# Statewide
# Mobility Performance Report
# 2012

*I-605 & I-5  Interchange Los Angeles County. Photo by: Thomas Ritter*

California Department of Transportation
Division of Traffic Operations
Office of Performance

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# CALIFORNIA DEPARTMENT OF TRANSPORTATION

# MOBILITY PERFORMANCE REPORT 2012

**Division of Traffic Operations**

**Office of Performance**

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# ACKNOWLEDGEMENTS

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# EXECUTIVE SUMMARY

The Mobility Performance Report (MPR) is the annual traffic congestion report regarding the State Highway System (SHS), prepared by the California Department of Transportation (Caltrans). The MPR provides system performance information that is used for work that includes setting priorities and directing resources to improve mobility in the State's urban areas. It also satisfies Caltrans' statutory obligation to report congestion data as described in Government Code section 14032.6: "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."

The MPR 2012 compares information for calendar years 2011 and 2012 in the following system performance areas:

- Travel demand (population, employment, and vehicle miles of travel).
- Traffic congestion (vehicle hours of delay, bottleneck locations).
- Lost productivity (equivalent lost lane miles).

This report's traffic congestion information is based on data collected every day of the year, 24 hours a day, by automated vehicle detector stations deployed on urban-area freeways where congestion is regularly experienced. The complete set of data that was analyzed for this report is presented in Appendix A. The methodology for collecting data and calculating performance measures is explained in Appendix B.

The MPR presents congestion information at two speed thresholds: delay from vehicles traveling below 35 miles per hour (mph), and delay from vehicles traveling below 60 mph. The delay at the 35 mph threshold represents severe congestion while delay at 60 mph represents all congestion, both light and heavy. These thresholds are set by Caltrans and are based upon engineering experience and recommendations from Caltrans district staff.

## STATEWIDE HIGHLIGHTS

In 2012, total statewide delay equaled 93.7 million vehicle hours of delay (VHD) at the 35 mph speed threshold, and 221.8 million VHD at the 60 mph threshold. The statewide average weekday delay experienced in 2012 was approximately 328,000 VHD at 35 mph, and 768,000 VHD at 60 mph. The total annual statewide delay at 35 mph equates to an opportunity cost (the cost of lost time in terms of salaries and wages) of $1.6 billion, or $4.6 million a day. The total annual statewide delay at 60 mph equates to an opportunity cost of $3.9 billion, or $10.9 million a day.

Approximately 44 percent of the State's delay is experienced in Los Angeles County (Caltrans District 7) and 27 percent is from the San Francisco Bay Area (District 4). Most urban areas in the State saw an increase in delay from 2011 to 2012, a reversal in trend from 2011.

# Chapter 1

# INTRODUCTION

## SECTION 1.1. BACKGROUND

The MPR 2012 prepared by the Department of Transportation (Caltrans) provides information regarding congestion on the SHS that is useful to transportation system planners and managers in setting priorities, determining effective strategies, and directing resources to improve mobility where it is needed most. The MPR is expected to continue to evolve over time as Caltrans' congestion reporting capabilities expand and as reader feedback suggests new ideas for improvement. The report's geographical coverage will also grow over time. Caltrans is continuing to establish more vehicle detection, including places beyond the major urban areas. The Performance Measurement System (PeMS) is the tool used to analyze congestion data.

The MPR 2012 provides transportation system performance information at a statewide level and by each of the Caltrans districts that has vehicle detection monitoring. Each participating district researched, analyzed, and prepared mobility performance data for calendar years 2011 and 2012 as part of this statewide reporting effort. Calendar year 2011 is included because it is most consistent with the 2012 format and data and provides a convenient frame of reference.

The MPR 2012 also satisfies Caltrans' statutory obligation to report congestion data, as described in Government Code Section 14032.6:

> 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.

The MPR 2012 reports congestion information based on traffic volume and occupancy data collected 24 hours a day, 365 days a year, by automated vehicle detector stations (VDS). These VDS cover the State's urban-area freeways and other areas where congestion is regularly experienced. Traffic congestion is experienced in places on the SHS where these VDS are not present including rural areas, conventional highways, or urban areas where there is a gap in vehicle detection coverage. The VDS are widely deployed, covering over 90 percent of freeways where recurrent congestion occurs. Given the confidence that the VDS are capturing the vast majority of both recurrent and non-recurrent delay experienced on the SHS, the MPR reports delay as the "total" or "average" experienced by freeway, district, and statewide.

Prior to 2009, Caltrans prepared a congestion report called the State Highway Congestion Monitoring Program (HICOMP) Annual Data Compilation that used a different

methodology that included manual data collection. Due to the substantial methodological changes between the HICOMP Annual Data Compilation and the MPR, comparing the data in the two reports is not recommended as findings may be misleading.

## SECTION 1.2. PERFORMANCE MEASURES

The automated VDS deployed around the State send data every 30 seconds to the PeMS. Most types of VDS collect traffic volume (also called flow) and occupancy data. Volume or flow refers to the number of vehicles passing over each detector in each lane. Occupancy refers to how long the vehicles are over each detector. The volume and occupancy data are used to calculate speed. In a few places, VDSs report speed directly. PeMS calculates and reports several performance measures from this raw data.

### 1.2.1. Vehicle Hours of Delay

The main measure of congestion is vehicle hours of delay (VHD), or the extra time spent in traffic beyond what people would experience if they were traveling at a given benchmark speed. In this report, delay is determined by calculating the difference between the observed travel time on the segment (as calculated from speed) and the travel time at two benchmark speeds: 35 mph and 60 mph. The hours of delay are then multiplied by the vehicle flow on the facility to produce VHD, using the following formula:

**VHD** = actual volume × (Travel Time at actual speed − Travel Time at threshold speed)

The threshold speeds of 35 mph and 60 mph were chosen as benchmarks because they distinguish heavy congestion from light congestion. Delay at 35 mph is a subset of the delay at 60 mph. Delay at 35 mph represents the delay experienced by vehicles traveling between zero and 35 mph. Delay at 60 mph represents the delay experienced by vehicles traveling between zero and 60 mph.

The MPR presents delay information in a number of ways. It presents the total VHD experienced in the year, which is a summation of the VHD recorded on each day of the year. It also presents the average weekday VHD experienced during the year, which is a daily value calculated by taking the average of the VHD recorded on each non-holiday weekday of the year. Average VHD is also calculated for each day of week and hour of day. In many of the figures in this report, delay trends are shown by month, so that seasonal differences can be analyzed.

### 1.2.2. Vehicle Miles of Travel

The MPR 2012 presents vehicle miles of travel (VMT). It should be noted that the VMT numbers presented in this report are not true district-wide or statewide numbers, in that they only reflect travel being done on the segments of freeway with automated VDS. The flow recorded at each VDS is multiplied by the length of freeway assigned to that respective VDS to determine the distance, expressed in miles that vehicles are traveling. VMT provides a measure of the amount of vehicle travel. If the amount of travel increases,

the probability of travel demand exceeding freeway capacity increases, and the likelihood of delay is greater.

### 1.2.3. Lost Productivity

The MPR also presents information about lost productivity. Lost productivity is the cumulative difference between the maximum traffic capacity at a location and the observed flow during congestion. When the average speed drops below the speed threshold of 35 mph, fewer vehicles pass by any fixed point on the freeway than would pass under free-flow conditions, per unit of time. The reduced flow on the facility is then divided by the capacity (the highest sustainable hourly flow as calculated by PeMS) to achieve lost-lane-mile hours. The MPR 2012 presents lost productivity in terms of lost lane miles (LLM). LLM is calculated by dividing the lost-lane-mile hours by the number of hours in the given time period (e.g., a.m. peak) to determine the average LLM per hour.

### 1.2.4. Detector Health

PeMS runs diagnostics on each detector's data to determine if the data is "good" or "bad." Ranges of data values are established for each detector, and if the data falls outside those ranges, PeMS identifies the detector as bad. Maintaining good detector health is of key importance to Caltrans' congestion monitoring and reporting activities. The information presented in the MPR is not based on observed data from bad detectors, but it does include information based on imputed data for these detectors (estimated volume and occupancy data based on historical values and neighboring good detectors).

The detector health sections of this report also provide information about the change in the overall number of detectors from year to year. The deployment of new detectors has slowed in recent years as many districts have reached the point at which their urban freeway systems are fully covered by detectors. However, there are still new detectors being installed and activated in locations where there are gaps in coverage, in new lanes if facilities are widened, in areas near the edges where congestion begins and ends, and in smaller urban areas where congestion is not as severe but monitoring is desired. Failed detectors are also replaced as necessary. Changes in the detection system create a challenge for analyzing trends over time. In general, with the number of detectors still growing by a small factor, there is a slight upward pressure on many performance measures, particularly VMT. Therefore, it should be noted that a small percentage of growth in performance measures is likely attributable to the growth in the number of detectors reporting data.

### 1.2.5. Bottleneck Locations

The MPR provides lists of the top bottlenecks identified in each district during the a.m. peak and p.m. peak periods for the year. A bottleneck is defined as a persistent and significant drop in speed between two locations on a freeway. Bottlenecks are determined by the bottleneck identification algorithm in PeMS. This algorithm looks at speeds along a facility and declares a bottleneck at a location where there has been a drop in speed of at least 20 mph between the current detector and the detector immediately downstream. This speed drop must persist for at least five out of any seven contiguous five-minute data points,

and the speed at the detector in question must be below 40 mph. While PeMS identifies the detector locations where these conditions are met, these bottleneck locations are only approximate (based on the locations where detectors are present). In compiling this report district staff used their engineering judgment and local knowledge to adjust the locations, as necessary.

The bottlenecks identified through the PeMS bottleneck identification algorithm are filtered by a number of factors; collectively called "bottleneck criteria." This filtering creates a consistent bottleneck analysis process for all districts, and reports only bottlenecks that are recurrent and causing large amounts of delay. The bottleneck lists in the MPR 2012 include bottleneck locations that were active on at least 20 percent of all weekdays during the year, persisted for at least 15 minutes on average, and caused more than 100 VHD per weekday. This filtering means that some rural districts had less than 10 bottlenecks to report in the a.m. peak and p.m. peak periods. In the MPR 2012, these top bottleneck locations are shown on district maps, along with lines depicting the congestion queue length resulting from these bottlenecks. If a district had more than 10 bottlenecks that met the criteria described above, those additional bottlenecks and their congestion queues are shown on that district's map.

### 1.2.6. Cost of Congestion

The MPR 2012 discusses the cost of congestion on page 35. These costs are presented in four categories: (1) extra fuel burned, (2) the cost of lost time (opportunity cost in terms of wages and salaries), (3) extra vehicle emissions of carbon dioxide (CO2), and (4) the estimated cost of emission. These calculations assume an average fuel price of $4.09 a gallon during 2012 based on figures from Caltrans' Division of Transportation Planning's Economic Analysis Branch. The opportunity cost is priced at $18.00 for each vehicle hour of delay, which assumes an average vehicle occupancy of 1.30 and a 9 percent truck volume.

The amount of extra fuel burned is assumed as 1.719 gallons of fuel for each vehicle hour of delay. The amount of extra vehicle emissions of $CO_2$ is derived from the figure of 8,887 grams of $CO_2$ produced for each gallon of gasoline burned. Note that the metric ton is the unit of measure for $CO_2$ emissions used in this report, consistent with the California Air Resource Board and other agencies that commonly report emissions in terms of metric tons. See Appendix B for more details regarding these calculations, including source information.

# Chapter 2

# STATEWIDE FINDINGS

This chapter reports statewide system performance information. Caltrans maintains and operates the State Highway System that is comprised of approximately 30,600 directional miles of roadway. Caltrans divides the State into 12 districts, and eight of those districts provide data for this report via automated detectors. Districts 1 and 2 in the largely rural northern part of the State and District 9 on the eastern side of the Sierra Nevada mountain range do not collect traffic data from automated VDS. District 5 along the central coast has just begun collecting data from VDS and will have a full year of data in 2013 to include in the MPR. The districts that contribute to this report are District 3 (Sacramento Area), District 4 (San Francisco Bay Area), District 6 (Central Valley), District 7 (Los Angeles Area), District 8 (Inland Empire), District 10 (Stockton Area), District 11 (San Diego Area), and District 12 (Orange County). Figure 2–1 is a California map showing the Caltrans district boundaries.

**FIGURE 2–1**
**STATE OF CALIFORNIA WITH CALTRANS DISTRICT BOUNDARIES**

This chapter presents the following information:

- Section 2.1 presents travel demand data by district, including population, employment statistics and VMT.
- Section 2.2 presents statewide traffic congestion trends in terms of VHD at the benchmark speeds of 35 mph and 60 mph, respectively. The tables and figures in this section illustrate delay in several ways: statewide total VHD by district and county, statewide average weekday VHD, and statewide average VHD by day of the week and by hour of day. Delay is compared between the 2011 and 2012 calendar years in most cases, but longer-term trends dating back to 2005 are also presented.
- Section 2.3 identifies the costs associated with congestion statewide and by district.
- Section 2.4 reports statewide information on lost freeway productivity in equivalent lost lane miles (LLM) by period of day.
- Section 2.5 reports detection health and data quality of all the detectors in the State.

## SECTION 2.1. TRAVEL DEMAND

The eight Caltrans districts that contributed to this report have automated detectors reporting data across approximately 19,000 lane miles of freeway. This section discusses the travel demand on these roads, as well as two factors that influence demand: population and employment. In 2012, California's population reached approximately 38.0 million residents, as summarized in Table 2–1. This represents an increase of 297,667 residents (or 0.8 percent) from 2011. After removing the districts that do not participate in this report, the population of the remaining districts was close to 36 million residents in 2012, 94 percent of the statewide total. District 7 (Los Angeles Area) was the most populous district with over 10.8 million residents, followed by District 4 in the San Francisco Bay Area (7.3 million), and District 8 in the Inland Empire (4.3 million). Combined, these three districts housed almost 60 percent of the State's total population. As shown in Table 2–1, most districts experienced a small increase in population from 2011 to 2012.

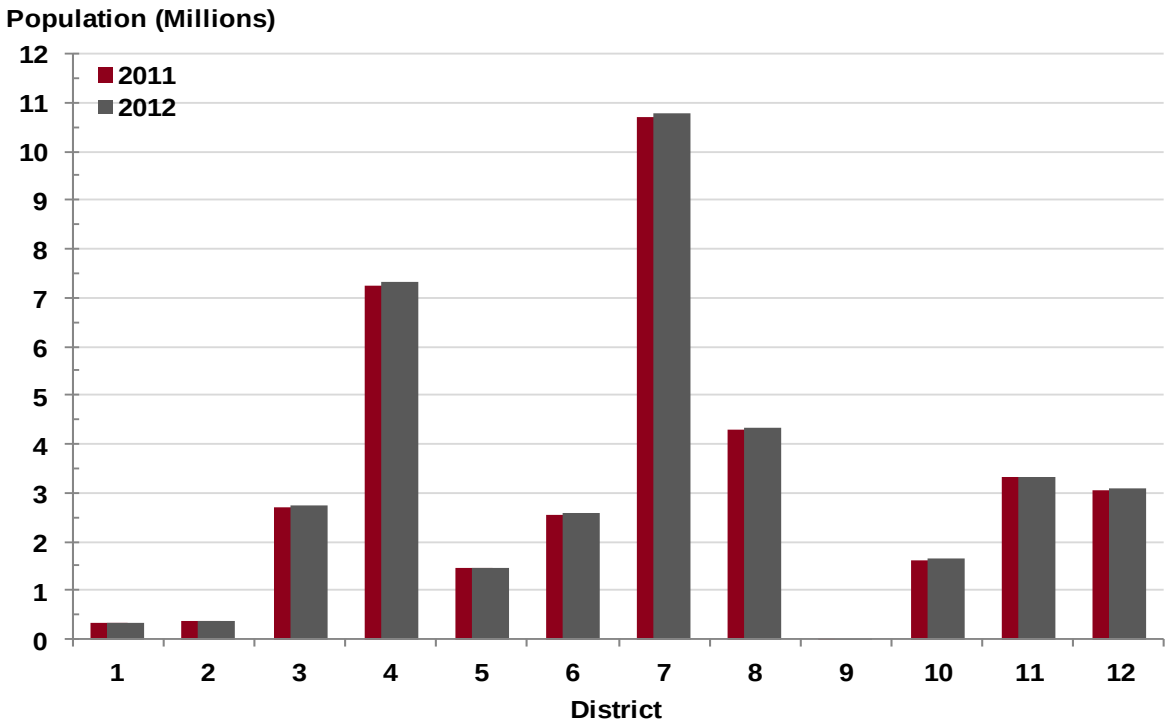
**Table 2-1. POPULATION ESTIMATES, CALIFORNIA TOTAL, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY CALTRANS DISTRICT, 2011–2012**

| District | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | Population | Percent of Total | Population | Percent of Total | Absolute | Percent |
| 1 | 315,632 | 0.8% | 316,411 | 0.8% | 779 | 0.2% |
| 2 | 363,104 | 1.0% | 363,199 | 1.0% | 95 | 0.0% |
| 3 | 2,713,432 | 7.2% | 2,732,537 | 7.2% | 19,105 | 0.7% |
| 4 | 7,249,144 | 19.2% | 7,327,626 | 19.3% | 78,482 | 1.1% |
| 5 | 1,438,926 | 3.8% | 1,446,202 | 3.8% | 7,276 | 0.5% |
| 6 | 2,549,109 | 6.8% | 2,570,365 | 6.8% | 21,256 | 0.8% |
| 7 | 10,718,585 | 28.5% | 10,793,527 | 28.4% | 74,942 | 0.7% |
| 8 | 4,293,892 | 11.4% | 4,331,333 | 11.4% | 37,441 | 0.9% |
| 9 | 32,961 | 0.1% | 33,066 | 0.1% | 105 | 0.3% |
| 10 | 1,628,268 | 4.3% | 1,640,162 | 4.3% | 11,894 | 0.7% |
| 11 | 3,307,872 | 8.8% | 3,330,239 | 8.8% | 22,367 | 0.7% |
| 12 | 3,057,879 | 8.1% | 3,081,804 | 8.1% | 23,925 | 0.8% |
| **Total** | **37,668,804** | **100%** | **37,966,471** | **100%** | **297,667** | **0.8%** |

Numbers may not sum to total due to rounding.
Districts 1, 2, 5, and 9 do not participate in mobility performance reporting.
Source: State of California, Department of Finance, *E-1 Population Estimates for Cities, Counties, and the State—January 1, 2012 and 2013.* Sacramento, California, May 2013.

Figure 2–2 displays the population by each Caltrans district. This figure shows District 7 as the most populated district.

**Figure 2–2**
**CALIFORNIA POPULATION, BY CALTRANS DISTRICT, 2011–2012**




### 2.1.1. Employment

California had about 16.6 million civilian jobs on average during 2012, compared to approximately 16.2 million in 2011–an increase of 2.0 percent. Table 2–2 shows employment figures by Caltrans district. About 976,000 of these jobs were located in the Caltrans districts excluded from this report. The average unemployment rate in the State was 10.5 percent in 2012, down from 11.8 percent in 2011. Comparing the State's population and employment data, it is evident that job growth was very minor in 2012.

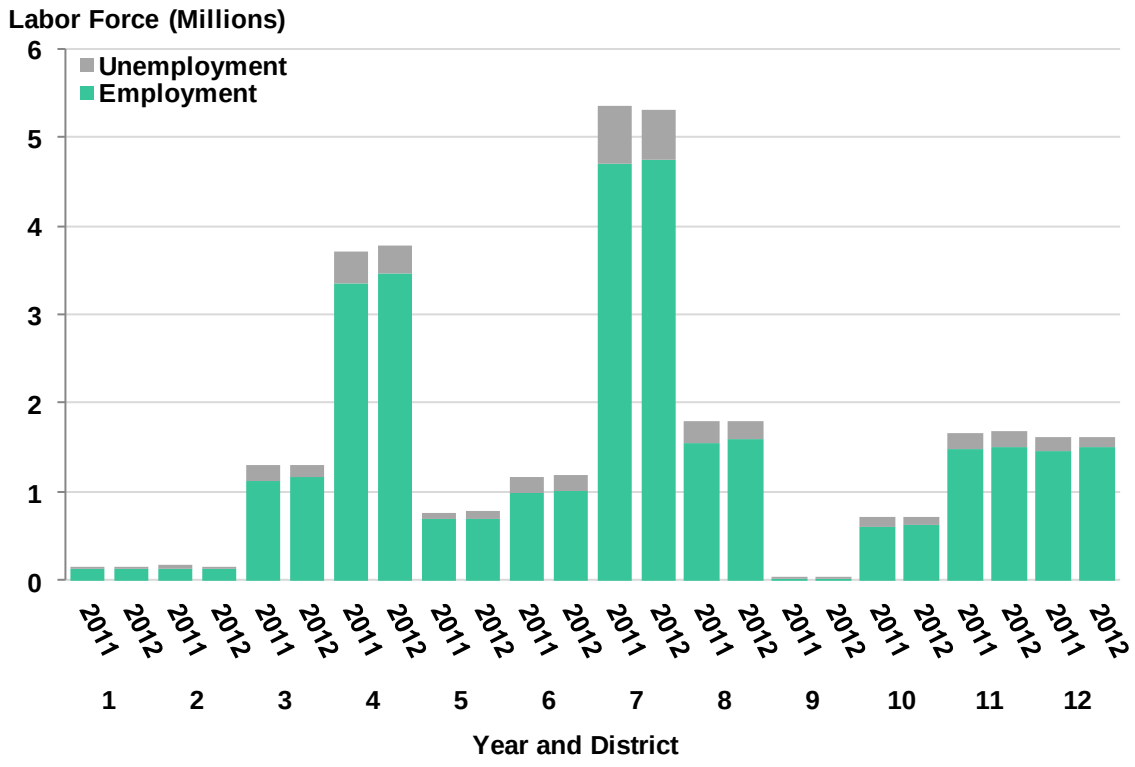
**Table 2-2. EMPLOYMENT, CALIFORNIA TOTAL, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY CALTRANS DISTRICTS, 2011–2012**

| District | 2011 | | | 2012 | | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|---|---|
| | Employment | Percent of Total | Unemployment Rate | Employment | Percent of Total | Unemployment Rate | Absolute | Percent |
| 1 | 123,110 | 0.8% | 12.4% | 124,026 | 0.7% | 11.3% | 916 | 0.7% |
| 2 | 135,758 | 0.8% | 15.2% | 135,747 | 0.8% | 13.8% | -11 | 0.0% |
| 3 | 1,133,106 | 7.0% | 12.5% | 1,154,287 | 7.0% | 11.0% | 21,181 | 1.9% |
| 4 | 3,362,567 | 20.7% | 9.6% | 3,471,558 | 21.0% | 8.3% | 108,992 | 3.2% |
| 5 | 679,208 | 4.2% | 11.0% | 700,683 | 4.2% | 9.8% | 21,475 | 3.2% |
| 6 | 980,283 | 6.0% | 15.9% | 1,004,258 | 6.1% | 14.6% | 23,975 | 2.4% |
| 7 | 4,715,267 | 29.0% | 12.1% | 4,746,525 | 28.7% | 10.8% | 31,258 | 0.7% |
| 8 | 1,551,500 | 9.6% | 13.6% | 1,586,775 | 9.6% | 12.1% | 35,275 | 2.3% |
| 9 | 16,425 | 0.1% | 10.0% | 15,928 | 0.1% | 9.9% | -497 | -3.0% |
| 10 | 601,624 | 3.7% | 16.7% | 612,068 | 3.7% | 15.1% | 10,444 | 1.7% |
| 11 | 1,478,392 | 9.1% | 11.0% | 1,512,492 | 9.1% | 9.8% | 34,100 | 2.3% |
| 12 | 1,460,042 | 9.0% | 8.8% | 1,495,975 | 9.0% | 7.6% | 35,933 | 2.5% |
| **Total** | **16,237,281** | **100%** | **11.8%** | **16,560,323** | **100%** | **10.5%** | **323,042** | **2.0%** |

Districts 1, 2, 5, and 9 do not participate in mobility performance reporting.
Data not seasonally adjusted.
Source: State of California, Employment Development Department (EDD), Labor Market Information Division; data downloaded Sept. 9, 2013.

Figure 2–3 displays California's employment and unemployment by Caltrans district.

**Figure 2–3**
**CALIFORNIA EMPLOYMENT AND UNEMPLOYMENT, BY CALTRANS DISTRICT, 2011–2012**



### 2.1.2. Vehicle Miles of Travel

In 2012, PeMS reported just under 117 billion total annual VMT on monitored freeways throughout the State[1] as shown in Table 2–3. This was an increase of approximately 4.7 billion VMT, or 4.2 percent from the previous year. Percent growth in VMT was largest in District 8 (San Bernardino and Riverside Counties) and District 10 (Stockton Area).

**Table 2-3. VEHICLE MILES OF TRAVEL (VMT), STATEWIDE TOTAL, PERCENT OF STATEWIDE TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY DISTRICT, 2011–2012**

| District | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | VMT | Percent of Total | VMT | Percent of Total | Absolute | Percent |
| 3 | 8,061,663,080 | 7.2% | 8,118,794,707 | 7.0% | 57,131,627 | 0.7% |
| 4 | 26,189,275,110 | 23.4% | 26,833,742,913 | 23.0% | 644,467,803 | 2.5% |
| 6 | 2,275,517,750 | 2.0% | 2,339,471,832 | 2.0% | 63,954,082 | 2.8% |
| 7 | 34,781,845,328 | 31.1% | 34,943,536,784 | 30.0% | 161,691,456 | 0.5% |
| 8 | 12,664,247,922 | 11.3% | 15,229,914,574 | 13.1% | 2,565,666,651 | 20.3% |
| 10 | 4,739,692,447 | 4.2% | 5,212,278,552 | 4.5% | 472,586,105 | 10.0% |
| 11 | 11,479,665,596 | 10.3% | 12,112,262,444 | 10.4% | 632,596,849 | 5.5% |
| 12 | 11,722,366,394 | 10.5% | 11,819,225,206 | 10.1% | 96,858,812 | 0.8% |
| **Total** | **111,914,273,625** | **100%** | **116,609,227,011** | **100%** | **4,694,953,386** | **4.2%** |

Numbers may not sum to total due to rounding.

