 11: San Diego Area

Exhibit 3-29 summarizes weekday recurrent congestion in District 11 during 2005 compared to 2004. Exhibit 3-30 presents trends in DVHD and CDM for the district. Exhibits 3-31 and 3-32 are maps showing the location and duration of morning and evening peak period congestion.

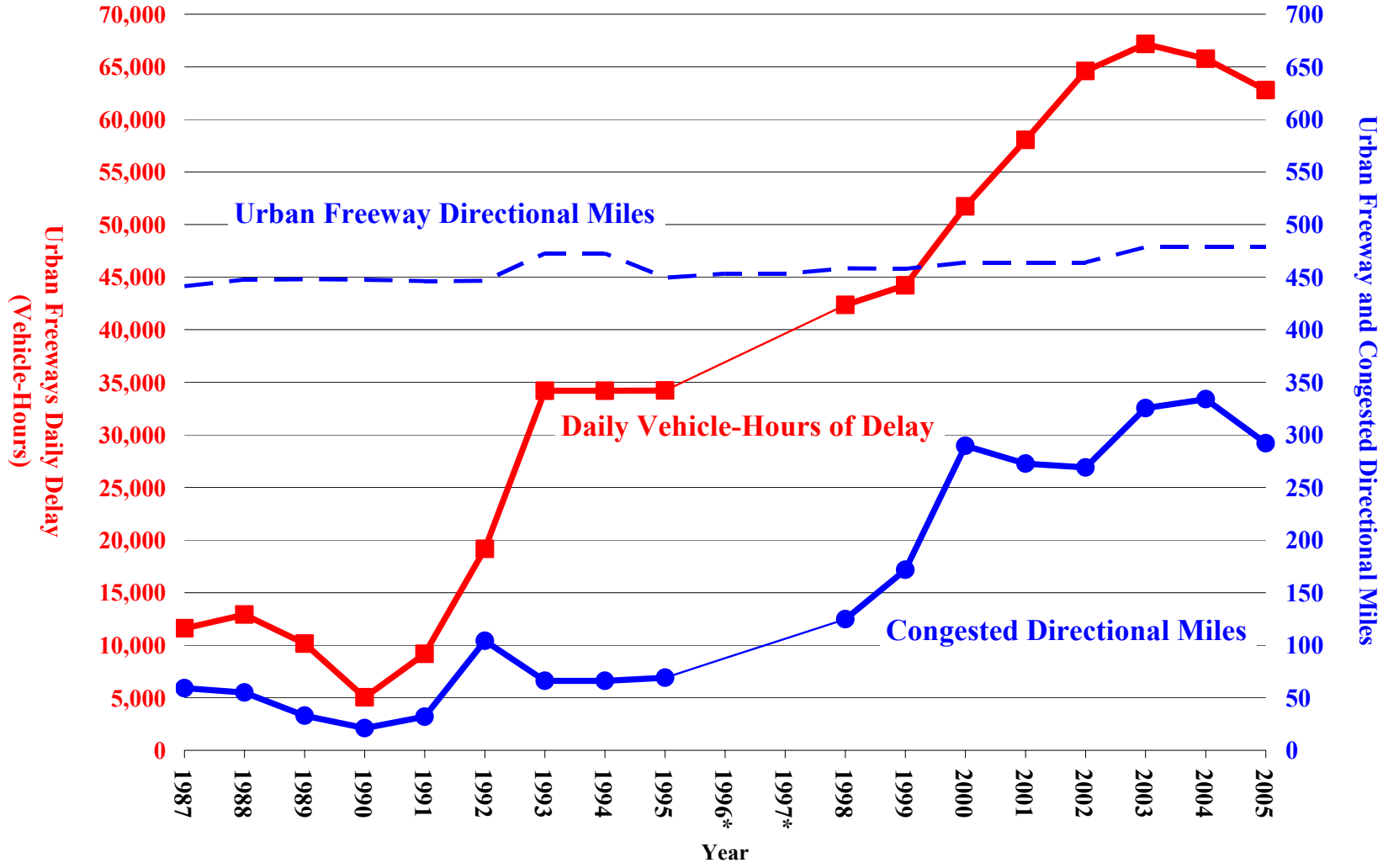
Both the 2004 and 2005 data used in this data compilation are based on fall floating vehicle and automatic detection data collection efforts. Prior to 1998, delay estimates were based on both spring and fall floating vehicle data. Since 1998, District 11 has been using automatic detection data from the fall to estimate delay for many route segments. The floating vehicle was used to monitor the remaining segments.

In 2005, the total DVHD was 62,796 compared to 65,768 hours reported for 2004 (a decrease of five percent). The CDM was 292 miles in 2005 from the 334 miles in 2004 (a 13 percent decrease).

