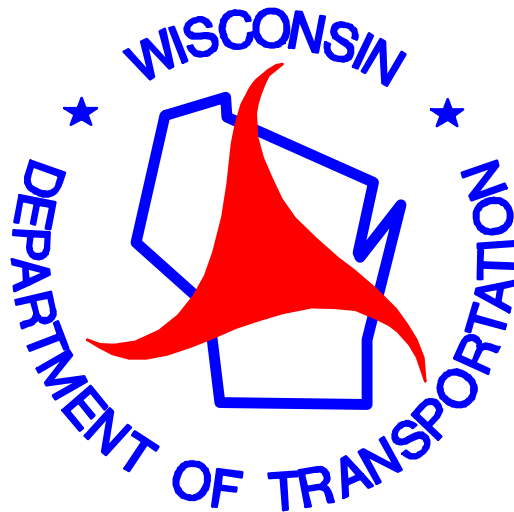


**EVALUATION OF THE GATEWAY PATROL AND
THE ENHANCED FREEWAY PATROL
MOTORIST ASSIST PROGRAMS**

FINAL REPORT



SEPTEMBER 2000

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16. Abstract The Wisconsin Department of Transportation (WisDOT) implemented two motorist assistance programs in order to better serve the motoring public traveling along portions of the I-94 corridor. The "Gateway Patrol" program serves the Racine and Kenosha County part of the corridor, and the "Enhancement Freeway Patrol" program serves the Milwaukee County freeway system. The Gateway Patrol program, provides motorist assistance using tow trucks that continuously patrol the freeway during weekday peak traffic periods (7-10 am and 4-7 pm) and during extended ten-hour periods (10 am to 8 pm) on weekends and selected holidays. The tow trucks, based on separate dispatch centers in Racine and Kenosha Counties, provide service ranging from minor on-site repairs (tire change, minor engine trouble) to towing disabled vehicles to designated off-freeway "Crash Investigation Sites." The program began operation on June 27, 1998. The Enhancement Freeway Patrol program involves two push bumper-equipped patrol squads, purchased with WisDOT funding, and operated by the Milwaukee County Sheriff department from 6 am to 10 pm every weekday. The squads serve the entire Milwaukee County freeway system with a primary focus on traffic control and enforcement assistance at construction zones during the construction season (May through October). The squads began patrolling on January 15, 1998. WisDOT was interested in assessing the effectiveness of each of these programs and commissioned the present evaluation in order to gather and analyze the quantitative and qualitative information necessary to this end. Both programs were found to be beneficial to the motoring public in terms of improved motorist service and traffic safety.			
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**EVALUATION OF THE GATEWAY PATROL AND THE
ENHANCEMENT FREEWAY PATROL MOTORIST ASSIST PROGRAMS**

FINAL REPORT
WisDOT Evaluation Study

by

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for the

WISCONSIN DEPARTMENT OF TRANSPORTATION

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EXECUTIVE SUMMARY

The Wisconsin Department of Transportation implemented two motorist assistance programs in order to better serve the motoring public traveling along portions of the I-94 corridor. The “Gateway Patrol” program serving the Racine and Kenosha County part of the corridor, and the “Enhanced Freeway Patrol” program serving the Milwaukee County freeway system.

Motorists traveling the Racine-Kenosha I-94 corridor who received assistance from Gateway Patrol Program tow trucks were stranded for approximately 9 minutes. Average time spent providing service was 15 minutes, ranging from a low of five minutes to report an abandoned vehicle to a high of 36 minutes when towing a vehicle from a crash scene was required. The time motorists had to wait until their vehicles were removed from the freeway was shortened by at least 52%, due to the presence of the Gateway Patrol Program, reducing the time stranded motorists were exposed to freeway traffic.

A fourteen percent decrease in the number of secondary collisions associated with a downstream collision was measured in the period following program implementation.

The program was very well received by the motoring public as expressed in written comments received by WisDOT. The most common comments were about fast and courteous service, however, most responding motorists were not aware of the program before they were assisted.

After activation of the Enhanced Freeway Patrol program (evaluated based on activity along the “East-West” portion of the Milwaukee County freeway system), the number of Milwaukee County Sheriff (MCS) dispatches increased by 7% overall, with a pronounced 20% increase during weekdays, and an even more pronounced increase (61%) during the afternoon peak traffic hours (4:00 pm to 6:00 pm). Enforcement dispatches increased by 26%. Average on-scene times decreased by 11% (from 21.0 min. to 18.7 min.), a reduction that approached statistical significance.

Most notable were on-scene duration reductions when responding to crashes, from 45.0 min. to 34.7 min. (10.3-min., or 22.9%), which were statistically significant. Durations were shorter by 11.7 min. for rear-end crashes, and 14.3 min. for multi-vehicle crashes. Similar savings were observed in overall crash durations (time between collision occurrence and enforcement vehicle departure from the scene).

An eight percent decrease in the number of secondary collisions associated with downstream incidents was measured in the period following program implementation.

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INTRODUCTION

The Wisconsin Department of Transportation (WisDOT) implemented two motorist assistance programs in order to better serve the motoring public traveling along portions of the I-94 corridor. The “Gateway Patrol” program serves the Racine and Kenosha County part of the corridor, and the “Enhancement Freeway Patrol” program serves the Milwaukee County freeway system.

The Gateway Patrol program, provides motorist assistance using tow trucks that continuously patrol the freeway during weekday peak traffic periods (7-10 am and 4-7 pm) and during extended ten-hour periods (10 am to 8 pm) on weekends and selected holidays. The tow trucks, based on separate dispatch centers in Racine and Kenosha Counties, provide service ranging from minor on-site repairs (tire change, minor engine trouble) to towing disabled vehicles to designated off-freeway “Crash Investigation Sites.” The program began operation on June 27, 1998.

The Enhancement Freeway Patrol program involves two push bumper-equipped patrol squads, purchased with WisDOT funding, and operated by the Milwaukee County Sheriff department from 6 am to 10 pm every day. The squads serve the entire Milwaukee County freeway system with a primary focus on traffic control and enforcement assistance at construction zones during the construction season (May through October). The squads began patrolling on January 15, 1998.

WisDOT was interested in assessing the effectiveness of each of these programs and commissioned the present evaluation in order to gather and analyze the quantitative and qualitative information necessary to this end.

1. EVALUATION SCOPE

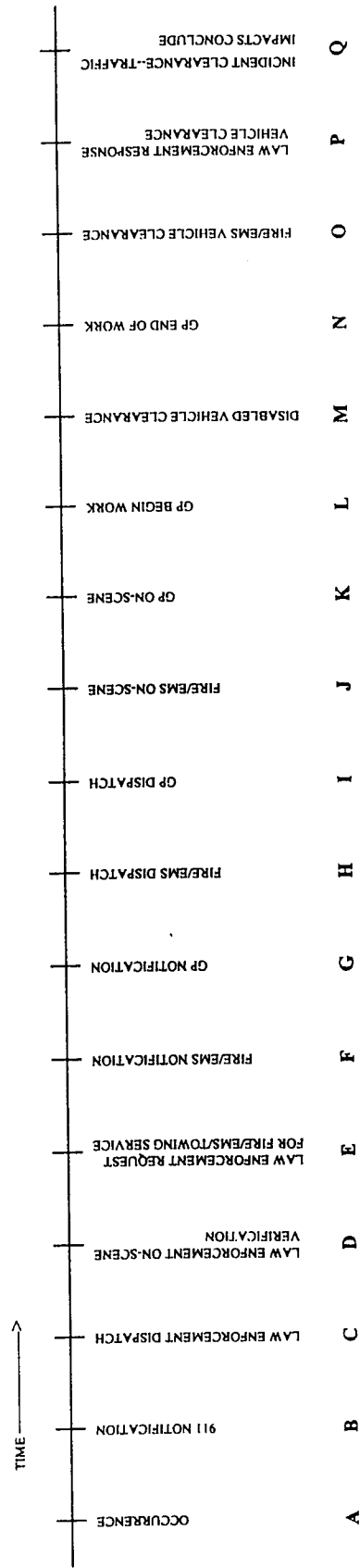
One of the primary goals of the Gateway Patrol (GP) program and the Enhancement Freeway Patrol (EFP) program was to reduce incident-induced freeway delays and thus reduce travel times and the possibility of “secondary crashes” (crashes upstream of an incident). In commissioning the present evaluation, WisDOT was mainly interested in assessing the impact that the two programs had on incident timeline components (see figure 1).

Given the major differences between the service providers of the two programs (enforcement agency versus towing company), in terms of types of vehicles, personnel, and operating hours, but also the nature of the corridors served by the GP and the EFP programs (rural versus urban, respectively), a separate evaluation was necessary for each program. It was decided to perform a “before-and-after” evaluation for each program, comparing statistics from a period before the program was implemented with a comparable period (i.e., equal duration, identical months) after the program was operational. It was decided to exclude construction periods from the evaluation, because lane configurations and traffic conditions during construction periods vary widely from day-to-day introducing many factors that affect incident duration components.

Given these considerations, it was decided at the outset to base program evaluations on two equal-length time periods, during which no construction was performed (see page A-1 for construction periods), one before the implementation of the two programs (November 15, 1995 to April 15, 1996), and one after the programs had been operational for some time (November 15, 1998 to April 15, 1999).

Evaluation of the GP program focuses on the entirety of the I-94 corridor in Racine and Kenosha counties. The EFP evaluation focuses on activity along the “East-West” freeway in Milwaukee County, the portion of Interstate 94 between the Marquette interchange in downtown Milwaukee (east border of evaluation area), and the Milwaukee County limit on 124th Street (west border of

Figure 1. Incident Timeline.



evaluation area). Although the EFP program serves the entire Milwaukee County freeway system, geographic limitations for the EFP evaluation were necessary because of -time and budget constraints. The East-West freeway was chosen because the EFP program placed a special emphasis on this corridor during the evaluation periods. The East-West freeway experiences the highest levels of recurrent congestion and the highest traffic volumes of the Milwaukee County freeway system.

General analysis corridor characteristics are presented in the Appendix (pp. A2-A6). A list of abbreviations used in this evaluation is presented on p. A-7, and a list of definitions on p. A-8.

2. DATABASE

The evaluation is based on four types of records:

- C Enforcement agency records,
- C Crash records,
- C Daily weather information, and
- C Gateway Patrol program records.

Enforcement agency records were collected from the Milwaukee, Racine and Kenosha County Sheriff Departments, and the Wisconsin State Police and included: a) dispatch information (incident location, agency notification time, the time a squad arrives at the incident scene, the time a squad leaves the incident scene, and incident nature information); and b) monthly summary freeway patrol statistics (miles driven, number of citations given, etc.) The dispatch record information collection effort was more intense in Milwaukee county--limited information was collected in Racine and Kenosha counties, after consultation with WisDOT.

Crash records provided the time a crash occurred, agency notification time, and the time the enforcement agency arrived at the scene, in addition to typical crash information, such as location, crash type, number of vehicles involved, and crash severity.

Daily weather information (temperature and precipitation statistics) provided the basis for evaluating weather effects on dispatch and crash characteristics. Separate weather stations were used for information used in the Milwaukee County and the Racine-Kenosha corridor analyses.

Three types of Gateway Patrol program records were analyzed: a) an in-vehicle log providing information about the time, location and nature of incidents to which tow trucks responded, as well as mileage driven during each shift, b) a “Gateway Patrol Spreadsheet” maintained at the WisDOT Traffic Operations Center (TOC) providing GP service type monthly summaries, and c) “Gateway Patrol response” survey forms distributed to motorists who received assistance from GP, providing statistics and information about customer satisfaction with the GP service. In addition, personal observations by a Marquette University Center for Highway and Traffic Engineering (MU-CHTE) employee were used to field-verify the collected information.

2.1 Dispatch Records-Milwaukee County Sheriff

The East-West corridor is patrolled by the Milwaukee County Sheriff (MCS) department. A new dispatch card is used by a dispatcher at the Milwaukee County communications center, located in the Safety Building on 821 West State Street in Milwaukee, each time the center receives a 911 call, or a MCS squad initiates a dispatch. Approximately 600 dispatch records are completed each day. Dispatch records are kept on activity on the freeway system (divided into seven Sectors--p. A-9), transports to/from detention centers, and Milwaukee County Parks Patrol activity. Approximately 2.7% of all dispatches (16 dispatches per day) concern the East-West freeway corridor which is within MCS Sector 2.

Each dispatch is logged manually on a separate index card (form OEI M30087-see sample form in p. A-10). Cards are machine-stamped with the time a call is received (MCS term: “Complaint Received” time--corresponds to $TIME_B$ in figure 1), the call initiation time (MCS code “10-7” -- officer off-patrol duty-- $TIME_D$ in figure 1), and the call termination time (MCS code “10-8”-- officer on-patrol duty-- $TIME_P$ in figure 1). In addition, location, sector, call type, and additional call information (“10-Signals”--p. A-11) are hand-filled by the dispatcher. Additional time

stamps and dispatcher comments are some times filled on the reverse side of the cards, usually for dispatches involving crashes, indicating number of vehicles involved, crash severity [Property Damage Only (PDO), Personal Injury (PI), number of injured persons], towing services-related information, medical transport-related information, and other incident-related information. Such additional information is not consistently recorded.

Direct communication between I-94 motorists and the dispatch center is only through cellular 911 telephone calls. Land-line 911 calls are directed to the closest enforcement agency, which may in turn alert MCS via “land-line.” No public-use land line telephones are located within the freeway right of way. Currently, cellular telephone calls are automatically converted to an equivalent “land line” number before being routed to the MCS dispatch center, thus no caller location identification capability exists. The time such a call is received is machine-stamped by the dispatcher on the dispatch record as the “complaint received” time ($TIME_B$). Only 27% of the analyzed dispatch records indicate a “complaint received” time. The remainder of the records indicate “officer off-duty” time ($TIME_D$), but no “complaint received time.” For the purposes of this evaluation, it is assumed that such records indicate officer-initiated dispatches, by officers already at the incident scene.

Based on the available time and budget for the evaluation and the need to avoid construction periods, as explained above, the data collection periods were limited to the “before” period of November 15, 1995 to February 4, 1996 and the “after” period of November 15, 1998 to February 4, 1999. Information from a total of 2,643 East-West freeway dispatch records was entered in an electronic database (sample printout p. A-12), selected among an estimated 97,200 dispatch records completed by the MCS dispatch center during these two periods.

MCS Traffic Division monthly activity reports for the periods November 1995 through April 1996 and November 1998 through April 1999 for the entire Milwaukee County freeway system were obtained from the Expressway Patrol Headquarters. The summaries provide activity summaries. Sample forms reviewed for this evaluation are included in pp. A-13 and A-14.

2.2 Dispatch Records-Racine County Sheriff

The Racine County Sheriff (RCS) department and the Wisconsin State Patrol (WSP) provide enforcement service for the I-94 freeway in Racine County. RCS also covers the rest of the county, and the WSP covers all State Trunk Highways in the county.

Racine County Sheriff dispatch records (hand-written index cards p. A-15) for I-94 were reviewed for the following periods:

- C December 16, 1995 through December 31, 1995.
- C January 24, 1996 through January 31, 1996.
- C December 24, 1998 through January 2, 1999.
- C January 24, 1999 through January 31, 1999.

A total of 229 records related to I-94 were identified during these 42 days and entered into an electronic database (p. A-16).

2.3 Dispatch Records-Kenosha County Sheriff

The Kenosha County Sheriff (KCS) department and the Wisconsin State Patrol (WSP) provide enforcement service for the I-94 freeway in Kenosha County. KCS also covers the rest of the county, and the WSP covers all State Trunk Highways in the county.

Kenosha County Sheriff I-94 dispatch records were obtained in electronic file form (p. A-17) for the following periods:

- C December 17, 1995 through January 2, 1996.
- C January 15, 1996 through January 31, 1996.
- C December 16, 1998 through January 2, 1999.
- C January 15, 1999 through January 31, 1999.

A total of 189 records related to I-94 were identified during these days.

2.4 Dispatch Records-Wisconsin State Patrol

The Wisconsin State Patrol (WSP) provides enforcement service for the I-94 freeway in Racine and Kenosha counties in cooperation with the respective county Sheriff Departments. WSP squads patrolling Racine and Kenosha county State Trunk Highways are assigned to WSP Sector 2 which also covers Walworth, Jefferson, Waukesha and Milwaukee Counties (for WSP sector layout see p. A-18), however Milwaukee County freeways are patrolled exclusively by the MCS department.

Printouts from the computerized dispatch log (p. A-19), covering the entire WSP Sector 2 were obtained for the following periods:

C January 15 to January 31, 1996 (records are not available for the period before January 1996)

C December 13, 1998 to January 15, 1999

However, only the period of December 13, 1998 through December 31, 1998, was reviewed and entered in a database (p. A-20). A total of 221 I-94 incidents, in Racine and Kenosha counties, to which WSP responded have been identified during this period. Approximately 1000 new log entries are added to the WSP Sector 2 dispatch log daily. Multiple records were typically entered during a single dispatch, each record corresponding to a dispatcher-trooper communication.

In addition, an “Accident Log” spreadsheet (for December 1998 and January 1999) and a “Tow-Away Log” spreadsheet (for January 1999) were obtained from WSP.

2.5 Crash Records

Crash records were obtained from WisDOT for Racine, Kenosha and Milwaukee counties, for the periods of November 15, 1995 to April 15, 1996 (the “before” period) and November 15, 1998 to April 15, 1999 (the “after” period). Crash record variables are among the variables listed in pp. A-21 through A-26). The crash database contained a total of 528 crashes. This total included all analyzed freeway segments and covered the hours between 6:00 am and 10:00 pm each day. A total of 152 crashes occurred in the “before” period on the East-West corridor, and

136 crashes in the “after” period. The figures for the Racine-Kenosha corridor were 134 and 100 crashes for the respective periods.

2.6 Daily Weather Information

Daily rain and snowfall precipitation, and minimum and maximum temperature information was obtained from the Midwestern Climate Center, State Climatology Office. Precipitation information was used to compute separate crash rates for dry, wet and snow days. The information was also used to analyze the effects of precipitation on enforcement agency dispatch timelines.

2.7 Gateway Patrol Program

Evaluation of the GP program was based on information from: i) daily GP logs completed by tow truck operators, ii) monthly service statistics kept on a spreadsheet, iii) a monthly summary of program hours of operation, iv) GP response forms filled by motorists who received assistance from the GP and mailed them to WisDOT on pre-addressed cards, and v) personal observations of a Marquette University employee riding a tow truck for five and a half hours (9:00 am to 2:30 pm) during Memorial Day, Monday, May 31st, 1999. Items ii), iii) and iv) are archived at the WisDOT Freeway Traffic Operations Center (TOC), and later sent to a remote storage facility.

Tow truck log records were analyzed for the period of December 1998 through April 1999. However, due to a change in the log format, statistics on time spent assisting each motorist were not available for March and April 1999. Monthly service statistics were compiled for the period January to April 1999. Summaries of program hours of operation were obtained for December 1998; partial records were available up to April 1999. GP response forms were analyzed for the period of January through April 1999 (only the numbers of received forms, but not the forms themselves were available for April 1999).