[1] Note that the VMT values presented in the MPR are not representative of total district or statewide VMT. These values represent only the VMT recorded by automated vehicle detectors deployed on urban freeways. This distinction is made because, while the vast majority of delay occurs on the freeways that are monitored by detectors, travel is done throughout the State, and detectors do not record all of it.

Figure 2–4 displays the values presented in Table 2–3 in graphic form. On the State's monitored freeways, District 7 (Los Angeles Area) represents over 30 percent of total VMT, with District 4 (San Francisco Bay Area) representing over 23 percent.

**FIGURE 2–4**
**STATEWIDE TOTAL VEHICLE MILES OF TRAVEL ON MONITORED FREEWAYS, BY DISTRICT, 2011–2012**

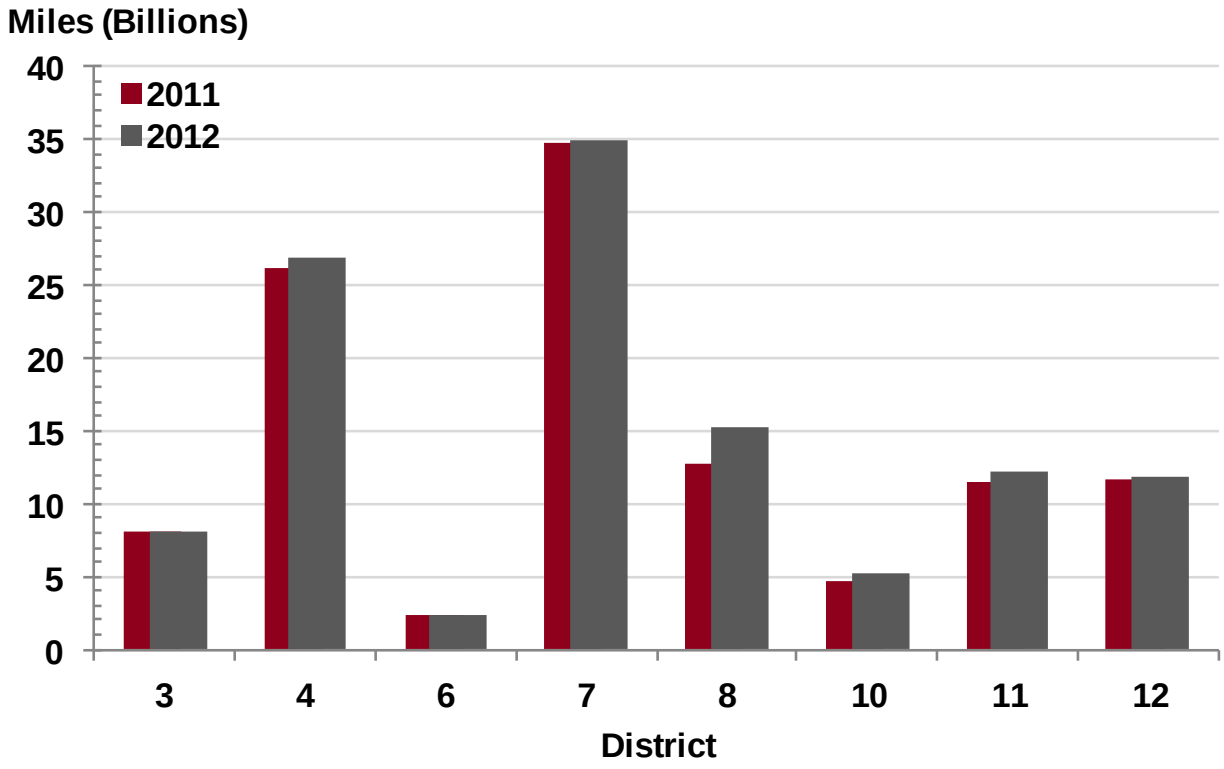
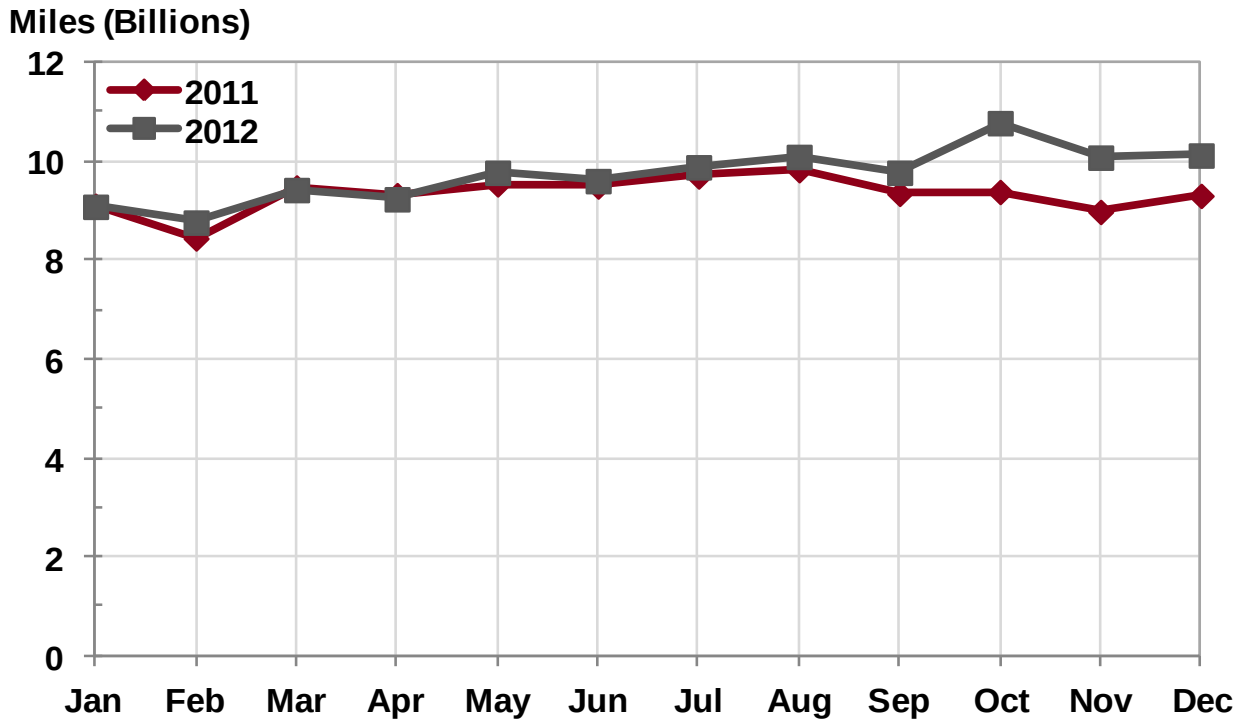


Figure 2–5 displays monthly VMT values for monitored freeways in 2011 and 2012. The annual pattern is remarkably similar between the two years except in the fourth quarter of 2012.

**Figure 2–5**
**STATEWIDE TOTAL VEHICLE MILES OF TRAVEL ON MONITORED FREEWAYS, BY MONTH, 2011–2012**



# SECTION 2.2. TRAFFIC CONGESTION

This section of the MPR 2012 reports traffic congestion in terms of VHD, or the extra time spent in traffic beyond what people would experience if they were traveling at a given benchmark speed. In this report, delay is determined by calculating the difference between the observed travel time on the segment (as calculated from speed) and the travel time at two benchmark speeds: 35 mph and 60 mph. These speeds are benchmarks because they separate heavy congestion (delay at 35 mph) from all congestion below free-flow speed (delay at 60 mph). The delay measured by vehicle detectors is then multiplied by vehicle flow on the facility to produce VHD.

Most Caltrans districts experienced increases in delay in 2012 at both speed thresholds. Table 2–4 presents the statewide total VHD at 35 mph for 2011 and 2012, as well as the absolute and percent year-over-year changes, by district. Statewide total VHD at 35 mph rose by nearly 7.2 million VHD, to about 93.7 million VHD in 2012; an increase of 8.3 percent from 2011.

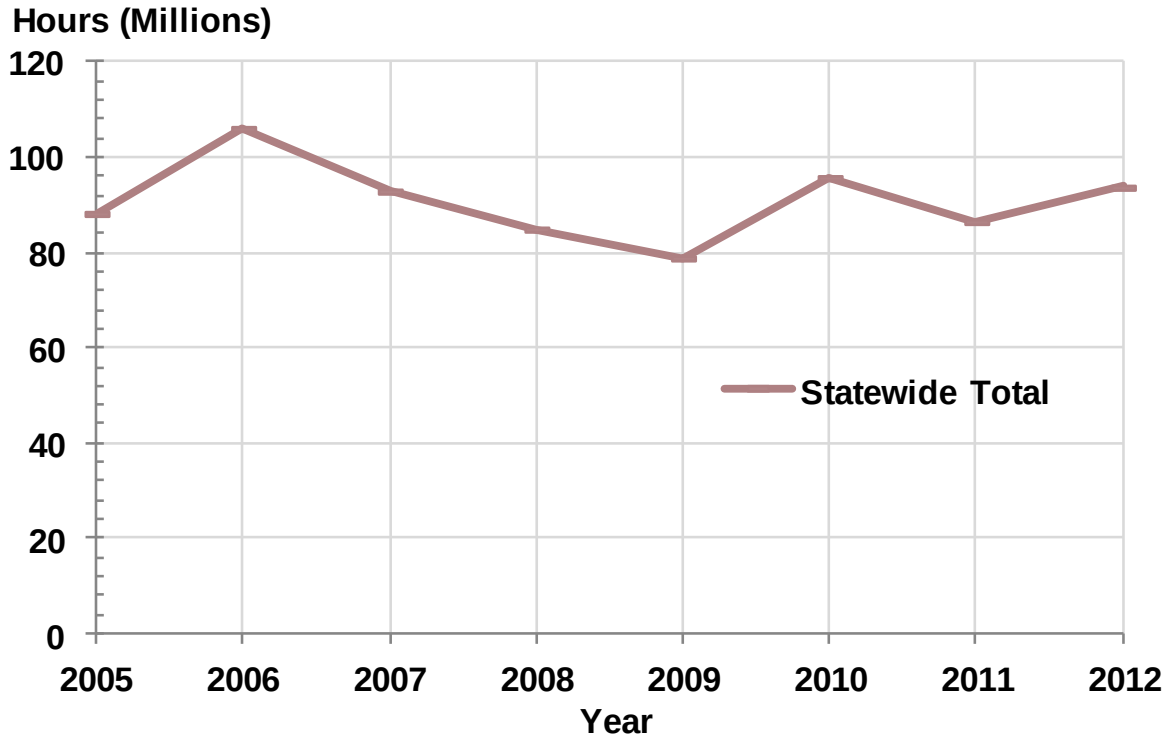
**Table 2-4. VEHICLE HOURS OF DELAY (VHD) AT 35 MILES PER HOUR (MPH), STATEWIDE TOTAL, PERCENT OF STATEWIDE TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY DISTRICT, 2011–2012**

| District | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | Absolute | Percent |
| 3 | 2,989,131 | 3.5% | 2,519,054 | 2.7% | -470,077 | -15.7% |
| 4 | 23,511,981 | 27.2% | 25,546,771 | 27.3% | 2,034,790 | 8.7% |
| 6 | 319,932 | 0.4% | 421,004 | 0.4% | 101,072 | 31.6% |
| 7 | 38,041,557 | 44.0% | 40,817,907 | 43.6% | 2,776,350 | 7.3% |
| 8 | 5,211,450 | 6.0% | 5,055,171 | 5.4% | -156,279 | -3.0% |
| 10 | 1,305,890 | 1.5% | 1,479,305 | 1.6% | 173,415 | 13.3% |
| 11 | 4,941,861 | 5.7% | 5,479,776 | 5.8% | 537,915 | 10.9% |
| 12 | 10,178,833 | 11.8% | 12,363,060 | 13.2% | 2,184,227 | 21.5% |
| **Total** | **86,500,635** | **100%** | **93,682,048** | **100%** | **7,181,413** | **8.3%** |

Numbers may not sum to total due to rounding.

Figure 2–6 presents a longer-term statewide total VHD at 35 mph trend. This figure demonstrates that, while delay rose in 2012 to 94 million VHD, it is still slightly below the level of delay experienced prior to the economic recession. In 2006, delay peaked at approximately 106 million VHD at 35 mph.

**FIGURE 2–6**
**HISTORICAL STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY YEAR, 2005–2012**



With the Los Angeles Area accounting for approximately 44 percent of the total statewide delay, District 7 has a large influence over the statewide trend.

Figure 2–7 demonstrates the relative magnitude of delay experienced in each district over the past six years.

**Figure 2–7**
**HISTORICAL STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY YEAR BY DISTRICT, 2005–2012**

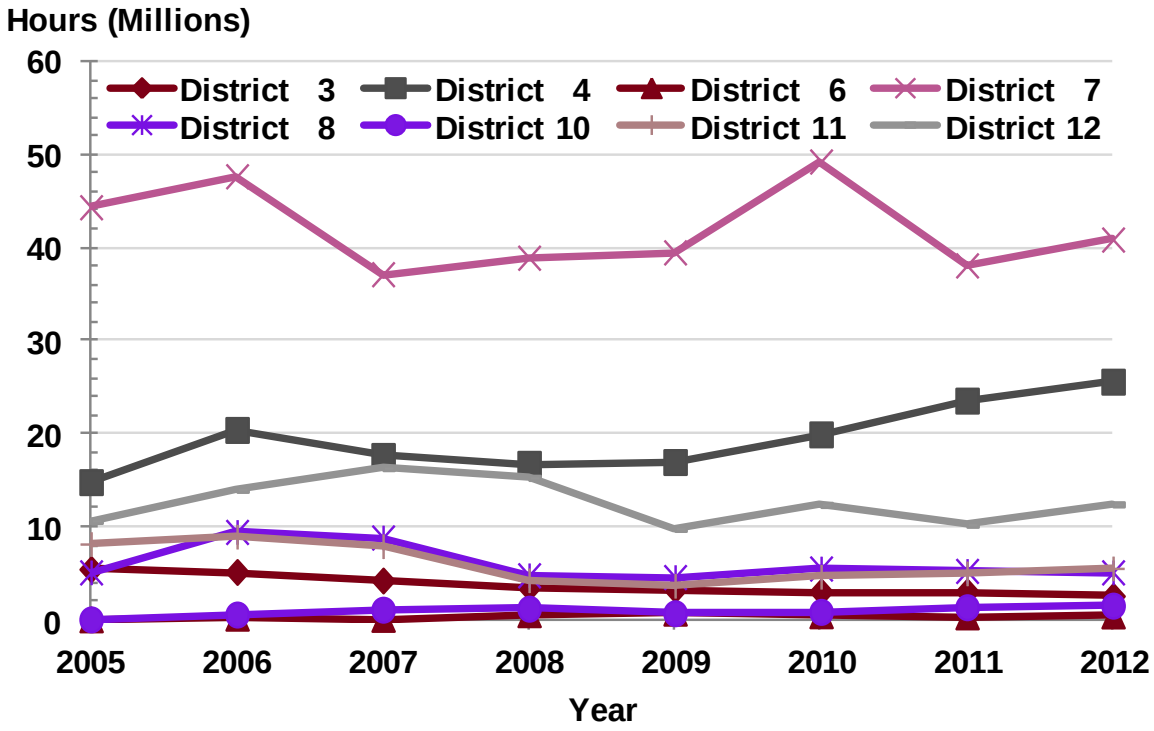


Table 2–5 presents the statewide total VHD at 60 mph for 2011 and 2012, as well as the absolute and percent year-over-year changes, by district. Statewide total VHD at 60 mph rose by 17.6 million VHD, to 204 million VHD in 2011; an increase of 8.6 percent over 2011.

**Table 2-5. VEHICLE HOURS OF DELAY (VHD) AT 60 MIILES PER HOUR (MPH), STATEWIDE TOTAL, PERCENT OF STATEWIDE TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY DISTRICT, 2011–2012**

| District | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | Absolute | Percent |
| 3 | 7,968,827 | 3.9% | 7,868,904 | 3.5% | -99,924 | -1.3% |
| 4 | 52,365,786 | 25.7% | 56,529,777 | 25.5% | 4,163,991 | 8.0% |
| 6 | 1,389,443 | 0.7% | 2,347,312 | 1.1% | 957,869 | 68.9% |
| 7 | 88,731,140 | 43.5% | 95,790,260 | 43.2% | 7,059,121 | 8.0% |
| 8 | 14,194,452 | 7.0% | 14,659,087 | 6.6% | 464,635 | 3.3% |
| 10 | 4,887,243 | 2.4% | 5,484,615 | 2.5% | 597,372 | 12.2% |
| 11 | 11,374,725 | 5.6% | 12,986,810 | 5.9% | 1,612,086 | 14.2% |
| 12 | 23,225,524 | 11.4% | 26,114,149 | 11.8% | 2,888,624 | 12.4% |
| **Total** | **204,137,139** | **100%** | **221,780,914** | **100%** | **17,643,775** | **8.6%** |

Numbers may not sum to total due to rounding.

Figure 2–8 presents a longer-term statewide total VHD at 60 mph trend. This trend is similar to the one for severe congestion (VHD at 35 mph), with delay levels yet to return to what they were pre-recession.

**FIGURE 2–8**
**HISTORICAL STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY YEAR, 2005–2012**

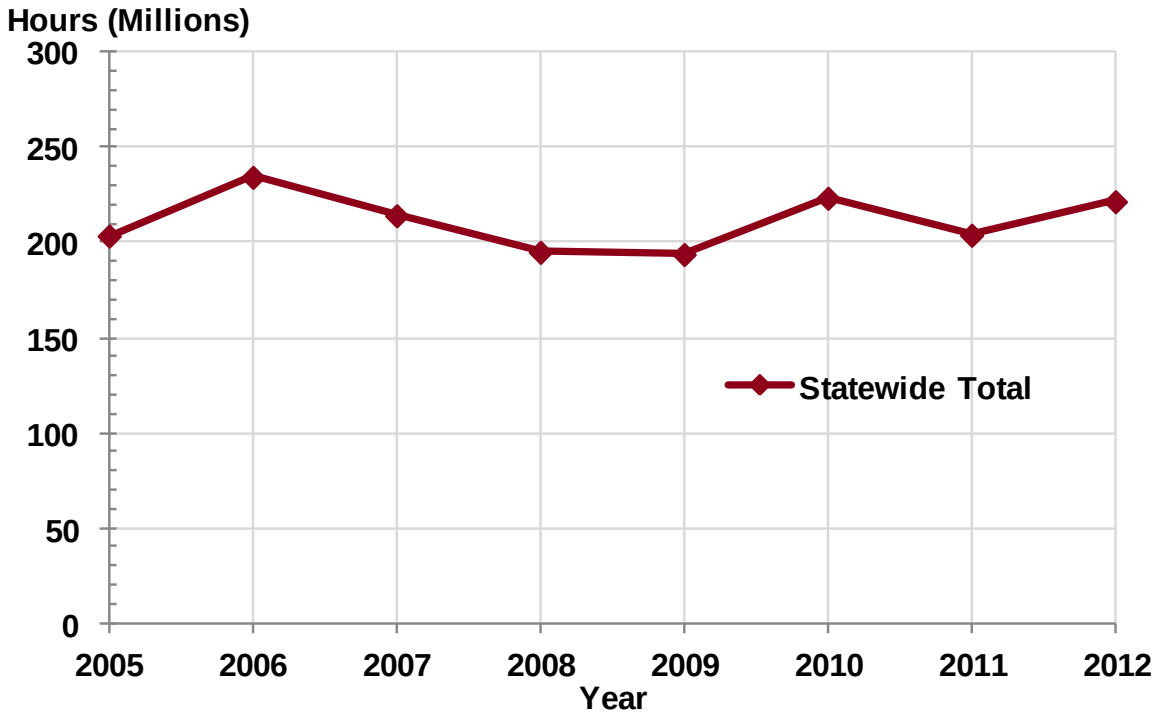
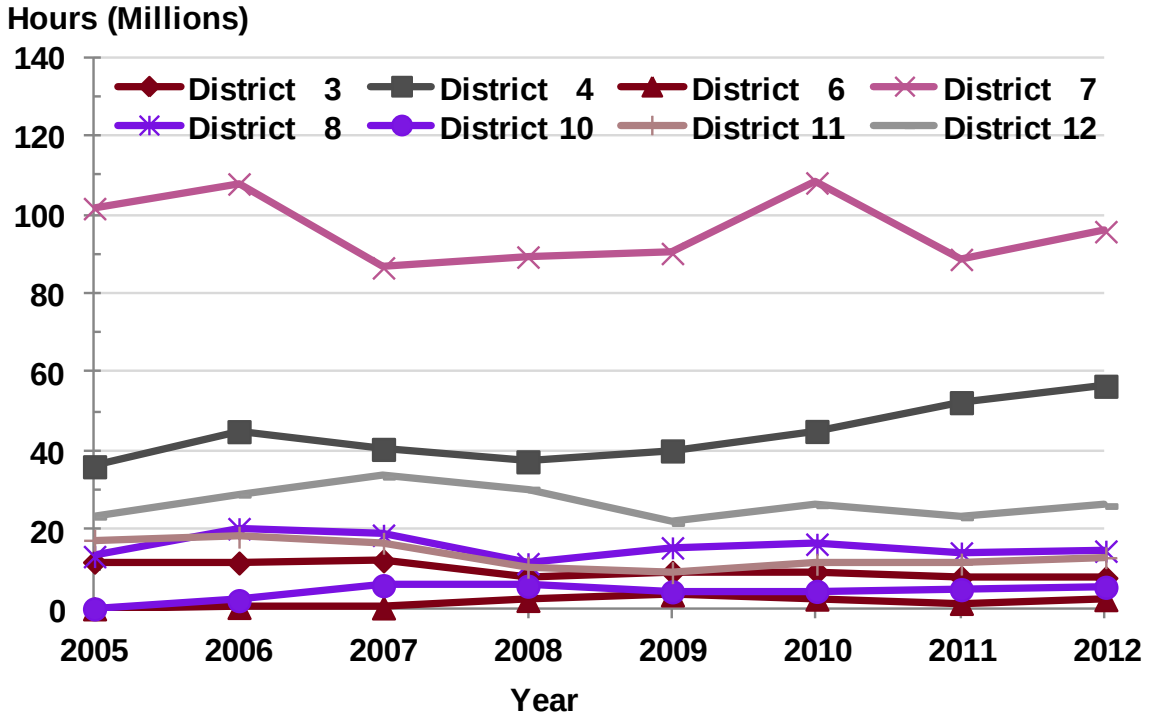


Figure 2–9 presents a longer-term statewide total VHD at 60 mph trend. This trend is similar to the one for severe congestion (VHD at 35 mph), with delay levels yet to return to what they were pre-recession.

**FIGURE 2–9**
**HISTORICAL STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY YEAR BY DISTRICT, 2005–2012**




Tables 2–4 and 2–5, as well as the Figures 2–7 and 2–9 demonstrate that there has been little change in the relative share of delay between districts over time, particularly between 2011 and 2012. District 7 (Los Angeles Area) contributes approximately 44 percent of the total statewide delay. District 4 (San Francisco Bay Area) accounts for roughly 26 percent of statewide delay, followed by District 12 (Orange County) with 12 percent. The districts with relatively small amounts of delay have relatively larger shares of statewide delay at 60 mph than they do at 35 mph. This finding demonstrates that the large urban areas of Los Angeles-Orange County and the San Francisco Bay Area not only have a large amount of overall delay, but also that their delay is more likely to be severe in nature (below 35 mph).

**FIGURE 2–10**
**STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY MONTH, 2011–2012**

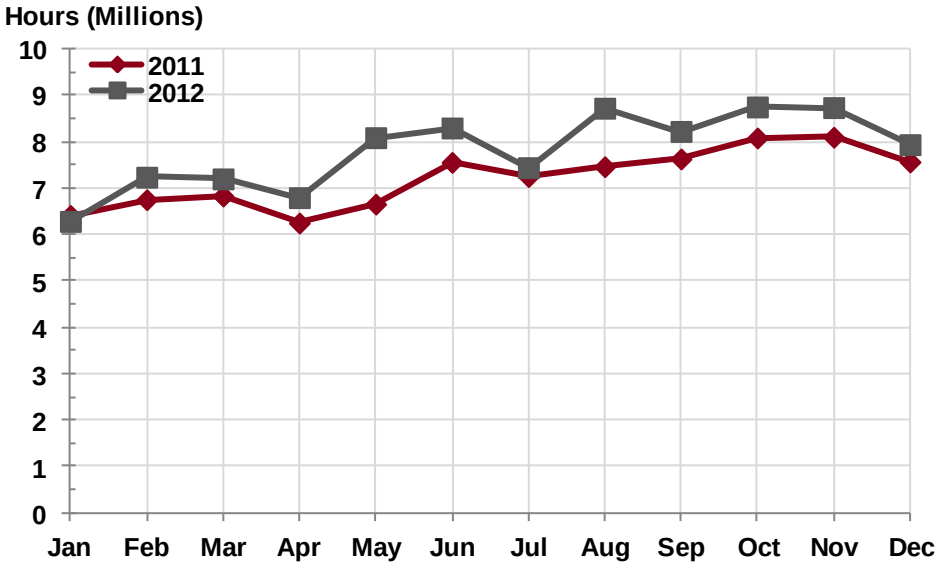
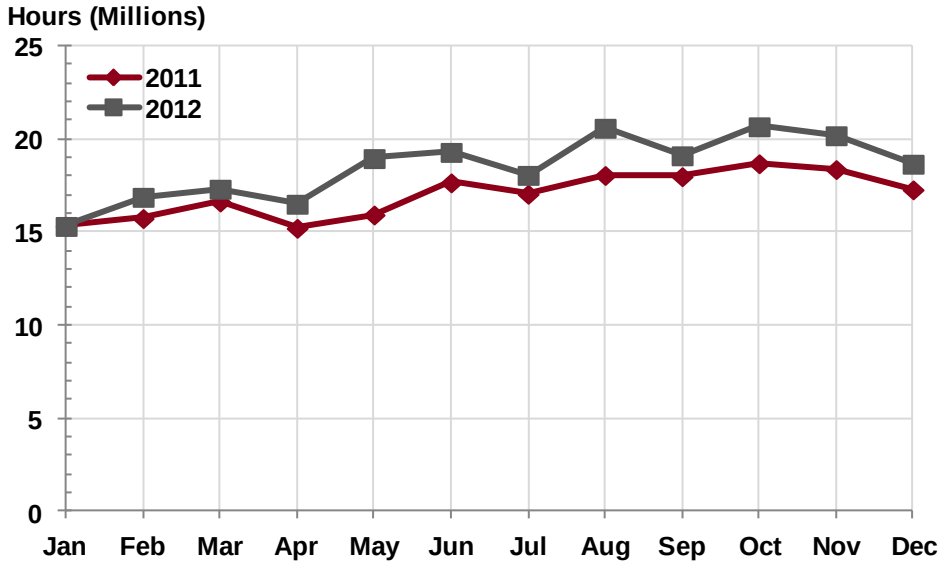



**FIGURE 2–11**
**STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY MONTH, 2011–2012**



Figures 2–10 and 2–11 display the monthly VHD values that comprise the 2011 and 2012 annual VHD totals shown in the previous tables. Figure 2–10 shows the pattern in delay at the 35 mph threshold, and Figure 2–11 shows the pattern at the 60 mph threshold. These patterns are relatively similar to the ones seen in the monthly VMT figures in the previous section. Appendix A includes the data supporting Figures 2–10 and 2–11.