Exhibit 3-29: District 11 Highway Congestion Summary

District 11	2004	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	65,768	62,796	**-5%**	**12%**
San Diego	65,768	62,796	-5%	
Congested Directional Miles	333.9	291.9	**-13%**	**15%**
San Diego	333.9	291.9	-13%	
Total Urban Area Freeway Directional Miles	478.4	478.4		
Congested Miles/Total Urban Freeway Miles	70%	61%		

Exhibit 3-30: District 11 Congestion Trends 1987-2005



* No HICOMP reporting performed.

EXHIBIT 3-31
DISTRICT 11
SAN DIEGO AREA
2005 MORNING CONGESTION MAP

EXHIBIT 3-32
DISTRICT 11
SAN DIEGO AREA
2005 EVENING CONGESTION MAP

3.9 District 12: Orange County

Exhibit 3-33 summarizes weekday recurrent congestion in District 12 during 2005 compared to 2004. Exhibit 3-34 presents trends in DVHD and CDM for the district. Exhibits 3-35 and 3-36 are maps showing the location and duration of morning and evening peak period congestion.

The 2004 data was derived from automatic detection data, which differs from the floating car data collection used in the past. Floating car data collected in 2005, generally yielding high DVHD results, was used to adjust the 2004 numbers.

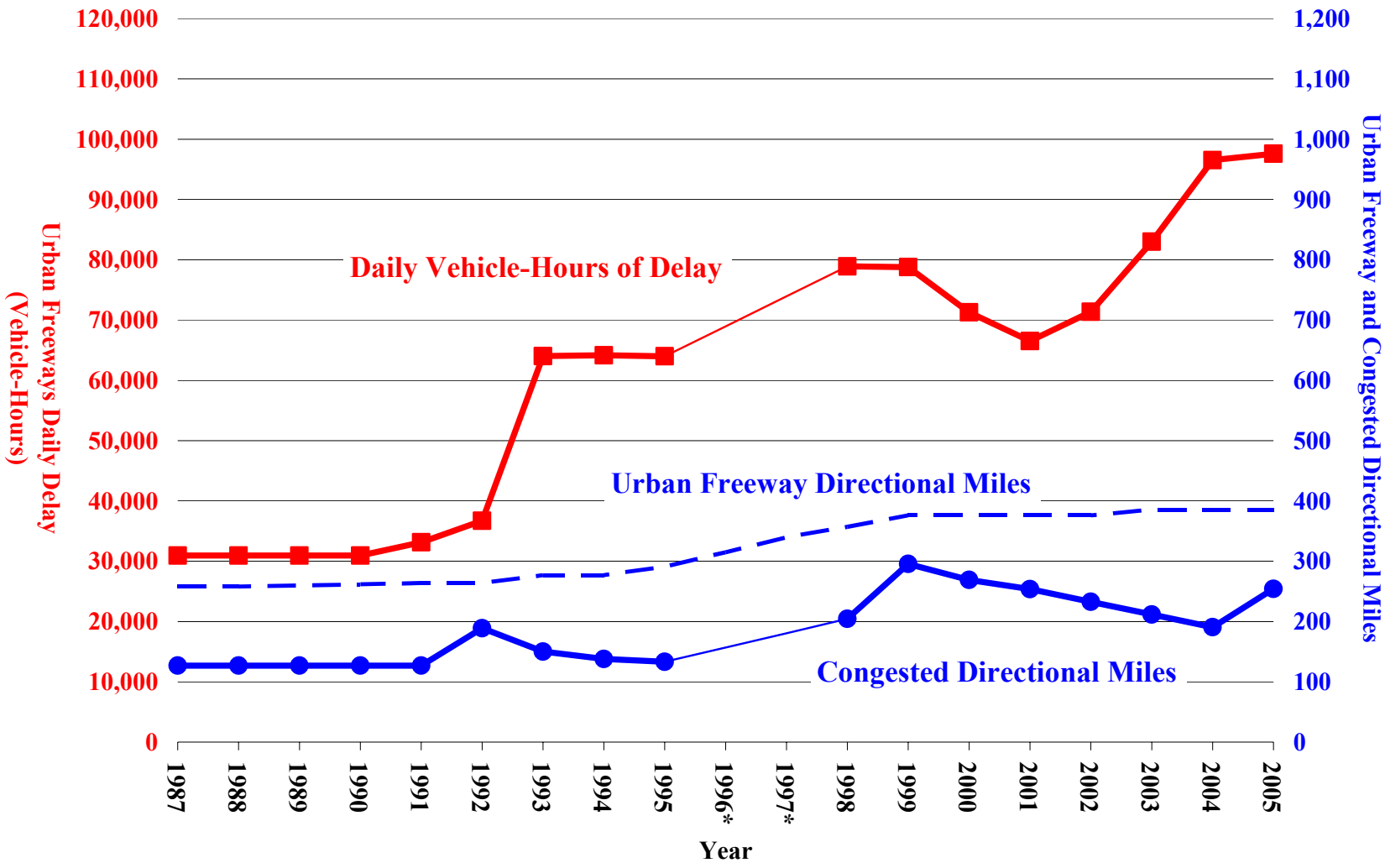
In 2005, the total DVHD was 97,581 compared to 96,522 hours for 2004 (a one percent increase). The CDM in 2005 was 254 compared to the 190 miles reported in 2004 (a 34 percent increase).