2.8 East-West Corridor Database

MCS East-West corridor dispatch record information was merged with crash and daily weather information. Matching dispatch and crash records was based primarily on time and location information. Matching rate was 87% (217 matches among 249 crashes). Crash records were not available for a small number of dispatches to crash locations and vice-versa. Variables included in the database are listed in pp. A-21 through A-26.

3. PROGRAM EVALUATION

The evaluation is organized in two main parts, one addressing the GP program, and one addressing the EFP program. The GP evaluation is based on data about GP service vehicle activity, RCS, KCS and WSP dispatch information, and crash records. The EFP evaluation is based on MCS dispatch information, patrol statistics, and crash records.

PART I: GATEWAY PATROL PROGRAM EVALUATION

The Gateway Patrol (GP) program evaluation was conceived as a “before-and-after” study, that would compare Measures of Effectiveness (MOE) between a period preceding program implementation (the “before” period), and a comparable period following program implementation (the “after” period). Expected program motorist benefits were: shorter times until stranded motorists received assistance, more expedient disabled vehicle removal from the freeway (either because vehicles were fixed and became operational, or because vehicles were towed away by patrolling service vehicles), and improved motorist safety due to: i) a reduction in the time stranded motorists had to spend exposed to freeway traffic; and, ii) a reduced chance for “secondary” crashes, due to prompt removal of vehicles involved in “primary” crashes.

Thus, the data collection effort focused on information about disabled vehicles and crashes. Ideally, a complete calendar of incidents involving disabled vehicles (either in traffic lanes or on shoulders) and crashes would be reconstructed from available databases, and the numbers and characteristics of such incidents would be compared between the before and the after periods. GP records provided information about incidents occurring during GP hours of operation for the “after” period. Information about freeway-related dispatches was available from the three enforcement agencies that patrol the corridor: the Racine County and Kenosha County Sheriffs (RCS and KCS respectively) and the Wisconsin State Patrol (WSP).

3.1 Tow Truck Log Analysis

Incident nature and some incident timeline information was consistently recorded in the tow truck logs (see sample form on p. A-27). Tow truck operators usually included a brief incident description and always recorded mileage information at the beginning and the end of each day. Other form fields, however, were not always completed. Starting with March 1999, no space was provided on the tow truck logs to record service duration (see sample form on page A-28). Tow truck log-based GP service statistics can be found in tables 1 and 2. Table 1 provides statistics for specific GP-provided service types collectively for Racine and Kenosha counties. The most frequent log entries indicated “no service provided” (see DEC-APR column). Such entries corresponded to situations where a motorist pulled over for reasons unrelated to a mechanical problem (to read a map, rest etc.), was approached by a GP operator, and declined GP service. Flat tire service was the next most frequent category, followed by service to stalled vehicles (either involving a tow or not). The most time-consuming stops were for vehicles involved in crashes, with an average service duration of 36 minutes. Next most time-consuming (25 min.) were categories involving a tow due to a mechanical break down, a flat tire or other reason. Least time-consuming were “no service provided” stops (duration 4 min.)

The GP program provided a cellular telephone for customer use. Once customers were towed off the freeway, they were provided with the “Yellow Pages” and could use the cellular telephone to call the tow service of their preference. Statistics on cellular telephone usage were recorded by GP operators. Cellular telephone service was used most frequently (35% of all instances when GP offered service) when towing service was provided and when service was provided for a stalled vehicle (33%). In many instances, a motorist placed more than one cellular telephone call. Statistics on cellular telephone use presented in table 1 indicate numbers of motorists using the service, not number of calls. Monthly cellular telephone call usage ranged from 12% to 42% of all motorist assists, with a monthly average of approximately 20% (corresponding to 45 assists per month).

TABLE 1. Gateway Patrol Statistics
 Racine and Kenosha Counties
 December 1998 through April 1999

	DECEMBER		JANUARY		FEBRUARY		MARCH (1)		APRIL (1)		DEC-APR	
	Count	Average Time (min)	Count	Average Time (min)	Count	Average Time (min)	Count	Average Time (min)	Count	Average Time (min)	Count	Average Time (min)
TOW TRUCK SERVICE RESPONSE TYPE												
Stalled Vehicle	32		14		17		18		25		106	
Time on Stalled Vehicle		23		13		16						19
Towed Stalled Vehicle	15		31		19		18		15		98	
Time on Towed Stalled Vehicle		24		25		23						24
Flat Tire	31		34		43		49		51		208	
Time on Flat Tire		15		15		12						14
Towed-Flat Tire	9		2		11		4		9		35	
Time on Towed Flat Tire		24		25		23						24
Towed Vehicle	23		4		9		21		18		75	
Time on Tow		25		20		27						25
Crash	14		30		4		13		6		67	
Time on Crash		35		38		30						36
Minor Repair	28		8		13		16		16		81	
Time on Minor Repair		14		7		20						14
Vehicle Out of Gas	16		13		11		17		16		73	
Time on Out of Gas		12		9		8						10
No Service Provided (2)	57		49		36		51		60		253	
Time-No Service Provided (2)		6		4		3						4
Combination of Services (3)	14		9		9		20		38		90	
Time on Combination of Services (3)		8		19		22						15
Abandoned Vehicle	8		0		7		16		7		38	
Time on Abandoned Vehicle		5		0		4						5
Total Responses	247		194		179		243		261		1124	
Average Response Time		16		16		14						15
GP-FURNISHED CELLULAR PHONE USE												
During Accident Responses	7		19		0		0		2		28	
During Tow Responses	15		28		9		17		11		80	
During Stalled Vehicle Responses	13		28		12		12		8		73	
During Other Service Responses	12		7		10		1		12		42	
Total	47		82		31		30		33		223	

Notes:

(1) Truck log form changed in February 1999. No time information was collected on the new form.

(2) Example: Motorist stopped to consult map, GP offered service, service was declined.

(3) Example: Stalled Vehicle, Minor Repair and Tow.

TABLE 2. Gateway Patrol Statistics
December 1998 through April 1999
Racine and Kenosha Counties

	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	DEC-APR
OVERALL STATISTICS						
Monthly Total Responses (number)	247	194	179	243	261	1124
Monthly Vehicle-Hours of Operation (1)	450	427	431	397	425	2129
Monthly Vehicle-Miles Traveled (1)	15080	14366	14438	14476	15881	74241
Monthly Time Serving Calls (hours) (2)	64	54	41			
Daily Vehicle-Hours of Operation	15	14	15	13	14	14
Daily Vehicle-Miles Traveled	486	463	516	467	529	492
Daily Time Serving Calls (hrs) (3)	2.1	1.7	1.5			
Daily Average Hours of Operation (4)	7.7	7.7	7.7	7.7	7.7	7.7
Hourly Vehicle-miles of Travel	63	60	67	61	69	64
Hourly Complete Corridor Loops (48 directional miles)	1.3	1.3	1.4	1.3	1.4	1.3
One Complete Loop (min.)	46	48	43	48	42	45
Average Operating Speed (mph) (5)	34	34	34	36	37	
Responses per Vehicle-Hour of Operation	0.55	0.45	0.42	0.61	0.61	0.53
Responses per 100 Vehicle-Miles Driven	1.64	1.35	1.24	1.68	1.64	1.51
Vehicle Hours of Operation: Mon-Thu (6)	219	167	191	193	173	942
Total Vehicle-Miles of Travel: Mon-Thu (7)	7347	5606	6417	7052	6460	32855
Vehicle Hours of Operation: Fri-Sun (6)	231	260	239	204	252	1187
Total Vehicle-Miles of Travel: Fri-Sun (7)	7733	8760	8021	7424	9421	41386

Notes:

- (1) Data from monthly truck log summary compiled at the WisDOT Traffic Operations Center
- (2) Sum of products: (Service Response Count) * (Average time to serve this type of Service Response)
- (3) Monthly Time Serving Responses divided by number of days in a month
- (4) Mon-Thu 7-10 am and 4-7 pm, Fri-Sun 10 am - 8 pm: 54 hrs/week or 7.7 hrs/day
- (5) Daily Vehicle-Miles of Travel divided by Daily Vehicle Hours of Operation
- (6) Hours of operation allocated proportionately to Weekday/Weekend Hours of Operation
- (7) Assuming equal Average Travel Speed on Weekdays and Weekends

The widest average service time variation between monthly statistics was reported for performing maintenance work (7-20 min.), when a combination of services was provided (8-22 min.), and when assisting with stalled vehicles (13-23 min.)

Monthly and Daily Vehicle-miles driven and hours of operations statistics were calculated based on the available five-month period information, to serve as benchmark statistics (see table 2). Average operating speed, calculated based on total vehicle-miles of travel and vehicle-hours of operation, ranged between 34 and 37 mph. This speed took into account time spent providing motorist service and time on break for regularly scheduled truck operator breaks. Time spent serving motorists ranged between 41 and 64 hours per month and represented approximately 12% of total vehicle-hours of operation. The total number of hours spent serving motorists during the five-month period from December 1998 to April 1999, was estimated to be approximately 280 hours. The highest allocation was for flat tires (an estimated 48.5 hours of service time), crashes (40.2 hours) and towing stalled vehicles (39.2 hours).

Based on December 1998 statistics, a total of 486 daily vehicle-miles of travel were driven among all GP vehicles during 15 daily vehicle-hours of operation (see truck log samples pp.A-27 and A-28, and mileage log sample p. A-29). Thus, average GP service vehicle operating speed was 34 mph. Taking into account that the GP program operated six hours during weekdays (Monday through Thursday) and ten hours during the rest of the week, the GP program operated an average of 7.71 hours per day, thus approximately 63 vehicle-miles were traveled every hour. The length of the Racine-Kenosha corridor is approximately 24 miles, therefore 2.6 corridor lengths (1.3 complete loops) were traveled by patrolling tow trucks each hour (one loop every 46 minutes). Thus, the maximum time any motorist would have to wait until being detected by the GP was 46 minutes. Since both directions of travel could be observed when traveling in either direction, waiting time could be expected to be significantly lower, in most cases on the order of one-half of this estimate (23 min.) The GP often received calls from the Racine and Kenosha Sheriffs and the Wisconsin State Patrol, which helped minimize response times on many occasions. Thus, response times could have possibly been much shorter than the above estimate of 23 min.

Waiting time statistics discussed above, included the time spent providing motorist service and time on break. A motorist could have had to wait a shorter or longer than the above-calculated average time, depending on tow truck position, whether another motorist was already being served, and how many motorists happened to require service at the same time.

3.2 Gateway Patrol Response Forms Analysis

“GP response” survey forms (see sample p. A-30) were handed out to motorists who received assistance from Gateway Patrol tow trucks. The forms were pre-stamped and pre-addressed to the Wisconsin Department of Transportation Traffic Operations Center (WisDOT TOC). The percentage of motorists handed forms was not consistent through the evaluation period. Eighty-seven percent of assisted motorists were handed survey forms in January 1999; the average was 52 percent for February through April of 1999 (see table 3 below). Returned forms represented between 7 and 13 percent of all assisted motorists between January and April 1999 (between 8 and 25 percent of dispensed forms). The number of survey forms handed out and the number of completed and returned to the TOC forms were recorded on the GP spreadsheet maintained at the TOC (see sample p. A-31). Although these two numbers were available for April 1999, actual returned response forms were not available for that month.

Table 3. Gateway Patrol Response Form Statistics.

Row #		1999				
		Jan.	Feb.	Mar.	Apr.	Avg. / month
(1)	Number of motorist assists	194	179	243	261	219
(2)	Response forms handed out (number)	169	91	125	139	131
(3)	Assisted motorists receiving survey forms (2)/(1)	87%	51%	51%	53%	60%
(4)	Motorists returning forms (number)	13	23	22	20	20
(5)	Motorists returning forms as a percent of those receiving forms (4)/(2)	8%	25%	18%	14%	15%
(6)	Motorists returning forms as a percent of all assisted motorists (4)/(1)	7%	13%	9%	8%	9%

Given the very low survey form return rate, but especially the selective handing of survey forms to assisted motorists, this evaluation instrument is of limited value in providing reliable GP statistics. However, the forms were the only available source of the time motorists waited for GP service ($TIME_{AK}$ —see figure 1). Time of occurrence ($TIME_A$) estimates were based exclusively on GP response forms. Due to the response form format, motorist waiting time was recorded as a choice among pre-determined time intervals (0-5 min., 5-10 min., 10-20 min., 20+ min.) thus reporting accuracy was lost to some (small) extent. Time of occurrence was not directly recorded on GP logs, but was calculated by subtracting the waiting time estimate from the (recorded) GP service vehicle arrival time.

Statistics were calculated based on data from individual survey cards returned to the WisDOT TOC for the months of January through March of 1999. All analyzed surveys were matched to tow truck log entries by date, time, service type and any other available information as a basic validity check. Matching surveys with tow truck log entries allowed matching the time that a motorist waited for the GP service vehicle to arrive ($TIME_{AK}$) reported on the survey forms as entry “Length of time you were stranded before GP arrived,” with the corresponding GP service time ($TIME_{KN}$) reported on the tow truck log. Service duration time $TIME_{KN}$ could only be calculated for January and February 1999 records--no such information was recorded on tow truck logs starting in March 1999, when the tow truck log format was changed.

It should be noted that a vehicle receiving GP assistance may be removed from the freeway at a time $TIME_M$, preceding the recorded GP service termination time ($TIME_N$). For example, if the vehicle was towed to a Crash Investigation Site (CIS), the disabled vehicle would have been removed from the shoulder when the tow was initiated. However, the time a tow was initiated was not recorded in the database. Thus, in this example, the recorded service duration time ($TIME_{KN}$) would have included a period of time, after the incident was cleared, during which the tow truck and towed vehicle were en route to the CIS, as well as time spent at the CIS. Abandoned vehicles were typically reported but not removed, in which case $TIME_N$ would have

preceded $TIME_M$. When no tow or checking an abandoned vehicle was involved, it could be assumed that the time a disabled vehicle was cleared off the freeway ($TIME_M$) was identical to the GP service termination time ($TIME_N$).

Although survey forms could be used for customer feedback regarding any GP-provided services, some types of motorist assists were not represented in the surveys returned to WisDOT.

Motorists who returned “GP response” forms, indicated that they were stalled for one of three reasons: a mechanical breakdown requiring towing, a flat tire, or running out of fuel. These particular problems accounted for only 43% of all motorist assists during all months for which service truck logs were available (see table 4). Service times for survey respondents closely followed service times for all motorists (recorded on tow truck logs) for the three service types represented in the survey (tire change, tow and out-of-fuel).

Table 4. Distribution of Service Types and Average Times to Render Service $TIME_{KN}$.

	All assisted motorists ^a		Motorists returning survey	
	Percent	Average Service Time	Percent ^b	Average Service Time ^c
Tire change	17%	14 min.	39%	14 min.
Tow	20%	24 min.	47%	23 min.
Out-of-fuel	6%	10 min.	14%	8 min.
Total	43%		100%	

a. Based on December 1998-February 1999 tow truck logs.

b. Based on January - March 1999 statistics (response cards not available for April 1999).

c. Based on January - February 1999 statistics ($TIME_{KN}$ matches between response cards and truck logs possible for these months only).

Based on January - March 1999 survey responses, $TIME_{AK}$ had the distribution shown in table 5 below:

Table 5. Time Survey Respondents Waited for GP Tow Truck ($TIME_{AK}$).

$TIME_{AK}$	Percent Respondents
0-5 min.	31%
5-10 Min.	47%
10-20 Min.	11%
More than 20 Min.	11%
Total	100%

Using average values for the time interval ranges shown in table 5 above, and assuming a 30-min. wait for motorists waiting longer than 20 min. (a conservative estimate, given the preceding discussion about patrolling frequencies), it is estimated that motorists returning survey forms were stranded an average of 9.3 min ($TIME_{AK}$) before they were offered assistance by the GP. Based on matched tow truck log records and survey responses (possible only for January and February of 1999), average time to respond and render service ($TIME_{AN}$) was 24 minutes.

Twenty-three of the 58 returned surveys contained comments. All comments were positive/enthusiastic about the tow truck driver and/or the service. Two mentioned fast service, ten made positive comments about the GP driver and eleven mentioned how good the GP service was. Most respondents were not aware of the GP program before they were assisted.

3.3 Ride with Gateway Patrol Tow Truck Operator

An employee from the Marquette University Center for Highway and Traffic Engineering (MU-CHTE) visited the GP Racine County dispatch center located at the Mobil station east of I-94 at milepoint 340, on Memorial Day, Monday, May 31st 1999. The employee rode on a GP tow truck from 9:00 am until 2:40 pm, and recorded tow truck activity during these hours on the event log presented at the end of this subsection.

On a typical day, two GP tow trucks dispatched from the Racine and Kenosha county GP dispatch centers patrolled their respective counties simultaneously. The trucks were equipped with cellular telephones and Citizens Band (CB) radios which allowed truck-to-truck and truck-to-dispatch center communications along the entire patrolled area.

Information from the event log compiled during the field visit agreed very well with the tow truck log summary statistics presented in table 1.

Notes specific to observer-recorded events:

- C The GP service vehicle started the shift at odometer reading 671 and finished the shift at odometer reading 800 (129 miles were traveled during the monitored hours). This mileage was driven between 9:03 am and 12:35 PM, thus the average operating speed was approximately 37 mph [comparing well with the log summary five-month calculated average of 35 mph].
- C Flat tire service lasted from 9:06 to 9:19 am, (13 min. compared to a 14 min. calculated average).
- C Stalled vehicle service lasted from 10:20 to 10:40 am (20 min compared to 19 min.)
- C Stalled vehicle with boat trailer service lasted from 11:40 am to 12:28 PM (a total of 48 min.) This situation, involved towing two vehicles, communication with the Racine County Sheriff about transporting occupants, stopping for an unrelated incident, and spending some time at the CIS, an unusually complex situation. Loading the disabled vehicle on the flatbed and towing the boat to CIS #2 took 32 min. (11:40 to 12:12) compared to an average of 24 min. required for an average tow. This time also included stopping at 12:05 to assist a motorist. The average duration for such calls (“no service provided”) was 4 min., thus the towing operation lasted approximately 28 min., despite the complexity of the situation. An additional 16 min. was spent at CIS#2 before the truck returned to patrol duty.

General observer notes about GP operations:

- C GP operations are effective in removing incidents from the roadway.
- C The GP tow truck provides additional safety for stranded motorists.
- C The presence of a stopped GP tow truck attracts passing-by drivers who stop to ask directions. This is a disadvantage from a traffic safety point of view. Increased delay for through traffic is also possible, if the presence of multiple vehicles on the shoulder creates a distraction for other drivers.
- C GP tow trucks do not operate on a continuous loop, since tow trucks often make U-turns to assist stopped vehicles. This practice may lead to short loops around the same area, increasing response times to other parts of the patrol corridor. This disadvantage is mitigated to a certain extent by the fact that County Sheriff and State Patrol squads place calls to the tow trucks when necessary. Additional calls may be received from motorists reporting incidents through 911 cellular telephone calls.
- C GP operators use communication equipment very efficiently and can readily assist each-other in special situations.
- C High-speed traffic places GP operators at risk. Operators should be rested and alert at all times. The observed operator was very meticulous with safety precautions.
- C Occasionally, vehicles stopped on the freeway shoulder left before the GP operator had a chance to offer assistance.
- C Typical GP travel speed ranged between 55 and 60 mph.