Beyond total delay, the MPR 2012 also presents average daily VHD. Because Caltrans collected speed data manually until a few years ago, Caltrans has a history of reporting delay as a daily average because that was the metric that could be most readily calculated. Data was not always available for each month, therefore, it was difficult to produce figures similar to the ones shown above. It was not possible to produce a true annual delay total, as the amount of delay on weekends was not typically measured. However, average daily delay is still a desirable metric to calculate, as the amount of delay is often more relatable in terms of one day's worth of delay as opposed to one year's worth. The average daily VHD presented here is the average of all non-holiday weekdays throughout the year. Weekends and federal holidays are excluded from the computation. This method of calculation keeps the values relatively similar to the old daily VHD calculations, which were derived exclusively from weekday data.

Table 2–6 presents the statewide average non-holiday weekday VHD at the 35 mph threshold for both 2011 and 2012, by district. The absolute and percent year-over-year changes are also shown. The average weekday delay experienced in 2012 was approximately 328,000 VHD, up from 303,000 in 2011.

**Table 2-6. VEHICLE HOURS OF DELAY (VHD) AT 35 MIILES PER HOUR (MPH), STATEWIDE NON-HOLIDAY WEEKDAY AVERAGE, PERCENT OF STATEWIDE AVERAGE, ABSOLUTE, AND PERCENT CHANGE, BY DISTRICT, 2011–2012**

| District | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | Average Non-Holiday Weekday VHD at 35 mph | Percent of Total | Average Non-Holiday Weekday VHD at 35 mph | Percent of Total | Absolute | Percent |
| 3 | 9,887 | 3.3% | 8,251 | 2.5% | (1,636) | -16.5% |
| 4 | 81,002 | 26.7% | 88,803 | 27.0% | 7,801 | 9.6% |
| 6 | 1,004 | 0.3% | 1,521 | 0.5% | 518 | 51.6% |
| 7 | 134,455 | 44.4% | 145,132 | 44.2% | 10,676 | 7.9% |
| 8 | 17,915 | 5.9% | 17,352 | 5.3% | (563) | -3.1% |
| 10 | 4,470 | 1.5% | 4,867 | 1.5% | 397 | 8.9% |
| 11 | 18,588 | 6.1% | 20,373 | 6.2% | 1,785 | 9.6% |
| 12 | 35,699 | 11.8% | 42,004 | 12.8% | 6,305 | 17.7% |
| **Statewide Average** | **303,019** | **100%** | **328,302** | **100%** | **25,283** | **8%** |

Numbers may not sum to total due to rounding

Table 2–7 presents the statewide average non-holiday weekday VHD at the 60 mph threshold for both 2011 and 2012, by district. The absolute and percent year-over-year changes are also shown. The average weekday delay experienced in 2012 was approximately 768,000 VHD, up from 711,000 in 2011.

**Table 2-7. VEHICLE HOURS OF DELAY (VHD) AT 60 MIILES PER HOUR (MPH), STATEWIDE NON-HOLIDAY WEEKDAY AVERAGE, PERCENT OF STATEWIDE AVERAGE, ABSOLUTE, AND PERCENT CHANGE, BY DISTRICT, 2011–2012**

| District | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | Average Non-Holiday Weekday VHD at 60 mph | Percent of Total | Average Non-Holiday Weekday VHD at 60 mph | Percent of Total | Absolute | Percent |
| 3 | 26,130 | 3.7% | 25,723 | 3.3% | (406) | -1.6% |
| 4 | 181,017 | 25.5% | 195,972 | 25.5% | 14,954 | 8.3% |
| 6 | 4,543 | 0.6% | 7,742 | 1.0% | 3,199 | 70.4% |
| 7 | 310,862 | 43.7% | 335,283 | 43.6% | 24,422 | 7.9% |
| 8 | 48,622 | 6.8% | 49,939 | 6.5% | 1,317 | 2.7% |
| 10 | 16,860 | 2.4% | 18,203 | 2.4% | 1,343 | 8.0% |
| 11 | 41,596 | 5.9% | 46,510 | 6.1% | 4,914 | 11.8% |
| 12 | 81,144 | 11.4% | 89,056 | 11.6% | 7,912 | 9.8% |
| **Statewide Average** | **710,773** | **100%** | **768,427** | **100%** | **57,654** | **8.1%** |

Numbers may not sum to total due to rounding

**FIGURE 2–12**
**STATEWIDE AVERAGE NON-HOLIDAY WEEKDAY VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY MONTH, 2011–2012**

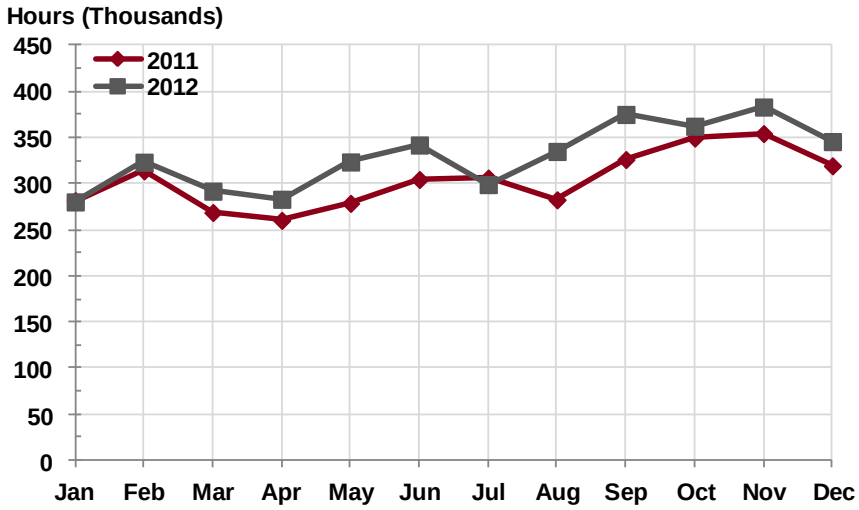
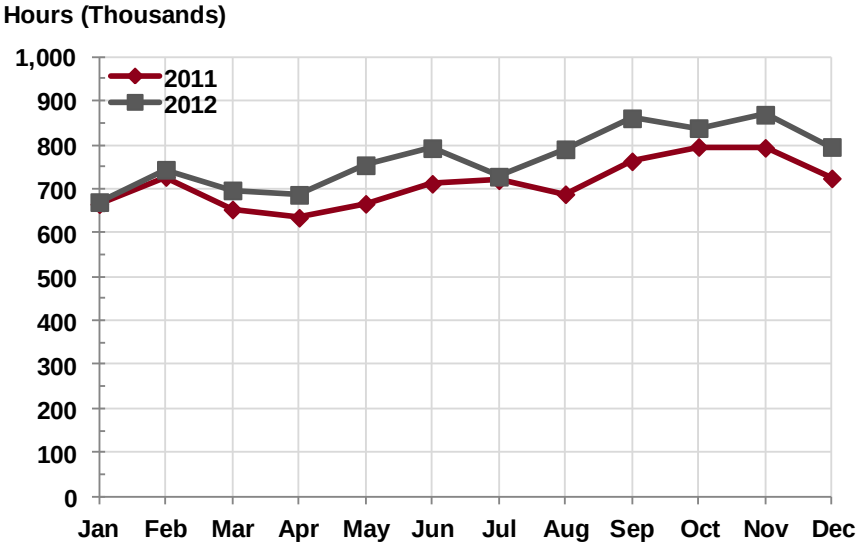



**FIGURE 2–13**
**STATEWIDE AVERAGE NON-HOLIDAY WEEKDAY VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY MONTH, 2011–2012**




Figures 2–12 and 2–13 show the average weekday VHD values by month. As with VMT and total VHD, the 2012 values are consistently higher than the 2011 values, and the two annual trend lines are almost parallel. Appendix A includes the data supporting these figures.

With continuous monitoring of automated detectors, delay can also be analyzed by day of week. Table 2–8 presents average daily VHD values for each day of week for 2012 and 2011 at the 60 mph threshold. On average, delay grows in a relatively steady rate from Monday through Friday. The amount of delay experienced on weekends is much less. The largest absolute decline in delay between 2012 and 2011 was experienced on Saturdays, but the largest percent in delay was on Sundays/holidays. Note that the average daily delay presented at the bottom of Table 2–8 includes weekends and holidays, differentiating it from the average, non-holiday weekday delay presented earlier in this section.

**Table 2-8. VEHICLE HOURS OF DELAY (VHD) AT 60 MILES PER HOUR (MPH), STATEWIDE DAILY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY DAY OF WEEK, 2011–2012**

| Day | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | Average Daily VHD at 60 mph | Percent of Total | Average Daily VHD at 60 mph | Percent of Total | Absolute | Percent |
| Monday | 622,332 | 15.6% | 661,088 | 15.2% | 38,755 | 6.2% |
| Tuesday | 678,077 | 16.9% | 736,003 | 17.0% | 57,926 | 8.5% |
| Wednesday | 719,973 | 18.0% | 772,631 | 17.8% | 52,657 | 7.3% |
| Thursday | 769,636 | 19.2% | 829,513 | 19.1% | 59,876 | 7.8% |
| Friday | 753,902 | 18.8% | 831,149 | 19.2% | 77,247 | 10.2% |
| Saturday | 275,644 | 6.9% | 268,061 | 6.2% | (7,583) | -2.8% |
| Sunday/Holiday | 182,359 | 4.6% | 237,563 | 5.5% | 55,203 | 30.3% |
| **Statewide Daily Average** | **559,280** | **100%** | **605,959** | **100%** | **46,679** | **8.3%** |

Numbers may not sum to total due to rounding.

Figure 2–14 presents the day of week delay values in graphic form.

**FIGURE 2–14**
**STATEWIDE AVERAGE VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY DAY OF WEEK, 2011–2012**

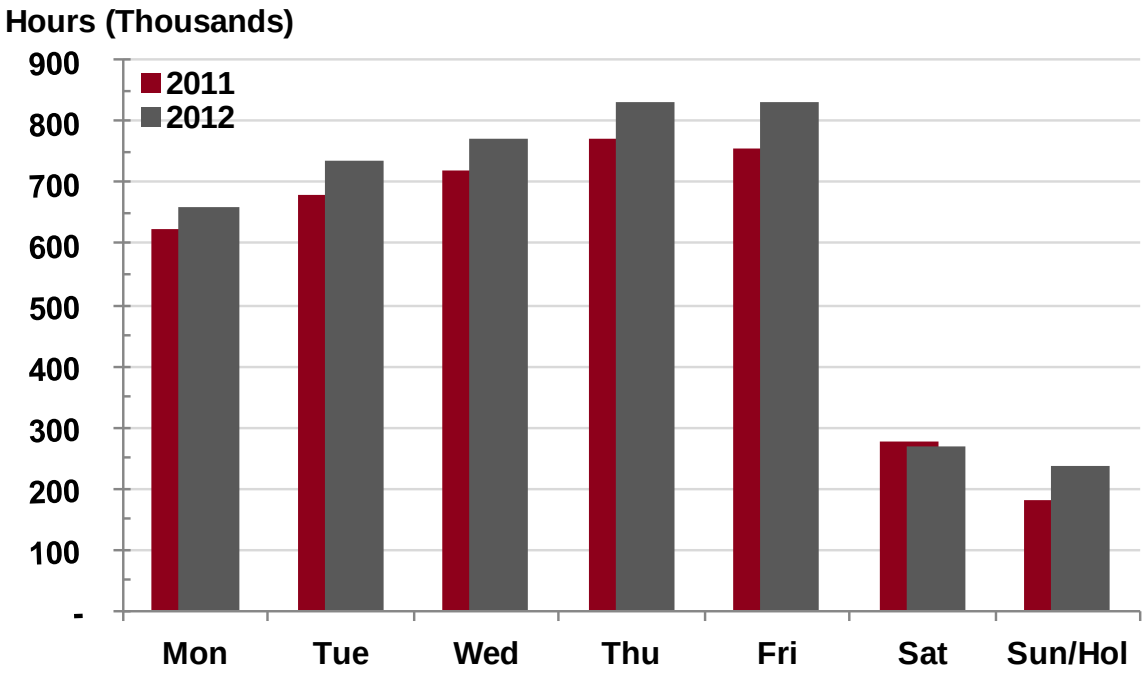


Table 2–9 presents the average VHD by hour of day at 35 MPH. This shows that the hour of 5:00 p.m. has the highest Average Daily VHD of 54,685, at speeds of 35 MPH.

**Table 2-9 (A). VEHICLE HOURS OF DELAY (VHD) AT 35 MILES PER HOUR (MPH), STATEWIDE WEEKDAY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY HOUR OF DAY, 2011–2012**

| | Weekdays | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | Change 2012 - 2011 | |
| Time | Average Daily VHD at 35 mph | Percent of Total | Average Daily VHD at 35 mph | Percent of Total | Absolute | Percent |
| **12:00 AM** | 501 | 0.2% | 638 | 0.2% | 137 | 27.3% |
| **1:00 AM** | 627 | 0.2% | 785 | 0.2% | 158 | 25.1% |
| **2:00 AM** | 668 | 0.2% | 851 | 0.3% | 183 | 27.4% |
| **3:00 AM** | 734 | 0.2% | 924 | 0.3% | 190 | 25.8% |
| **4:00 AM** | 942 | 0.3% | 1,188 | 0.4% | 247 | 26.2% |
| **5:00 AM** | 1,994 | 0.7% | 2,598 | 0.8% | 604 | 30.3% |
| **6:00 AM** | 8,213 | 2.7% | 10,076 | 3.1% | 1,863 | 22.7% |
| **7:00 AM** | 27,482 | 9.1% | 29,921 | 9.1% | 2,439 | 8.9% |
| **8:00 AM** | 34,119 | 11.3% | 35,937 | 10.9% | 1,819 | 5.3% |
| **9:00 AM** | 18,535 | 6.1% | 19,944 | 6.1% | 1,409 | 7.6% |
| **10:00 AM** | 10,982 | 3.6% | 11,834 | 3.6% | 852 | 7.8% |
| **11:00 AM** | 9,572 | 3.2% | 9,978 | 3.0% | 406 | 4.2% |
| **12:00 PM** | 9,747 | 3.2% | 9,830 | 3.0% | 83 | 0.8% |
| **1:00 PM** | 9,939 | 3.3% | 9,942 | 3.0% | 3 | 0.0% |
| **2:00 PM** | 12,619 | 4.2% | 13,130 | 4.0% | 511 | 4.0% |
| **3:00 PM** | 21,857 | 7.2% | 24,021 | 7.3% | 2,164 | 9.9% |
| **4:00 PM** | 35,327 | 11.7% | 38,874 | 11.8% | 3,547 | 10.0% |
| **5:00 PM** | 50,608 | 16.7% | 54,685 | 16.7% | 4,078 | 8.1% |
| **6:00 PM** | 31,502 | 10.4% | 34,140 | 10.4% | 2,638 | 8.4% |
| **7:00 PM** | 8,869 | 2.9% | 9,696 | 3.0% | 827 | 9.3% |
| **8:00 PM** | 2,925 | 1.0% | 3,219 | 1.0% | 294 | 10.1% |
| **9:00 PM** | 2,051 | 0.7% | 2,226 | 0.7% | 175 | 8.5% |
| **10:00 PM** | 1,809 | 0.6% | 2,102 | 0.6% | 293 | 16.2% |
| **11:00 PM** | 1,397 | 0.5% | 1,761 | 0.5% | 364 | 26.1% |
| **Statewide Daily Average** | **303,019** | **100%** | **328,302** | **100%** | **25,283** | **8.3%** |

Numbers may not sum to total due to rounding.

**Table 2-9 (B). VEHICLE HOURS OF DELAY (VHD) AT 35 MILES PER HOUR (MPH), STATEWIDE SATURDAY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY HOUR OF DAY, 2011–2012**

| | Saturdays | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | Change 2012 - 2011 | |
| Time | Average Daily VHD at 35 mph | Percent of Total | Average Daily VHD at 35 mph | Percent of Total | Absolute | Percent |
| **12:00 AM** | 651 | 0.6% | 917 | 0.7% | 265 | 40.8% |
| **1:00 AM** | 745 | 0.7% | 886 | 0.7% | 141 | 19.0% |
| **2:00 AM** | 736 | 0.7% | 834 | 0.7% | 99 | 13.4% |
| **3:00 AM** | 677 | 0.6% | 801 | 0.6% | 124 | 18.3% |
| **4:00 AM** | 698 | 0.6% | 886 | 0.7% | 188 | 27.0% |
| **5:00 AM** | 861 | 0.8% | 1,060 | 0.8% | 200 | 23.2% |
| **6:00 AM** | 1,138 | 1.0% | 1,262 | 1.0% | 124 | 10.9% |
| **7:00 AM** | 1,576 | 1.4% | 1,699 | 1.4% | 123 | 7.8% |
| **8:00 AM** | 2,351 | 2.1% | 2,548 | 2.0% | 197 | 8.4% |
| **9:00 AM** | 3,686 | 3.3% | 3,983 | 3.2% | 298 | 8.1% |
| **10:00 AM** | 5,416 | 4.8% | 6,103 | 4.9% | 687 | 12.7% |
| **11:00 AM** | 8,038 | 7.1% | 9,259 | 7.4% | 1,220 | 15.2% |
| **12:00 PM** | 10,828 | 9.6% | 11,931 | 9.5% | 1,103 | 10.2% |
| **1:00 PM** | 11,607 | 10.3% | 12,667 | 10.1% | 1,061 | 9.1% |
| **2:00 PM** | 10,989 | 9.7% | 12,487 | 9.9% | 1,498 | 13.6% |
| **3:00 PM** | 10,354 | 9.2% | 12,044 | 9.6% | 1,690 | 16.3% |
| **4:00 PM** | 10,508 | 9.3% | 11,798 | 9.4% | 1,290 | 12.3% |
| **5:00 PM** | 10,897 | 9.7% | 11,387 | 9.1% | 489 | 4.5% |
| **6:00 PM** | 8,885 | 7.9% | 8,796 | 7.0% | (89) | -1.0% |
| **7:00 PM** | 4,608 | 4.1% | 4,879 | 3.9% | 271 | 5.9% |
| **8:00 PM** | 2,243 | 2.0% | 2,679 | 2.1% | 435 | 19.4% |
| **9:00 PM** | 1,743 | 1.5% | 2,259 | 1.8% | 516 | 29.6% |
| **10:00 PM** | 1,908 | 1.7% | 2,262 | 1.8% | 354 | 18.5% |
| **11:00 PM** | 1,751 | 1.6% | 2,143 | 1.7% | 391 | 22.3% |
| **Statewide Daily Average** | **112,893** | **100%** | **125,570** | **100%** | **12,677** | **11.2%** |

Numbers may not sum to total due to rounding.

**Table 2-9 (C). VEHICLE HOURS OF DELAY (VHD) AT 35 MILES PER HOUR (MPH), STATEWIDE SUNDAY/HOLIDAY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY HOUR OF DAY, 2011–2012**

| | Sundays/Holidays | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | Change 2012 - 2011 | |
| Time | Average Daily VHD at 35 mph | Percent of Total | Average Daily VHD at 35 mph | Percent of Total | Absolute | Percent |
| **12:00 AM** | 749 | 1.0% | 934 | 1.2% | 184 | 24.6% |
| **1:00 AM** | 812 | 1.1% | 933 | 1.2% | 121 | 14.9% |
| **2:00 AM** | 739 | 1.0% | 823 | 1.1% | 84 | 11.4% |
| **3:00 AM** | 627 | 0.9% | 684 | 0.9% | 57 | 9.1% |
| **4:00 AM** | 556 | 0.8% | 662 | 0.9% | 106 | 19.1% |
| **5:00 AM** | 645 | 0.9% | 829 | 1.1% | 183 | 28.4% |
| **6:00 AM** | 962 | 1.3% | 1,228 | 1.6% | 265 | 27.5% |
| **7:00 AM** | 1,447 | 2.0% | 2,050 | 2.7% | 602 | 41.6% |
| **8:00 AM** | 1,642 | 2.2% | 2,257 | 3.0% | 615 | 37.5% |
| **9:00 AM** | 1,843 | 2.5% | 2,212 | 2.9% | 369 | 20.0% |
| **10:00 AM** | 2,605 | 3.6% | 2,718 | 3.6% | 113 | 4.3% |
| **11:00 AM** | 3,944 | 5.4% | 4,000 | 5.3% | 55 | 1.4% |
| **12:00 PM** | 5,505 | 7.5% | 5,734 | 7.6% | 229 | 4.2% |
| **1:00 PM** | 6,447 | 8.8% | 6,798 | 9.0% | 352 | 5.5% |
| **2:00 PM** | 6,702 | 9.2% | 6,811 | 9.0% | 108 | 1.6% |
| **3:00 PM** | 6,650 | 9.1% | 6,490 | 8.6% | (160) | -2.4% |
| **4:00 PM** | 6,867 | 9.4% | 6,444 | 8.5% | (422) | -6.1% |
| **5:00 PM** | 7,294 | 10.0% | 6,811 | 9.0% | (483) | -6.6% |
| **6:00 PM** | 5,634 | 7.7% | 5,172 | 6.9% | (462) | -8.2% |
| **7:00 PM** | 3,351 | 4.6% | 3,373 | 4.5% | 23 | 0.7% |
| **8:00 PM** | 2,674 | 3.7% | 2,787 | 3.7% | 113 | 4.2% |
| **9:00 PM** | 2,192 | 3.0% | 2,322 | 3.1% | 130 | 5.9% |
| **10:00 PM** | 1,803 | 2.5% | 1,865 | 2.5% | 62 | 3.5% |
| **11:00 PM** | 1,416 | 1.9% | 1,439 | 1.9% | 22 | 1.6% |
| **Statewide Daily Average** | **73,107** | **100%** | **75,374** | **100%** | **2,268** | **3.1%** |

Numbers may not sum to total due to rounding.

Table 2–10 presents the average VHD by hour of day at 60 MPH. This shows that the hour of 5:00 p.m. has the highest Average Daily VHD of 109,411, at speeds of 60 MPH.

**Table 2-10 (A). VEHICLE HOURS OF DELAY (VHD) AT 60 MILES PER HOUR (MPH), STATEWIDE WEEKDAY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY HOUR OF DAY, 2011–2012**

| | Weekdays | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | Change 2012 - 2011 | |
| Time | Average Daily VHD at 60 mph | Percent of Total | Average Daily VHD at 60 mph | Percent of Total | Absolute | Percent |
| **12:00 AM** | 1,745 | 0.2% | 2,000 | 0.3% | 255 | 14.6% |
| **1:00 AM** | 2,317 | 0.3% | 2,650 | 0.3% | 333 | 14.4% |
| **2:00 AM** | 2,519 | 0.4% | 2,903 | 0.4% | 384 | 15.2% |
| **3:00 AM** | 2,971 | 0.4% | 3,423 | 0.4% | 452 | 15.2% |
| **4:00 AM** | 3,963 | 0.6% | 4,722 | 0.6% | 759 | 19.2% |
| **5:00 AM** | 7,429 | 1.0% | 9,355 | 1.2% | 1,926 | 25.9% |
| **6:00 AM** | 23,225 | 3.3% | 27,442 | 3.6% | 4,217 | 18.2% |
| **7:00 AM** | 60,446 | 8.5% | 65,351 | 8.5% | 4,905 | 8.1% |
| **8:00 AM** | 70,002 | 9.8% | 73,842 | 9.6% | 3,840 | 5.5% |
| **9:00 AM** | 43,182 | 6.1% | 45,934 | 6.0% | 2,752 | 6.4% |
| **10:00 AM** | 29,754 | 4.2% | 31,965 | 4.2% | 2,211 | 7.4% |
| **11:00 AM** | 26,884 | 3.8% | 28,474 | 3.7% | 1,591 | 5.9% |
| **12:00 PM** | 27,024 | 3.8% | 28,241 | 3.7% | 1,217 | 4.5% |
| **1:00 PM** | 27,769 | 3.9% | 29,037 | 3.8% | 1,268 | 4.6% |
| **2:00 PM** | 35,036 | 4.9% | 37,314 | 4.9% | 2,278 | 6.5% |
| **3:00 PM** | 54,575 | 7.7% | 59,165 | 7.7% | 4,590 | 8.4% |
| **4:00 PM** | 77,965 | 11.0% | 84,522 | 11.0% | 6,558 | 8.4% |
| **5:00 PM** | 102,414 | 14.4% | 109,411 | 14.2% | 6,998 | 6.8% |
| **6:00 PM** | 66,828 | 9.4% | 71,687 | 9.3% | 4,859 | 7.3% |
| **7:00 PM** | 22,017 | 3.1% | 24,270 | 3.2% | 2,253 | 10.2% |
| **8:00 PM** | 8,126 | 1.1% | 9,382 | 1.2% | 1,256 | 15.5% |
| **9:00 PM** | 5,796 | 0.8% | 6,708 | 0.9% | 912 | 15.7% |
| **10:00 PM** | 4,936 | 0.7% | 5,899 | 0.8% | 962 | 19.5% |
| **11:00 PM** | 3,851 | 0.5% | 4,730 | 0.6% | 879 | 22.8% |
| **Statewide Daily Average** | **710,773** | **100%** | **768,427** | **100%** | **57,654** | **8.1%** |

Numbers may not sum to total due to rounding.