Exhibit 3-33: District 12 Highway Congestion Summary

District 12	2004*	2005	Percent Change 2004-2005	Percent of Statewide 2005
Daily Vehicle-Hours of Delay	96,522	97,581	**1%**	**19%**
Orange	96,522	97,581	1%	
Congested Directional Miles	190.3	254.1	**34%**	**13%**
Orange	190.3	254.1	34%	
Total Urban Area Freeway Directional Miles	385.5	385.5		
Congested Miles/Total Urban Freeway Miles	49%	66%		

* The district incorporated a methodological change in 2004, which contributed to the increase in overall delay reported.

Exhibit 3-34: District 12 Congestion Trends 1987-2005

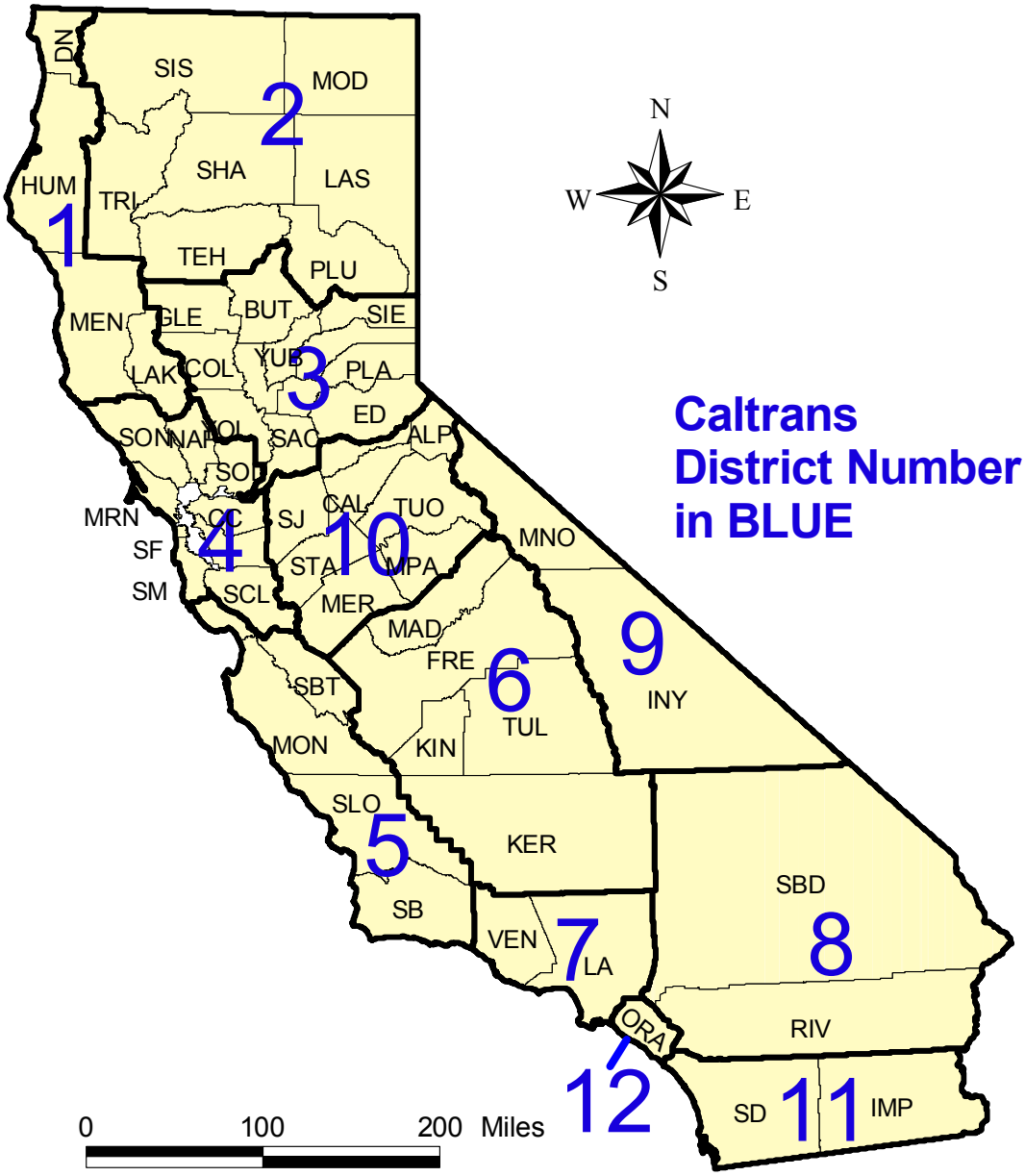


* No HICOMP reporting performed.