**3.4 Gateway Patrol Log Compiled Between 9:00 am and 2:35 pm on Memorial Day 1999
(Monday, May 31, 1999)-Racine County Gateway Patrol (Flatbed Service Truck).**

Time (Odometer)	Action
9:03(671)	Left Racine County GP dispatch center.
9:06(674)	Stopped to assist with a flat tire. GP operator used own jack to help the motorist. The motorist had trouble lowering the spare tire.
9:19	Flat tire service ends.
9:30	Observed a vehicle on the shoulder in the opposite direction.
9:33	Turned around to check on vehicle stopped on the shoulder. Vehicle had departed.
10:00	Official start of weekend GP shift.
10:15(696)	Stopped for unattended vehicle parked on the shoulder. Call placed to Racine County Sheriff. Left scene.
10:20	Vehicle owner observed walking toward the unattended vehicle. GP returns to the vehicle. GP operator worked on mechanical problem.
10:35(702)	Racine County squad arrived. Squad left the scene after a brief conversation with the vehicle owner and GP operator. Mechanical problem fixed.
10:40(703)	GP escorted the vehicle to a gas station. Driver was handed a "GP response form."
10:50	Checked CIS #2 (Hwy 20-Racine County Sheriff Substation).
11:05	Checked CIS #3 (Hwy G). A car with no license plates parked at the site was reported to the Racine County Sheriff.
11:40(741)	Observed car with boat trailer stalled on shoulder next to an on-ramp. There were three occupants in the vehicle. Racine County Sheriff was called to assist with occupant transportation.
11:40	Racine County Sheriff squad arrived to transport occupants.
12:03	Car loaded on flatbed, boat towed behind tow truck.
12:05	Stalled vehicle observed on the right shoulder. Motorist stated that the serpentine belt came loose. Motorist was informed that GP would be back shortly to assist.
12:12	Arrived at the CIS #2. Car, boat were dropped off. Occupants had already been transported there.
12:28	Service call was completed.
12:35	Checked on vehicle with loose serpentine belt. Vehicle had departed.
1:00-2:00	Interruption of patrol due to a call from the dispatch center regarding an off-freeway assignment.
2:30-2:35	Debris removed from roadway.

3.5 Enforcement Agency Dispatch Log Information

Enforcement agency activity along the corridor was analyzed in order to gain insights into timeline statistics relating to vehicles requiring towing. Dispatch records typically indicated the time a call was received, the time a squad was dispatched, the time it arrived at the incident scene and the time it left the scene, as well as the nature of the dispatch (motorist assistance, disabled vehicle, crash). The three enforcement agencies with jurisdiction over the corridor kept separate dispatch records, logged by their respective dispatch centers. Although there was no direct link between these databases (information was not recorded in the same manner, dispatches were not classified into the same categories), extensive compatibility existed between dispatch records, and dispatch with crash records.

Emphasis in the following paragraphs is placed on tow truck-related dispatch information. The time that a breakdown occurred was not recorded, thus the first time stamp available from dispatch records is either the time a 911 call was received, or the time a patrolling officer called the dispatch center to report a disabled vehicle. Statistics were extracted from dispatches that occurred between 6:00 am and 10:00 pm.

A total of 7 “Motorist Assistance” dispatches involving a towing request were available from RCS data. The average time that elapsed between the time the dispatch center was notified, and the time a deputy at the scene placed a tow truck request, was $\text{Time}_{\text{BE}} = 10.9$ min. Timeline information for these dispatches is summarized below:

911 Notification-to-Squad Dispatch	$\text{Time}_{\text{BC}} = 4.0$ min.
Squad Dispatch-to-Arrival at the Scene	$\text{Time}_{\text{CD}} = 3.0$ min.
Arrival at the Scene-to-Request for Tow Service	$\text{Time}_{\text{DE}} = 3.9$ min.
Request for Tow Service-to-Squad Clearance	$\text{Time}_{\text{EP}} = 39.4$ min.
Time_{BP}	Total: 50.3 min.

None of these dispatches occurred during GP hours of operation; five occurred in the “before” period ($\text{Time}_{\text{BP}} = 51.0$ min.), and two in the “after” period ($\text{Time}_{\text{BP}} = 48.5$ min.)

Similar, but less detailed timeline information was available from six “Motorist Assistance” WSP dispatch records. Average $Time_{BE}$ was 6.2 min. Timeline information for these dispatches is summarized below:

911 Notification-to-Request for Tow Service	$Time_{BE} = 6.2$ min.
Request for Tow Service-to-Squad Clearance	$Time_{EP} = 11.3$ min.
$Time_{BP}$	Total: 17.5 min.

All WSP data were gathered in the “after” period; two were during non-EFP hours of operation, ($Time_{BP} = 21.5$ min.) and four during EFP hours of operation ($Time_{BP} = 15.5$ min.)

Although times until a request for a tow truck was placed did not differ much between the two agencies, total dispatch durations did. WSP concentrates on patrolling the State Trunk Highway system, and will typically contact another agency (a local Sheriff) whenever incidents require a longer presence at the scene. Thus the time a WSP squad leaves a scene, does not always indicate incident termination time.

The weighted average for the time that elapsed between a 911 call reporting a stranded motorist, and the time an enforcement agency requested tow truck service ($Time_{BE}$) was 8.7 min.,

No records containing tow truck requests were retrieved from KCS dispatches.

3.6 Secondary Crash Analysis

Crashes upstream of a “primary” crash site were identified as “secondary” crashes. A total of 14 secondary crashes were identified in the period from November 15, 1995 to April 15, 1996 (the “before” period) and 12 secondary crashes were identified in the period from November 15, 1998 to April 15, 1999. Thus, secondary crashes were reduced by 14% in the after period.

3.7 Gateway Patrol Program Evaluation Summary and Discussion

Motorist Time Savings

The close agreement between information recorded daily on truck logs and information recorded during a ride with a GP service vehicle, is an excellent indicator that motorist-reported service time ($TIME_{KN}$) information is accurate.

- ! The time a motorist waited for a GP service vehicle to arrive and provide service ($TIME_{AN}$) was estimated to be 24 min., on average. It can be broken down into:
- ! The time a motorist waited for a GP service vehicle to arrive ($TIME_{AK}$) estimated to be 9 min. and
- ! The time a motorist waited while being served by a GP service vehicle ($TIME_{KN}$) estimated to be 15 min.

It should be noted that actual $TIME_{AK}$ was much lower than the theoretical time of 23 min., calculated on the assumption that GP service vehicles drive the entire length of the corridor in continuous loops.

The average time that elapsed between a 911 call reporting a stranded motorist, and the time an enforcement agency requested tow truck service ($TIME_{BE}$) was 8.7 min., almost equal to the time stranded motorists waited for a GP service truck during GP hours of operation when no enforcement agency was involved.

Although the actual time a motorist was stranded was not recorded on enforcement agency logs, some conclusions about the effectiveness of the GP program can be drawn by comparing Racine County Sheriff (RCS) and GP data. According to RCS dispatch information, average 911 Notification-to-Squad Clearance Time ($TIME_{BP}$) during periods when the EFP program was not active was 50.3 min. Based on the information available through GP logs and motorist surveys, the average time motorists spent waiting for and being serviced by GP service vehicles ($TIME_{AN}$) was 24 min. Thus, during GP hours of operation, the time stranded motorists had to spend on the freeway was shortened by at least 26.3 min. (52%) on average. The (currently unavailable) average time between breakdown occurrence and 911 notification for the before period should be added to these time savings.

Service Times and Motorist Responses

The most frequently provided type of service was fixing flat tires (19% of all responses) with an average service time of 14 min., that consumed 17% of all service hours. Most time-consuming were responses to crashes, which represented 6% of all responses, but consumed 14% of all service hours (average 36 min. per response).

The GP program-provided cellular telephone was a frequently used service that afforded stranded motorists the opportunity to arrange for repairs to be performed at a service station of their choice. Cellular telephones provide an often necessary service: many motorists report that they do not have change or other means to use a regular payphone, even when one is available.

Gateway Patrol operators spent 12% of their time providing service to motorists with 17% of that time allocated to fixing flat tires and 14% each, serving motorists involved in crashes, and towing stalled vehicles. Approximately one response was logged per two hours of program operation, the equivalent of three responses for every 200 service vehicle-miles driven at an average operating speed of 35 mph (average vehicle travel speed was between 55 and 60 mph).

Approximately 40 % of analyzed GP response forms contain comments, all of which praise the program. Responders were not aware of the GP program at the time they were offered assistance.

Discussion

The present effort identified a need to collect data on how long disabled vehicles typically spend on the freeway before they are removed. The only reliable “before” period data were collected by enforcement agencies, which typically were not interested in information on the time a motorist was stranded ($TIME_A$), the time the GP was notified ($TIME_G$), or when a disabled vehicle was removed from the freeway ($TIME_M$).

Based on information presented above, it is evident that the GP is very effective in promptly removing disabled vehicles from the freeway. The presence of the GP service vehicles provides many benefits to WisDOT: i) additional safety for stranded motorists due to reduced time they spend exposed to freeway traffic; ii) additional safety for all other motorists traveling through the corridor, since the probability of secondary collisions and collisions with disabled vehicles is

reduced; iii) continuous freeway monitoring by GP personnel, so that maintenance, safety and other concerns can be promptly identified and reported during GP hours of operation; iv) major public relations benefits for WisDOT, in terms of evident customer satisfaction.

A campaign to increase GP program visibility may produce much wider public opinion support for WisDOT— it appears that, currently, only motorists who have received service from the GP program are aware of the program.

Information collected and analyzed in the course of the present effort will provide Wisconsin-based benchmark performance statistics for similar types of programs that WisDOT may be willing to initiate in the future.

The following recommendations will benefit future motorist assistance program evaluations:

- ! Information on the time motorists were stranded and the time they spent waiting for service is not likely to be systematically recorded by any agency—a database needs to be constructed both for the before and the after period, in order to accurately assess program effectiveness.
- ! Motorist assistance program and enforcement agency dispatch protocols need to be reviewed during the original stages of planning: when tow trucks provide assistance to motorists without the need for an enforcement agency to request this service, valuable time can be saved in providing service and removing disabled vehicles. In addition, squads could focus on responding to higher priority calls. However, enforcement agency public safety concerns are the paramount consideration, and protocols that seek a balance between providing prompt motorist assistance without neglecting safety concerns should be at the basis of every new program.
- ! It may be desirable to investigate the possibility of a separate dispatch telephone number to report mechanical breakdowns. This option would reduce Enforcement agency 911 call traffic, and enforcement agency dispatchers would be able to concentrate on higher priority calls. However, the means to share information between GP and all enforcement agencies about disabled vehicle calls should be provided.

PART II: ENHANCEMENT FREEWAY PATROL PROGRAM EVALUATION

This section presents an evaluation of the Enhancement Freeway Patrol (EFP) Program. When evaluated, the program consisted of two specially-equipped Milwaukee County Sheriff (MCS) squads, purchased with WisDOT assistance and staffed by MCS deputies, that patrolled Milwaukee County freeways from 6:00 am to 10:00 pm during weekdays. EFP squads responded to all types of incidents, but placed a special emphasis on motorist assistance and debris removal. During the construction season they patrolled construction zones almost exclusively and provided special assistance with lane closures and other traffic control needs. This specific focus could reasonably be expected to greatly benefit safety and traffic flow in construction zones. However, because traffic patterns continuously change during construction periods, and the short duration of construction projects in the period following the initiation of the EFP program, the present evaluation centered on the comparison of two non-construction periods for an estimation of EFP Program benefits.

The effect of the presence of the EFP squads on the Milwaukee freeway system was evaluated by comparing two construction-free three-month periods. A period during which the EFP Program was not present (November 15, 1995 to February 4, 1996--the “before” period) was compared with a similar period, during which the EFP Program was present (November 15, 1998 to February 4, 1999--the “after” period). It was decided at the outset of the evaluation to focus the analysis on the “East-West” corridor (the portion of Interstate 94 between the west Milwaukee County border and the Marquette interchange-see map on p. A-4), because the EFP Program placed a special emphasis on this heavily-traveled, heavily-congested urban freeway segment. The analysis corridor coincides with MCS Sector 2 (sector descriptions p. A-9).

The Enhancement Freeway Patrol Program was evaluated based on information gathered from MCS dispatch records, monthly freeway patrol logs, and crash records. The following paragraphs examine East-West corridor MCS patrol activity: dispatch characteristics are presented first, with a special focus placed on Enhancement Freeway Patrol (EFP) squad activity, followed by a presentation of general crash characteristics and characteristics of dispatches to crashes.

Time intervals used in the evaluation are presented in table 6 below. Dispatch data were available for time intervals A and C. Crash data were available for all four periods (A, B, C, and D), however matches with dispatch information were only possible for periods A and C. The main focus of Before-and-After comparisons is on incidents that occurred during time interval A. Other interval comparisons are used to provide additional information, where possible.

Table 6. Time Intervals Used in the EFP Evaluation.

24-Hour Period	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	Sun.
600	NON-EFP HOURS WEEKDAY (Interval B-24% of the time)					(Interval D-9% of the time)	
	EFP HOURS (Interval A-48% of the time)*					NON-EFP HOURS WEEKEND (Interval C-19% of the time)	
2000	NON-EFP HOURS WEEKDAY (Interval B-24% of the time)					(Interval D-9% of the time)	

*EFP program active only during the after period. The same interval was used in the before period for comparison purposes only.

Note: A+B+C+D = 100% of the time

Time interval descriptions or their corresponding abbreviations (A, B, C and D) defined in table 6 are to be used interchangeably in the remainder of this chapter.

3.8 General Dispatch Characteristics

Dispatch information was kept for each squad dispatched to an incident on a separate card at the MCS Dispatch Center (sample in p.A-10). Dispatch cards allowed dispatchers to circle multiple “dispatch type” codes for each dispatch. For example, a dispatch card may have indicated the following four-code sequence: “Abandoned,” “Auto/Truck,” “Query,” “Violation,” indicating that an abandoned vehicle was found, the officer ran a query on the license plate and ticketed the operator. The analyzed database allowed space for six codes to be recorded for any individual dispatch. Dispatch codes captured in the database were queried and dispatches were classified in six categories. These categories are listed below in diminishing traffic impact severity order and

were assigned based on the following logic:

- i. All dispatches indicating “Accident” (dispatch type code on dispatch index card = 2) were assigned to the category “Crash” regardless of the presence of any other codes on the same dispatch record.
- ii. From the remaining dispatch records, those indicating “Abandoned” (code 1) or “Disabled” (code 16) were assigned to the category with the same label (regardless of the presence of other codes).
- iii. From the remaining records, records indicating a “Backup” (code 8) were selected, followed by records indicating:
 - iv. “Debris” (code 15),
 - v. “Query” (code 35) or “Traffic Violator” (code 42).
 - vi. The remaining records were classified as “Other.”

Thus, for example, if a vehicle was abandoned following a crash, the dispatch to the crash scene would be classified under the “Crash” category, not under the “Abandoned/Disabled” category. Finally all records indicating “No Cause” (code 29) were removed from consideration, regardless of any other codes present on the dispatch record.

A total of 2300 p C10 valid dispatch records were included in the database, representing dispatches to locations along the East-West corridor between 6:00 am and 10:00 pm (time intervals A and C in table 6 above), for the periods of November 15, 1995 to February 4, 1996, (the “before” period) and November 15, 1998 to February 4, 1999 (the “after” period). There was a 7% increase in the number of dispatches in the after period (from 1111 in the before to 1189 in the after period-table ST1) . The most significant change in the after period, is an increase by 26% in the “Query/Violation” category which is the predominant MCS activity in both the before and the after periods. Among the most frequent dispatch types, smaller changes occurred in the “Abandoned/Disabled Vehicle” category (13% decrease), and dispatches to crashes (10% increase).

Weekday dispatch counts (logged during time interval A) are shown in figures 2 and 3. Activity peaked on Mondays and weekends in the before period, and Mondays through Thursdays in the

after period (approximately 17% of the weekly activity). A 20% increase in weekday dispatches was noted in the after period (151 additional dispatches). Enhancement patrols were present Monday-Friday during the after period.

Weekend activity (logged during time interval C) represented 31% of all dispatches in the before period. The corresponding figure for the after period was 24%, representing a decrease by 73 dispatches between the two periods.

During weekdays, most dispatches per hour occurred during the pm hours (especially between 2:00 pm and 7:00 pm) in both the before and the after periods-figures 4 and 5. A 61% increase in the number of dispatches was present between 4:00 pm and 6:00 pm in the after period (an additional 72 dispatches). During weekends the peak dispatch times were between 7:00 am and 8:00 am in the before, and during the following hour in the after period. A notable drop in activity was present between noon and 3:00 pm in the after period; it was present only between 2:00 pm and 3:00 pm in the before period. No activity differences between the two periods were present during the rest of the weekend afternoons.

3.9 Before-and-After Comparisons

Two types of before-and-after statistical comparisons were performed in order to evaluate: i) changes that occurred in dispatch distributions; and, ii) changes that occurred in timeline statistics (separate before-and-after comparisons were performed for time intervals A+C, A and C, for the categories for which sufficient data was available). The chi-square statistic was used to evaluate changes in dispatch distributions, and the t-test was used in timeline comparisons. The 0.05 level of significance was used in reporting statistical significance.

Figure 2. Dispatch Distribution by Day of Week—Before EFP Implementation Period.

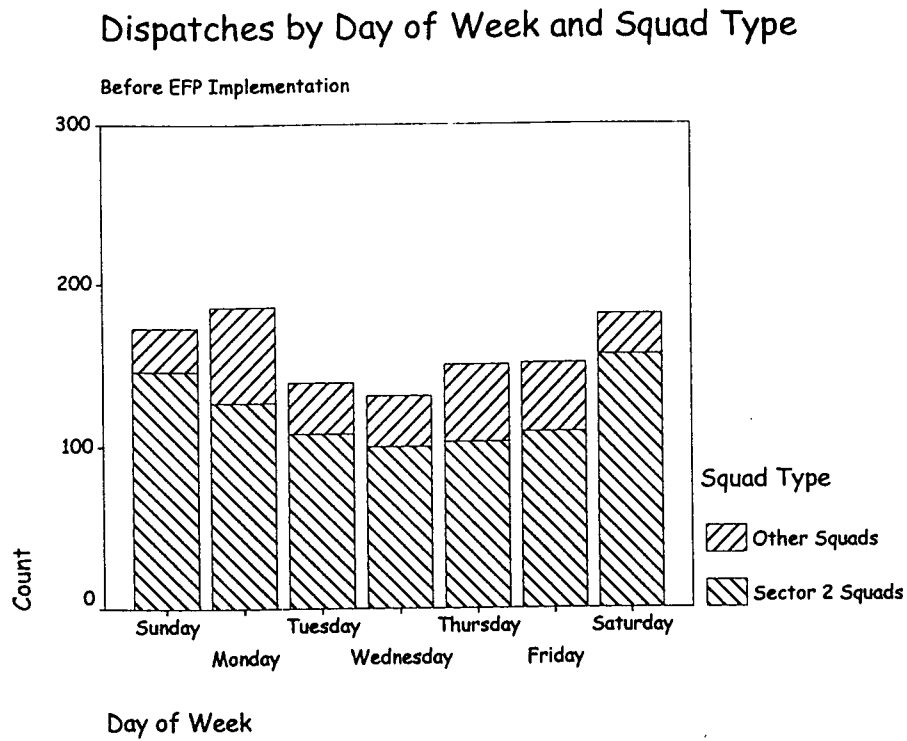


Figure 3. Dispatch Distribution by Day of Week—After EFP Implementation Period.