**Table 2-10 (B). VEHICLE HOURS OF DELAY (VHD) AT 60 MILES PER HOUR (MPH), STATEWIDE SATURDAY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY HOUR OF DAY, 2011–2012**

| | Saturdays | | | | | |
|---|---|---|---|---|---|---|
| Time | 2011 | | 2012 | | Change 2012 - 2011 | |
| | Average Daily VHD at 60 mph | Percent of Total | Average Daily VHD at 60 mph | Percent of Total | Absolute | Percent |
| **12:00 AM** | 1,858 | 0.7% | 2,359 | 0.8% | 501 | 27.0% |
| **1:00 AM** | 1,933 | 0.7% | 2,290 | 0.7% | 357 | 18.5% |
| **2:00 AM** | 1,821 | 0.7% | 2,119 | 0.7% | 298 | 16.4% |
| **3:00 AM** | 1,723 | 0.6% | 2,055 | 0.7% | 332 | 19.3% |
| **4:00 AM** | 1,929 | 0.7% | 2,391 | 0.8% | 462 | 24.0% |
| **5:00 AM** | 2,460 | 0.9% | 3,066 | 1.0% | 607 | 24.7% |
| **6:00 AM** | 3,223 | 1.2% | 3,957 | 1.3% | 733 | 22.7% |
| **7:00 AM** | 4,469 | 1.6% | 5,397 | 1.7% | 928 | 20.8% |
| **8:00 AM** | 6,387 | 2.3% | 7,642 | 2.4% | 1,256 | 19.7% |
| **9:00 AM** | 9,423 | 3.4% | 11,143 | 3.5% | 1,720 | 18.3% |
| **10:00 AM** | 13,543 | 4.9% | 16,039 | 5.1% | 2,496 | 18.4% |
| **11:00 AM** | 19,159 | 7.0% | 22,522 | 7.2% | 3,364 | 17.6% |
| **12:00 PM** | 24,821 | 9.0% | 28,074 | 8.9% | 3,254 | 13.1% |
| **1:00 PM** | 26,582 | 9.6% | 29,720 | 9.5% | 3,138 | 11.8% |
| **2:00 PM** | 25,866 | 9.4% | 29,554 | 9.4% | 3,688 | 14.3% |
| **3:00 PM** | 25,533 | 9.3% | 29,849 | 9.5% | 4,316 | 16.9% |
| **4:00 PM** | 25,992 | 9.4% | 29,438 | 9.4% | 3,446 | 13.3% |
| **5:00 PM** | 26,846 | 9.7% | 28,691 | 9.1% | 1,845 | 6.9% |
| **6:00 PM** | 21,348 | 7.7% | 22,054 | 7.0% | 705 | 3.3% |
| **7:00 PM** | 11,298 | 4.1% | 12,304 | 3.9% | 1,006 | 8.9% |
| **8:00 PM** | 5,917 | 2.1% | 7,062 | 2.2% | 1,145 | 19.3% |
| **9:00 PM** | 4,739 | 1.7% | 5,951 | 1.9% | 1,212 | 25.6% |
| **10:00 PM** | 4,833 | 1.8% | 5,744 | 1.8% | 911 | 18.8% |
| **11:00 PM** | 3,943 | 1.4% | 4,826 | 1.5% | 883 | 22.4% |
| **Statewide Daily Average** | **275,644** | **100%** | **314,245** | **100%** | **38,601** | **14.0%** |

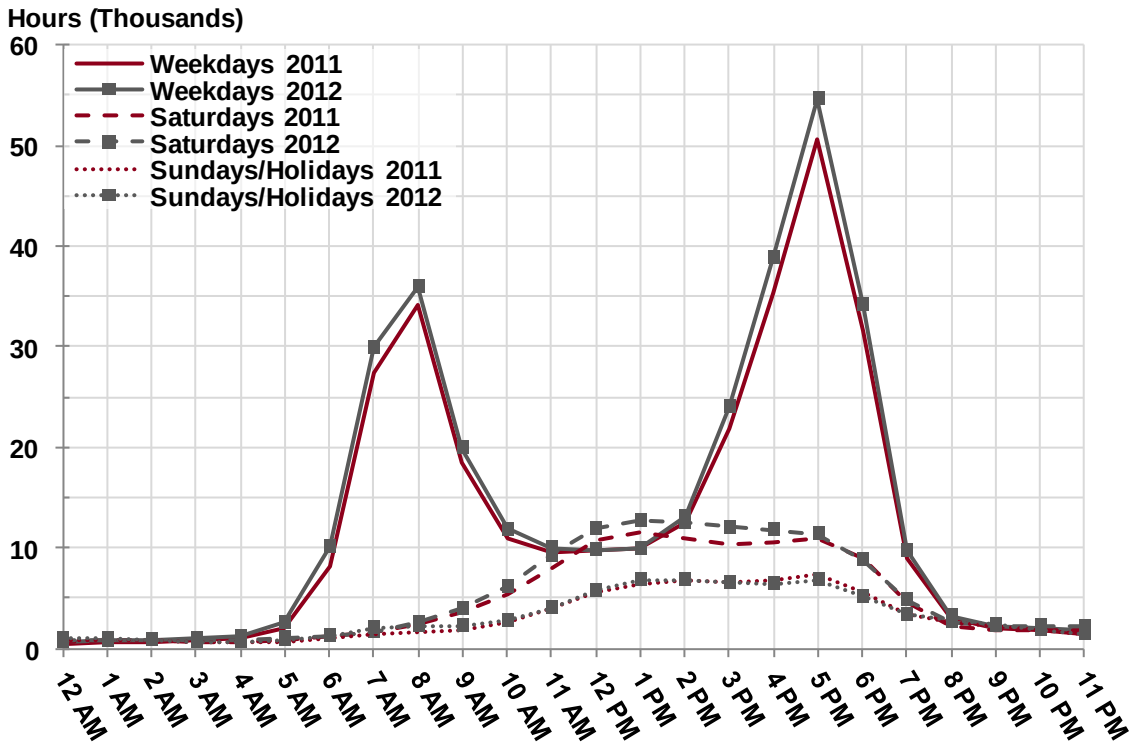
Numbers may not sum to total due to rounding.

**Table 2-10 (C). VEHICLE HOURS OF DELAY (VHD) AT 60 MILES PER HOUR (MPH), STATEWIDE SUNDAY/HOLIDAY AVERAGE, PERCENT OF TOTAL, AND ABSOLUTE AND PERCENT CHANGE, BY HOUR OF DAY, 2011–2012**

| | Sundays/Holidays | | | | | |
|---|---|---|---|---|---|---|
| | 2011 | | 2012 | | Change 2012 - 2011 | |
| Time | Average Daily VHD at 60 mph | Percent of Total | Average Daily VHD at 60 mph | Percent of Total | Absolute | Percent |
| **12:00 AM** | 1,881 | 1.0% | 2,211 | 1.1% | 330 | 17.5% |
| **1:00 AM** | 1,821 | 1.0% | 2,093 | 1.0% | 272 | 14.9% |
| **2:00 AM** | 1,638 | 0.9% | 1,848 | 0.9% | 210 | 12.8% |
| **3:00 AM** | 1,463 | 0.8% | 1,625 | 0.8% | 162 | 11.0% |
| **4:00 AM** | 1,480 | 0.8% | 1,735 | 0.9% | 255 | 17.2% |
| **5:00 AM** | 1,851 | 1.0% | 2,319 | 1.2% | 468 | 25.3% |
| **6:00 AM** | 2,731 | 1.5% | 3,541 | 1.8% | 810 | 29.7% |
| **7:00 AM** | 3,989 | 2.2% | 5,525 | 2.8% | 1,535 | 38.5% |
| **8:00 AM** | 4,735 | 2.6% | 6,340 | 3.2% | 1,605 | 33.9% |
| **9:00 AM** | 5,442 | 3.0% | 6,708 | 3.4% | 1,266 | 23.3% |
| **10:00 AM** | 7,280 | 4.0% | 8,263 | 4.1% | 983 | 13.5% |
| **11:00 AM** | 10,110 | 5.5% | 11,128 | 5.6% | 1,018 | 10.1% |
| **12:00 PM** | 13,236 | 7.3% | 14,545 | 7.3% | 1,309 | 9.9% |
| **1:00 PM** | 15,330 | 8.4% | 16,766 | 8.4% | 1,436 | 9.4% |
| **2:00 PM** | 16,224 | 8.9% | 17,249 | 8.6% | 1,024 | 6.3% |
| **3:00 PM** | 16,283 | 8.9% | 16,971 | 8.5% | 688 | 4.2% |
| **4:00 PM** | 16,564 | 9.1% | 16,936 | 8.5% | 372 | 2.2% |
| **5:00 PM** | 17,373 | 9.5% | 17,676 | 8.9% | 304 | 1.7% |
| **6:00 PM** | 13,497 | 7.4% | 13,538 | 6.8% | 40 | 0.3% |
| **7:00 PM** | 8,618 | 4.7% | 9,225 | 4.6% | 608 | 7.1% |
| **8:00 PM** | 6,961 | 3.8% | 7,792 | 3.9% | 830 | 11.9% |
| **9:00 PM** | 5,702 | 3.1% | 6,465 | 3.2% | 762 | 13.4% |
| **10:00 PM** | 4,574 | 2.5% | 5,071 | 2.5% | 497 | 10.9% |
| **11:00 PM** | 3,574 | 2.0% | 3,872 | 1.9% | 298 | 8.3% |
| **Statewide Daily Average** | **182,359** | **100%** | **199,442** | **100%** | **17,083** | **9.4%** |

Numbers may not sum to total due to rounding.

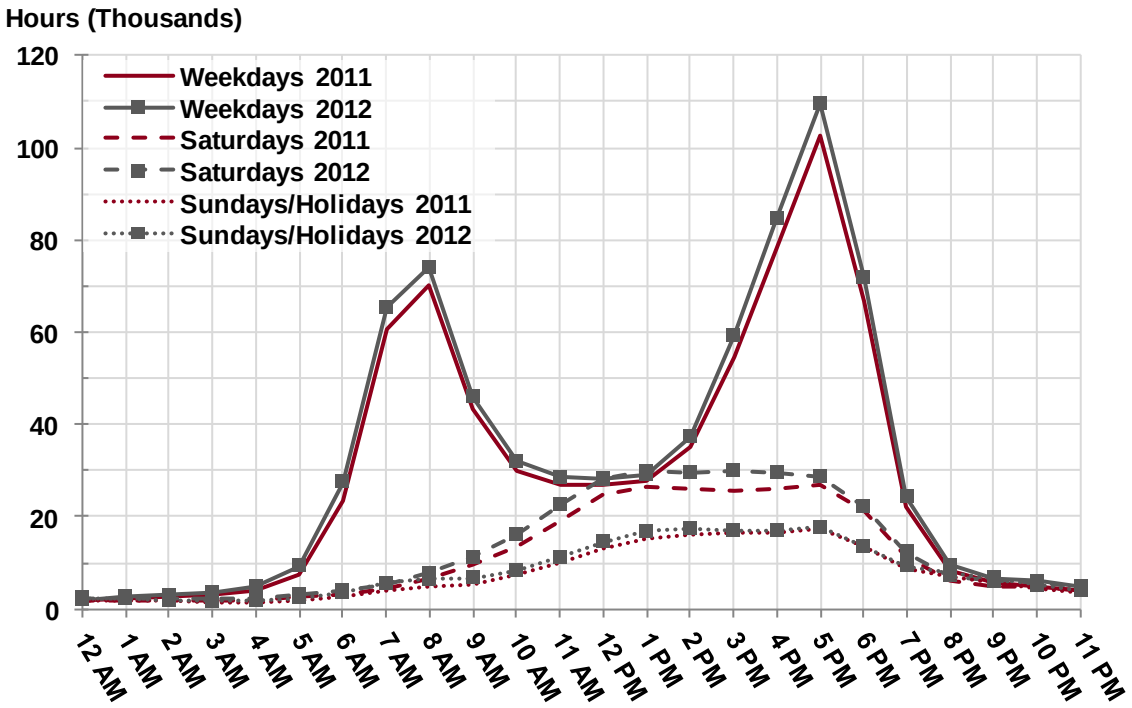
**FIGURE 2–15**
**STATEWIDE AVERAGE VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY HOUR OF DAY, 2011–2012**




The MPR 2012 includes congestion analysis that looks at the delay pattern by hour of day. Figure 2–15 shows the average hourly VHD at 35 mph for weekdays, Saturdays, and Sundays/holidays in 2011 and 2012. Figure 2–16 shows the average hourly VHD at 60 mph for weekdays, Saturdays, and Sundays/holidays in 2011 and 2012. This figure clearly depicts the a.m. and p.m. peak periods, when increased demand results in congested conditions. Note that each hour represents the starting point of data collection. In other words, the VHD reported at 6:00 a.m. represents the delay experienced from 6:00 a.m. until 6:59 a.m. In 2012, the statewide p.m. peak hour was the hour starting at 5:00 p.m., when average congestion was 109,000 VHD. The a.m. peak hour began at 8:00 a.m. with an average of 74,000 VHD. The weekends and holidays did not experience peaking in 2012, but rather had relatively consistent levels of delay from late morning until early evening.

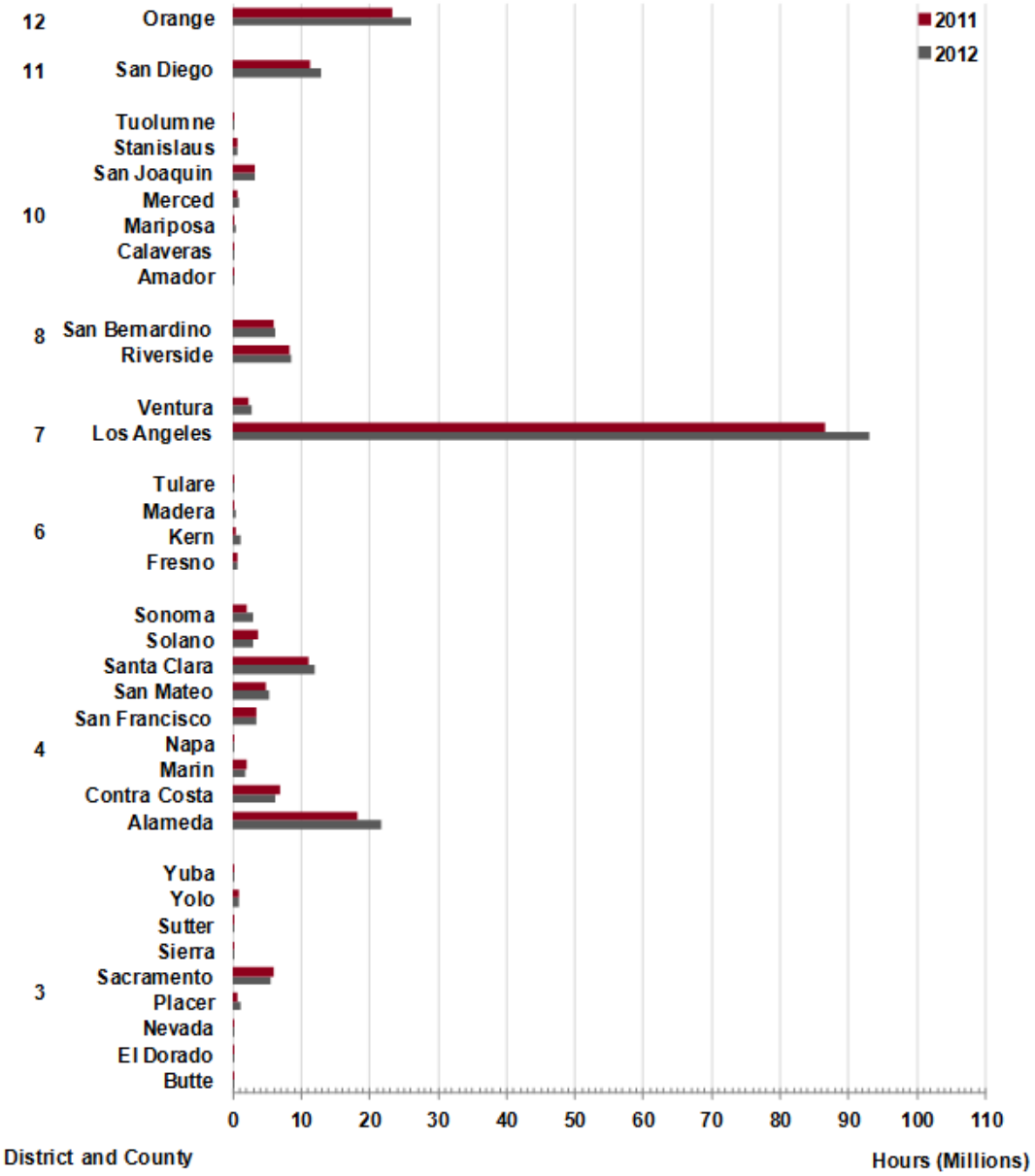
Appendix A includes the data supporting Figures 2–15 and 2-16.

**FIGURE 2–16**
**STATEWIDE AVERAGE VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, BY HOUR OF DAY, 2011–2012**



Finally, beyond the Caltrans district boundaries, delay is analyzed by county. Figure 2–17 again demonstrates how much delay is experienced in Los Angeles County. After Los Angeles County, the counties with the most delay are Orange, Alameda, and San Diego.

**FIGURE 2–17**
**STATEWIDE TOTAL VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, BY COUNTY, 2011–2012**



# SECTION 2.3. COSTS OF CONGESTION

The costs of congestion in 2012 are presented in four categories: (1) extra fuel burned, (2) the cost of lost time (opportunity cost in terms of wages and salaries), (3) extra vehicle emissions of carbon dioxide ($CO_2$), and (4) an estimated cost of $CO_2$ emission. These values are calculated for delay at two speed benchmarks: 35 mph (representing severe congestion) and 60 mph (representing total congestion). Note that the costs of the two speed thresholds should not be added together – the costs of delay at 35 mph are essentially a subset of the costs of delay at 60 mph.

Overall, the total statewide annual cost of delay in terms of lost time at the 35 mph threshold was $1.7 billion in 2012. The total annual cost of delay in terms of lost time at the 60 mph threshold was about $4 billion. There is also a cost associated with the extra fuel consumed because of delay. These annual costs totaled $693 million for delay at 35 mph and $1.6 billion for delay at 60 mph in 2012.

Finally, vehicles emit more $CO_2$ because of congestion, contributing to climate change. The extra amount of $CO_2$ emitted in 2012 is estimated at 1.5 million metric tons due to delay at 35 mph and 3.7 million metric tons due to delay at 60 mph and the emission cost is estimated at $37 million and $87 million respectively.

**Table 2-11. STATEWIDE COSTS OF CONGESION FOR DELAY AT 35 MILES PER HOUR (MPH) AND DELAY AT 60 MPH, IN TERMS OF EXTRA COST OF FUEL BURNED, COST IN LOST TIME, AND VEHICLE EMISSIONS OF CARBON DIOXIDE, BY DISTRICT, 2012**

| DISTRICT | Cost in Extra Fuel Burned (Dollars) | | Cost in Time Lost (Dolloars) | | CO2 Vehicle Emissions (Metric Tons) | | CO2 Emission Cost | |
|---|---|---|---|---|---|---|---|---|
| | Delay at 35 mph | Delay at 60 mph | Delay at 35 mph | Delay at 60 mph | Delay at 35 mph | Delay at 60 mph | Delay at 35 mph | Delay at 60 mph |
| 3 | $18,452,549 | $57,641,217 | $45,342,972 | $141,640,272 | 42,420 | 132,510 | $993,905 | $3,104,715 |
| 4 | $187,134,951 | $414,091,357 | $459,841,878 | $1,017,535,986 | 430,201 | 951,946 | $10,079,605 | $22,304,103 |
| 6 | $3,083,934 | $17,194,506 | $7,578,072 | $42,251,616 | 7,090 | 39,528 | $166,109 | $926,144 |
| 7 | $298,998,924 | $701,681,855 | $734,722,326 | $1,724,224,680 | 687,363 | 1,613,082 | $16,104,907 | $37,794,520 |
| 8 | $37,030,088 | $107,380,598 | $90,993,078 | $263,863,566 | 85,128 | 246,855 | $1,994,543 | $5,783,815 |
| 10 | $10,836,190 | $40,175,847 | $26,627,490 | $98,723,070 | 24,911 | 92,359 | $583,667 | $2,163,982 |
| 11 | $40,140,400 | $95,130,851 | $98,635,968 | $233,762,580 | 92,278 | 218,694 | $2,162,073 | $5,124,010 |
| 12 | $90,561,763 | $191,291,103 | $222,535,080 | $470,054,682 | 208,191 | 439,755 | $4,877,906 | $10,303,466 |
| **Total** | **$686,238,801** | **$1,624,587,333** | **$1,686,276,864** | **$3,992,056,452** | **1,577,581** | **$3,734,731** | **$36,962,715** | **$87,504,755** |

# SECTION 2.4. LOST PRODUCTIVITY

The congestion reported results in lost productivity. As traffic volumes increase beyond the capacity of a roadway, speeds decline and throughput drops. This loss in throughput is the lost productivity of the system. A critical goal of system management is to maximize transportation productivity and person throughput.

One approach used to present lost productivity is to convert lost vehicle throughput where speeds drop below 35 mph into "equivalent lost lane miles." These lost lane miles (LLM) represent a theoretical level of capacity that would be needed to achieve maximum throughput during the most congested time periods.

Table 2–12 shows how congestion affects theoretical lane capacity during different periods of the day. A total of over one thousand lane miles was theoretically lost during severely congested periods (delay due to speeds below 35 mph) in 2012. This was an increase over 145 lane miles from 2011. About half of the system's productivity was lost in the p.m. peak period from 3:00 p.m. to 7:00 p.m.

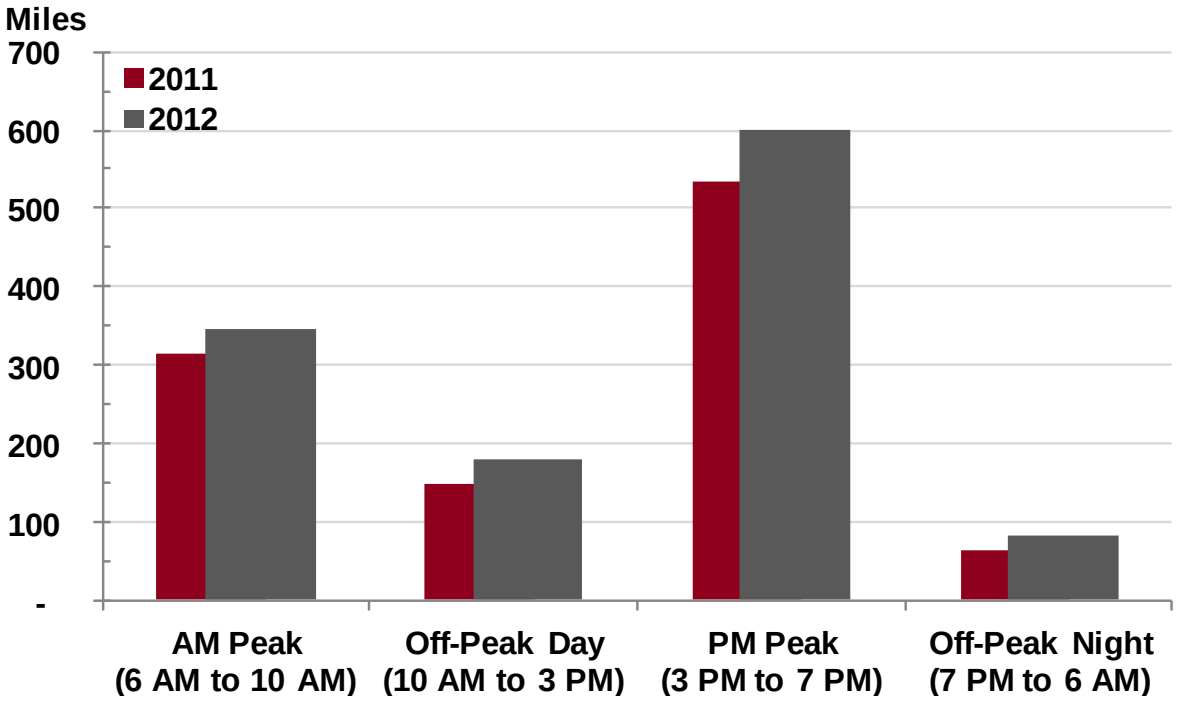
**Table 2-12. EQUIVALENT LOST LANE-MILES (LLM) AT 35 MILES PER HOUR (MPH), STATEWIDE NON-HOLIDAY WEEKDAY AVERAGE, PERCENT OF NON-HOLIDAY WEEKDAY AVERAGE, AND ABSOLUTE AND PERCENT CHANGE, BY TIME PERIOD, 2011–2012**

| Period | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | Total Non-Holiday Weekday LLM at 35 mph | Percent of Total | Total Non-Holiday Weekday LLM at 35 mph | Percent of Total | Absolute | Percent |
| **AM Peak (6 AM to 10 AM)** | 316 | 29.7% | 345 | 28.6% | 29 | 9.2% |
| **Off-Peak Day (10 AM to 3 PM)** | 149 | 14.0% | 179 | 14.9% | 31 | 20.6% |
| **PM Peak (3 PM to 7 PM)** | 533 | 50.2% | 600 | 49.7% | 66 | 12.5% |
| **Off-Peak Night (7 PM to 6 AM)** | 65 | 6.1% | 83 | 6.9% | 19 | 28.7% |
| **Statewide Daily Total** | **1,062** | **100%** | **1,207** | **100%** | **145** | **13.6%** |

Numbers may not sum to total due to rounding

Figure 2–18 depicts the data shown in Table 2–12 in graphic form.