EXHIBIT 3-35
DISTRICT 12
ORANGE COUNTY
2005 MORNING CONGESTION MAP

EXHIBIT 3-36
DISTRICT 12
ORANGE COUNTY
2005 EVENING CONGESTION MAP

Appendix A: Department District and County Map



Appendix B: Department Contacts

District	Contact Person	Public Number	Email Address
03	Matt Taghipour	(916) 859-7950	matt_taghipour@dot.ca.gov
04	Ron Kyutoku	(510) 286-4640	ron_kyutoku@dot.ca.gov
05	Roger D. Barnes	(805) 594-6190	roger_d_barnes@dot.ca.gov
06	Albert Lee	(559) 488-4111	albert_lee@dot.ca.gov
07	Kirk Patel	(213) 897-1825	kirk_patel@dot.ca.gov
08	Mohammed Bendelhoum	(909) 383-6452	mohammed_bendelhoum@dot.ca.gov
10	Arlene Cordero	(209) 948-3894	arlene_cordero@dot.ca.gov
11	Lawrence Emerson	(858) 467-3073	lawrence_emerson@dot.ca.gov
12	Farid Nowshiravan	(949) 756-7639	farid_nowshiravan@dot.ca.gov
HQ	Rex Cluff	(916) 651-9059	rex_cluff@dot.ca.gov

Appendix C: Glossary of Terms

Automatic Detection – The most common type of automatic detection uses inductive loops (commonly referred to as "loop detectors"). New technologies are also being employed such as radar, infrared sensors, and vehicle transponder tags, such as those used for toll roads or bridges.

Daily Vehicle Hours of Delay (DVHD) – is the result of calculating V × D × T. Where, V = Volume in vehicles per hour = Number of lanes × Vehicles per hour per lane (VPHPL), D = Duration of congestion in hours and T = Travel time (in hours) to cover a given distance under congested conditions minus the travel time at 35 mph.

Directional Mile – A one-mile length of freeway has two directional miles, regardless of number of lanes.

Duration – The length of time the freeway directional segment remains congested expressed in hours.

Congested Directional Miles (CDM) – See Extent.

Extent – The length of freeway segment, by direction, experiencing speeds below 35 mph for 15 minutes or more. Extent is expressed in terms of congested directional miles (CDM).

Floating Vehicle – Consists of either a fixed transmission sensor mounted in the engine compartment of a vehicle or GPS device. The transmission sensor, or tachometer, counts the number of wheel rotations in one second and sends that data to a laptop computer. Software on the computer then translates this data into meaningful time, distance, and travel speed information. A GPS system uses satellite technology to identify the location of the vehicle over time. Computer software identifies the freeway, direction of travel, and average speed of the vehicle.

High Occupancy Vehicle Lanes (HOV) – Lanes on freeways restricted to vehicles carrying more than one person or to public transportation vehicles. Minimum vehicle occupancies can be either two or three people depending on the highway segment. HOV lanes are designed to encourage ridesharing.

Magnitude – The difference in time between the time it takes to travel a segment at the recorded congested speed and the travel time at 35 mph. DVHD is the term used to express the magnitude of the delay.

Metered Connector – Ramp meter on a freeway-to-freeway connector.

Non-Recurrent Congestion – Caused by events that occur irregularly such as accidents, sporting events, and maintenance or construction.

Ramp Metering – Signalized devices installed on freeway on-ramps to regulate traffic entering the freeway system.

Recurrent Congestion – A condition lasting for 15 minutes or longer where travel demand exceeds freeway capacity, as evident by vehicular speeds of 35 mph or less occurring during peak commute periods on a typical, incident-free weekday.

Surveillance Stations – All detector locations including ramp-metering stations are termed surveillance stations.

Arnold Schwarzenegger
Governor

Dale E. Bonner
Secretary, Business, Transportation and Housing Agency

Will Kempton
Director, California Department of Transportation

Robert Copp
Division Chief, Traffic Operations

For more information or additional copies of this data compilation please contact Rex Cluff at (916) 651-9059 or by email: rex_cluff@dot.ca.gov