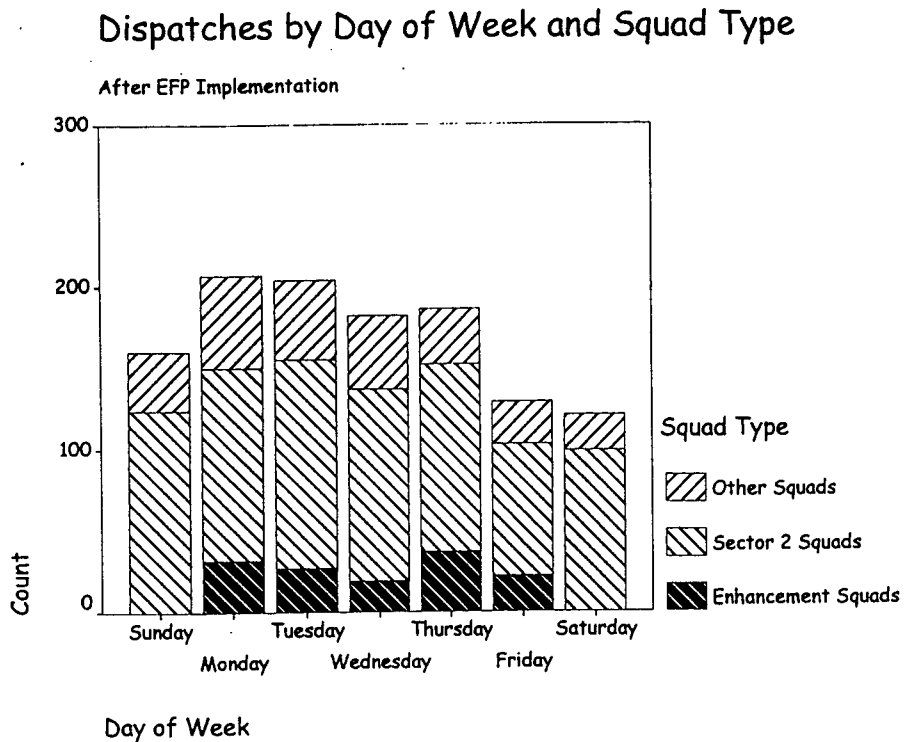


Figure 4. Dispatch Distribution by Hour of Day—Weekdays.

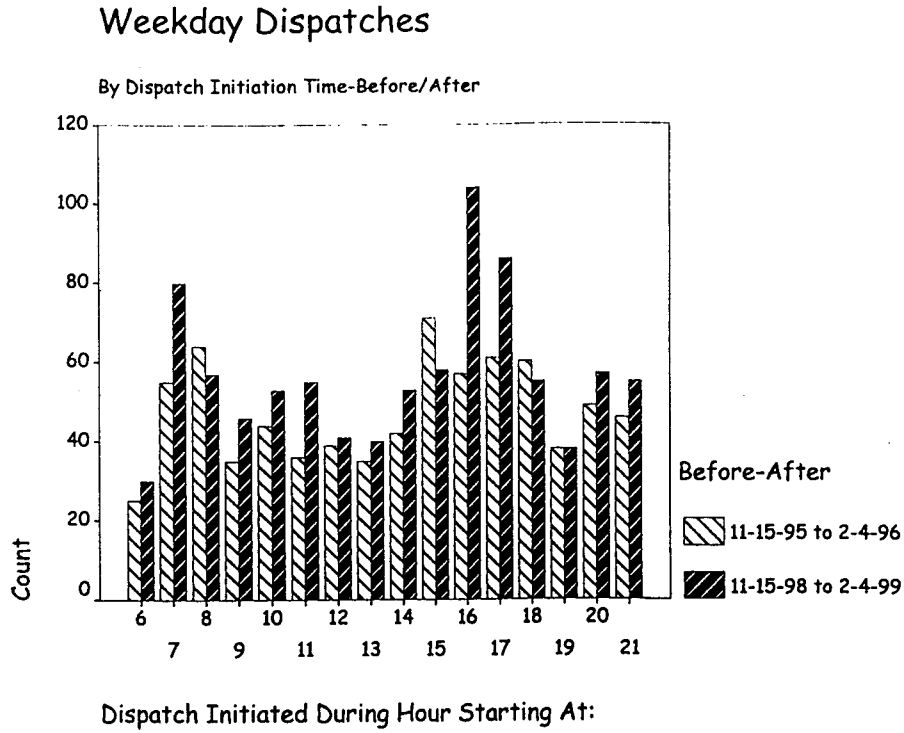
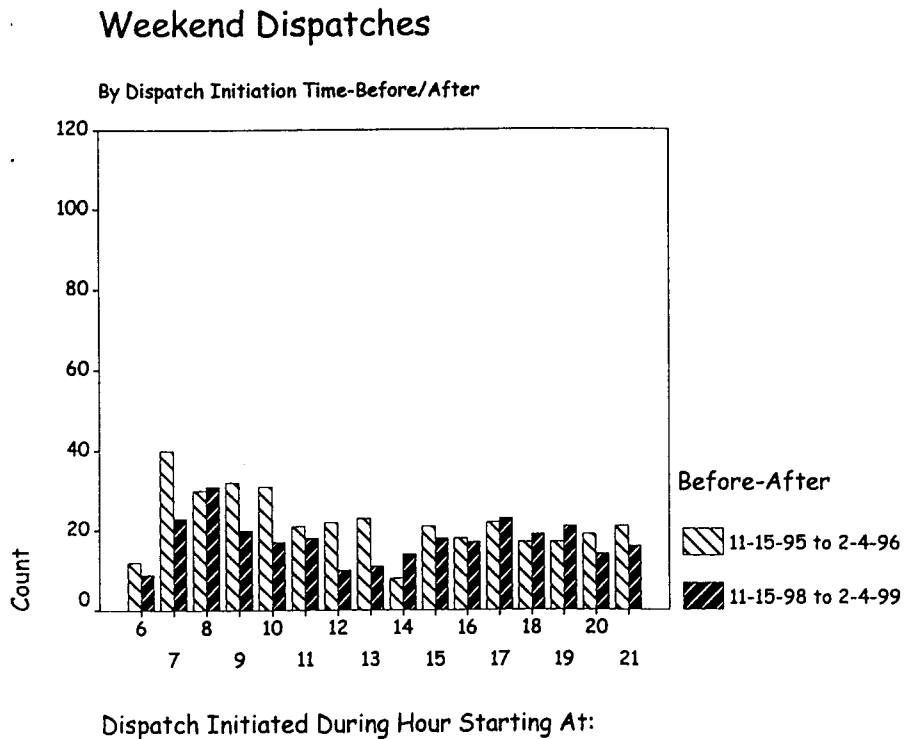


Figure 5. Dispatch Distribution by Hour of Day—Weekends.



3.9.1 Dispatch Distribution Changes

Dispatch temporal distribution by day of week was statistically significantly different between the before and the after period (chi-square test significance $p = 0.000$ -out3). Differences were mainly due to a higher-than-expected number of dispatches on Tuesdays and Wednesdays and lower than expected dispatches on Saturdays in the after period. Dispatch type distribution was also statistically significantly different between the two periods ($p = 0.039$), mainly due to changes in the distribution of weekday dispatches ($p = 0.000$ -out4). This was the result of lower than expected number of dispatches to Abandoned/Disabled vehicles and a higher than expected number of Query/Violation dispatches in the after period. Weekend dispatch type distribution did not significantly change in the after period ($p = 0.380$).

3.9.2 Changes in Averaged Timeline Statistics

Before-and-After response time (TIME_{BD} -see figure 1) and on-scene duration (TIME_{DP}) comparisons were performed for all available data (interval A+C); also separately for interval A and interval C. Results are presented in tables 7 and 8.

Response time information was available for 21% of all dispatches ($n = 482$). Response time was typically not recorded for certain types of dispatches (for example Query/Violation, Backup), since they were initiated by dispatchers, not by external 911 calls (time stamp B-figure 1-not recorded). Mean response time was 4.3 min. in the before period and 4.5 min. in the after. Response times for dispatches to abandoned/disabled vehicles were 7.9 and 6.0 min in the before and after periods respectively during EFP hours. Response times for calls reporting debris on the roadway were 4.8 and 3.6 min. during EFP hours, respectively, but not enough information was available to calculate reliable statistics. None of these changes in response times was statistically significant. Very few non-EFP weekend dispatches included response time information, thus no statistics were calculated for this time interval. A summary of response time findings is presented in table 7. Response time statistics are presented under the general crash characteristics subsection.

Table 7. Mean Dispatch Response Times (min.) Before/After Comparisons.

		Before		After		Significance	Difference (min) ^d
		Mean	No	Mean	No		
All Dispatches		4.3	235	4.5	247	0.875a	+0.2
EFP Hours		4.8	200	4.5	212	0.783a	-0.31
Non-EFP Hours Weekend		1.5	35	4.3	35	0.014b	+2.8
Abandoned/ Disabled	EFP Hours	7.9	54	6.0	59	0.585a	-1.9
	Non-EFP Hours Weekend	1.8	9	7.8	14	c	
Debris	EFP Hours	4.8	25	3.6	17	c	
	Non-EFP Hours Weekend	2.0	3	2.8	4	c	

a. Non-statistically significant difference at the 0.05 significance level.

b. Statistically significant difference at the 0.05 significance level.

c. Inadequate sample for valid statistics.

d. A negative sign indicates a decrease in the after period. No value indicates inadequate information.

On-scene time information was available from 2194 dispatches. Average on-scene time in the before period was 19.4 min. (n = 1048), and 18.3 min. in the after (n = 1146). During EFP hours, average on-scene time in the before period was 21.0 min. and 18.7 min. in the after. The corresponding statistics for non-EFP weekend hours are 16.2 and 16.9 min. respectively. None of these differences is statistically significant, however the change within EFP hours is close to the 0.05 level of significance (p = 0.068).

Mean on-scene time for Abandoned/Disabled dispatches during EFP hours was 15.1 min. in the before and 13.4 min. in the after period. The corresponding figures for non-EFP hours are 12.7 and 13.5 min. None of these differences was statistically significant. Mean on-scene time for “Query/Violation” dispatches was 15.2 and 13.5 min. in the before and the after periods respectively during EFP hours, and 13.0 and 14.7 min. during non-EFP hours, respectively. The before-and-after differences were not statistically significant. No statistically significant differences were detected for dispatches to remove debris or dispatches in the category “Other.” On-Scene time statistics are presented in table 8.

Table 8. Mean Dispatch On-Scene Times (min.) Before/After Comparisons.

		Before		After		Significance	Difference (min) ^c
		Mean	No	Mean	No		
All Dispatches		19.4	1048	18.3	1146	0.252a	-1.2
EFP Hours		21.0	707	18.7	871	0.068a	-2.3
Non-EFP Hours Weekend		16.2	341	16.9	275	0.703a	+0.7
Abandoned/ Disabled	EFP Hours	15.1	212	13.4	195	0.474a	-1.7
	Non-EFP Hours Weekend	12.7	49	13.5	39	0.867a	+0.8
Query/Violation	EFP Hours	15.2	151	13.5	285	0.319a	-1.7
	Non-EFP Hours Weekend	13.0	207	14.7	170	0.295a	+1.8
Debris	EFP Hours	8.7	44	10.5	39	0.528a	+1.8
	Non-EFP Hours Weekend	5.3	7	11.7	11	b	
Other	EFP Hours	11.2	33	20.2	43	0.100a	+9.0
	Non-EFP Hours Weekend	10.6	10	15.2	6	b	

a. Non-statistically significant difference at the 0.05 significance level.

b. Inadequate sample for valid statistics.

c. A negative sign indicates a decrease in the after period. No value indicates inadequate information.

3.10 Crashes Along the “East-West” Freeway

Crashes warrant special attention in the present analysis because of the serious impact they have on operations and safety along the analysis corridor. Because crashes typically require longer clearance times than other incidents, the chances for secondary collisions are higher in the period following a crash; also, crash-induced delays are more severe than those due to other incidents.

Information from crash records was available for crashes that occurred during any time of the day (time intervals A, B, C, and D-table 6), during the entire analysis period. However, MCS dispatch information was available only for time periods A and C, thus matching dispatch and crash information was possible only for these two time intervals.

The following subsections are organized in two parts: a general presentation of crash characteristics which identifies the prevalent types of crashes along the corridor, and their temporal distributions; and, before-and-after comparisons of crash characteristics and dispatch

timeline statistics for dispatches to crashes.

The discussion of general crash characteristics points to the importance of addressing crashes that occur during EFP hours of operation. Three time intervals that cover all hours of each week were used: time interval A (EFP hours), B (non-EFP hours-Weekday) and C+D together (Weekend). Crash timeline statistics (based on information from merged crash and dispatch records) are limited to time intervals A+C and A. Very few statistics were calculated for time interval C due to lack of adequate information.

3.10.1 General Crash Characteristics

This section presents crash characteristics extracted from the entire database, without separate consideration of the before and after periods-such comparisons are deferred until a subsequent section. The main purpose here is to identify differences in crash characteristics between EFP hours of operation and non-EFP hours of operation (both weekday and weekend), and establish the likelihood of certain types of crashes to occur during given time intervals.

A total of 310 crashes were reported on the East-West corridor during the periods November 15 1995 to February 4 1996 and November 15 1998 to February 4 1999. If crashes were evenly distributed over the days of the week, one-seventh (14%) would be expected to occur each day. However, approximately 21% of the total occurred on Mondays, and a similar percentage on Tuesdays--the rest of the weekdays had approximately one-seventh of the crashes each (15%), and the two weekend days together accounted for another 13% of the crashes (Table ST2). Under an even distribution of crashes over time, five-sevenths of the crashes (71%) would be expected on weekdays, the actual figure, however, was 87% (Table 9). Eighty percent occurred during EFP operating hours¹ which represented 48% of the time. Within EFP operating hours,

¹ 6:00 am to 10:00 pm Monday-Friday. This statistic includes both the before and the after period. The EFP program was not active in the before period-the statistic is presented for comparison purposes.

Table 9. Crash Likelihood Ratios During Analysis Time Intervals.

		Crashes		Time	
		No (1)	% of Crash Total (2)	% Time Type of Crash Is Possible (3)	Crash Likelihood Ratio ^a (2)/(3)
All Crashes		310	100	100	1.00
Weekday/ Weekend	Weekday	269	87	71	1.22
	Weekend	41	13	29	0.45
EFP hours	All EFP hours (A)	249	80	48	1.67
	AM peak (7:00-9:00 am)	63	20	6	3.33
	PM peak (5:00-7:00 pm)	76	25	6	4.17
Non-EFP hours	Weekday (B)	20	6	24	0.25
	Weekend (C+D)	41	13	29	0.45
Day of Week	Mondays-Tuesdays	65/each	21/each	14/each	1.50
	Wednesdays-Fridays	47/each	15/each	14/each	1.07
	Saturdays-Sundays	21/each	7/each	14/each	0.50
Crash Severity	Injury	102	33	100	0.33
	Property Damage Only	208	67	100	0.67
Manner of collision	Rear-End	156	50	100	0.50
	EFP hours (A)	139	45	48	0.94
	Non EFP Weekend (C+D)	13	4	29	0.14
	Other than MV in Transport	67	22	100	0.22
	EFP hours (A)	37	12	48	0.25
	Non-EFP Weekend (C+D)	19	6	29	0.21
Pavement Condition ^b	Dry	192	62	60	1.03
	EFP hours (A)	162	52	29	1.79
	Non-EFP Weekend (C+D)	20	6	17	0.35
	Wet	53	17	16	1.06
	EFP hours (A)	39	13	8	1.63
	Non-EFP Weekend (C+D)	10	3	5	0.60
	Snow/Slush	50	16	24	0.67
	EFP hours (A)	36	12	12	1.00
	Non-EFP Weekend (C+D)	11	4	7	0.54
Number of Vehicles Involved in Crash	1 veh.	57	18	100	0.18
	EFP hours (A) 1 veh.	29	9	48	0.19
	Non-EFP hours (C+D) 1 veh.	19	6	29	0.21
	2+ veh.	253	82	100	0.82
	EFP hours (A) 2+ veh.	220	71	48	1.48
	Non-EFP hours (C+D) 2+ veh.	22	7	29	0.24

a. A value of 1.00 indicates actual crash percentage was exactly equal to expected crash percentage during a given time interval, if crashes were evenly distributed over time. A value higher than 1.00 indicates that actual number of crashes exceeded expected number of crashes in a given time period and vice versa.

b. Percent time with no precipitation, rain and snow precipitation was calculated using data from the Midwestern Climate Center.

the highest crash concentration was during peak hours² (45% of the crashes during 12% of the time), and the pm peak had an even higher crash concentration: 25% of the crashes within 6% of the time. (Ratios of the crash/time percentages — “Crash Likelihood Ratios” are presented in Table 9.

Crashes involving an injury ranged between 29% (weekend) and 40% (weekdays non-EFP hours) of all crashes during the corresponding time period with an overall average of 33%- table ST 3. Differences between time periods were not statistically significant. The predominant types of crashes were Rear-End (RE), crashes with Other than Motor Vehicle-in-Transport Objects (OtMVO), Side-Swipe Same Direction (SSSD), and Angle (AGL) crashes-table ST 4.

RE crashes were dominant (50% of all crashes) and constituted 56% of all crashes during EFP hours of operation, but only 20% and 32% of the crashes during non-EFP weekday and weekend hours, respectively-table ST 4. OtMVO crashes were less frequent overall (22% of the total), the least frequent during EFP hours of operation (15%) and the most frequent during other hours of operation (55% and 46% during weekday and weekend non-EFP hours, respectively). The lowest overall frequencies were SSSD (16% of all crashes) and AGL (9.4%) collisions. The overwhelming majority (82%) of these crashes occurred during EFP hours.

The chi-square statistic was used to identify statistically significant differences in the distributions of crash characteristics among analysis time intervals. Statistical requirements for the chi-square test allowed only categories with sufficient crash frequencies to be tested. A comparison between EFP hours (interval A) and Weekend (intervals C+D) crashes, limited to Rear-End (RE), Collisions with Other than Motor Vehicles in Transport Objects (OtMVO) and Side Swipe Same Direction (SSSD) crashes, indicated statistically significant differences between the two time periods ($p = 0.000$ -out6). RE and OtMVO crashes are mainly responsible for the differences between the time periods (more than expected RE and less than expected OtMVO crashes during EFP hours).

² 7:00 am to 9:00 am and 5:00 pm to 7:00 pm.