**FIGURE 2–18**
**STATEWIDE EQUIVALENT LOST LANE MILES AT 35 MILES PER HOUR, NON-HOLIDAY WEEKDAY AVERAGE, 2011–2012**



### 2.4.1. Detection Health and Data Quality

The travel demand and mobility data in this report originates exclusively from automated detection. There are two main factors to consider regarding detection: the magnitude of change in the size of the detection system (i.e., by how much the number of detectors has increased or decreased) over time, and the relative health of the detectors.

It is important to note changes in the number and placement of detectors on the urban freeway system, as these changes can be a factor in the observed performance trends. By the end of 2012, the State had 35,403 detectors in place, an increase from 33,272 at the end of 2011. This represents a six percent increase in detection from the end of 2011 to the end of 2012. This growth in the number of detectors can explain some of the growth in VMT and delay between these years because new detectors can measure VMT and delay in places that were previously unmonitored. Conversely, new detectors may just be "infill" detectors, placed in between existing detectors, so it is not always the case that new detectors will necessarily record more VMT or delay. However, it is advisable to note that the growth trends presented in this report may be slightly inflated because detectors may have recorded travel and delay in places not recorded in previous years.

Deficiencies in detection health and data quality can affect the results contained in this report. Regular monitoring of detector data quality and effective detector maintenance are necessary to provide reliable and accurate results. Barriers to good detector health include construction activities, which often require the deactivation of detectors, and a growing problem of copper wire theft. Figure 2–19 shows the statewide average number of detectors for each month in 2011 and 2012. These numbers are separated into good, working detectors and bad detectors (for which data is imputed, or estimated). On average, the percentage of good detectors was 65 percent in 2012, down from 68 percent in 2011.

**FIGURE 2–19**
**STATEWIDE DETECTOR HEALTH, BY MONTH, 2011–2012**

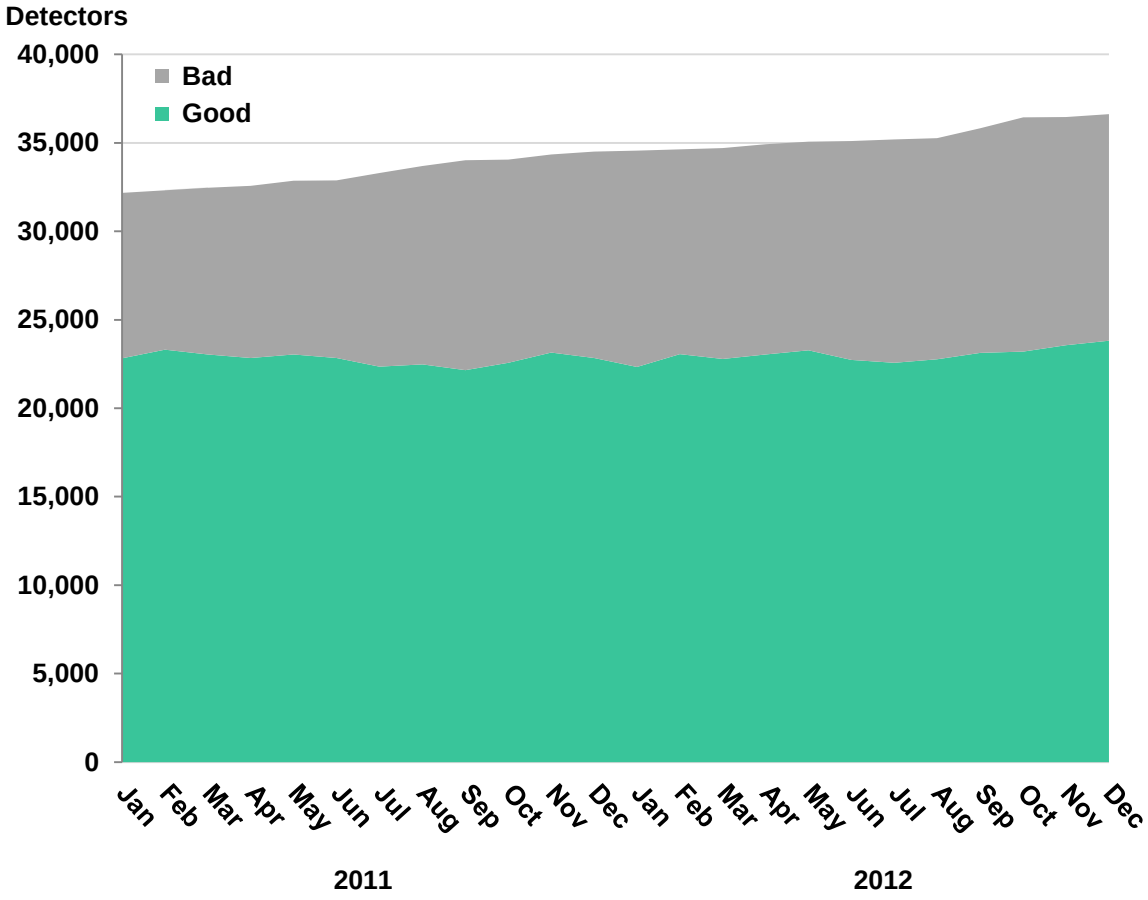



**Table 2-13. DETECTOR HEALTH, STATEWIDE TOTAL, PERCENT OF STATEWIDE TOTAL, AND ABSOLUTE AND PERCENT CHANGE, 2011–2012**

| Detector Health | 2011 | | 2012 | | Change 2012 - 2011 | |
|---|---|---|---|---|---|---|
| | Average Number of Detectors | Percent of Total | Average Number of Detectors | Percent of Total | Absolute | Percent |
| Good Detectors | 22,784 | 68% | 23,022 | 65% | 238 | 1% |
| Bad Detectors | 10,488 | 32% | 12,381 | 35% | 1,894 | 18% |
| **Statewide Total** | **33,272** | **100%** | **35,403** | **100%** | **2,132** | **6%** |

# APPENDIX A

# DATA TABLES

## TABLE A-1.

## VEHICLE MILES OF TRAVEL, STATEWIDE TOTAL, BY DISTRICT, BY MONTH, 2011–2012

| District | Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2011 | 657,646,167 | 602,424,378 | 664,607,838 | 662,262,522 | 676,053,331 | 673,733,973 | 713,896,092 | 716,651,719 | 681,042,260 | 689,535,476 | 649,369,627 | 674,439,697 | **8,061,663,080** |
| | 2012 | 649,319,245 | 630,626,665 | 667,115,615 | 653,191,926 | 692,725,580 | 689,017,775 | 716,630,585 | 731,667,664 | 678,595,406 | 690,290,415 | 656,737,318 | 662,876,513 | **8,118,794,707** |
| 4 | 2011 | 2,153,057,802 | 1,995,763,731 | 2,218,055,012 | 2,205,311,611 | 2,271,400,193 | 2,254,589,164 | 2,307,162,304 | 2,339,669,118 | 2,199,505,801 | 2,086,316,828 | 2,027,855,788 | 2,130,587,760 | **26,189,275,110** |
| | 2012 | 2,084,536,470 | 2,001,111,878 | 2,142,183,911 | 2,150,138,224 | 2,351,846,213 | 2,313,581,223 | 2,371,941,837 | 2,391,156,469 | 2,236,476,310 | 2,351,461,314 | 2,209,951,486 | 2,229,357,578 | **26,833,742,913** |
| 6 | 2011 | 178,539,273 | 170,811,739 | 190,014,950 | 189,436,933 | 195,620,406 | 192,650,052 | 199,573,768 | 202,932,583 | 191,742,449 | 194,558,986 | 184,561,642 | 185,074,969 | **2,275,517,750** |
| | 2012 | 178,241,145 | 177,738,903 | 192,524,691 | 188,001,488 | 205,790,781 | 203,035,212 | 207,966,665 | 211,129,202 | 192,135,335 | 201,390,330 | 192,033,933 | 189,484,147 | **2,339,471,832** |
| 7 | 2011 | 2,844,990,458 | 2,622,011,927 | 2,952,018,196 | 2,888,202,473 | 2,962,263,770 | 2,937,780,024 | 2,958,072,032 | 3,000,298,865 | 2,890,407,215 | 2,967,227,012 | 2,838,016,432 | 2,920,556,925 | **34,781,845,328** |
| | 2012 | 2,870,759,587 | 2,755,434,295 | 2,976,287,801 | 2,882,159,285 | 3,000,273,413 | 2,930,307,326 | 2,976,698,626 | 3,036,052,857 | 2,840,910,787 | 2,965,161,875 | 2,849,442,108 | 2,860,048,825 | **34,943,536,784** |
| 8 | 2011 | 1,045,584,092 | 963,917,016 | 1,079,612,253 | 1,056,602,717 | 1,072,277,861 | 1,067,148,707 | 1,085,028,676 | 1,096,442,555 | 1,046,005,774 | 1,071,026,317 | 1,024,322,659 | 1,056,279,295 | **12,664,247,922** |
| | 2012 | 1,029,263,660 | 1,001,630,017 | 1,078,847,485 | 1,044,535,092 | 1,081,678,275 | 1,055,416,247 | 1,077,500,681 | 1,080,297,301 | 1,318,688,584 | 1,993,832,167 | 1,746,768,039 | 1,721,457,026 | **15,229,914,574** |
| 10 | 2011 | 331,174,150 | 327,516,853 | 376,249,125 | 388,899,646 | 397,627,746 | 399,714,317 | 418,622,642 | 427,674,586 | 417,320,611 | 417,803,751 | 410,066,496 | 427,022,525 | **4,739,692,447** |
| | 2012 | 399,984,648 | 394,580,181 | 423,723,285 | 424,512,603 | 448,823,161 | 447,157,636 | 460,591,373 | 471,722,456 | 435,084,510 | 448,767,049 | 431,618,602 | 425,713,047 | **5,212,278,552** |
| 11 | 2011 | 943,058,849 | 873,561,379 | 988,527,941 | 948,773,058 | 966,779,556 | 973,769,721 | 997,139,982 | 1,010,394,401 | 951,041,364 | 971,023,013 | 914,305,163 | 941,291,168 | **11,479,665,596** |
| | 2012 | 922,088,938 | 893,357,531 | 958,495,267 | 935,835,931 | 989,127,449 | 975,784,869 | 1,063,012,136 | 1,151,308,301 | 1,060,741,191 | 1,090,195,781 | 1,029,800,136 | 1,042,514,913 | **12,112,262,444** |
| 12 | 2011 | 951,349,703 | 887,977,306 | 1,006,567,984 | 981,903,279 | 995,567,492 | 994,795,867 | 1,017,860,884 | 1,030,184,184 | 968,696,606 | 986,351,018 | 931,730,984 | 969,381,087 | **11,722,366,394** |
| | 2012 | 949,810,027 | 910,455,431 | 984,390,048 | 958,181,861 | 1,002,059,532 | 989,580,268 | 1,008,474,458 | 1,019,499,099 | 1,009,796,047 | 1,034,910,416 | 961,943,043 | 990,124,975 | **11,819,225,206** |
| **Total** | **2011** | **9,105,400,494** | **8,443,984,329** | **9,475,653,298** | **9,321,392,238** | **9,537,590,355** | **9,494,181,825** | **9,697,356,379** | **9,824,248,012** | **9,345,762,078** | **9,383,842,400** | **8,980,228,792** | **9,304,633,426** | **111,914,273,625** |
| **Total** | **2012** | **9,084,003,721** | **8,764,934,901** | **9,423,568,103** | **9,236,556,409** | **9,772,324,403** | **9,603,880,557** | **9,882,816,362** | **10,092,833,350** | **9,772,428,169** | **10,776,009,347** | **10,078,294,664** | **10,121,577,026** | **116,609,227,011** |

## Table A-2.

## HISTORICAL VEHICLE HOURS OF DELAY (VHD) AT 35 MPH, STATEWIDE AND DISTRICT TOTALS, PERCENT OF STATEWIDE TOTAL, BY DISTRICT, 2005-2012

| | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| District | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total | VHD at 35 mph | Percent of Total |
| 3 | 5,399,394 | 6.1% | 5,095,332 | 4.8% | 4,177,656 | 4.5% | 3,448,082 | 4.1% | 3,227,278 | 4.1% | 2,990,158 | 3.1% | 2,989,131 | 3.5% | 2,519,054 | 2.7% |
| 4 | 14,750,661 | 16.7% | 20,361,232 | 19.2% | 17,565,580 | 18.9% | 16,721,164 | 19.7% | 16,910,562 | 21.4% | 19,883,167 | 20.8% | 23,511,981 | 27.2% | 25,546,771 | 27.3% |
| 6 | 2,268 | 0.0% | 182,657 | 0.2% | 55,256 | 0.1% | 554,891 | 0.7% | 719,913 | 0.9% | 439,037 | 0.5% | 319,932 | 0.4% | 421,004 | 0.4% |
| 7 | 44,290,451 | 50.2% | 47,619,547 | 44.9% | 37,097,300 | 39.9% | 38,864,571 | 45.8% | 39,441,826 | 50.0% | 49,209,529 | 51.4% | 38,041,557 | 44.0% | 40,817,907 | 43.6% |
| 8 | 5,054,794 | 5.7% | 9,398,501 | 8.9% | 8,801,026 | 9.5% | 4,740,172 | 5.6% | 4,547,384 | 5.8% | 5,469,601 | 5.7% | 5,211,450 | 6.0% | 5,055,171 | 5.4% |
| 10 | - | 0.0% | 523,480 | 0.5% | 1,043,661 | 1.1% | 1,151,889 | 1.4% | 662,029 | 0.8% | 811,100 | 0.8% | 1,305,890 | 1.5% | 1,479,305 | 1.6% |
| 11 | 8,098,209 | 9.2% | 8,889,241 | 8.4% | 7,866,378 | 8.5% | 4,207,711 | 5.0% | 3,613,140 | 4.6% | 4,585,513 | 4.8% | 4,941,861 | 5.7% | 5,479,776 | 5.8% |
| 12 | 10,594,562 | 12.0% | 13,931,846 | 13.1% | 16,262,858 | 17.5% | 15,211,551 | 17.9% | 9,735,627 | 12.3% | 12,305,973 | 12.9% | 10,178,833 | 11.8% | 12,363,060 | 13.2% |
| **Statewide Total** | **88,190,339** | **100%** | **106,001,835** | **100%** | **92,869,715** | **100%** | **84,900,031** | **100%** | **78,857,759** | **100%** | **95,694,077** | **100%** | **86,500,635** | **100%** | **93,682,048** | **100%** |

## Table A-3.

### HISTORICAL VEHICLE HOURS OF DELAY (VHD) AT 60 MILES PER HOUR (MPH), STATEWIDE AND DISTRICT TOTALS, PERCENT OF STATEWIDE TOTAL, BY DISTRICT, 2005-2012

| | 2005 | | 2006 | | 2007 | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| District | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total | VHD at 60 mph | Percent of Total |
| 3 | 11,869,678 | 5.8% | 11,645,997 | 5.0% | 12,194,681 | 5.7% | 8,211,201 | 4.2% | 9,296,136 | 4.8% | 9,390,255 | 4.2% | 7,968,827 | 3.9% | 7,868,904 | 3.5% |
| 4 | 36,087,876 | 17.7% | 45,000,926 | 19.2% | 40,498,843 | 18.9% | 37,345,019 | 19% | 40,101,939 | 21% | 45,048,943 | 20% | 52,365,786 | 25.7% | 56,529,777 | 25.5% |
| 6 | 11,689 | 0.0% | 363,566 | 0.2% | 247,140 | 0.1% | 2,143,285 | 1.1% | 3,536,624 | 1.8% | 2,483,382 | 1.1% | 1,389,443 | 0.7% | 2,347,312 | 1.1% |
| 7 | 101,647,574 | 49.9% | 107,899,895 | 46.0% | 86,592,953 | 40.4% | 89,336,614 | 46% | 90,243,679 | 47% | 108,162,001 | 48% | 88,731,140 | 43.5% | 95,790,260 | 43.2% |
| 8 | 13,280,480 | 6.5% | 20,368,874 | 8.7% | 18,701,989 | 8.7% | 11,480,488 | 5.9% | 15,498,566 | 8.0% | 16,418,407 | 7.3% | 14,194,452 | 7.0% | 14,659,087 | 6.6% |
| 10 | - | 0.0% | 2,092,743 | 0.9% | 5,897,863 | 2.8% | 5,762,128 | 3% | 4,336,335 | 2% | 4,441,831 | 2% | 4,887,243 | 2.4% | 5,484,615 | 2.5% |
| 11 | 17,415,687 | 8.5% | 18,209,169 | 7.8% | 16,657,001 | 7.8% | 10,576,740 | 5.4% | 9,192,776 | 4.7% | 11,317,044 | 5.1% | 11,374,725 | 5.6% | 12,986,810 | 5.9% |
| 12 | 23,382,801 | 11.5% | 28,971,073 | 12.4% | 33,555,205 | 15.7% | 30,311,407 | 16% | 21,791,847 | 11% | 26,294,903 | 12% | 23,225,524 | 11.4% | 26,114,149 | 11.8% |
| **Statewide Total** | **203,695,784** | **100%** | **234,552,241** | **100%** | **214,345,675** | **100%** | **195,166,882** | **100%** | **193,997,902** | **100%** | **223,556,767** | **100%** | **204,137,139** | **100%** | **221,780,914** | **100%** |

## Table A-4.

## VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, STATEWIDE AND DISTRICT TOTALS, BY DISTRICT BY MONTH, 2011–2012

| District | Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2011 | 215,999 | 263,813 | 293,224 | 243,981 | 310,154 | 205,691 | 241,191 | 269,015 | 263,907 | 218,211 | 253,054 | 210,891 | **2,989,131** |
| | 2012 | 191,633 | 197,585 | 215,315 | 172,546 | 213,336 | 205,194 | 229,831 | 247,147 | 205,115 | 186,942 | 229,149 | 225,260 | **2,519,054** |
| 4 | 2011 | 1,603,247 | 1,731,334 | 1,769,422 | 1,698,699 | 1,935,693 | 2,153,807 | 1,924,867 | 2,200,583 | 2,208,971 | 2,231,376 | 2,111,514 | 1,942,469 | **23,511,981** |
| | 2012 | 1,627,665 | 1,789,294 | 1,901,577 | 1,745,184 | 2,249,096 | 2,327,058 | 1,881,281 | 2,395,154 | 2,357,877 | 2,515,866 | 2,414,962 | 2,341,756 | **25,546,771** |
| 6 | 2011 | 30,147 | 38,029 | 28,629 | 35,951 | 17,082 | 26,741 | 20,350 | 33,997 | 20,765 | 23,578 | 18,373 | 26,290 | **319,932** |
| | 2012 | 11,101 | 25,581 | 30,369 | 27,393 | 27,155 | 31,955 | 41,048 | 49,563 | 45,409 | 52,926 | 45,318 | 33,185 | **421,004** |
| 7 | 2011 | 2,816,086 | 2,943,086 | 3,053,101 | 2,710,413 | 2,916,799 | 3,433,622 | 3,184,545 | 3,139,272 | 3,336,857 | 3,676,216 | 3,564,016 | 3,267,544 | **38,041,557** |
| | 2012 | 2,792,195 | 3,275,379 | 3,256,457 | 2,986,129 | 3,666,382 | 3,676,270 | 3,145,104 | 3,783,468 | 3,532,513 | 3,684,450 | 3,722,370 | 3,297,191 | **40,817,907** |
| 8 | 2011 | 502,868 | 553,053 | 476,633 | 432,126 | 363,244 | 349,691 | 322,577 | 373,403 | 376,829 | 392,867 | 539,414 | 528,745 | **5,211,450** |
| | 2012 | 334,136 | 430,530 | 374,526 | 451,646 | 442,316 | 436,667 | 404,009 | 419,643 | 359,062 | 448,783 | 468,764 | 485,090 | **5,055,171** |
| 10 | 2011 | 54,613 | 61,780 | 54,607 | 43,972 | 71,203 | 88,339 | 99,442 | 186,656 | 190,062 | 194,676 | 143,911 | 116,629 | **1,305,890** |
| | 2012 | 78,705 | 93,713 | 99,122 | 113,206 | 161,754 | 140,830 | 161,572 | 173,149 | 150,142 | 112,037 | 102,654 | 92,422 | **1,479,305** |
| 11 | 2011 | 392,530 | 415,798 | 390,833 | 302,101 | 326,866 | 404,175 | 392,979 | 402,755 | 435,543 | 449,823 | 567,524 | 460,935 | **4,941,861** |
| | 2012 | 420,752 | 433,350 | 349,018 | 371,403 | 383,946 | 450,869 | 502,820 | 532,447 | 449,334 | 535,861 | 556,826 | 493,151 | **5,479,776** |
| 12 | 2011 | 792,116 | 740,639 | 759,495 | 777,278 | 711,177 | 890,542 | 1,061,754 | 853,585 | 793,791 | 892,347 | 897,265 | 1,008,846 | **10,178,833** |
| | 2012 | 824,234 | 988,062 | 970,160 | 924,828 | 941,986 | 1,025,680 | 1,073,353 | 1,120,625 | 1,120,974 | 1,211,634 | 1,194,586 | 966,939 | **12,363,060** |
| **Statewide Total** | **2011** | **6,407,606** | **6,747,531** | **6,825,944** | **6,244,522** | **6,652,217** | **7,552,608** | **7,247,704** | **7,459,265** | **7,626,726** | **8,079,093** | **8,095,071** | **7,562,349** | **86,500,635** |
| **Statewide Total** | **2012** | **6,280,420** | **7,233,492** | **7,196,545** | **6,792,336** | **8,085,972** | **8,294,524** | **7,439,018** | **8,721,196** | **8,220,427** | **8,748,498** | **8,734,629** | **7,934,992** | **93,682,048** |

## Table A-5.

## VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, STATEWIDE AND DISTRICT NON-HOLIDAY WEEKDAY AVERAGES, BY DISTRICT BY MONTH, 2011–2012

| District | Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2011 | 8,596 | 11,405 | 10,607 | 9,598 | 12,796 | 8,045 | 9,549 | 9,375 | 10,681 | 9,091 | 10,630 | 8,403 | **9,887** |
| | 2012 | 8,167 | 8,340 | 8,195 | 6,658 | 8,354 | 7,967 | 8,403 | 8,080 | 8,608 | 7,566 | 9,924 | 8,945 | **8,251** |
| 4 | 2011 | 69,516 | 78,611 | 69,527 | 69,294 | 77,703 | 85,855 | 80,545 | 82,630 | 92,564 | 94,839 | 91,166 | 80,832 | **81,002** |
| | 2012 | 72,290 | 78,667 | 78,100 | 72,893 | 88,844 | 96,203 | 74,520 | 91,865 | 104,874 | 103,361 | 104,706 | 100,408 | **88,803** |
| 6 | 2011 | 944 | 1,402 | 937 | 1,283 | 767 | 1,093 | 885 | 1,205 | 844 | 995 | 757 | 930 | **1,004** |
| | 2012 | 485 | 1,110 | 1,258 | 1,193 | 1,141 | 1,389 | 1,821 | 2,006 | 2,201 | 2,183 | 1,983 | 1,456 | **1,521** |
| 7 | 2011 | 124,218 | 137,944 | 120,517 | 113,516 | 124,238 | 139,951 | 136,597 | 120,162 | 144,231 | 159,067 | 157,531 | 140,134 | **134,455** |
| | 2012 | 125,814 | 147,833 | 132,758 | 125,133 | 149,265 | 153,729 | 130,180 | 148,790 | 165,037 | 154,764 | 164,370 | 145,529 | **145,132** |
| 8 | 2011 | 21,746 | 25,140 | 17,828 | 17,951 | 15,181 | 13,683 | 13,486 | 14,322 | 16,372 | 17,146 | 22,458 | 21,056 | **17,915** |
| | 2012 | 14,753 | 19,023 | 14,533 | 18,350 | 16,811 | 17,341 | 16,192 | 16,433 | 16,948 | 18,702 | 19,822 | 19,640 | **17,352** |
| 10 | 2011 | 2,625 | 3,059 | 2,293 | 1,999 | 3,155 | 3,572 | 4,156 | 6,999 | 7,603 | 7,927 | 5,740 | 4,506 | **4,470** |
| | 2012 | 3,245 | 3,994 | 3,812 | 4,422 | 6,381 | 5,641 | 6,236 | 6,505 | 6,162 | 4,263 | 4,121 | 3,368 | **4,867** |
| 11 | 2011 | 18,827 | 20,650 | 16,628 | 13,566 | 14,925 | 16,976 | 17,481 | 16,269 | 19,840 | 20,924 | 26,951 | 21,164 | **18,588** |
| | 2012 | 20,179 | 21,162 | 15,193 | 16,939 | 16,342 | 19,008 | 20,759 | 21,076 | 22,094 | 22,812 | 26,314 | 23,472 | **20,373** |
| 12 | 2011 | 35,197 | 35,724 | 30,481 | 33,100 | 29,966 | 35,385 | 43,463 | 31,600 | 34,078 | 39,507 | 39,107 | 42,369 | **35,699** |
| | 2012 | 35,395 | 43,188 | 38,108 | 37,600 | 36,440 | 40,684 | 40,982 | 40,252 | 49,169 | 48,714 | 51,872 | 42,873 | **42,004** |
| **Statewide Average** | **2011** | **281,669** | **313,934** | **268,819** | **260,308** | **278,731** | **304,562** | **306,161** | **282,562** | **326,214** | **349,495** | **354,340** | **319,395** | **303,019** |
| **Statewide Average** | **2012** | **280,328** | **323,317** | **291,956** | **283,188** | **323,579** | **341,962** | **299,093** | **335,007** | **375,093** | **362,366** | **383,112** | **345,690** | **328,302** |