Most crashes (62%) occurred on dry pavements. Of those, 65% occurred during EFP hours, compared to 50% during other time intervals-table ST 5. Approximately 16% of the crashes occurred on wet and an equal percentage on snow/slush-covered pavement. The percentages were approximately 15% during EFP hours, and 25% in each of these pavement conditions during weekends. Differences between the three time intervals were statistically significant ($p = 0.048$).

Only 12% of the crashes during EFP hours involved a single vehicle, compared to 45% during the other time intervals-table ST 6. Most crashes during EFP hours involved two vehicles (67%); the percentage for each of the other two periods was approximately 44%-similar to that of single-vehicle crashes. Comparisons between single-vehicle and multi-vehicle crashes indicated statistically significant ($p = 0.000$ -out6) differences between the EFP and Weekend periods.

Two-thirds of the crashes (67%) did not involve an injury-table ST 7, and this was true for all three analyzed time periods. One injury was present in 24% of the crashes, with the most notable deviation for the weekday non-EFP hours, during which 35% of the crashes involved an injury.³ Multiple-injury crashes represent approximately 9% of all crashes and the overwhelming majority of those (93%) occurred during EFP hours.³ Due to the small number of multiple-injury crashes, only statistics comparing no-injury versus injury crashes were calculated—this comparison was identical to comparing PDO versus injury crashes—no statistically significant differences were present between EFP, non-EFP weekday and Weekend time intervals ($p = 0.704$).

Days of the week with the highest numbers of crashes were Mondays and Tuesdays (average 21% per day)-see table ST 2. Other weekdays had approximately equal numbers of crashes (15% each). The lowest numbers of crashes occurred on weekends (7% each day). Figures 6 and 7, present crash temporal distribution for weekdays and weekends respectively. During weekdays, the highest crash-per-hour concentrations occurred during the morning and afternoon peak hours

³ Very few crashes available in this category--statistics should be viewed as tentative.

under high-volume and low-speed (20-35 mph) conditions. Total, injury and PDO crashes, peaked simultaneously during these hours. The heaviest crash concentrations occurred between 2:00 pm and 8:00 pm. The number of weekend crashes was too low to derive definitive conclusions about their temporal distribution. No crashes were reported during the hours starting at 1:00, 4:00, 6:00, 9:00, 15:00, and 23:00.

One-third of all crashes resulted in at least one injury, however, when at least one vehicle was severely damaged (this occurred in 16% of the crashes), the chances of at least one injured occupant climbed to 55%-table ST 8. Only 5% of the crashes involved very severely damaged vehicles, and in 63% of those, at least one occupant was injured.

Vehicles required towing in approximately 39% of the crashes, with a notable discrepancy from that figure for weekday non-EFP hours (70%)⁴-table ST 9.

Table 9 presents crash likelihood ratios, the actual percentage of crashes that occurred during a specific time interval, over the percentage of time this interval represents. For example, weekdays represent five-fifths (71%) of the time, during which 87% of all crashes occurred ($269/310 = 0.87$). Thus the crash likelihood ratio for weekdays is $0.87/0.71 = 1.22$. The higher the crash likelihood ratio is, the higher the chance of a crash is (the higher the number of crashes per hour is).

Based on information presented in table 9, crashes were more likely to occur on weekdays versus weekends, EFP hours versus non-EFP hours, the pm peak versus the am peak, Mondays and Tuesdays versus the rest of the week.

⁴ Very few crashes available in this category--statistics should be viewed as tentative.

Figure 6. Crash Occurrence Hour—Weekdays.

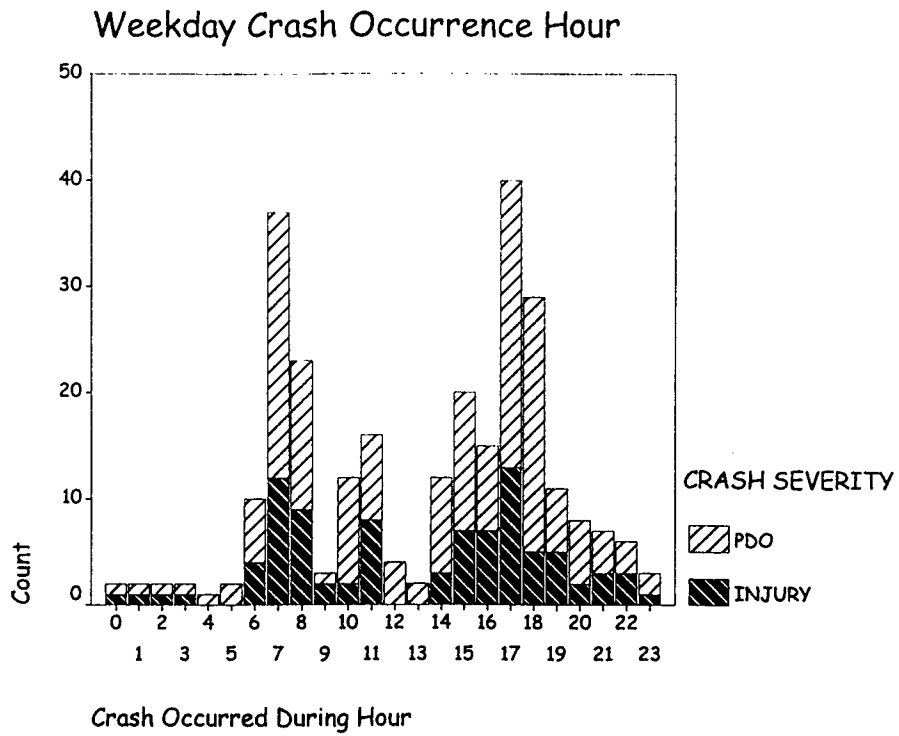
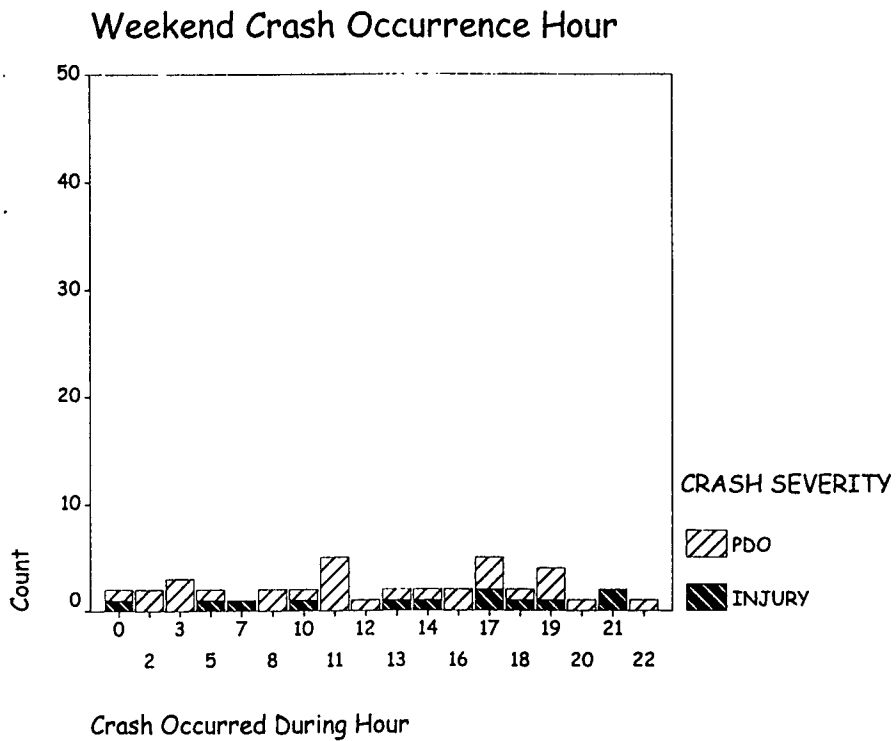


Figure 7. Crash Occurrence Hour—Weekends.



Rear-End crashes constituted 50% of all crashes and thus were more likely than collisions with other-than-motor-vehicle-objects, which constituted 22% of all crashes. If crashes were evenly distributed during all hours of the day, half of the expected number of crashes during EFP hours would be rear-end. However, rear-end crashes constituted 94% of the crashes expected during EFP hours, but only 14% of the crashes expected during non-EFP weekend hours.

Higher-than-expected crashes occurred on dry and wet pavement during EFP hours of operation. Multi-vehicle crashes were also higher than expected during EFP hours of operation.

3.10.2 Before-and-After Comparisons

Comparisons between the before and the after period were conducted for the three time intervals presented in the preceding discussion (A, B, C+D). Separate comparisons were conducted to examine: i) whether changes occurred in the distribution of certain crash characteristics (e.g., crashes during daytime and nighttime, crashes on wet and dry pavements, crashes involving one or multiple vehicles); and ii) whether changes occurred in timeline intervals (e.g., response time) within any given time interval (e.g., EFP hours of operation). Changes in crash characteristic distributions were examined using the chi-square test, and the t-test was used to examine changes in timeline intervals.

Some tests were omitted because not enough cases were available to conduct valid statistical tests. Timeline interval comparisons were feasible only for EFP hours of operation, because crashes in the other two time periods were very few.

Crash Distribution Comparisons

This subsection addresses the issue of whether the distribution of crash characteristics in the after period differed from that in the before period. As part of the EFP evaluation, it was necessary to examine whether the operation of the EFP program had an impact on crash statistics during non-EFP hours of operation. This could have been possible if, for example, the establishment of the EFP program was associated with some change in MCS freeway enforcement policy or resource reallocation. However, addressing non-EFP hours of operation was only possible at the broadest

level (overall before-after comparison), because the number of crashes became too small for valid comparisons, once additional factors (e.g., crash severity, light condition) were introduced.

No statistically significant differences were present in the distribution of crashes between the EFP, non-EFP weekday and non-EFP weekend time intervals in the after period. Statistical tests were performed concerning characteristics of crashes that occurred during the entire before versus the entire after period. Changes in the characteristics of crashes that occurred during EFP hours of operation in the after period were also addressed.

Statistical information is summarized in table 10, where statistical significance (based on the chi-square statistic) indicates a change in the **distribution** of crashes for a given crash characteristic. For example, statistical significance for the variable “Pavement Condition” in table 10 indicates that a significantly different percentage of crashes occurred in the after period (compared to the before), within at least one of the examined pavement conditions (dry pavement, wet pavement, pavement covered with snow or slush).

There was an overall 9% reduction in crashes in the after period-table ST 10. The reduction was 16% during EFP hours of operation, and 2% during non-EFP weekday hours, but an increase of 56% was noted during weekends. These changes were not statistically significant.

Injury crashes decreased by 21% overall and 29% within the EFP hours of operation in the after period. There were fewer Rear-End, collisions with Other than Motor-Vehicle Objects, Side Swipe Same-Direction and Angle crashes within EFP hours of operation in the after period, however, none of these improvements were statistically significant.

Changes in the percentages of crashes occurring under each pavement condition were observed in the after period during EFP hours of operation: a decrease of crashes on dry pavement an increase in wet pavement crashes, and a drastic decrease in snow/slush-covered pavement crashes. These changes were statistically significant at the 0.05 level of significance.

Table 10 Changes in the distributions of crash characteristics between the before and the after period.

		No. Before	No. After	Difference (%) ^a	Significance ^b
All Hours		162	148	-9	Not applicable
Time Interval	EFP Hours	135	114	-16	0.190
	Non-EFP Hours Weekday	11	9	-2	
	Non-EFP Hours Weekend	16	25	+56	
Crash Severity All Hours	Injury	57	45	-21	0.371
	PDO	105	103	-2	
Crash Severity EFP Hours	Injury	48	34	-29	0.410
	PDO	87	80	-8	
Light Condition All Hours	Daylight	82	69	-16	0.612
	Dark-Lighted	75	71	-5	
Light Condition EFP Hours	Daylight	73	63	-14	0.628
	Dark-Lighted	59	44	-25	
Manner of Collision All Hours	Rear-End	79	77	-3	0.628
	SSSD	25	25	=0	
	OtMVO	40	27	-33	
	Angle	15	14	-7	
Manner of Collision EFP Hours	Rear-End	73	66	-10	0.310
	SSSD	20	21	+5	
	OtMVO	26	11	-58	
	Angle	13	12	-8	
Pavement Condition All Hours	Dry	99	93	-6	0.065
	Wet	23	30	+30	
	Snow/Slush	33	17	-48	
Pavement Condition EFP Hours	Dry	86	76	-12	0.026
	Wet	18	21	+17	
	Snow/Slush	27	9	-67	
Number of Vehicles Involved All Hours	1	32	25	-22	0.516
	2+	130	123	-5	
Number of Vehicles Involved EFP Hours	1	21	8	-62	0.058
	2+	114	106	-7	
Towing Required All Hours	Yes	92	95	+3	0.230
	No	68	53	-22	
Towing Required EFP Hours	Yes	77	79	+3	0.064
	No	56	35	-38	

a. (After - Before) / Before (Negative value indicates a decrease in the after period).

b. Bold type indicates statistically significant at the 0.05 significance level.

There was a 62% decrease in the number of single-vehicle crashes within EFP hours in the after period. The number of vehicles involved in crashes that required towing declined by 38% in the after period-table ST 11. Although both of these changes were close to the point of becoming statistically significant, neither of these reductions was significant at the 0.05 level of significance.

Averaged Timeline Statistics

Timeline information was derived by merging crash record and MCS dispatch information. Crash time, notification time, and scene arrival time were recorded on crash records. MCS dispatch records indicated notification time, scene arrival time and scene clearance time. Crash details were extracted from crash records.

Two or more squads were frequently present at crash scenes (this was verified by use of Log C discussed under the Enhancement Squad Characteristics subsection and presented in pp. A-38 and A-39), thus the number of dispatches to crashes during the analysis period ($n = 434$) exceeded the number of reported crashes ($n = 249$). [The total number of crashes during 24-hour periods was 310, however, only 249 of those occurred between 6:00 am and 10:00 pm (= time intervals A and C)]. A total of 217 (75%) of the crashes that occurred within time intervals A and C were matched with MCS dispatch records, and were used to derive the timeline interval statistics analyzed below.

Based on information from the matched dispatch and crash records, separate before-and-after comparisons were performed for time interval A and time interval C for the following timeline interval statistics: i) mean notification time and mean response time; ii) mean on-scene duration; and, iii) mean crash-to-clearance time. Statistical conclusions were based on the t-test for comparison of means. The 0.05 level of significance was used for this test.

Mean Notification and Mean Response Time

Notification time $TIME_{AB}$ -figure 1-information was available from 108 matched records. No significant differences were found between the before and the after period during EFP hours of

operation. Not enough information was available for non-EFP weekend hours. Given the absence of differences between the before and after periods an average notification time of 2.9 min was calculated, based on all available information-table 11.

Table 11. Dispatches to Crashes: Mean Notification Times (min.) Before/After Comparisons.

	Before		After		Significance	Difference (min) ^c
	Mean	No	Mean	No		
All Dispatches	3.1	60	2.7	48	0.539a	-0.4
EFP Hours	3.2	54	3.0	42	0.808a	-0.2
Non-EFP Hours Weekend	2.7	6	0.8	6	b	

a. Non-statistically significant difference at the 0.05 significance level.

b. Inadequate sample for valid statistics.

c. A negative sign indicates a decrease in the after period. No value indicates inadequate information.

Response time ($TIME_{BD}$ -figure 1) statistics were calculated based on 129 matched dispatch and crash records. No statistically significant differences were present between the before and the after period, during EFP hours of operation. Average response time was 3.4 min., based on all available information-table 12.

Table 12. Dispatches to Crashes: Mean Response Times (min.) Before/After Comparisons.

	Before		After		Significance	Difference (min) ^c
	Mean	No	Mean	No		
All Dispatches	2.8	68	4.0	61	0.286a	+1.2
EFP Hours	3.1	61	4.5	50	0.262a	+1.5
Non-EFP Hours Weekend	0.6	7	2.4	7	b	

a. Non-statistically significant difference at the 0.05 significance level.

b. Inadequate sample for valid statistics.

c. A negative sign indicates a decrease in the after period. No value indicates inadequate information.

Mean On-Scene Duration Time

On-scene duration ($TIME_{DP}$) information was available for 195 crashes. There was an overall drop in mean on-scene duration from 45.0 min. in the before period to 34.7 min. in the after period. The drop was from 44.9 min. to 34.6 min. during EFP hours (time interval A), which

was statistically significant at the 0.05 level of significance. Not enough data was available for before-after comparisons concerning weekends (time interval C).

Due to lack of adequate data, before-after evaluations were not pursued any further for time interval C ; the discussion below addresses only time interval A comparisons. Findings are summarized in table 13.

Table 13. Dispatches to Crashes: Mean On-Scene Times (min.) Before/After Comparisons.

		Before		After		Significance	Difference ^d
		Mean	No	Mean	No		
All Crashes		45.0	97	34.7	98	0.015a	-10.3
Enhancement Freeway	EFP Hours (A)	44.9	89	34.6	86	0.021a	-10.3
Patrol Active or Not	Non-EFP Hours (C)	45.9	8	35.8	12	b	
Crash Severity	Injury	51.5	34	39.5	31	0.127c	-12.0
EFP Hours (A)	PDO	40.9	55	31.8	55	0.090c	-9.1
Light Conditions	Daylight	43.6	44	33.0	48	0.089c	-10.6
EFP Hours (A)	Dark-Lighted	46.7	44	39.3	34	0.286c	-7.4
Manner of Collision	Rear-End	45.4	50	33.7	55	0.022a	-11.7
EFP Hours (A)	No Collision w/MV in Transport	39.8	19	49.0	8	b	
	SS Same Direction	34.4	12	29.7	13	b	
Pavement Condition	Dry	43.2	57	35.1	61	0.138c	-8.1
EFP Hours (A)	Wet	45.5	11	32.2	17	b	
	Snow/Slush	52.6	18	41	6	b	
No of Vehicles Involved in	1	31.4	14	53.8	6	b	
Crash-- EFP Hours (A)	2+	47.5	75	33.2	80	0.003a	-14.3

a. Significant difference at the 0.05 significance level.

b. Inadequate sample for valid statistics.

c. Non-statistically significant difference at the 0.05 significance level.

d. A negative sign indicates a decrease in the after period. No value indicates inadequate information.

Reductions in mean on-scene durations for injury crashes (from 51.5 min. in the before to 39.5

min. in the after period) and Property Damage Only crashes (from 40.9 min. to 31.8 min. respectively), were not statistically significant.

Reductions in mean on-scene durations were evident in the after period for crashes during daylight (from 44.6 to 33.0 min) and dark-lighted conditions (from 46.7 to 39.4 min.), and on dry pavements (from 43.2 min. to 35.1 min.) A statistically significant reduction was identified for rear-end crashes (from 45.4 min. to 33.7 min.)

Crash Occurrence-to-Clearance Time

Information on crash occurrence-to-incident clearance time ($TIME_{AP}$) was available for 195 crashes. There were statistically significant reductions for interval A+C (from 53.1 min. to 42.3 min.) and interval A (from 52.9 min. to 42.5 min.) . The same variables as in the on-scene time analysis were examined, and the only other statistically significant differences noted were for rear-end crashes (from 54.9 min. to 42.9 min.) and multi-vehicle collisions (from 55.1 min. to 40.9 min.) It should be noted that a reduction from 48.8 min. to 39.7 min. for property damage only crashes had a significance of 0.064, close to the 0.05 level of significance. Findings are summarized in table 14.

3. 11 Secondary Crash Analysis

Crashes upstream of any type of a “primary” incident, were identified as “secondary” crashes. A total of 24 occurrences of secondary crashes were identified in the “before” period and 22 in the “after” period, a reduction of 8%. Primary incidents associated with secondary crashes were mostly crashes (46%). The most prominent among the remaining primary incident categories included: disabled vehicles (33%, one-third of which were also reported to be blocking a traffic lane), and vehicles reported to block a traffic lane, not reported to be disabled (4%). Thus these three primary incident categories collectively accounted for 83% of secondary crashes.

Table 14. Dispatches to Crashes: Mean Crash-to-Clearance Times (min.) Before/After Comparisons.

		Before		After		Significance	Difference (min) ^d
		Mean	No	Mean	No		
All Crashes		53.1	97	42.3	98	0.009a	-10.8
Enhancement Freeway Patrol Active or Not	EFP Hours (A)	52.9	90	42.5	87	0.016a	-10.4
	Non-EFP Hours (C)	55.4	7	40.3	11	b	
Crash Severity EFP Hours (A)	Injury	60.1	33	47.7	31	0.124c	-12.4
	PDO	48.8	57	39.7	56	0.064c	-9.1
Light Conditions EFP Hours (A)	Daylight	52.2	46	40.8	49	0.068c	-11.4
	Dark-Lighted	54.1	43	47.7	34	0.296c	-6.4
Manner of Collision EFP Hours (A)	Rear-End	54.9	52	42.9	55	0.023a	-12.0
	No Collision w/MV in Transport	48.0	19	56.0	8	b	
	SS Same Direction	42.5	11	38.2	14	b	
Pavement Condition EFP Hours (A)	Dry	54.5	57	43.8	61	0.138c	-10.7
	Wet	46.3	12	41.5	17	b	
	Snow/Slush	55.1	18	44	6	b	
No of Vehicles Involved in Crash--EFP Hours (A)	1	43.8	17	55.8	9	b	
	2+	55.1	80	40.9	89	0.001a	-14.2

a. Significant difference at the 0.05 significance level.

b. Inadequate sample for valid statistics.

c. Non-statistically significant difference at the 0.05 significance level.

d. A negative sign indicates a decrease in the after period. No value indicates inadequate information.

3.12 Enhancement Squad Dispatch Characteristics

Activity in the corridor was dominated by Sector 2-dedicated squads in both periods. An 8% decrease was noted in the after period--figure 8 accompanied by an increase by 3% in the use of other sector squads, in the after period. The net effect was an overall decrease of 5% in the number of dispatches between these two squad categories. Enhancement squad dispatches more than made up for this deficit, and resulted in the overall net increase of 7% in the after period, mentioned above. Enhancement squad dispatches (n = 138) represent 6% of all analyzed dispatches, and 12% of dispatches in the after period.

Figure 8. Number of Dispatches Before and After EFP Implementation.

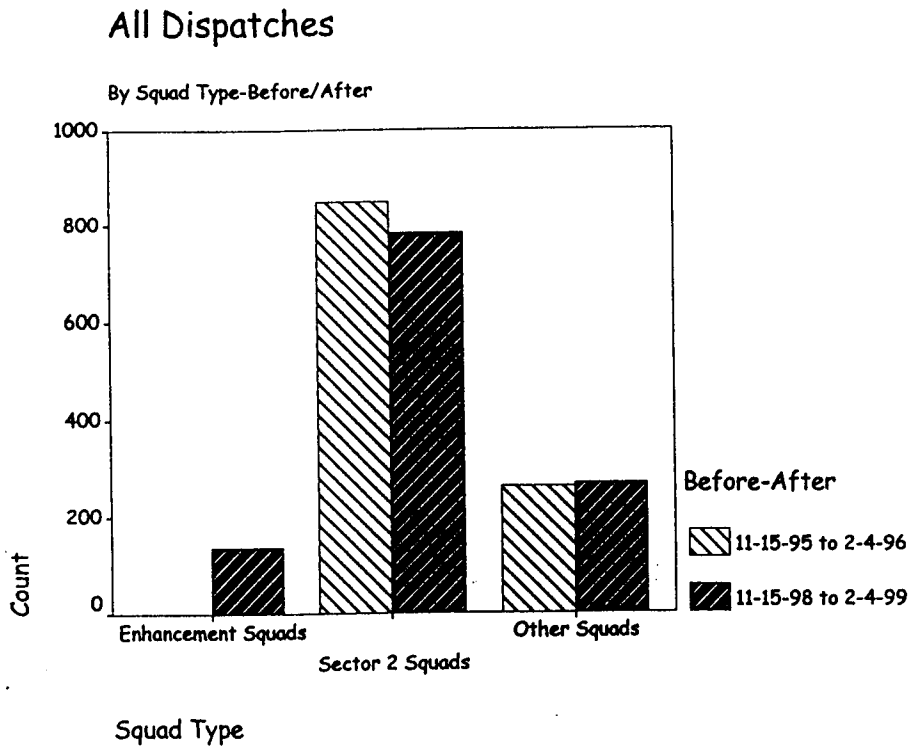


Figure 9 displays the percentage of each type of dispatch that was served by Sector 2-dedicated squads and squads from external sectors (“Other Squads”) during the before period, when the EFP program had not been enacted (percentages for each squad type add up to 100%).

Approximately 76% of dispatches were served by Sector 2 squads, the remainder by “Other” squads (table ST 12). Most dispatch types were served proportionately to squad type presence, however Sector 2 squads had a lower proportion of backup and “Other” dispatches. These differences were statistically significantly different at the 0.05 level (chi-square $p = 0.002$).

Dispatch type distributions for Enhancement, dedicated Sector 2 and “Other” squads for the after period are shown in figure 10. Enhancement squads served 12% of the dispatches, Sector 2 squads 66 % and the remaining 23% was served by “Other” squads (table ST 13). Enhancement squads served predominantly “Abandoned/Disabled” and “Debris” dispatches, and placed a lower emphasis on “Query/Violation” dispatches. Sector 2 squads placed the most emphasis on dispatches to crashes and the least on backups. “Other” squads placed lower emphasis on “Abandoned/Disabled” and higher emphasis on backup and “Other” dispatches. Differences between the types of calls served by each squad type were statistically significant ($p = 0.000$).

The distribution of dispatch types served by Sector 2 squads did not change statistically significantly in the period after the introduction of the EFP squads ($p = 0.075$). However, dispatch type distribution for “Other” squads did experience a statistically significant change in the after period ($p = 0.003$).

3.12.1 Squad Service Area Analysis

The evaluation corridor was served primarily by Sector 2-dedicated squads (see MCS Sector descriptions in p. A-9) during the evaluation period. Dedicated Sector 2 squads were also supported by enhancement squads (two squads during each of the day shift and the second shift) and squads from other sectors that were occasionally dispatched to assist with Sector 2 dispatches.

Figure 9. Dispatch Types Served by Squad Type Before EFP Implementation.

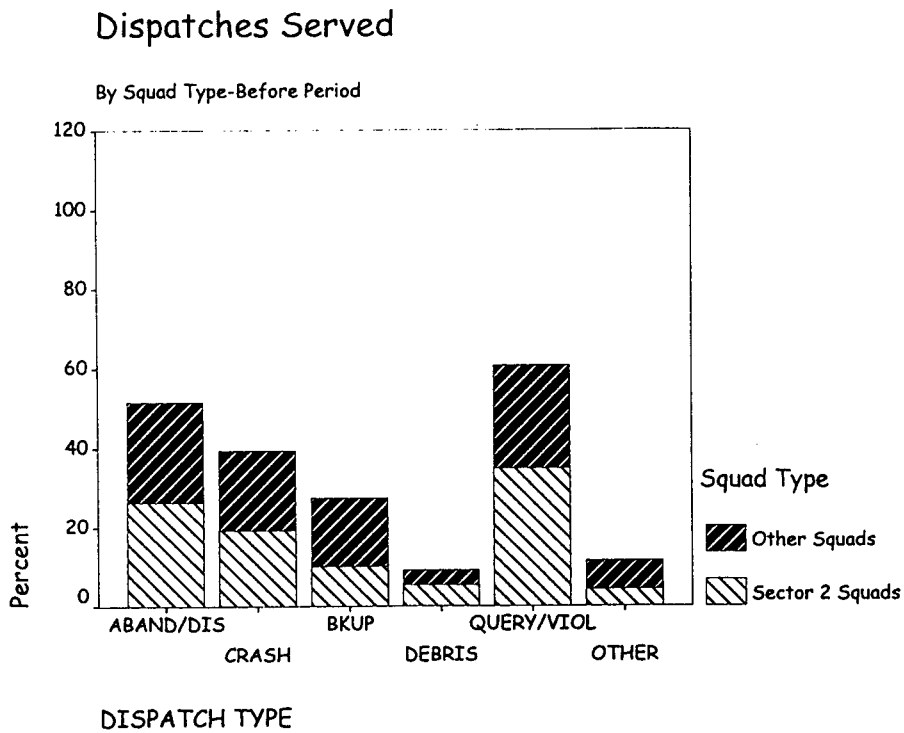
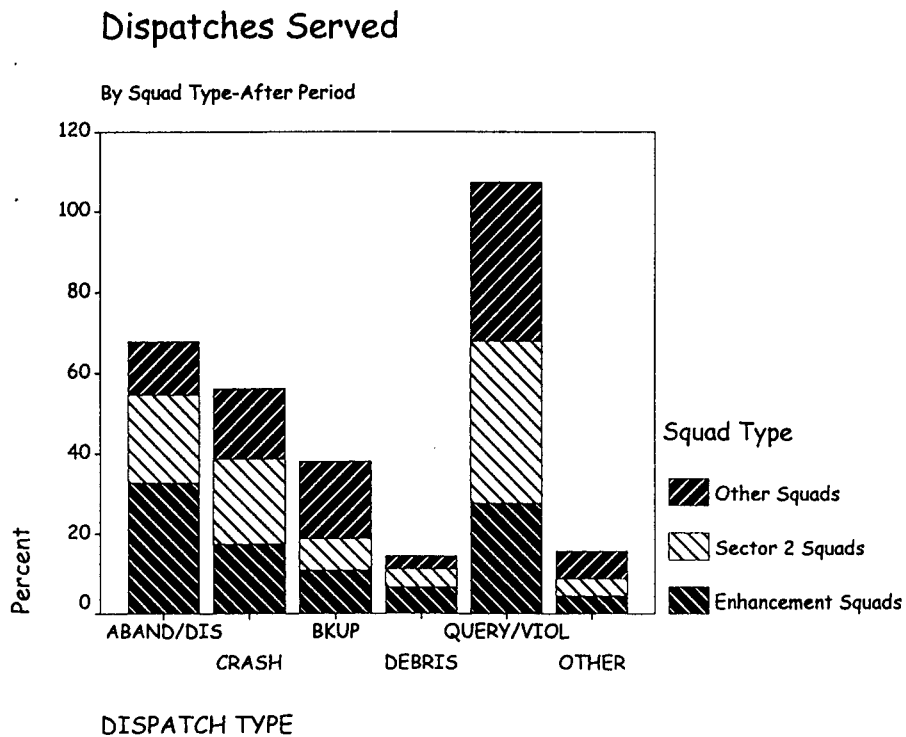


Figure 10. Dispatch Types Served by Squad Type After EFP Implementation.



Dispatch records indicate squad identification number. This information was captured in the database and made possible to track dispatch activity by individual squads. The first digit of a squad number indicated the sector to which a squad was assigned (for example squad number 23 is assigned to sector 2, squad 14 is assigned to sector 1); typically, low second digits (1-3) indicated a day shift squad and higher second digits (4+) indicated a second shift squad. A squad suffix indicated a special squad: 'R' indicated a special enforcement squad during the Day shift, and a roving squad during the second shift; 'T' indicated a truck enforcement squad; 'A' and 'B' indicated EFP squads--23A and 23B were day shift, 26A and 26B second shift squads.

Table ST 14 presents the number of dispatches on the East-West freeway during the entire evaluation period. Activity is shown by sector to which squads were dedicated. Most dispatches (77%) were served by sector 2-dedicated squads (enhancement squads included). This percentage remained constant during the before and the after periods, despite a 7% increase in the number of dispatches in the after period. Enhancement squads (present only in the after period) were mainly responsible for keeping the share of all dispatches served by sector 2-dedicated squads unchanged, despite the overall increased level of activity. They provided 11% of the after period on-scene work hours.

Sector 2-dedicated squads served 8% more dispatches in the after period with a little over 2% additional off-duty (on-scene) hours. This can be partially attributed to the increased number of shorter-on-scene-time Query/Violation dispatches, but also to reduced mean on-scene times for the Abandoned/Disabled and Crash dispatch categories in the after period. Squads dispatched to Sector 2 from external sectors served 3% more dispatches in the after period, using 2% less off-duty hours. Differences between Sector 2 and external sector squad statistics can be attributed to dispatch protocols--for example, it was common practice that an external squad dispatched to a sector 2 incident would return on-duty as soon as a sector 2 squad was available at the incident scene.

Based on information presented in table ST 15, day shift squads 21 and 22 and second shift squads 24 and 25 had an average 182 dispatches per squad during the analysis period. During the

same period, EFP day shift squads 23A and 23B and second shift squads 26A and 26B had an average of 30 dispatches per squad, which corresponded to approximately 17% of the activity of the previously mentioned squads.

Tables 15 and 16 below were derived from monthly Traffic Division Activity Reports (pp. A-13 and A-14). Average miles driven per day did not differ significantly between “patrol” and “enhancement” squads (terms used in the Activity Reports): the average for enhancement squads was 133.6 miles per day, and 138.5 miles per day for patrol squads. Average enforcement days per month per deputy were 16.8 for enhancement and 14.8 for patrol squads.

Table 15. Average Miles Driven per Shift per Squad.

	Dayshift		Second Shift	
	Patrol	Enhancement	Patrol	Enhancement
Nov 98	144	144	139	93
Dec 98	140	168	127	120
Jan 99	142	144	142	119
Feb 99	135	154	139	127

Table 16. Average Enforcement Days per Month per Deputy.

	Dayshift		Second Shift	
	Patrol	Enhancement	Patrol	Enhancement
Nov 98	13.6	11.5	14.1	14.0
Dec 98	14.9	18.5	13.8	19.5
Jan 99	17.1	19.0	15.4	15.5
Feb 99	14.9	17.0	14.5	19.5

Given the similarities between number of miles driven and number of enforcement days, it can be reasonably expected that similar numbers of dispatches would have been logged by these two types of squads, however, as mentioned above, enhancement squads logged only 17% of the dispatches logged by enforcement squads. This leads to a conclusion that enhancement squads

were dispatched outside sector 2 approximately 83% of the on-duty time during the analysis period.

The three logs presented in the Appendix (pp. A-32 through A-39), provide better insights into squad activity along the evaluation corridor. Log A traces Enhancement squads 23A and 23B (dayshift), and 26A and 26B (second shift) during the entire after period. Individual squads rarely logged more than a few dispatches in a single day on the study corridor. No dispatches were logged on weekends, and occasionally no dispatches were logged for one or more days.

Log B traces Patrol squads 21 (dayshift) and 24 (second shift) for the period of Sunday, November 15, 1998 to Tuesday, December 1, 1998. Squad 21 spent the morning of Saturday, November 15, 1998 in self-initiated enforcement dispatches (time B is missing--no 911 call was received, but time D is present, indicating the time the squad was at the incident scene). The first query/violation dispatch was initiated at 7:45 am near the Stadium interchange and terminated at 7:53 am. Then the officer traveled eastbound and the next query/violation was reported on 22nd Street, at 8:23 am. That call terminated at 8:30 am. The officer traveled westbound and initiated another query/violation on 23rd Street. In all, the officer gave four tickets, ending the fourth dispatch at 8:44 am at 40th Street, after which time no dispatch is shown for squad 21 on that day. Squad 24 arrived as a backup at 14:46 near 68th Street and terminated this call at 14:56. Only one dispatch was registered for this squad within the evaluation area on November 15, 1998. Dispatch times are consistent with shift periods (squad 21 served the morning shift, and squad 24 the second shift). Incident notification times are recorded for some dispatches during the evaluation period, but as noted above, most dispatch records do not show a notification time (time B).

Log C traces all dispatch activity along the evaluation corridor for a one-week period (Sunday, November 15, 1998 through Saturday, November 21, 1998). This log provides the opportunity to correlate dispatches by time and location. For example, squad 12 self-initiated a call at 14:40 on November 15, 1998, near 68th Street, and squad 24 joined as a backup at 14:46. Both squads terminated their respective calls at 14:56. Three similar primary/backup dispatch pairs can be

observed on November 16, 1998: one at 15:42 near 11th Street , one at 17:02 near 84th Street, and one at 17:36 near the Zoo interchange, each involving a crash with a backup squad showing up 3-4 minutes after the first squad arrived at the scene. Log C could provide information about incident-related crashes: dispatches to crashes occurring upstream of a dispatch to an incident (especially a roadway-blocking incident) within a reasonable “window” of time, could potentially be in response to a “secondary collision” caused by the original incident. For example, an obstruction-related incident could cause congestion/shockwave which in turn would propagate upstream causing a crash. It is interesting to note that during the week presented in log C, no dispatches are recorded for Friday, November 20, 1998.

3.13 Enhancement Freeway Patrol Program Evaluation Summary and Discussion

Dispatch Characteristics

MCS activity on the East-West corridor increased by 7% during the “after” period, when the EFP program was active. The increase was more apparent during weekdays (+20%), particularly between 4:00 pm and 6:00 pm, when a 61% increase was noted. An increase of enforcement-related dispatches was also noted (+26%). The EFP program was responsible for 12% of the dispatches along the corridor during the after period. It was estimated that EFP squads logged approximately 17% of their dispatches along the East-West corridor. Statistically significant changes toward more dispatches on Tuesdays and Wednesdays, and more enforcement dispatches were noted in the after period.

Average response times ($TIME_{BD}$ -figure 1) were very short both before and after EFP program implementation (4.4 min.) Average on-scene time ($TIME_{DP}$) was shorter by 2.3 min. in the “after” period (a reduction from 21.0 min. to 18.7 min.), during EFP hours of operation, a change that was almost statistically significant.

Crash Characteristics

The highest numbers of crashes occurred on Mondays and Tuesdays and the lowest on weekends. Within weekdays, the highest crash concentration was during EFP hours, especially during peak traffic periods, and particularly during the pm peak. Half of all crashes were rear-end, and those

occurred most frequently during EFP hours of operation. Approximately one-fifth of the crashes involved collisions with other-than-motor-vehicle-in-transport objects. Such collisions were less likely during EFP hours and more likely during non-EFP weekend hours. These collision type differences between weekdays and weekends were statistically significant.

Single-vehicle crashes accounted for one-fifth of all crashes. Such crashes were much less likely during EFP hours of operation, which were dominated by two-vehicle crashes. Differences in number of vehicles involved in crashes between weekdays and weekends were statistically significant.