## Table A-6.

## VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, STATEWIDE AND DISTRICT TOTALS, BY DISTRICT BY MONTH, 2011–2012

| District | Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2011 | 557,528 | 650,517 | 748,150 | 637,952 | 682,136 | 590,954 | 680,448 | 749,524 | 743,115 | 662,184 | 674,095 | 592,225 | **7,968,827** |
| | 2012 | 571,461 | 593,190 | 652,149 | 571,125 | 669,951 | 647,322 | 686,039 | 752,323 | 668,118 | 676,544 | 696,468 | 684,213 | **7,868,904** |
| 4 | 2011 | 3,782,996 | 3,991,091 | 4,222,720 | 3,923,620 | 4,313,193 | 4,687,238 | 4,277,751 | 4,865,999 | 4,818,404 | 4,731,540 | 4,526,039 | 4,225,196 | **52,365,786** |
| | 2012 | 3,813,995 | 3,985,110 | 4,284,579 | 3,984,522 | 4,954,527 | 5,024,327 | 4,347,542 | 5,240,920 | 5,021,039 | 5,487,628 | 5,285,660 | 5,099,926 | **56,529,777** |
| 6 | 2011 | 101,703 | 116,802 | 115,970 | 129,712 | 120,495 | 108,900 | 99,119 | 137,851 | 120,510 | 125,354 | 105,895 | 107,131 | **1,389,443** |
| | 2012 | 103,841 | 148,568 | 165,901 | 155,557 | 169,895 | 198,591 | 211,731 | 252,864 | 233,184 | 265,144 | 238,230 | 203,807 | **2,347,312** |
| 7 | 2011 | 6,614,765 | 6,737,635 | 7,302,107 | 6,636,177 | 6,970,028 | 7,972,552 | 7,488,080 | 7,632,778 | 7,721,361 | 8,254,091 | 7,952,187 | 7,449,378 | **88,731,140** |
| | 2012 | 6,695,180 | 7,533,704 | 7,771,063 | 7,293,699 | 8,443,720 | 8,560,965 | 7,712,721 | 8,880,707 | 8,087,729 | 8,604,032 | 8,548,953 | 7,657,789 | **95,790,260** |
| 8 | 2011 | 1,321,636 | 1,383,318 | 1,268,062 | 1,147,812 | 1,033,610 | 1,027,897 | 954,835 | 1,103,080 | 1,069,068 | 1,135,250 | 1,393,422 | 1,356,463 | **14,194,452** |
| | 2012 | 1,021,553 | 1,219,804 | 1,132,837 | 1,237,135 | 1,242,102 | 1,205,333 | 1,143,035 | 1,223,888 | 1,110,589 | 1,373,410 | 1,344,775 | 1,404,625 | **14,659,087** |
| 10 | 2011 | 259,095 | 248,987 | 271,084 | 252,717 | 311,817 | 344,073 | 368,084 | 557,972 | 647,188 | 666,012 | 526,222 | 433,991 | **4,887,243** |
| | 2012 | 374,391 | 395,120 | 431,266 | 443,364 | 551,411 | 516,894 | 537,713 | 589,470 | 533,939 | 417,928 | 363,088 | 330,031 | **5,484,615** |
| 11 | 2011 | 890,584 | 905,923 | 899,058 | 739,322 | 804,335 | 935,598 | 958,457 | 985,211 | 996,601 | 1,051,719 | 1,209,104 | 998,812 | **11,374,725** |
| | 2012 | 916,395 | 969,380 | 868,754 | 882,658 | 917,012 | 1,040,502 | 1,212,671 | 1,316,054 | 1,122,046 | 1,285,676 | 1,286,666 | 1,168,998 | **12,986,810** |
| 12 | 2011 | 1,817,862 | 1,723,785 | 1,819,313 | 1,763,389 | 1,713,203 | 2,008,117 | 2,234,544 | 2,040,193 | 1,890,541 | 2,076,230 | 2,002,336 | 2,136,012 | **23,225,524** |
| | 2012 | 1,837,203 | 2,053,429 | 2,028,563 | 1,959,210 | 2,031,139 | 2,120,037 | 2,226,054 | 2,353,635 | 2,353,380 | 2,577,939 | 2,444,326 | 2,129,234 | **26,114,149** |
| **Statewide Total** | 2011 | **15,346,170** | **15,758,058** | **16,646,464** | **15,230,701** | **15,948,818** | **17,675,329** | **17,061,317** | **18,072,607** | **18,006,788** | **18,702,380** | **18,389,300** | **17,299,208** | **204,137,139** |
| **Statewide Total** | 2012 | **15,334,018** | **16,898,305** | **17,335,112** | **16,527,271** | **18,979,756** | **19,313,971** | **18,077,507** | **20,609,860** | **19,130,025** | **20,688,301** | **20,208,166** | **18,678,623** | **221,780,914** |

## Table A-7.

## VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, STATEWIDE AND DISTRICT NON-HOLIDAY WEEKDAY AVERAGES, BY DISTRICT BY MONTH, 2011–2012

| District | Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2011 | 22,020 | 27,980 | 27,129 | 24,808 | 27,356 | 22,956 | 26,727 | 26,756 | 29,667 | 26,712 | 27,997 | 23,570 | **26,130** |
| | 2012 | 23,521 | 24,696 | 24,846 | 22,224 | 25,781 | 25,185 | 25,645 | 26,552 | 27,908 | 26,330 | 29,112 | 27,094 | **25,723** |
| 4 | 2011 | 163,218 | 182,229 | 165,663 | 162,140 | 176,066 | 188,365 | 179,734 | 184,699 | 201,811 | 200,495 | 193,974 | 175,327 | **181,017** |
| | 2012 | 167,156 | 174,966 | 174,851 | 167,516 | 196,069 | 208,510 | 174,621 | 201,472 | 223,799 | 222,447 | 226,914 | 215,223 | **195,972** |
| 6 | 2011 | 3,693 | 4,817 | 4,283 | 4,928 | 4,840 | 4,323 | 4,104 | 5,059 | 4,838 | 5,055 | 4,344 | 4,198 | **4,543** |
| | 2012 | 4,184 | 6,112 | 6,367 | 6,229 | 6,495 | 7,951 | 8,429 | 9,513 | 9,881 | 10,032 | 9,581 | 8,030 | **7,742** |
| 7 | 2011 | 287,708 | 311,822 | 286,838 | 276,870 | 294,185 | 322,734 | 319,803 | 292,910 | 330,536 | 351,697 | 346,352 | 315,368 | **310,862** |
| | 2012 | 294,968 | 333,061 | 313,212 | 303,123 | 339,144 | 353,743 | 316,806 | 346,383 | 370,397 | 353,454 | 369,662 | 331,151 | **335,283** |
| 8 | 2011 | 55,881 | 62,193 | 48,178 | 47,466 | 42,835 | 40,647 | 40,108 | 42,483 | 45,650 | 48,069 | 57,900 | 54,706 | **48,622** |
| | 2012 | 43,885 | 52,826 | 43,928 | 50,563 | 48,021 | 48,370 | 46,018 | 47,456 | 50,641 | 55,296 | 56,106 | 57,058 | **49,939** |
| 10 | 2011 | 11,502 | 11,833 | 11,072 | 11,177 | 13,551 | 14,236 | 15,874 | 21,482 | 26,330 | 26,593 | 21,593 | 17,222 | **16,860** |
| | 2012 | 15,065 | 16,606 | 16,809 | 17,821 | 21,500 | 20,889 | 21,279 | 22,405 | 22,667 | 15,678 | 14,534 | 12,570 | **18,203** |
| 11 | 2011 | 41,572 | 44,374 | 37,666 | 32,442 | 35,355 | 38,691 | 41,303 | 38,681 | 43,907 | 47,356 | 54,996 | 44,758 | **41,596** |
| | 2012 | 42,557 | 45,768 | 36,599 | 38,993 | 37,997 | 43,280 | 48,707 | 50,179 | 51,926 | 52,585 | 58,288 | 52,628 | **46,510** |
| 12 | 2011 | 80,015 | 82,198 | 72,604 | 74,836 | 72,153 | 80,042 | 92,351 | 76,093 | 80,377 | 89,847 | 86,659 | 89,159 | **81,144** |
| | 2012 | 78,926 | 89,884 | 80,315 | 80,382 | 79,162 | 85,172 | 86,639 | 86,577 | 103,878 | 102,921 | 105,063 | 92,088 | **89,056** |
| **Statewide Average** | **2011** | **665,609** | **727,445** | **653,434** | **634,667** | **666,340** | **711,993** | **720,004** | **688,163** | **763,116** | **795,823** | **793,814** | **724,307** | **710,773** |
| **Statewide Average** | **2012** | **670,263** | **743,918** | **696,927** | **686,852** | **754,169** | **793,099** | **728,144** | **790,535** | **861,096** | **838,743** | **869,261** | **795,843** | **768,427** |

## Table A-8.

### VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, STATEWIDE AND DISTRICT AVERAGES, BY DISTRICT BY DAY OF WEEK, 2011–2012

| District | Year | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | Weekly Average |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 2011 | 19,504 | 25,300 | 27,289 | 27,811 | 29,957 | 13,955 | 10,995 | **21,832** |
| | 2012 | 19,801 | 25,358 | 26,427 | 28,041 | 28,358 | 13,339 | 11,408 | **21,500** |
| 4 | 2011 | 143,996 | 178,698 | 192,672 | 209,881 | 175,300 | 72,616 | 50,521 | **143,468** |
| | 2012 | 152,503 | 188,625 | 210,735 | 222,682 | 200,954 | 79,189 | 51,159 | **154,453** |
| 6 | 2011 | 5,715 | 3,961 | 4,499 | 4,710 | 3,981 | 2,622 | 1,806 | **3,807** |
| | 2012 | 8,683 | 7,381 | 7,276 | 7,965 | 7,499 | 3,805 | 3,275 | **6,413** |
| 7 | 2011 | 272,915 | 292,424 | 309,570 | 333,358 | 341,964 | 122,382 | 69,157 | **243,099** |
| | 2012 | 288,081 | 318,665 | 331,409 | 361,580 | 371,347 | 87,835 | 112,170 | **261,722** |
| 8 | 2011 | 49,992 | 44,291 | 45,743 | 47,138 | 56,247 | 18,426 | 16,620 | **38,889** |
| | 2012 | 49,666 | 45,967 | 45,386 | 48,922 | 59,538 | 21,236 | 16,194 | **40,052** |
| 10 | 2011 | 21,813 | 16,157 | 15,821 | 15,125 | 16,002 | 5,116 | 6,298 | **13,390** |
| | 2012 | 22,041 | 16,488 | 16,824 | 17,307 | 18,722 | 9,744 | 6,492 | **14,985** |
| 11 | 2011 | 34,956 | 43,519 | 42,248 | 41,155 | 45,268 | 9,839 | 6,766 | **31,164** |
| | 2012 | 38,243 | 48,815 | 45,870 | 46,646 | 52,057 | 13,241 | 9,908 | **35,483** |
| 12 | 2011 | 73,442 | 73,727 | 82,131 | 90,458 | 85,181 | 30,688 | 20,195 | **63,632** |
| | 2012 | 82,070 | 84,705 | 88,704 | 96,371 | 92,674 | 39,672 | 26,956 | **71,350** |
| **Statewide Average** | **2011** | **622,332** | **678,077** | **719,973** | **769,636** | **753,902** | **275,644** | **182,359** | **559,280** |
| **Statewide Average** | **2012** | **661,088** | **736,003** | **772,631** | **829,513** | **831,149** | **268,061** | **237,563** | **605,959** |

## Table A-9 (A).

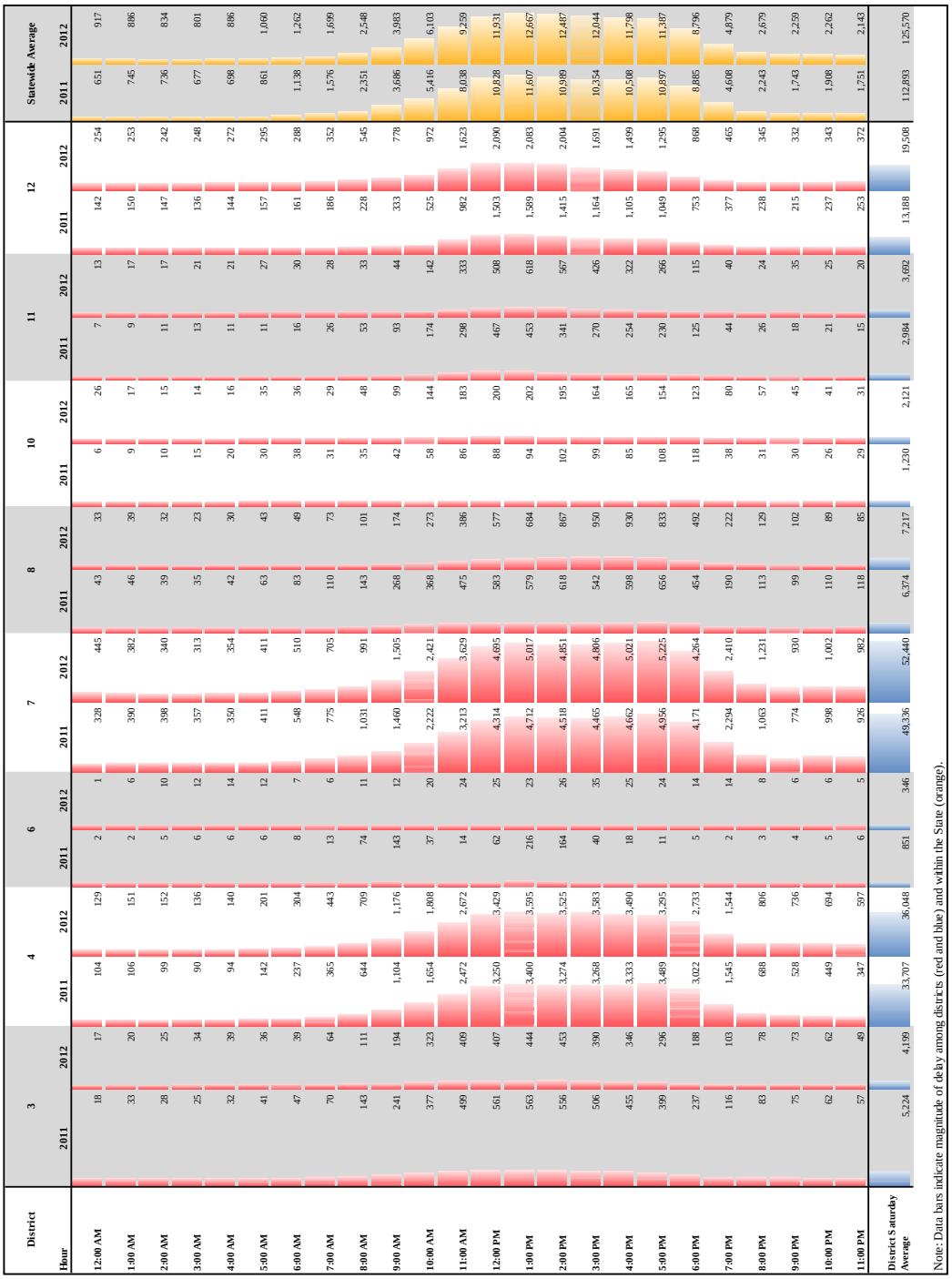
## VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, STATEWIDE AND DISTRICT NON-HOLIDAY WEEKDAY AVERAGES, BY DISTRICT BY HOUR, 2011–2012

| District | 3 | | 4 | | 6 | | 7 | | 8 | | 10 | | 11 | | 12 | | Statewide Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hour | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| 12:00 AM | 15 | 9 | 85 | 99 | 3 | 5 | 222 | 261 | 23 | 19 | 17 | 12 | 10 | 15 | 127 | 217 | 501 | 638 |
| 1:00 AM | 26 | 23 | 93 | 112 | 11 | 28 | 301 | 329 | 36 | 30 | 17 | 14 | 11 | 15 | 133 | 234 | 627 | 785 |
| 2:00 AM | 32 | 37 | 98 | 118 | 18 | 39 | 309 | 338 | 49 | 40 | 22 | 22 | 10 | 17 | 131 | 241 | 668 | 851 |
| 3:00 AM | 39 | 49 | 117 | 143 | 23 | 46 | 320 | 366 | 66 | 52 | 26 | 27 | 10 | 22 | 134 | 220 | 734 | 924 |
| 4:00 AM | 47 | 55 | 170 | 209 | 25 | 49 | 399 | 460 | 106 | 77 | 34 | 43 | 13 | 31 | 147 | 264 | 942 | 1,188 |
| 5:00 AM | 71 | 75 | 359 | 452 | 26 | 50 | 728 | 922 | 449 | 387 | 144 | 141 | 33 | 54 | 184 | 517 | 1,994 | 2,598 |
| 6:00 AM | 127 | 109 | 1,531 | 2,124 | 25 | 45 | 4,160 | 5,371 | 1,194 | 933 | 166 | 127 | 394 | 343 | 616 | 1,023 | 8,213 | 10,076 |
| 7:00 AM | 559 | 547 | 6,044 | 6,945 | 44 | 58 | 13,500 | 14,807 | 1,643 | 1,444 | 158 | 169 | 2,162 | 2,062 | 3,372 | 3,890 | 27,482 | 29,921 |
| 8:00 AM | 797 | 753 | 9,824 | 10,452 | 47 | 64 | 15,765 | 16,566 | 1,218 | 1,150 | 178 | 222 | 2,196 | 2,222 | 4,093 | 4,508 | 34,119 | 35,937 |
| 9:00 AM | 392 | 330 | 6,082 | 6,837 | 40 | 58 | 9,014 | 9,475 | 649 | 575 | 207 | 230 | 614 | 605 | 1,536 | 1,832 | 18,535 | 19,944 |
| 10:00 AM | 393 | 281 | 3,533 | 3,904 | 50 | 64 | 5,016 | 5,386 | 585 | 470 | 269 | 272 | 369 | 365 | 767 | 1,091 | 10,982 | 11,834 |
| 11:00 AM | 417 | 306 | 3,095 | 3,128 | 55 | 68 | 3,941 | 4,161 | 588 | 484 | 316 | 323 | 407 | 412 | 753 | 1,096 | 9,572 | 9,978 |
| 12:00 PM | 465 | 340 | 3,115 | 2,972 | 57 | 70 | 3,796 | 3,917 | 669 | 547 | 310 | 331 | 444 | 464 | 891 | 1,189 | 9,747 | 9,830 |
| 1:00 PM | 514 | 378 | 2,954 | 2,732 | 51 | 74 | 3,932 | 4,078 | 751 | 671 | 320 | 328 | 480 | 500 | 939 | 1,183 | 9,939 | 9,942 |
| 2:00 PM | 605 | 449 | 3,315 | 3,286 | 56 | 88 | 5,421 | 5,712 | 972 | 1,029 | 325 | 374 | 589 | 625 | 1,336 | 1,566 | 12,619 | 13,130 |
| 3:00 PM | 845 | 630 | 5,051 | 5,735 | 51 | 110 | 9,971 | 10,995 | 1,599 | 1,806 | 419 | 454 | 1,345 | 1,552 | 2,576 | 2,739 | 21,857 | 24,021 |
| 4:00 PM | 1,329 | 1,063 | 8,599 | 9,994 | 62 | 137 | 14,973 | 16,399 | 2,225 | 2,347 | 527 | 518 | 3,038 | 3,682 | 4,573 | 4,733 | 35,327 | 38,874 |
| 5:00 PM | 1,960 | 1,715 | 13,596 | 14,664 | 111 | 158 | 19,992 | 21,670 | 2,754 | 2,820 | 455 | 498 | 4,404 | 5,204 | 7,336 | 7,957 | 50,608 | 54,685 |
| 6:00 PM | 673 | 610 | 9,374 | 10,210 | 42 | 70 | 14,055 | 14,973 | 1,320 | 1,392 | 157 | 237 | 1,605 | 1,775 | 4,275 | 4,874 | 31,502 | 34,140 |
| 7:00 PM | 211 | 172 | 2,280 | 2,626 | 34 | 53 | 4,792 | 4,933 | 366 | 449 | 89 | 129 | 222 | 196 | 875 | 1,139 | 8,869 | 9,696 |
| 8:00 PM | 118 | 108 | 648 | 717 | 48 | 51 | 1,479 | 1,510 | 203 | 226 | 80 | 94 | 72 | 66 | 277 | 447 | 2,925 | 3,219 |
| 9:00 PM | 103 | 86 | 430 | 514 | 55 | 51 | 909 | 881 | 181 | 169 | 88 | 110 | 72 | 50 | 215 | 367 | 2,051 | 2,226 |
| 10:00 PM | 85 | 74 | 345 | 467 | 47 | 45 | 813 | 854 | 166 | 146 | 82 | 115 | 58 | 52 | 213 | 349 | 1,809 | 2,102 |
| 11:00 PM | 66 | 54 | 266 | 363 | 23 | 39 | 647 | 769 | 104 | 87 | 61 | 77 | 30 | 43 | 201 | 330 | 1,397 | 1,761 |
| District Daily Average | 9,887 | 8,251 | 81,002 | 88,803 | 1,004 | 1,521 | 134,455 | 145,132 | 17,915 | 17,352 | 4,470 | 4,867 | 18,588 | 20,373 | 35,699 | 42,004 | 303,019 | 328,302 |

Note: Data bars indicate magnitude of delay among districts (red and blue) and within the State (orange).

**Table A-9 (B).**

## VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, STATEWIDE AND DISTRICT SATURDAY AVERAGES, BY DISTRICT BY HOUR, 2011–2012



| District | 3 | | 4 | | 6 | | 7 | | 8 | | 10 | | 11 | | 12 | | Statewide Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hour | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| 12:00 AM | 18 | 17 | 104 | 129 | 2 | 1 | 328 | 445 | 43 | 33 | 6 | 26 | 7 | 13 | 142 | 254 | 651 | 917 |
| 1:00 AM | 33 | 20 | 106 | 151 | 2 | 6 | 390 | 382 | 46 | 39 | 9 | 17 | 9 | 17 | 150 | 253 | 745 | 886 |
| 2:00 AM | 28 | 25 | 99 | 152 | 5 | 10 | 398 | 340 | 39 | 32 | 10 | 15 | 11 | 17 | 147 | 242 | 736 | 834 |
| 3:00 AM | 25 | 34 | 90 | 136 | 6 | 12 | 357 | 313 | 35 | 23 | 15 | 14 | 13 | 21 | 136 | 248 | 677 | 801 |
| 4:00 AM | 32 | 39 | 94 | 140 | 6 | 14 | 350 | 354 | 42 | 30 | 20 | 16 | 11 | 21 | 144 | 272 | 698 | 886 |
| 5:00 AM | 41 | 36 | 142 | 201 | 6 | 12 | 411 | 411 | 63 | 43 | 30 | 35 | 11 | 27 | 157 | 295 | 861 | 1,060 |
| 6:00 AM | 47 | 39 | 237 | 304 | 8 | 7 | 548 | 510 | 83 | 49 | 38 | 36 | 16 | 30 | 161 | 288 | 1,138 | 1,262 |
| 7:00 AM | 70 | 64 | 365 | 443 | 13 | 6 | 775 | 705 | 110 | 73 | 31 | 29 | 26 | 28 | 186 | 352 | 1,576 | 1,699 |
| 8:00 AM | 143 | 111 | 644 | 709 | 74 | 11 | 1,031 | 991 | 143 | 101 | 35 | 48 | 53 | 33 | 228 | 545 | 2,351 | 2,548 |
| 9:00 AM | 241 | 194 | 1,104 | 1,176 | 143 | 12 | 1,460 | 1,505 | 268 | 174 | 42 | 99 | 93 | 44 | 333 | 778 | 3,686 | 3,983 |
| 10:00 AM | 377 | 323 | 1,654 | 1,808 | 37 | 20 | 2,222 | 2,421 | 368 | 273 | 58 | 144 | 174 | 142 | 525 | 972 | 5,416 | 6,103 |
| 11:00 AM | 499 | 409 | 2,472 | 2,672 | 14 | 24 | 3,213 | 3,629 | 475 | 386 | 86 | 183 | 298 | 333 | 982 | 1,623 | 8,038 | 9,239 |
| 12:00 PM | 561 | 407 | 3,250 | 3,429 | 62 | 25 | 4,314 | 4,695 | 583 | 577 | 88 | 200 | 467 | 500 | 1,503 | 2,090 | 10,828 | 11,931 |
| 1:00 PM | 563 | 444 | 3,400 | 3,595 | 216 | 23 | 4,712 | 5,017 | 579 | 684 | 94 | 202 | 453 | 618 | 1,589 | 2,083 | 11,607 | 12,667 |
| 2:00 PM | 556 | 453 | 3,274 | 3,525 | 164 | 26 | 4,518 | 4,851 | 618 | 867 | 102 | 195 | 341 | 567 | 1,415 | 2,004 | 10,989 | 12,487 |
| 3:00 PM | 506 | 390 | 3,268 | 3,583 | 40 | 35 | 4,465 | 4,806 | 542 | 950 | 99 | 164 | 270 | 426 | 1,164 | 1,691 | 10,354 | 12,044 |
| 4:00 PM | 455 | 346 | 3,333 | 3,490 | 18 | 25 | 4,662 | 5,021 | 598 | 930 | 85 | 165 | 254 | 322 | 1,105 | 1,499 | 10,508 | 11,798 |
| 5:00 PM | 399 | 296 | 3,489 | 3,295 | 11 | 24 | 4,956 | 5,225 | 656 | 833 | 108 | 154 | 230 | 266 | 1,049 | 1,295 | 10,897 | 11,307 |
| 6:00 PM | 237 | 188 | 3,022 | 2,733 | 5 | 14 | 4,171 | 4,264 | 454 | 492 | 118 | 123 | 125 | 115 | 753 | 868 | 8,885 | 8,796 |
| 7:00 PM | 116 | 103 | 1,545 | 1,544 | 2 | 14 | 2,294 | 2,410 | 190 | 222 | 38 | 80 | 44 | 40 | 377 | 465 | 4,608 | 4,879 |
| 8:00 PM | 83 | 78 | 688 | 806 | 3 | 8 | 1,063 | 1,231 | 113 | 129 | 31 | 57 | 26 | 24 | 238 | 345 | 2,243 | 2,679 |
| 9:00 PM | 75 | 73 | 528 | 736 | 4 | 6 | 774 | 930 | 99 | 102 | 30 | 45 | 18 | 35 | 215 | 332 | 1,743 | 2,259 |
| 10:00 PM | 62 | 62 | 449 | 694 | 5 | 6 | 998 | 1,002 | 110 | 89 | 26 | 41 | 21 | 25 | 237 | 343 | 1,908 | 2,262 |
| 11:00 PM | 57 | 49 | 347 | 597 | 6 | 5 | 926 | 982 | 118 | 85 | 29 | 31 | 15 | 20 | 253 | 372 | 1,751 | 2,143 |
| District Saturday Average | 5,224 | 4,199 | 33,707 | 36,048 | 851 | 346 | 49,336 | 52,440 | 6,374 | 7,217 | 1,230 | 2,121 | 2,984 | 3,692 | 13,188 | 19,508 | 112,893 | 125,570 |

Note: Data bars indicate magnitude of delay among districts (red and blue) and within the State (orange).