One in three crashes involved an injury. When at least one vehicle involved in a crash was severely damaged, the chances of an injury were 55%. The presence of at least one very severely damaged vehicle was associated with a 62% chance of an injury.

There was an overall 9% reduction in crashes in the after period. During the after period: i) the distribution of crashes between EFP hours of operation and non-EFP hours of operation remained unchanged; ii) no statistically significant differences were identified in manner of collision, crash severity, and crashes occurring under different light conditions; and, iii) the number of vehicles requiring towing after a crash and the number of single-vehicle crashes declined to an almost statistically significant extent.

No statistically significant changes were detected in mean Notification time ($TIME_{AB}$ -figure 1) and mean Response time ($TIME_{BD}$) for responses to crashes. A statistically significant overall drop by 10.3 min. (from 45.0 min. to 34.7 min.) was identified in mean on-scene time ($TIME_{DP}$). This finding was based mainly on statistics collected during EFP hours of operation. Statistically significant improvements were also identified for rear-end crashes (a reduction by 11.7 min.) and multi-vehicle crashes (a reduction by 14.3 min.)

Statistically significant reductions were identified for mean Crash-to-Clearance Time ($TIME_{AP}$) during EFP hours of operation. The overall identified reduction was 10.4 min. $TIME_{AP}$ was

reduced by 12.0 min. for rear-end crashes, and by 14.2 min. for multi-vehicle crashes.

Secondary collisions were reduced by 8% in the after period. Almost half (46%) of the primary incidents associated with secondary collisions were crashes and one-third (33%) involved disabled vehicles.

Discussion

Based on the information presented above, the EFP program has been shown to have addressed the most pressing needs of the motoring public: it was present during the hours that incidents were most likely to occur and, with its help the MCS Department was able to provide a more efficient service, particularly when responding to crashes. Service time reductions have the additional benefit of improving the Department's productivity, by allowing the same number of squads to serve a greater number of dispatches.

Although no speed data specific to the evaluation periods was analyzed, crash patterns were consistent with the typically lower speeds present during congested EFP hours of operation (a higher percentage of two-vehicle rear-end crashes, fewer crashes with fixed objects) and higher speeds during other hours when lower traffic volumes were present (a higher percentage of single-vehicle, fixed-object crashes and fewer rear-end crashes). The presence of the EFP program, allowed the MCS Department to increase enforcement, a much needed measure during the hours when no congestion was present.

Enhancement squads provided the above benefits for the East-West corridor, where they logged approximately 13% of their activity, thus, benefits from the EFP program can reasonably be expected to extend to the other parts of the freeway system, where they logged the rest of their activity.

3.14 Summary of the Most Significant Findings

GP Program:

- ! The time motorists waited for a GP service vehicle to arrive and provide service ($TIME_{AN}$) was 24 min.
- ! The time motorists waited for a GP service vehicle to arrive ($TIME_{AK}$) was 9 min.
- ! The time motorists waited while being served ($TIME_{KN}$) was 15 min.
- ! The time stranded motorists had to spend on the freeway was shortened by at least 26 min. (52%) due to the GP program.
- ! Motorists who have been assisted by the GP have high praise for the program.
- ! The same motorists, were not aware of the program before being assisted by the GP, giving an indication that the general public is not aware of the GP program.
- ! Secondary crashes were reduced 14% in the after period..

EFP Program:

Approximately 17% of EFP program squad time was dedicated to the “East-West” corridor. EFP squad presence allowed the MCS Department to:

- ! Increase weekday dispatches by 20%.
- ! Increase weekday afternoon peak dispatches by 61%.
- ! Increase enforcement-related dispatches by 26%.
- ! Decrease average on-scene time for all dispatches by 11% (from 21.0 min. to 18.7 min.)
- ! Decrease average on-scene time ($TIME_{DP}$) for dispatches to crashes by 10.3 min. (11.7 min. for rear-end crashes, and 14.2 min. for multi-vehicle crashes)
- ! Reduce secondary collisions by 8%.

These benefits are expected to have extended to the other parts of the freeway system where EFP squads logged the remainder of their activity.

APPENDIX

I-94 Construction Schedules and Motorist Assistance Program Initiation Dates.

Racine and Kenosha Counties

Construction Schedule in the Racine-Kenosha corridor from 1995 to 1999.

County	Direction	Date
Kenosha	Northbound	May 4, 1998 to October 2, 1998
Kenosha	Southbound	April 24, 1998 to September 19, 1998
Racine		No Construction Entire 1998

The Gateway Patrol Program was initiated in Racine and Kenosha Counties June 27, 1998. Service focused in Kenosha County during the construction period.

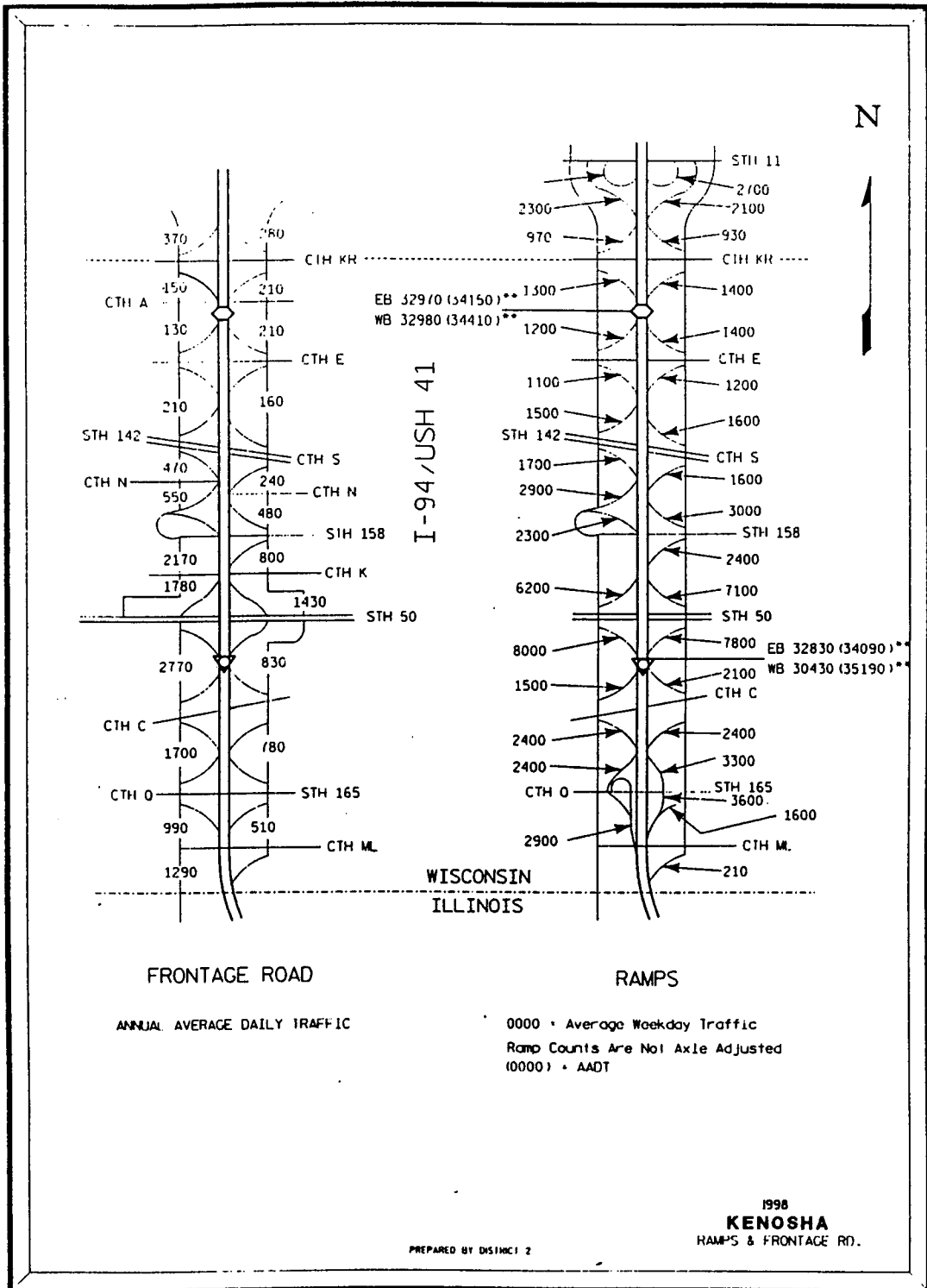
Milwaukee County

Construction Schedule in Milwaukee County from 1995 to 1999.

Project limits	Direction	Date
East-West Freeway	Eastbound	April 13, 1998 to July 18, 1998
Bender Rd to N. County Line		August 9, 1998 to September 30, 1998

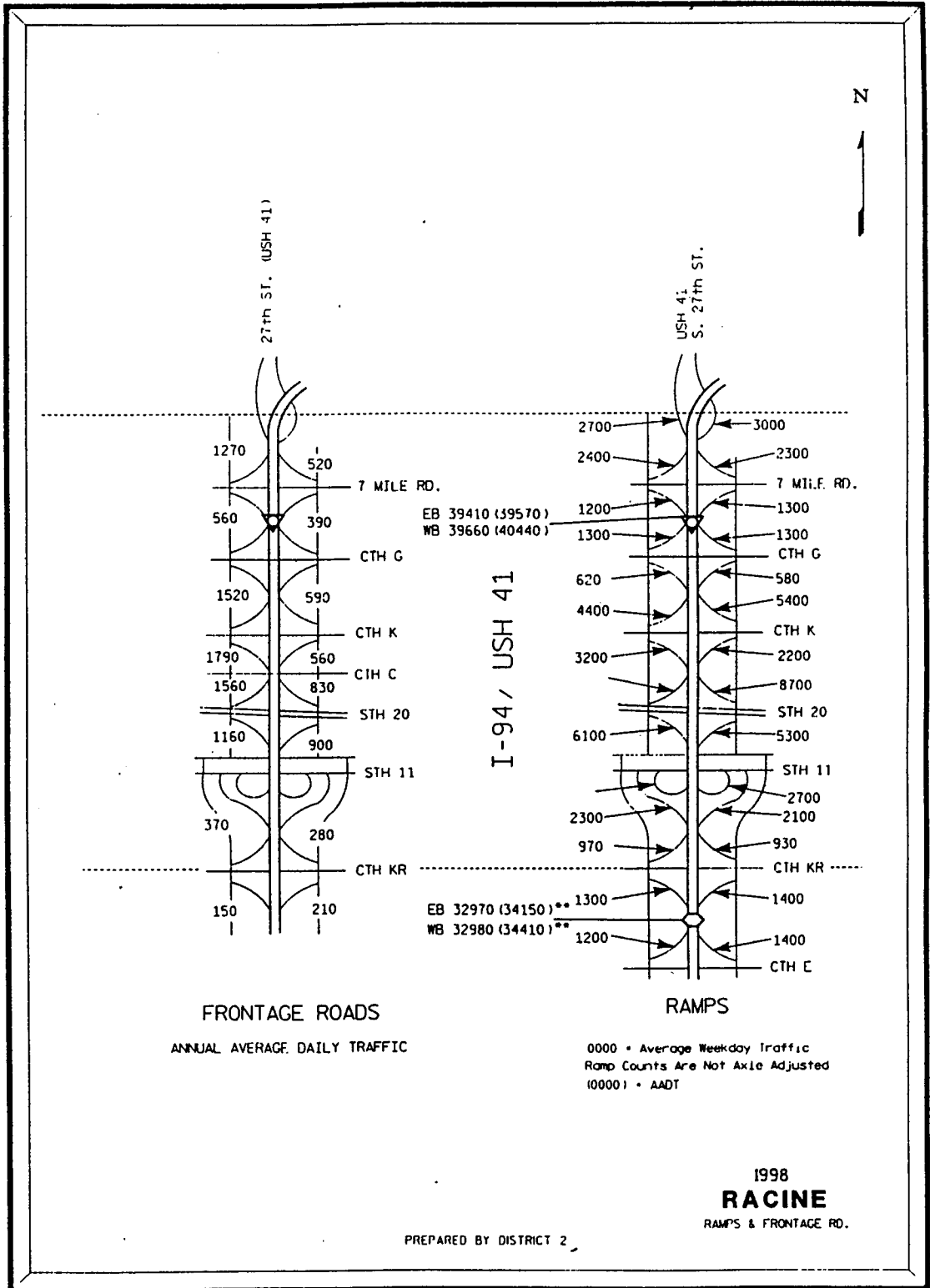
The Enhancement Freeway Patrol program was initiated January 15, 1998 and worked day shifts (6 am to 2 pm) for 13 days. A second shift (3 pm to 11 pm) was added February 1, 1998.

Interstate 94 Kenosha County Cross Streets, Mainline and Ramp Volumes



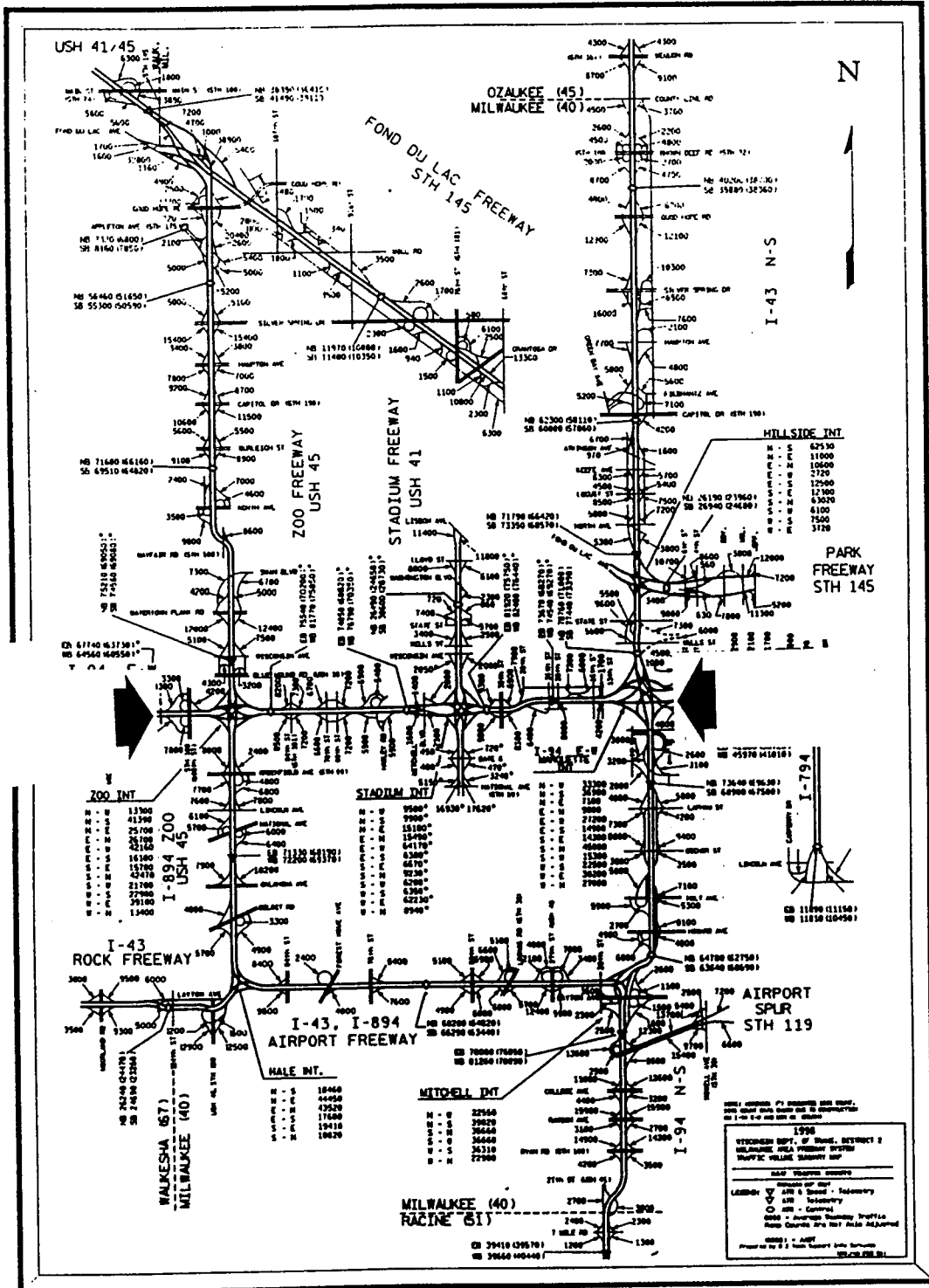
Source: 1998 Wisconsin Highway Traffic Volume Data, WisDOT, March 1999.

Interstate 94 Racine County Cross Streets, Mainline and Ramp Volumes



Source: 1998 Wisconsin Highway Traffic Volume Data, WisDOT, March 1999.

Interstate 94 Milwaukee County Cross Streets, Mainline and Ramp Volumes



The limits of the "East-West" freeway are indicated by the bold type arrows.
 Source: 1998 Wisconsin Highway Traffic Volume Data, WisDOT, March 1999.

I-94 RACINE AND KENOSHA COUNTIES TRAFFIC DISTRIBUTION STATISTICS
Based on 1998 Hourly Directional Counts at the Somers (Kenosha) and Kilbournville (Racine) Count Stations

EKDAY (PERCENT DAILY TRAFF)			
	WB (NB)	EB (SB)	Bi-Directional
6:00 AM	5.17	5.38	5.27
7:00 AM	6.23	6.10	6.17
8:00 AM	5.52	5.00	5.26
9:00 AM	5.42	4.96	5.18
10:00 AM	5.36	5.15	5.26
11:00 AM	5.55	5.32	5.43
12:00 PM	5.68	5.46	5.57
1:00 PM	5.89	5.72	5.80
2:00 PM	6.11	6.32	6.22
3:00 PM	6.62	7.12	6.87
4:00 PM	6.93	7.55	7.24
5:00 PM	6.73	7.15	6.94
6:00 PM	5.59	5.53	5.56
7:00 PM	3.98	4.05	4.01

1998	AAWDT (1)	36244	37031	73275
1996	AAWDT (1)	N/A	N/A	71620
1995	AAWDT (1)	N/A	N/A	70107

	Duration	Peak Direction	D
AM PEAK	7 am	EB (SB)	50.01 %
PM PEAK	2-5 pm	EB (SB)	52.14 %

Annual Average Daily Traffic (1998)= 72522

T factor (Racine County) = 27%

T factor (Kenosha County) = 22%

(1) AAWDT: Annual Average Weekday Traffic. The estimate of typical traffic over the period of one year for the days Monday through Friday.

(2) AAWET: Annual Average Weekend Traffic. The estimate of typical traffic over the period of one year for the days Saturday through Sunday.