**Table A-9 (C).**

## VEHICLE HOURS OF DELAY AT 35 MILES PER HOUR, STATEWIDE AND DISTRICT SUNDAY AND HOLIDAY AVERAGES, BY DISTRICT BY HOUR, 2011–2012

| District | 3 | | 4 | | 6 | | 7 | | 8 | | 10 | | 11 | | 12 | | Statewide Hourly Total Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hour | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| 12:00 AM | 18 | 8 | 104 | 140 | 3 | 0 | 385 | 484 | 58 | 30 | 7 | 4 | 4 | 4 | 171 | 264 | 749 | 934 |
| 1:00 AM | 28 | 14 | 114 | 173 | 5 | 1 | 411 | 422 | 56 | 27 | 6 | 5 | 3 | 8 | 189 | 283 | 812 | 933 |
| 2:00 AM | 29 | 21 | 105 | 183 | 4 | 3 | 370 | 347 | 50 | 17 | 8 | 6 | 4 | 10 | 180 | 249 | 739 | 823 |
| 3:00 AM | 25 | 27 | 95 | 157 | 5 | 4 | 302 | 241 | 40 | 14 | 9 | 4 | 3 | 11 | 147 | 226 | 627 | 684 |
| 4:00 AM | 26 | 28 | 96 | 151 | 5 | 5 | 244 | 218 | 38 | 17 | 9 | 7 | 3 | 11 | 137 | 226 | 556 | 662 |
| 5:00 AM | 29 | 28 | 109 | 173 | 6 | 5 | 287 | 281 | 49 | 34 | 13 | 13 | 6 | 15 | 147 | 280 | 645 | 829 |
| 6:00 AM | 36 | 28 | 181 | 251 | 8 | 5 | 450 | 517 | 74 | 45 | 20 | 13 | 12 | 32 | 182 | 335 | 962 | 1,228 |
| 7:00 AM | 44 | 37 | 306 | 397 | 10 | 6 | 726 | 902 | 78 | 56 | 20 | 20 | 27 | 99 | 226 | 533 | 1,447 | 2,050 |
| 8:00 AM | 54 | 40 | 392 | 623 | 13 | 6 | 794 | 923 | 89 | 57 | 26 | 35 | 19 | 57 | 254 | 516 | 1,642 | 2,257 |
| 9:00 AM | 80 | 77 | 528 | 661 | 19 | 12 | 763 | 797 | 127 | 84 | 50 | 80 | 33 | 40 | 243 | 463 | 1,843 | 2,212 |
| 10:00 AM | 141 | 152 | 804 | 824 | 19 | 20 | 983 | 914 | 222 | 142 | 78 | 117 | 67 | 88 | 291 | 461 | 2,605 | 2,718 |
| 11:00 AM | 227 | 235 | 1,252 | 1,259 | 18 | 19 | 1,445 | 1,286 | 328 | 241 | 118 | 177 | 138 | 181 | 419 | 601 | 3,944 | 4,000 |
| 12:00 PM | 319 | 320 | 1,735 | 1,715 | 18 | 25 | 1,930 | 1,903 | 491 | 416 | 149 | 226 | 209 | 272 | 655 | 858 | 5,505 | 5,734 |
| 1:00 PM | 368 | 382 | 1,980 | 2,002 | 14 | 31 | 2,326 | 2,283 | 612 | 556 | 152 | 238 | 228 | 330 | 766 | 977 | 6,447 | 6,798 |
| 2:00 PM | 390 | 359 | 2,145 | 1,990 | 17 | 26 | 2,465 | 2,412 | 663 | 567 | 157 | 242 | 193 | 300 | 674 | 914 | 6,702 | 6,811 |
| 3:00 PM | 419 | 351 | 2,250 | 1,958 | 15 | 26 | 2,431 | 2,299 | 611 | 556 | 150 | 222 | 156 | 257 | 619 | 820 | 6,650 | 6,490 |
| 4:00 PM | 426 | 393 | 2,432 | 1,952 | 18 | 21 | 2,422 | 2,178 | 567 | 552 | 157 | 216 | 181 | 268 | 664 | 865 | 6,867 | 6,444 |
| 5:00 PM | 427 | 376 | 2,708 | 2,182 | 21 | 26 | 2,467 | 2,221 | 610 | 573 | 182 | 197 | 216 | 292 | 663 | 942 | 7,294 | 6,811 |
| 6:00 PM | 273 | 268 | 2,193 | 1,827 | 19 | 20 | 1,886 | 1,564 | 454 | 394 | 122 | 138 | 161 | 202 | 525 | 759 | 5,634 | 5,172 |
| 7:00 PM | 151 | 171 | 1,200 | 1,140 | 21 | 17 | 1,162 | 1,020 | 279 | 264 | 105 | 116 | 92 | 108 | 339 | 538 | 3,351 | 3,373 |
| 8:00 PM | 89 | 134 | 831 | 774 | 43 | 15 | 998 | 930 | 255 | 230 | 87 | 98 | 59 | 82 | 312 | 525 | 2,674 | 2,787 |
| 9:00 PM | 72 | 85 | 613 | 641 | 34 | 14 | 882 | 853 | 197 | 158 | 107 | 81 | 41 | 49 | 247 | 441 | 2,192 | 2,322 |
| 10:00 PM | 65 | 74 | 405 | 467 | 26 | 14 | 770 | 736 | 136 | 78 | 114 | 57 | 49 | 34 | 229 | 403 | 1,803 | 1,865 |
| 11:00 PM | 47 | 40 | 278 | 309 | 16 | 16 | 621 | 671 | 98 | 45 | 102 | 29 | 34 | 16 | 221 | 314 | 1,416 | 1,439 |
| District Sunday and Holiday Total Average | 3,781 | 3,646 | 22,851 | 21,948 | 376 | 336 | 27,516 | 26,807 | 6,180 | 5,152 | 1,947 | 2,341 | 1,938 | 2,767 | 8,517 | 12,769 | 73,107 | 75,374 |

Note: Data bars indicate magnitude of delay among districts (red and blue) and within the State (orange).

## Table A-10 (A).

## VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, STATEWIDE AND DISTRICT NON-HOLIDAY WEEKDAY AVERAGES, BY DISTRICT BY HOUR, 2011–2012

| District | 3 | | 4 | | 6 | | 7 | | 8 | | 10 | | 11 | | 12 | | Statewide Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hour | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| 12:00 AM | 77 | 82 | 297 | 321 | 37 | 51 | 799 | 881 | 130 | 163 | 89 | 83 | 34 | 46 | 283 | 375 | 1,745 | 2,000 |
| 1:00 AM | 120 | 141 | 363 | 404 | 64 | 97 | 1,059 | 1,149 | 211 | 253 | 137 | 124 | 45 | 62 | 318 | 419 | 2,317 | 2,650 |
| 2:00 AM | 135 | 174 | 402 | 456 | 78 | 114 | 1,105 | 1,208 | 255 | 294 | 168 | 153 | 54 | 75 | 322 | 429 | 2,519 | 2,903 |
| 3:00 AM | 166 | 217 | 505 | 582 | 91 | 134 | 1,243 | 1,373 | 322 | 372 | 220 | 204 | 74 | 107 | 351 | 434 | 2,971 | 3,423 |
| 4:00 AM | 220 | 277 | 742 | 858 | 102 | 168 | 1,601 | 1,846 | 468 | 527 | 289 | 298 | 109 | 181 | 431 | 569 | 3,963 | 4,722 |
| 5:00 AM | 318 | 378 | 1,435 | 1,732 | 118 | 226 | 2,799 | 3,633 | 1,334 | 1,342 | 567 | 564 | 193 | 346 | 664 | 1,133 | 7,429 | 9,355 |
| 6:00 AM | 561 | 599 | 4,572 | 5,919 | 145 | 282 | 11,425 | 13,729 | 2,554 | 2,310 | 631 | 600 | 1,080 | 1,240 | 2,258 | 2,764 | 23,225 | 27,442 |
| 7:00 AM | 1,744 | 1,854 | 13,797 | 15,498 | 246 | 431 | 27,864 | 30,121 | 3,763 | 3,585 | 648 | 756 | 4,667 | 4,942 | 7,716 | 8,163 | 60,446 | 65,351 |
| 8:00 AM | 2,095 | 2,131 | 20,063 | 21,199 | 217 | 390 | 30,871 | 32,504 | 2,948 | 3,006 | 784 | 889 | 4,584 | 4,851 | 8,441 | 8,871 | 70,002 | 73,842 |
| 9:00 AM | 1,131 | 1,171 | 13,743 | 14,754 | 188 | 343 | 19,669 | 20,798 | 1,908 | 1,926 | 1,014 | 1,042 | 1,582 | 1,676 | 3,946 | 4,222 | 43,182 | 45,934 |
| 10:00 AM | 1,111 | 1,100 | 8,954 | 9,578 | 210 | 359 | 12,908 | 14,020 | 1,812 | 1,765 | 1,218 | 1,202 | 1,083 | 1,191 | 2,458 | 2,751 | 29,754 | 31,965 |
| 11:00 AM | 1,188 | 1,167 | 8,026 | 8,164 | 229 | 386 | 10,753 | 11,609 | 1,878 | 1,858 | 1,340 | 1,316 | 1,165 | 1,303 | 2,305 | 2,671 | 26,884 | 28,474 |
| 12:00 PM | 1,274 | 1,235 | 7,972 | 7,904 | 245 | 415 | 10,391 | 11,104 | 2,102 | 2,053 | 1,348 | 1,335 | 1,239 | 1,405 | 2,453 | 2,790 | 27,024 | 28,241 |
| 1:00 PM | 1,367 | 1,309 | 7,696 | 7,598 | 259 | 444 | 10,852 | 11,637 | 2,361 | 2,355 | 1,341 | 1,323 | 1,287 | 1,469 | 2,607 | 2,901 | 27,769 | 29,037 |
| 2:00 PM | 1,580 | 1,480 | 8,685 | 8,939 | 287 | 506 | 14,904 | 16,131 | 3,003 | 3,175 | 1,302 | 1,373 | 1,570 | 1,777 | 3,704 | 3,935 | 35,036 | 37,314 |
| 3:00 PM | 2,130 | 1,900 | 11,987 | 13,378 | 319 | 607 | 24,881 | 27,015 | 4,406 | 4,708 | 1,341 | 1,471 | 3,208 | 3,660 | 6,303 | 6,426 | 54,575 | 59,165 |
| 4:00 PM | 3,153 | 2,881 | 17,778 | 20,017 | 359 | 665 | 33,496 | 36,073 | 5,669 | 5,882 | 1,359 | 1,520 | 6,436 | 7,381 | 9,714 | 10,104 | 77,965 | 84,522 |
| 5:00 PM | 4,238 | 4,053 | 25,797 | 27,622 | 468 | 712 | 41,321 | 44,005 | 6,832 | 6,909 | 1,167 | 1,429 | 8,602 | 9,670 | 13,988 | 15,012 | 102,414 | 109,411 |
| 6:00 PM | 1,657 | 1,621 | 18,323 | 19,754 | 203 | 369 | 30,778 | 32,520 | 3,498 | 3,634 | 543 | 761 | 3,380 | 3,733 | 8,446 | 9,295 | 66,828 | 71,687 |
| 7:00 PM | 611 | 608 | 5,320 | 6,014 | 152 | 271 | 11,794 | 12,416 | 1,171 | 1,391 | 359 | 478 | 532 | 560 | 2,078 | 2,532 | 22,017 | 24,270 |
| 8:00 PM | 403 | 438 | 1,715 | 1,919 | 154 | 238 | 3,912 | 4,260 | 675 | 843 | 294 | 375 | 219 | 275 | 754 | 1,035 | 8,126 | 9,382 |
| 9:00 PM | 351 | 369 | 1,193 | 1,361 | 152 | 214 | 2,513 | 2,706 | 526 | 646 | 268 | 353 | 201 | 225 | 593 | 835 | 5,796 | 6,708 |
| 10:00 PM | 280 | 300 | 940 | 1,136 | 129 | 177 | 2,181 | 2,473 | 460 | 545 | 238 | 318 | 156 | 193 | 551 | 756 | 4,936 | 5,899 |
| 11:00 PM | 219 | 236 | 715 | 865 | 91 | 144 | 1,744 | 2,072 | 333 | 398 | 194 | 237 | 94 | 142 | 462 | 637 | 3,851 | 4,730 |
| District Daily Average | 26,130 | 25,723 | 181,017 | 195,972 | 4,543 | 7,742 | 310,862 | 335,283 | 48,622 | 49,939 | 16,860 | 18,203 | 41,596 | 46,510 | 81,144 | 89,056 | 710,773 | 768,427 |

Note: Data bars indicate magnitude of delay among districts (red and blue) and within the State (orange).

## Table A-10 (B).

## VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, STATEWIDE AND DISTRICT SATURDAY AVERAGES, BY DISTRICT BY HOUR, 2011–2012

| District | 3 | | 4 | | 6 | | 7 | | 8 | | 10 | | 11 | | 12 | | Statewide Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hour | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| 12:00 AM | 86 | 91 | 324 | 361 | 28 | 40 | 916 | 1,121 | 126 | 166 | 37 | 83 | 29 | 48 | 312 | 449 | 1,858 | 2,359 |
| 1:00 AM | 114 | 118 | 309 | 368 | 35 | 67 | 950 | 996 | 140 | 184 | 48 | 74 | 30 | 55 | 307 | 429 | 1,933 | 2,290 |
| 2:00 AM | 103 | 121 | 279 | 349 | 41 | 70 | 902 | 891 | 125 | 165 | 55 | 75 | 30 | 55 | 287 | 393 | 1,821 | 2,119 |
| 3:00 AM | 101 | 136 | 261 | 324 | 42 | 70 | 828 | 838 | 123 | 158 | 72 | 83 | 31 | 58 | 266 | 388 | 1,723 | 2,055 |
| 4:00 AM | 122 | 157 | 292 | 359 | 44 | 83 | 904 | 991 | 149 | 195 | 92 | 104 | 38 | 70 | 288 | 432 | 1,929 | 2,391 |
| 5:00 AM | 153 | 177 | 415 | 505 | 54 | 106 | 1,126 | 1,251 | 205 | 255 | 114 | 145 | 51 | 111 | 343 | 517 | 2,460 | 3,066 |
| 6:00 AM | 197 | 217 | 653 | 784 | 63 | 118 | 1,429 | 1,603 | 275 | 320 | 132 | 166 | 79 | 156 | 397 | 592 | 3,223 | 3,957 |
| 7:00 AM | 290 | 306 | 1,051 | 1,237 | 80 | 139 | 1,935 | 2,147 | 357 | 407 | 145 | 192 | 123 | 201 | 486 | 767 | 4,469 | 5,397 |
| 8:00 AM | 452 | 439 | 1,774 | 1,997 | 156 | 172 | 2,515 | 2,878 | 469 | 521 | 187 | 270 | 196 | 270 | 638 | 1,096 | 6,387 | 7,642 |
| 9:00 AM | 662 | 653 | 2,799 | 3,029 | 246 | 205 | 3,519 | 4,238 | 713 | 717 | 249 | 406 | 310 | 375 | 925 | 1,520 | 9,423 | 11,143 |
| 10:00 AM | 953 | 952 | 4,007 | 4,334 | 159 | 237 | 5,188 | 6,282 | 954 | 970 | 328 | 539 | 553 | 693 | 1,403 | 2,032 | 13,543 | 16,039 |
| 11:00 AM | 1,198 | 1,145 | 5,523 | 5,916 | 148 | 262 | 7,399 | 8,883 | 1,278 | 1,306 | 406 | 641 | 941 | 1,208 | 2,265 | 3,163 | 19,159 | 22,522 |
| 12:00 PM | 1,323 | 1,179 | 6,770 | 7,138 | 201 | 273 | 10,041 | 11,546 | 1,597 | 1,717 | 418 | 681 | 1,341 | 1,630 | 3,130 | 3,910 | 24,821 | 28,074 |
| 1:00 PM | 1,340 | 1,232 | 6,956 | 7,356 | 352 | 268 | 11,261 | 12,618 | 1,657 | 1,904 | 407 | 667 | 1,357 | 1,778 | 3,252 | 3,897 | 26,582 | 29,720 |
| 2:00 PM | 1,303 | 1,220 | 6,704 | 7,291 | 293 | 268 | 11,307 | 12,671 | 1,751 | 2,150 | 400 | 633 | 1,103 | 1,611 | 3,005 | 3,711 | 25,866 | 29,554 |
| 3:00 PM | 1,228 | 1,121 | 7,096 | 8,361 | 155 | 271 | 11,361 | 12,507 | 1,675 | 2,264 | 376 | 575 | 961 | 1,370 | 2,681 | 3,380 | 25,533 | 29,849 |
| 4:00 PM | 1,152 | 1,042 | 7,078 | 8,069 | 119 | 238 | 11,893 | 12,848 | 1,786 | 2,246 | 335 | 553 | 893 | 1,130 | 2,736 | 3,311 | 25,992 | 29,438 |
| 5:00 PM | 1,038 | 932 | 6,901 | 7,088 | 98 | 218 | 13,151 | 13,844 | 1,828 | 2,037 | 342 | 512 | 760 | 945 | 2,727 | 3,115 | 26,846 | 28,691 |
| 6:00 PM | 718 | 664 | 5,634 | 5,435 | 78 | 174 | 10,894 | 11,242 | 1,312 | 1,336 | 312 | 420 | 426 | 538 | 1,975 | 2,244 | 21,348 | 22,054 |
| 7:00 PM | 433 | 410 | 2,989 | 3,042 | 59 | 145 | 5,842 | 6,261 | 628 | 706 | 189 | 309 | 199 | 259 | 960 | 1,173 | 11,298 | 12,304 |
| 8:00 PM | 323 | 323 | 1,592 | 1,765 | 50 | 118 | 2,676 | 3,104 | 373 | 467 | 154 | 248 | 138 | 207 | 612 | 830 | 5,917 | 7,062 |
| 9:00 PM | 277 | 288 | 1,289 | 1,553 | 46 | 102 | 2,001 | 2,412 | 322 | 400 | 132 | 207 | 104 | 199 | 568 | 789 | 4,739 | 5,951 |
| 10:00 PM | 221 | 237 | 1,119 | 1,414 | 41 | 90 | 2,357 | 2,529 | 312 | 350 | 103 | 166 | 90 | 162 | 591 | 797 | 4,833 | 5,744 |
| 11:00 PM | 168 | 178 | 801 | 1,117 | 36 | 70 | 1,987 | 2,199 | 274 | 296 | 84 | 118 | 58 | 112 | 535 | 737 | 3,943 | 4,826 |
| District Saturday Average | 13,955 | 13,339 | 72,616 | 79,189 | 2,622 | 3,805 | 122,382 | 135,899 | 18,426 | 21,236 | 5,116 | 7,865 | 9,839 | 13,241 | 30,688 | 39,672 | 275,644 | 314,245 |

Note: Data bars indicate magnitude of delay among districts (red and blue) and within the State (orange).

## Table A-10 (C).

## VEHICLE HOURS OF DELAY AT 60 MILES PER HOUR, STATEWIDE AND DISTRICT SUNDAY AND HOLIDAY AVERAGES, BY DISTRICT BY HOUR, 2011–2012

| District | 3 | | 4 | | 6 | | 7 | | 8 | | 10 | | 11 | | 12 | | Statewide Hourly Total Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hour | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| 12:00 AM | 70 | 62 | 342 | 387 | 22 | 28 | 894 | 1,052 | 145 | 145 | 32 | 32 | 22 | 34 | 355 | 471 | 1,881 | 2,211 |
| 1:00 AM | 88 | 81 | 325 | 406 | 26 | 40 | 830 | 880 | 138 | 138 | 37 | 38 | 23 | 45 | 353 | 465 | 1,821 | 2,093 |
| 2:00 AM | 87 | 90 | 295 | 395 | 26 | 41 | 746 | 752 | 124 | 114 | 40 | 40 | 22 | 45 | 324 | 402 | 1,638 | 1,848 |
| 3:00 AM | 81 | 98 | 277 | 357 | 27 | 40 | 627 | 577 | 110 | 107 | 45 | 42 | 18 | 41 | 279 | 363 | 1,463 | 1,625 |
| 4:00 AM | 92 | 114 | 295 | 377 | 28 | 46 | 591 | 590 | 120 | 126 | 56 | 56 | 25 | 51 | 275 | 376 | 1,480 | 1,735 |
| 5:00 AM | 110 | 132 | 369 | 480 | 34 | 60 | 730 | 802 | 167 | 191 | 81 | 83 | 39 | 81 | 322 | 489 | 1,851 | 2,319 |
| 6:00 AM | 143 | 161 | 580 | 723 | 43 | 74 | 1,137 | 1,418 | 224 | 234 | 105 | 109 | 72 | 157 | 425 | 665 | 2,731 | 3,541 |
| 7:00 AM | 188 | 216 | 891 | 1,108 | 50 | 90 | 1,778 | 2,344 | 262 | 287 | 127 | 151 | 122 | 311 | 571 | 1,018 | 3,989 | 5,525 |
| 8:00 AM | 242 | 272 | 1,179 | 1,664 | 59 | 106 | 1,992 | 2,467 | 319 | 333 | 170 | 221 | 135 | 260 | 638 | 1,018 | 4,735 | 6,340 |
| 9:00 AM | 342 | 390 | 1,496 | 1,803 | 78 | 137 | 1,986 | 2,298 | 434 | 432 | 249 | 354 | 188 | 283 | 669 | 1,013 | 5,442 | 6,708 |
| 10:00 AM | 510 | 579 | 2,075 | 2,208 | 88 | 175 | 2,502 | 2,674 | 636 | 596 | 333 | 471 | 303 | 430 | 835 | 1,131 | 7,280 | 8,263 |
| 11:00 AM | 709 | 767 | 2,913 | 3,047 | 94 | 183 | 3,482 | 3,588 | 895 | 841 | 428 | 595 | 477 | 659 | 1,113 | 1,448 | 10,110 | 11,128 |
| 12:00 PM | 884 | 934 | 3,734 | 3,854 | 100 | 214 | 4,634 | 4,913 | 1,223 | 1,177 | 488 | 689 | 670 | 913 | 1,504 | 1,850 | 13,236 | 14,545 |
| 1:00 PM | 991 | 1,036 | 4,165 | 4,305 | 97 | 230 | 5,728 | 5,994 | 1,482 | 1,457 | 494 | 708 | 698 | 1,026 | 1,675 | 2,010 | 15,330 | 16,766 |
| 2:00 PM | 1,038 | 1,006 | 4,459 | 4,363 | 100 | 225 | 6,399 | 6,557 | 1,563 | 1,497 | 488 | 698 | 620 | 963 | 1,557 | 1,940 | 16,224 | 17,249 |
| 3:00 PM | 1,072 | 987 | 4,601 | 4,356 | 103 | 231 | 6,466 | 6,546 | 1,540 | 1,462 | 463 | 658 | 554 | 872 | 1,484 | 1,859 | 16,283 | 16,971 |
| 4:00 PM | 1,062 | 1,025 | 4,894 | 4,458 | 112 | 224 | 6,360 | 6,296 | 1,491 | 1,446 | 454 | 636 | 591 | 878 | 1,600 | 1,973 | 16,564 | 16,936 |
| 5:00 PM | 1,031 | 976 | 5,451 | 4,952 | 119 | 233 | 6,471 | 6,358 | 1,571 | 1,551 | 461 | 601 | 669 | 894 | 1,600 | 2,111 | 17,373 | 17,676 |
| 6:00 PM | 732 | 731 | 4,481 | 4,035 | 109 | 206 | 4,835 | 4,649 | 1,232 | 1,145 | 364 | 472 | 497 | 654 | 1,247 | 1,645 | 13,497 | 13,538 |
| 7:00 PM | 492 | 531 | 2,659 | 2,610 | 101 | 178 | 2,968 | 2,967 | 853 | 864 | 327 | 407 | 329 | 444 | 888 | 1,224 | 8,618 | 9,225 |
| 8:00 PM | 350 | 431 | 1,908 | 1,906 | 118 | 158 | 2,521 | 2,677 | 752 | 782 | 284 | 341 | 236 | 351 | 793 | 1,145 | 6,961 | 7,792 |
| 9:00 PM | 279 | 330 | 1,433 | 1,514 | 106 | 138 | 2,206 | 2,426 | 582 | 588 | 274 | 276 | 186 | 249 | 636 | 945 | 5,702 | 6,465 |
| 10:00 PM | 229 | 271 | 985 | 1,092 | 93 | 119 | 1,844 | 2,017 | 425 | 392 | 264 | 210 | 160 | 167 | 574 | 802 | 4,574 | 5,071 |
| 11:00 PM | 174 | 191 | 721 | 765 | 71 | 100 | 1,442 | 1,667 | 334 | 292 | 238 | 156 | 109 | 101 | 485 | 600 | 3,574 | 3,872 |
| District Sunday and Holiday Total Average | 10,995 | 11,408 | 50,521 | 51,159 | 1,806 | 3,275 | 69,157 | 72,499 | 16,620 | 16,194 | 6,298 | 8,043 | 6,766 | 9,908 | 20,195 | 26,956 | 182,359 | 199,442 |

Note: Data bars indicate magnitude of delay among districts (red and blue) and within the State (orange).

## Table A-11. VEHICLE HOURS OF DELAY (VHD) AT 60 MILES PER HOUR (MPH), STATEWIDE TOTAL, PERCENT OF DISTRICT TOTALS, AND ABSOLUTE AND PERCENT CHANGE, BY DISTRICT BY COUNTY, 2011–2012

| | | 2011 | 2012 |
|---|---|---|---|
| District | County | VHD at 60 mph | VHD at 60 mph |
| 3 | Butte | 3,213 | 5,307 |
| | El Dorado | 247,159 | 254,511 |
| | Nevada | 117,917 | 213,378 |
| | Placer | 584,709 | 1,045,575 |
| | Sacramento | 5,974,728 | 5,453,796 |
| | Sierra | 1,626 | 5,745 |
| | Sutter | 29,960 | 43,269 |
| | Yolo | 953,400 | 803,992 |
| | Yuba | 56,115 | 43,331 |
| **District 3 Subtotal** | | **7,968,827** | **7,868,904** |
| 4 | Alameda | 18,275,702 | 21,739,175 |
| | Contra Costa | 6,942,316 | 6,208,489 |
| | Marin | 2,013,578 | 1,946,995 |
| | Napa | 116,046 | 113,210 |
| | San Francisco | 3,459,596 | 3,345,840 |
| | San Mateo | 4,887,858 | 5,213,049 |
| | Santa Clara | 10,959,660 | 11,911,645 |
| | Solano | 3,643,402 | 3,070,166 |
| | Sonoma | 2,067,628 | 2,981,209 |
| **District 4 Subtotal** | | **52,365,786** | **56,529,777** |
| 6 | Fresno | 640,815 | 694,989 |
| | Kern | 359,963 | 1,071,684 |
| | Madera | 253,225 | 562,018 |
| | Tulare | 135,441 | 18,620 |
| **District 6 Subtotal** | | **1,389,443** | **2,347,312** |
| 7 | Los Angeles | 86,542,431 | 93,045,292 |
| | Ventura | 2,188,708 | 2,744,969 |
| **District 7 Subtotal** | | **88,731,140** | **95,790,260** |
| 8 | Riverside | 8,288,842 | 8,545,592 |
| | San Bernardino | 5,905,610 | 6,113,495 |
| **District 8 Subtotal** | | **14,194,452** | **14,659,087** |
| 10 | Amador | 78,730 | 231,478 |
| | Calaveras | 2,246 | 2,472 |
| | Mariposa | 84,561 | 376,006 |
| | Merced | 628,117 | 865,727 |
| | San Joaquin | 3,241,959 | 3,114,685 |
| | Stanislaus | 756,222 | 735,255 |
| | Tuolumne | 95,408 | 158,992 |
| **District 10 Subtotal** | | **4,887,243** | **5,484,615** |
| 11 | San Diego | 11,374,725 | 12,986,810 |
| **District 11 Subtotal** | | **11,374,725** | **12,986,810** |
| 12 | Orange | 23,225,524 | 26,114,149 |
| **District 12 Subtotal** | | **23,225,524** | **26,114,149** |
| **Statewide Total** | | **204,137,139** | **221,780,914** |

**Table A-12. EQUIVALENT LOST LANE-MILES AT 35 MILES PER HOUR, NON-HOLIDAY WEEKDAY AVERAGE, BY DISTRICT BY TIME PERIOD, 2011–2012**

| District | Year | AM Peak | Off-Peak Day | PM Peak | Off-Peak Night | District Daily Total Average |
|---|---|---|---|---|---|---|
| 3 | 2011 | 6.5 | 6.8 | 17.6 | 5.1 | 36.0 |
| | 2012 | 7.5 | 5.6 | 15.4 | 7.9 | 36.3 |
| 4 | 2011 | 70.8 | 30.9 | 122.5 | 9.7 | 233.8 |
| | 2012 | 84.1 | 34.3 | 148.7 | 13.0 | 280.1 |
| 6 | 2011 | 0.3 | 0.3 | 0.9 | 1.4 | 2.9 |
| | 2012 | 0.9 | 1.0 | 3.8 | 5.2 | 10.9 |
| 7 | 2011 | 144.8 | 58.1 | 235.1 | 21.3 | 459.3 |
| | 2012 | 152.8 | 57.7 | 257.6 | 20.0 | 488.1 |
| 8 | 2011 | 16.1 | 8.0 | 30.3 | 2.9 | 57.2 |
| | 2012 | 16.1 | 8.1 | 30.3 | 3.9 | 58.4 |
| 10 | 2011 | 19.7 | 28.3 | 27.0 | 13.9 | 88.9 |
| | 2012 | 45.3 | 63.0 | 62.5 | 29.7 | 200.5 |
| 11 | 2011 | 20.1 | 4.0 | 34.4 | 2.0 | 60.5 |
| | 2012 | 19.1 | 4.9 | 40.6 | 1.8 | 66.4 |
| 12 | 2011 | 37.5 | 12.4 | 65.4 | 8.4 | 123.7 |
| | 2012 | 19.1 | 4.9 | 40.6 | 1.8 | 66.4 |
| **Statewide Daily Average** | **2011** | **315.8** | **148.8** | **533.2** | **64.6** | **1,062.3** |
| **Statewide Daily Average** | **2012** | **345.0** | **179.4** | **599.6** | **83.2** | **1,207.1** |

## Table A-13. DETECTOR HEALTH, BY DISTRICT BY QUARTER, 2011–2012

| | Quarter | 1 | | 2 | | 3 | | 4 | | Quarterly Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| District | Year | Sum of Good | Sum of Bad | Sum of Good | Sum of Bad | Sum of Good | Sum of Bad | Sum of Good | Sum of Bad | Good | Bad |
| | 2011 | 1,699 | 595 | 1,667 | 651 | 1,597 | 768 | 1,584 | 834 | **1,636** | **713** |
| **3** | 2012 | 1,641 | 826 | 1,710 | 787 | 1,604 | 958 | 1,770 | 839 | **1,681** | **853** |
| | 2011 | 4,110 | 2,473 | 3,886 | 2,697 | 3,359 | 3,833 | 3,679 | 3,622 | **3,756** | **3,161** |
| **4** | 2012 | 3,724 | 3,577 | 3,643 | 3,877 | 3,533 | 4,044 | 3,763 | 3,911 | **3,666** | **3,853** |
| | 2011 | 532 | 114 | 561 | 85 | 555 | 91 | 570 | 76 | **555** | **91** |
| **6** | 2012 | 576 | 104 | 607 | 101 | 590 | 124 | 557 | 157 | **583** | **122** |
| | 2011 | 5,994 | 3,909 | 6,189 | 3,891 | 6,231 | 4,021 | 6,560 | 3,849 | **6,245** | **3,917** |
| **7** | 2012 | 6,803 | 3,627 | 6,760 | 3,717 | 6,742 | 3,762 | 6,908 | 3,646 | **6,803** | **3,688** |
| | 2011 | 2,486 | 625 | 2,282 | 829 | 2,201 | 910 | 2,293 | 962 | **2,315** | **833** |
| **8** | 2012 | 2,170 | 1,188 | 2,297 | 1,128 | 2,055 | 1,476 | 2,055 | 2,272 | **2,144** | **1,518** |
| | 2011 | 833 | 38 | 988 | 34 | 1,024 | 48 | 1,093 | 114 | **985** | **59** |
| **10** | 2012 | 1,244 | 90 | 1,219 | 125 | 1,235 | 135 | 1,212 | 171 | **1,227** | **130** |
| | 2011 | 3,231 | 395 | 3,363 | 365 | 3,351 | 398 | 3,179 | 604 | **3,281** | **441** |
| **11** | 2012 | 2,926 | 852 | 3,104 | 674 | 3,343 | 512 | 3,482 | 368 | **3,215** | **601** |
| | 2011 | 4,165 | 1,119 | 3,976 | 1,308 | 4,016 | 1,268 | 3,890 | 1,394 | **4,011** | **1,273** |
| **12** | 2012 | 3,635 | 1,649 | 3,684 | 1,600 | 3,714 | 1,597 | 3,780 | 1,622 | **3,704** | **1,617** |
| **Statewide Daily Average** | **2011** | **23,050** | **9,266** | **22,912** | **9,860** | **22,335** | **11,336** | **22,847** | **11,455** | **22,784** | **10,488** |
| **Statewide Daily Average** | **2012** | **22,719** | **11,913** | **23,024** | **12,008** | **22,817** | **12,608** | **23,527** | **12,987** | **23,022** | **12,381** |

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# APPENDIX B
# METHODOLOGY

In 2012, Caltrans used a standardized statewide methodology for measuring freeway traffic congestion using automatically collected traffic data from vehicle detector stations (VDS). Caltrans collects data from VDS on major freeway corridors throughout California's major urban areas. VDS collects traffic data over all lanes, 24 hours a day, 365 days a year.

Traffic activates the VDS devices embedded in or placed alongside freeways. Communication equipment transmits occupancy (occupancy means the amount of time a vehicle is physically above a detection device) and volume data from the roadside controllers to the regional Transportation Management Centers (TMCs) every 30 seconds. The data is then sent to the Caltrans PeMS, which runs diagnostics on the data and stores the data in five minute bins. The stored data is used by engineers, planners, designers, consultants, commercial navigation firms, traffic media companies, and others interested in traffic conditions and performance. The data can be analyzed to calculate a number of performance measures.

Automated detection reduces data collection costs, improves self-reliance for congestion monitoring, allows a statewide standardized methodology for measuring traffic performance, and establishes a reliable trend line for future monitoring. However, until Caltrans has full (100 percent) detection coverage on its congested urban freeways, using VDS data presents two challenges: (1) congestion will not be reported for the small percentage (currently less than 10 percent) of congested freeway locations without VDS, and (2) when new VDS are activated, data will be reported for new locations and this expansion of coverage will distort trends over time.

The following pages in Appendix B present information on the calculations used in this report.

## Calculating Vehicle Miles of Travel

For a given unit of time and a given section of the freeway, VMT is the sum of the miles of freeway driven by each vehicle. For a section of fixed length, L, the number of freeway miles driven is the flow for a period of time multiplied by the length (L). In this report, VMT is calculated by summing the flow for all the lengths of all of the VDS deployed in each district, all time periods within calendar year 2011 and 2012.

## Calculating Delay

The MPR 2012 uses the following calculation, computed in PeMS using the VDS data, to determine the vehicle hours of delay (VHD):

Delay = actual volume x [(length ÷ actual speed) – (length ÷ threshold speed)]

This calculation is the equivalent of:

Actual volume x [Travel Time at actual speed – Travel Time at threshold speed]

The actual volume (the number of vehicles in each lane) is known because Caltrans' VDS provides vehicle counts. The summation is over all five minute periods where the average travel time is greater than the threshold travel time as derived from speed. Length refers to the freeway segment assigned to a particular VDS (determined by the distance to the neighboring upstream and downstream VDS). This methodology is standardized across all districts, promoting consistency and equity.

Delay is expressed in the units of VHD. Two threshold speeds are used in this report: 35 mph, representing severe congestion, and 60 mph, presenting total congestion. VHD at 35 mph is a subset of the VHD at 60 mph. VHD at 35 mph represents the delay experienced by vehicles traveling between zero and 35 mph. VHD at 60 mph represents the delay experienced by vehicles traveling between zero and 60 mph.

**Calculating Cost of Congestion**

Cost of lost time = total delay x $18.00, representing the cost of an hour of a traveler's time. This figure represents the opportunity cost of travel time in terms of wages and salaries. An average vehicle occupancy of 1.30 is assumed in the $18.00 cost figure, as is a nine percent truck volume and a four percent real discount rate. This figure comes from the Caltrans Division of Transportation Planning, Office of State Planning, Economic Analysis Branch.

Cost of lost time a day = cost of lost time (see above) ÷ 365. This figure thus represents the average for all days of the year, not just weekdays.

Wasted fuel (gallons) = total delay in VHD x 1.719 gallons for each vehicle hour of delay. This formula has been used in the HICOMP Annual Date Compilation since the 1990s.

Cost of extra fuel = wasted fuel (gallons) x $4.09 a gallon. This figure is based on the weighted average of gasoline and diesel provided by the Caltrans Economic Analysis Branch.

Emissions of $CO_2$ in tons (metric) = wasted fuel (gallons) x 8,887 grams of $CO_2$ produced for each gallon of burned gasoline ÷ 1,000,000 grams in a metric ton. California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C) base cost for $CO_2$ was $23 for 2012 and price was adjusted according to the GDP Deflator.

GDP Deflator is based on the Office of Management and Budget Table 10.1:

https://www.whitehouse.gov/omb/budget/Historicals

Reference to Cal-B/C $CO_2$ cost can be found here on p. III-75:

http://www.dot.ca.gov/hq/tpp/offices/eab/benefit_files/CalBC_Tech_Supplement_Vol3.pdf

## Calculating Lost Productivity

PeMS calculates the number of lane-mile-hours on a freeway that are lost due to operating under congested conditions instead of under free-flow conditions. When a freeway is congested (i.e., when speeds are below the 35 mph threshold used in this report for calculating Lost Productivity), PeMS calculates the ratio between the measured flow and the maximum sustainable capacity for the location. This drop in capacity is observed when the freeway is operating in congested conditions instead of in free-flow, and fewer vehicles can pass a given point in a given time period because speeds have dropped. PeMS then multiplies one minus this ratio by the length of the segment to determine the number of equivalent lane-miles-hours of freeway that this represents. To determine the maximum sustainable capacity at a given location, historical measured data for each location are analyzed to determine the maximum observed 15 minute flow. The minimum five-minute flow within that maximum 15 minute flow is used as the maximum sustainable flow, or maximum sustainable capacity.

In this report, the equivalent lost lane-mile-hours for each defined time period (a.m. peak, p.m. peak, etc.) is calculated using PeMS. These lost lane-mile-hours are divided by the number of hours within the period (e.g., the a.m. peak, from 6:00 a.m. to 10:00 a.m. has four hours) to calculate lost lane miles (LLM).

## Determining Bottleneck Locations

This report uses the Bottleneck Identification Algorithm in PeMS as a starting point for determining bottleneck locations. PeMS uses the following criteria in calculating bottlenecks:

- There must be a drop in speed of at least 20 mph between the current detector and its nearest downstream detector.
- The speed at the current detector must be less than 40 mph.
- The space between detectors must be less than three miles apart.
- The speed drop must persist for at least five out of any seven contiguous five–minute data points.

PeMS reports the amount of delay, expressed in VHD, associated with each bottleneck, as well as the average extent (or queue length) of the bottleneck and the average duration that the bottleneck persists, in minutes. It also reports on the number of days in the given period that the bottleneck was active. A bottleneck is active when it meets all of the criteria listed above.

From the initial list generated by PeMS, the results were filtered to report bottlenecks that met the following additional criteria:

- The bottleneck must be active at least 20 percent of all weekdays within the period, (251 days in 2012.)
- The bottleneck must cause at least 100 VHD per weekday.
- The bottleneck must persist for at least 15 minutes per weekday.

Some districts did not have 10 bottlenecks that met this additional criteria within either the a.m. or p.m. peak periods.

When mapping the bottlenecks, the average extent of each bottleneck, as calculated by PeMS, was used to show the freeway segments that are congested when the bottlenecks are active.

In listing their bottlenecks, each district used their local knowledge and engineering judgment to modify locations of bottlenecks as deemed appropriate. PeMS calculates bottlenecks based on the location of detector stations, but the true cause of the bottleneck may exist somewhere between two detector stations.

# APPENDIX C
# GLOSSARY

**Absolute Postmile:**

The true measure of linear distance, in miles, from the beginning of a route to its terminus. Postmiles are measured from south to north on odd numbered routes and from west to east on even numbered routes. PeMS uses Absolute Postmiles to calculate many of the performance measures, like vehicle miles of travel and vehicle hours of delay, which require knowing the length of the route in order to compute them. The Absolute Postmile does not reset to zero at each county line, as does the County-Route-Postmile system that Caltrans uses as its standard mileage measurement system.

**Bottleneck:**

A bottleneck is a persistent drop in speed between two locations on a freeway. A bottleneck can have a number of causes, including a change in capacity (like a reduction of the number of lanes), a visual distraction, an incident, a weaving section, etc.

**Caltrans Performance Measurement System (PeMS):**

A traffic data collection, processing, and analysis tool for assessing the performance of the transportation system. PeMS obtains 30-second detector count and occupancy data from Caltrans detectors in real-time from the district Transportation Management Centers (TMCs). PeMS can be accessed at <http://pems.dot.ca.gov>.

**County-Route-Postmile:**

California uses a postmile system on all of its State highways, including U.S. Routes and Interstate Highways. The postmile markers indicate the distance a route travels through individual counties. In general, even-numbered routes are measured from west to east and odd-numbered routes are measured from south to north. The postmiles begin at zero at each county line; therefore, it is necessary to include the county with the postmile to understand its location. If a route alignment changes, prefixes and equations are used so that not all of the postmiles from the realignment point to the end of the route need to be recalculated. Because of this system, it is necessary to understand what the prefixes mean–and what the equations are behind them–to understand the true linear distance of the route. PeMS refers to the county-route postmile as the California Postmile.

**Directional Mile:**

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

**Floating Vehicle or Probe Vehicle:**

A vehicle equipped with either a fixed transmission sensor mounted in the engine compartment or a global positioning system device. Computer software is used to identify the freeway, direction of travel, and average speed of the vehicle–data that can be used to

calculate travel time. Caltrans often refers to collecting data using one of these vehicles as doing a Tachometer or "tach" run.

**Highway Congestion Monitoring Program (HICOMP):**

The MPR replaces the HICOMP Annual Data Compilation as the report that satisfies Caltrans' statutory obligation to report congestion data, as described in Government Code section 14032.6.

**Nonrecurrent Congestion:**

Congestion caused by events that occur irregularly, such as accidents, sporting events, maintenance, or construction.

**Occupancy:**

In this report, when "occupancy" is mentioned as a data element collected by VDS, occupancy means the amount of time a vehicle is physically above a detection device (usually an in-ground loop). Occupancy is used to derive the speed of traffic. A secondary usage is in terms of "vehicle occupancy" and refers to the number of people traveling in a vehicle. This secondary usage is not used in this report.

**Maximum Sustainable Flow:**

Refers to the capacity of a roadway and is the maximum number of vehicles that can reasonably be expected to traverse it during a specified time period under given roadway, geometric, traffic, environmental, and controlled conditions. It is used in the calculation of lost productivity. PeMS estimates the capacity for each station as the maximum five–minute sustainable flow over 15 minutes. To compute this value, a few weeks of weekday, peak period (both a.m. and p.m.), five-minute observed flow data aggregated across all lanes are used to find the maximum for any 15-minute period. Then, the minimum five-minute flow of that 15-minute maximum is used. Only values that have more than 50 percent "good" detector health are used. The resulting value is the maximum sustainable flow, or the capacity, of that location.

**Recurrent Congestion:**

Congestion caused by traffic demand exceeding roadway capacity, regularly resulting in delay during peak periods.

**Travel Time:**

The time, typically expressed in minutes, that it takes to go from one end of a defined corridor to the other.

**Vehicle Detector Station (VDS):**

A VDS is a logical grouping of automated detectors, usually referring to a set of detectors spanning a freeway at a particular location in one direction.

**Vehicle Hours of Delay (VHD):**

The metric used to express the amount of additional time caused by congestion that vehicles spend on a section of road. This is the difference between the travel time at a threshold speed and the current speed (only calculated when the current speed is below the threshold speed). A threshold speed must be set to determine the VHD. In this report, 35 mph and 60 mph are the threshold speeds and delay is expressed as both total delay and average delay over a given time period.

**Vehicle Miles of Travel (VMT):**

The metric used to express the total miles that are driven in a certain area. PeMS takes the number of cars that drove over a detector during a period (flow) and multiplies it by the segment length. It then does that for each detector in a given area, such as a district, facility, or the entire State, and adds the miles up to get the total VMT.

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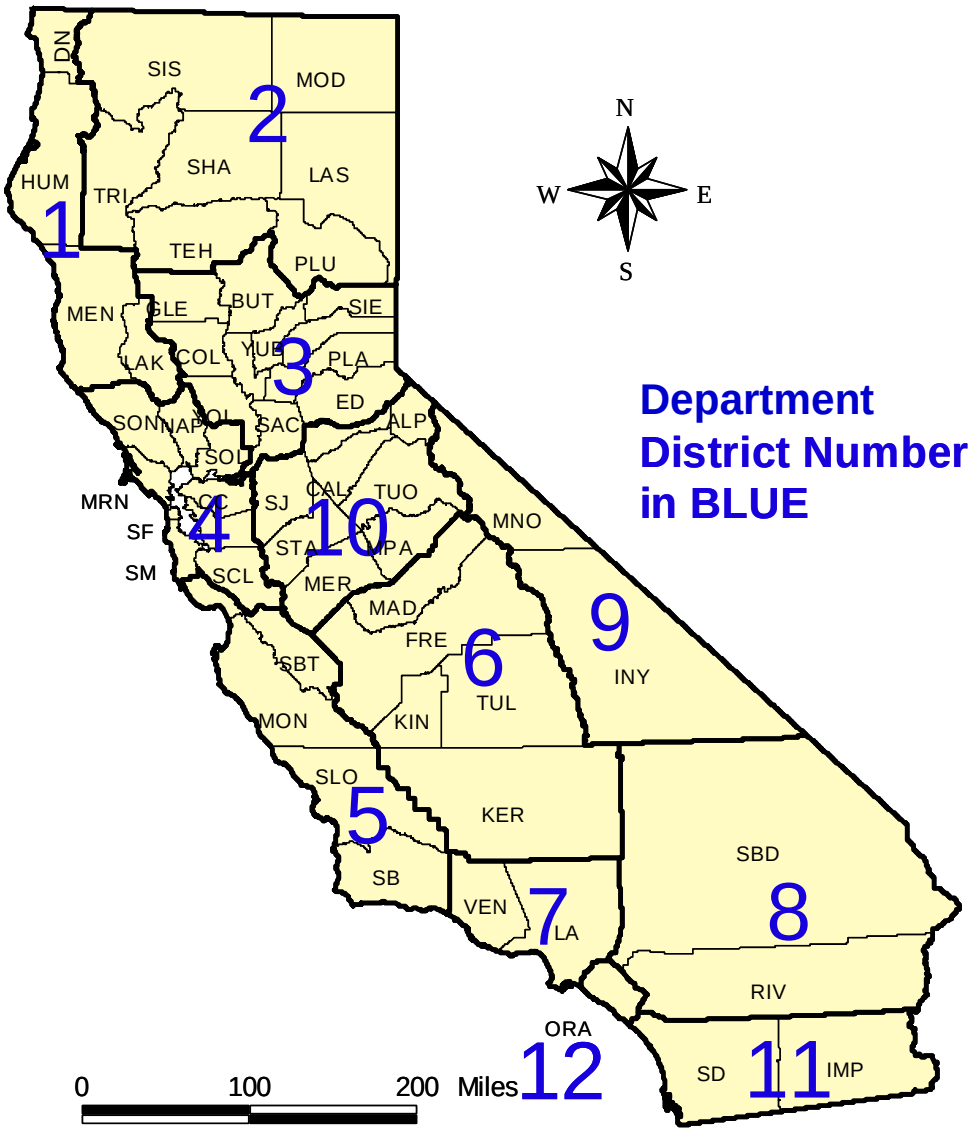
# APPENDIX D
# STATEWIDE MAP OF CALTRANS DISTRICTS



# APPENDIX E
# DISTRICT CONTACTS

| District | Contact Person | Phone Number | E-mail Address |
|---|---|---|---|
| 3 | Nelson Xiao | (916) 859-7958 | nelson.xiao@dot.ca.gov |
| 4 | Ron Kyutoku | (510) 286–4640 | ron.kyutoku@dot.ca.gov |
| 5 | Sam Toh | (805) 542-4709 | sam.toh@dot.ca.gov |
| 6 | Koko Widyatmoko | (559) 445-5588 | koko.widyatmoko@dot.ca.gov |
| 7 | Ashraf M. Armanious | (213) 897–6504 | ashraf.m.armanious@dot.ca.gov |
| 8 | Ramin Ghodsi | (909) 356-3729 | ramin.ghodsi@dot.ca.gov |
| 10 | Jaime Quesada | (209) 948-7184 | jaime.quesada@dot.ca.gov |
| 11 | Carlos Mendoza | (858) 467-3212 | carlos.mendoza@dot.ca.gov |
| 12 | Devang Desai | (949) 936-3566 | devang.a.desai@dot.ca.gov |
| HQ | Binoy Alexander | (916) 654-6939 | binoy.alexander@dot.ca.gov |

For more information or additional copies of the "Mobility Performance Report 2012," please contact Binoy Alexander at (916) 654-6939 or by e-mail sent to binoy.alexander@dot.ca.gov.