N/A: Not available

Bold Type: Peak Period

EB= East Bound

WB= West Bound

EEKEND (PERCENT DAILY TRAFF)			
	WB (NB)	EB (SB)	Bi-Directional
6:00 AM	1.68	1.94	1.81
7:00 AM	2.54	2.70	2.62
8:00 AM	3.68	3.63	3.66
9:00 AM	5.20	4.78	4.99
10:00 AM	6.57	5.89	6.24
11:00 AM	7.40	6.63	7.02
12:00 PM	7.86	6.92	7.40
1:00 PM	7.78	7.00	7.39
2:00 PM	7.62	7.18	7.41
3:00 PM	7.65	7.37	7.51
4:00 PM	7.45	7.64	7.54
5:00 PM	6.77	7.14	6.96
6:00 PM	5.61	6.37	5.99
7:00 PM	4.60	5.15	4.87

1998	AAWET (2)	35762	34879	70641
1996	AAWET (2)	N/A	N/A	70384
1995	AAWET (2)	N/A	N/A	69619

	Duration	Peak Direction	D
WEEKEND PEAK	10-5 pm	WB (NB)	52.70 %

EAST-WEST FREEWAY TRAFFIC DISTRIBUTION STATISTICS
Based on 1998 Hourly Directional Counts at the 92nd Street Count Station

WEEKDAY (PERCENT DAILY TRAFFIC)			
	EB	WB	Bi-Directional
6:00 AM	3.87	4.75	4.30
7:00 AM	5.93	6.60	6.25
8:00 AM	5.94	6.34	6.13
9:00 AM	4.84	5.31	5.07
10:00 AM	4.64	5.05	4.84
11:00 AM	5.22	5.47	5.34
12:00 PM	5.70	5.79	5.75
1:00 PM	5.89	6.04	5.96
2:00 PM	6.59	6.45	6.52
3:00 PM	7.51	6.93	7.23
4:00 PM	7.82	6.97	7.40
5:00 PM	7.65	6.91	7.29
6:00 PM	6.77	6.11	6.45
7:00 PM	4.87	4.36	4.62

1998	AAWDT (1)	82666	78032	160697
1996	AAWDT (1)	N/A	N/A	158497
1995	AAWDT (1)	N/A	N/A	159022

	Duration	Peak Direction	D
AM PEAK	7-8 am	W/B	50.74 %
PM PEAK	3-6 pm	E/B	53.93 %

WEEKEND (PERCENT DAILY TRAFFIC)			
	EB	WB	Bi-Directional
6:00 AM	2.11	1.64	1.85
7:00 AM	2.76	2.65	2.70
8:00 AM	3.75	3.76	3.76
9:00 AM	4.48	4.63	4.56
10:00 AM	5.61	5.78	5.70
11:00 AM	6.75	6.92	6.84
12:00 PM	7.38	7.53	7.46
1:00 PM	7.19	7.24	7.22
2:00 PM	7.29	7.10	7.19
3:00 PM	7.39	7.17	7.27
4:00 PM	6.83	6.77	6.80
5:00 PM	6.15	6.12	6.13
6:00 PM	5.29	5.43	5.37
7:00 PM	4.05	4.32	4.20

1998	AAWET (2)	50612	59522	110134
1996	AAWET (2)	N/A	N/A	113372
1995	AAWET (2)	N/A	N/A	114388

	Duration	Peak Direction	D
WEEKEND PEAK	11-4 pm	WB	53.87 %

Annual Average Daily Traffic (1998)=

146250

T factor = 6%

(1) AAWDT: Annual Average Weekday Traffic. The estimate of typical traffic over the period of one year for the days Monday through Friday.

(2) AAWET: Annual Average Weekend Traffic. The estimate of typical traffic over the period of one year for the days Saturday through Sunday.

N/A: Not available

Bold Type: Peak Period

EB= East Bound

WB= West Bound

ALPHABETICAL LIST OF ACRONYMS and ABBREVIATIONS

ABAND/DIS	Dispatch to an Abandoned or Disabled Vehicle
AGL	Angle (Crashes)
BKUP	Backup Dispatch
CIS	Crash Investigation Site
COMP_REC	Complaint Received (Time a 911 call was received at the Dispatch Center)
DEBRIS	Dispatch to Remove Debris from the Freeway
EFP	Enhanced Freeway Patrol
FINISH	Time a dispatch was terminated (Time 10-8)
GP	Gateway Patrol
HRS	Hours
IRT	Incident Response Time
KCS	Kenosha County Sheriff
MCS	Milwaukee County Sheriff
MOE	Measure of Effectiveness
MU-CHTE	Marquette University Center for Highway and Traffic Engineering
MV	Motor Vehicle
OtMVO	(Crashes with) Other than Motor Vehicle-in-Transport Objects
PDO	Property Damage Only (Crashes)
QUERY/VIOL	Dispatch Involving a Driver Record Query, or Traffic Violation
RCS	Racine County Sheriff
RE	Rear-End (Crashes)
SS	Side-Swipe (Crashes)
SSSD	Side-Swipe Same Direction (Crashes)
START	Time a Dispatch was initiated (Time 10-7)
TOC	Traffic Operations Center
TRBL	Trouble
WSP	Wisconsin State Patrol

DEFINITIONS USED IN THE EVALUATION

<u>Term</u>	<u>For Definition see:</u>
Before and After Periods used in the report	Page 2
Dispatch Types used in the evaluation of the Enhanced Freeway Patrol Program	Page 30
Evaluation Periods used in the report	Page A-1
Time Intervals used in the evaluation of the Enhanced Freeway Patrol Program	Table 6

MILWAUKEE COUNTY SHERIFFS DEPARTMENT
COMMUNICATIONS TRAINING

EXPRESSWAY SECTOR BOUNDARIES

Sector #1 I-43 from the Ozaukee county line to Juneau (including the Hillside Interchange) and the Park (145) expressway. All related ramps are included.

Sector #2 I-94 from the Waukesha county line to the Marquette Interchange and ~~I-794 to Lincoln Memorial Drive~~. US41 from National Avenue to Garfield Avenue. All related ramps are included.

Sector #3 I-43 from Loomis Road to the I-894 and the Zoo Interchange. US 45 from the Zoo Interchange to Watertown Plank Road, and I-43 from the Waukesha county line to the Hale Interchange. All related ramps are included.

Sector #4 US45 from the Waukesha county line to Watertown Plank Road. Hwy 145 from the Waukesha county line to Hampton Avenue. All related ramps are included.

Sector #5 I-94 from the Racine county line to I-43 at Howard Avenue, and I-43 from Loomis Road to the Mitchell Interchange. All related ramps are included.

Sector #6 I-43 from Howard Avenue to the Marquette Interchange. I-43 from the Marquette Interchange to Juneau. ~~I-794 from the Lake Interchange to Carferry Drive. All related ramps are included.~~

~~*** I-794 will be double patrolled from the Marquette Interchange to Carferry Drive by sector 2 and 6.~~

SECTOR #7 I-794 FROM MARQUETTE -X TO LAKE-X
LAKE -X TO LAYTON AVE AND
ALL RELATED RAMPs

Milwaukee County Sheriff Sample Dispatch Index Cards.

SECTOR	TIME CODE	OFFICER	TOTAL TIME	10-8	10-7						
MOTORIST SERVICE				OPERATOR	LOG	DISPATCHER	SENT	RECEIVED	SQUAD/UNIT		
15	MOTOR TROUBLE	20	SELF SERVICE	AUTH/EXT		LOCATION					
16	GAS	95	MOTOR TROUBLE-TOW								
17	TIRE	96	GAS-TOW								
18	INFO	97	TIRE-TOW								
19	OTHER	99	OTHER-TOW	ADDITIONAL INFO							
1	ABANDONED	8	BACKUP	15	DEBRIS	22	FIRE DEPT.	29	NO CAUSE 10-76	36	RELIEF
2	ACCIDENT	9	CALL 10-21	16	DISABLED	23	FOLLOW UP	30	NOTIFICATION	37	REMOVED
3	ALARM	10	CITIZEN	17	DISREGARD 10-25	24	HIGHWAY DEPT.	31	OFFICER	38	RETURN 10-22
4	AMBULANCE	11	COMPLAINT	18	ELECTRICIAN	25	HIT & RUN	32	PEDESTRIAN	39	ROLLOVER
5	ARREST	12	CONE DETAIL	19	ESCORT	26	IN TRAFFIC	33	PICTURES	40	RUSH 10-17
6	ASSIST	13	CONVEYANCE 10-16	20	FEMALE/MALE	27	JUVENILE	34	PDO/PI	41	SPECIAL DETAIL
7	AUTO/TRUCK	14	CYCLE	21	FIRE	28	MEET	35	QUERY	42	TRAFFIC VIOLATOR

COMPLAINT RECEIVED 1234 R5

SECTOR	TIME CODE	OFFICER	TOTAL TIME	10-8	10-7						
MOTORIST SERVICE				OPERATOR	LOG	DISPATCHER	SENT	RECEIVED	SQUAD/UNIT		
15	MOTOR TROUBLE	20	SELF SERVICE	AUTH/EXT		LOCATION					
16	GAS	95	MOTOR TROUBLE-TOW								
17	TIRE	96	GAS-TOW								
18	INFO	97	TIRE-TOW								
19	OTHER	99	OTHER-TOW	ADDITIONAL INFO							
1	ABANDONED	8	BACKUP	15	DEBRIS	22	FIRE DEPT.	29	NO CAUSE 10-76	36	RELIEF
2	ACCIDENT	9	CALL 10-21	16	DISABLED	23	FOLLOW UP	30	NOTIFICATION	37	REMOVED
3	ALARM	10	CITIZEN	17	DISREGARD 10-25	24	HIGHWAY DEPT.	31	OFFICER	38	RETURN 10-22
4	AMBULANCE	11	COMPLAINT	18	ELECTRICIAN	25	HIT & RUN	32	PEDESTRIAN	39	ROLLOVER
5	ARREST	12	CONE DETAIL	19	ESCORT	26	IN TRAFFIC	33	PICTURES	40	RUSH 10-17
6	ASSIST	13	CONVEYANCE 10-16	20	FEMALE/MALE	27	JUVENILE	34	PDO/PI	41	SPECIAL DETAIL
7	AUTO/TRUCK	14	CYCLE	21	FIRE	28	MEET	35	QUERY	42	TRAFFIC VIOLATOR

1999 JAN -9 PM 7:24
 1999 JAN -9 PM 6:59
 N43 N of North Ave
 truck lost duals - near (C) CC 16 RB2 Hallet
 a Back-up for

COMPLAINT RECEIVED 1234 R5

Milwaukee County Sheriff's Department "10" Signals.

Milwaukee County Sheriff's Department

"10" Signals

10-1 UNABLE TO COPY
 10-2 SIGNAL IS GOOD
 10-3 AFFIRMATIVE
 10-4 MESSAGE RECEIVED
 10-6 BUSY, STAND BY
 10-7 OUT OF SERVICE
 10-8 IN SERVICE
 10-9 REPEAT
 10-10 ON MINOR DETAIL, SUBJECT TO CALL
 10-11 REMAIN IN SERVICE
 10-12 VISITORS OR OFFICIALS PRESENT
 10-13 WEATHER & ROAD CONDITIONS
 10-14 CORRECT TIME
 10-15 HAVE IN POSSESSION _____
 10-16 CONVEYANCE
 10-17 URGENT - RUSH
 10-18 ANYTHING FOR US
 10-19 NOTHING FOR YOU
 10-20 WHAT IS YOUR LOCATION
 10-21 CALL _____ BY PHONE
 10-22 REPORT IN PERSON TO _____
 10-23 ARRIVED AT SCENE
 10-24 FINISHED WITH LAST ASSIGNMENT
 10-25 DISREGARD LAST INFORMATION
 10-28 FULL REGISTRATION INFORMATION
 10-29 CHECK RECORDS FOR WANTED
 10-30 DOES NOT CONFORM TO RULES & REGS
 10-33 EMERGENCY
 10-41 BEGINNING TOUR OF DUTY
 10-42 ENDING TOUR OF DUTY

10-47 CAR WASH
 10-49 HOURLY REPORT MARK
 10-50 ACCIDENT
 10-59 CONVOY OR ESCORT
 10-62 CHANGE TO FREQUENCY # 2
 10-63 CHANGE TO FREQUENCY # 3
 10-64 CHANGE TO FREQUENCY # 4
 10-69 TURN REPEATER OFF
 10-70 FIRE
 10-76 NO CAUSE
 10-87 CIVIL DISTURBANCE
 10-89 BOMB THREAT
 10-90 ON SPECIAL ASSIGNMENT
 10-98 DRUG INTERDICTION STOP

CODE 1 SIGNIFIES A TRAFFIC WANTED
 CODE 2 SIGNIFIES A MISDEMEANOR WANTED
 CODE 3 SIGNIFIES A FELONY WANTED
 CODE 4 SIGNIFIES A WANTED, DANGEROUS OR ARMED

A ADAM	J JOHN	S SAM
B BOY	K KING	T TOM
C CHARLES	L LINCOLN	U UNION
D DAVID	M MARY	V VICTOR
E EDWARD	N NORA	W WILLIAM
F FRANK	O OCEAN	X X-RAY
G GEORGE	P PAUL	Y YOUNG
H HENRY	Q QUEEN	Z ZEBRA
I IDA	R ROBERT	

REVISED 8/97

Milwaukee County Sheriff Dispatches Coded in Marquette University Electronic Database.

	Date	TC	TI	10-8	10-7	Mot.Code	SQUAD	E-W	INT.	LN	omp.Rec	Resp. Code	NOTES
1150	1/4/96			15:56	15:51		25	94	W	27		1	RAN ONTO WALL
1151	1/4/96			16:54	16:15		25	94	W	W100		1	
1152	1/4/96			16:46	16:20		35	94	W	E 62		35	
1153	1/4/96			17:59	17:08		24	94	W	22		2	3 CAR; PDO; @ 17:05
1154	1/4/96			19:20	17:52		25	94	W	E 76		2	2 CAR; PDO; @ 17:50
1155	1/4/96			19:12	18:35		15	94	W	E 84		2	4 CAR; PDO; @ 18:15
1156	1/4/96			19:03	18:31		24	94	W	E 81			
1157	1/4/96			18:58	18:49		64	94	E	W/MARQ		7	
1158	1/4/96			19:09	18:25		79	94	W	E 62		2	1 PUT CAR; PDO; @ 18:30
1159	1/5/96			16:26	16:22		24	94	E	STAD		15	
1160	1/5/96			16:26	16:22		71	94	E	STAD		16	
1161	1/5/96			18:12	17:32		24	94	E	E 124		2	2 CAR; PDO; @ 17:25
1162	1/5/96			18:09	18:06		25	94	E	E 124		18	
1163	1/5/96			17:59	17:55		25	94	W	16		16	
1164	1/5/96			18:27	18:58		24	94	E	W 35		2	2 CAR; PDO; @ 18:54
1165	1/5/96			19:43	19:17		79	94	E	W/MARQ		2	2 CAR; MINOR PI; HOSP; @ 19:15
1166	1/5/96			19:57	19:16		15	94	E	W/MARQ		8	
1167	1/5/96			20:43	20:36		34	94	E	E 84		2	
1168	1/6/96			19:07	18:40		25	94	E	7		1	TOW RD PATROL
1169	1/6/96			19:39	18:51		34	94	E	E 100		2	JEEP HIT WALL; @ 18:45
1170	1/6/96			19:15	19:01		21	94	E	E 100		8	

Milwaukee Sheriff Department Sample Expressway Activity Report "After" Period.

TRAFFIC SECTION MONTHLY ACTIVITY REPORT

Dayshift - January, 1999

Auto Speed	OWI	OAR/ OAS	Other Mov.	Non-Mov.	Seat Belt	Co. Ord.	Avg. Tickets / Day	Warrant Arrests	Acc.	Off. Inc.	Intox. Oper.	Total Contacts	Stolen Auto	F.I.'s	Motor Serv.	Avg. Miles	Enforce. Days Worked	Actual Days Worked	Avg. Contacts
27	0	3	14	1	3	0	48	0	25	0	0	74	0	0	79	171.35	21.5	22	3.44
16	0	1	0	1	0	0	18	0	10	1	3	32	0	1	31	133.33	15	16	2.13
25	0	2	21	5	0	2	55	0	12	0	1	70	1	0	58	112.38	18	17	4.38
24	0	7	14	1	1	0	47	0	17	0	0	64	0	0	0	147.83	17.5	18	3.86
55	0	2	10	7	0	1	75	0	23	0	3	103	0	0	77	128.36	22	22	4.86
3	0	2	7	11	0	0	23	0	34	2	3	64	0	0	50	161.10	15.5	16	4.13
3	0	1	1	1	0	0	6	0	1	0	0	7	0	0	2	174.50	2	2	3.50
19	0	1	4	2	7	0	33	0	22	0	0	55	0	0	50	122.80	21	21	2.82
7	0	1	18	1	3	0	30	0	17	0	0	47	0	0	63	115.53	19	19	2.47
37	0	3	9	3	1	0	53	0	18	0	3	74	0	0	60	136.41	19.5	20	3.78
7	0	1	17	0	2	0	27	0	12	0	3	43	0	0	68	114.80	17.5	17.5	2.46
13	0	0	6	1	3	0	23	0	6	0	0	29	0	0	0	180.35	20	20	1.45
15	0	2	7	5	10	0	39	0	7	0	5	81	0	0	48	128.40	12.5	13	4.08
16	0	2	22	11	10	2	66	0	16	2	0	84	0	0	56	108.00	18.5	20	4.54
24	1	1	4	2	0	0	32	0	28	3	2	65	0	0	44	147.59	14.5	16	4.49
32	0	4	12	2	6	0	56	0	15	0	0	71	0	0	59	132.00	21.5	22	3.50
17	1	4	18	3	11	0	54	0	11	0	0	65	0	0	89	161.21	19	19	3.42
16	0	7	8	6	1	0	36	0	16	0	0	55	0	0	75	174.38	16	16.5	3.44
Totals	2	44	192	63	58	5	722	0	290	10	23	1053	1	1	887	141.89	308.5	317	3.44

Racine County Sheriff Sample Dispatch Record.

ACTIVITY CODE	GRID CODE	JURISDICTION	COMPLAINT NUMBER
			No 955773
COMPLAINANTS NAME		TELEPHONE NO.	SQUAD ASSIGNED DEPUTIES ASSIGNED
COMPLAINANTS ADDRESS			
ADDRESS OF INCIDENT			
REPORTED NATURE OF INCIDENT			
COMMENTS			
		REC	
		DISP	
		ARR	
		COMP	
NOTIFICATIONS MADE			
AGENCY			TIME
TOWING			
REC'D. BY			
DISPATCH BY			
CORONER			
NEXT OF KIN			
ELECTRIC CO.			
TELEPHONE CO.			

RACINE COUNTY SHERIFFS DEPT.

Racine County Sheriff Dispatches Coded in Marquette University Electronic Database.

Racine County Incident MU Database - 1995/96

Date	Act.Code	Rec.	Dispat	Arr	Compl	Squad	Dir	Location	Incid. type	Comments
1	12/16/1995	276	21:23	21:23	21:36	60	N	20	1	
5	12/18/1995	6:12	6:12	6:16		59/60	S	N EVANS	1	
6	12/18/1995	699	16:56	16:56			N	KR	1	
15	12/20/1995		17:26	17:29	18:27	64	N	11	1	TOW (MARRIO'S); TR UP AGAINST WALL
16	12/20/1995	111	19:42	19:42	20:04	54	S	7 MI	1	
19	12/22/1995	111	20:28	20:32	20:51		S	S 20	1	
24	12/23/1995		11:29	11:33	12:15	52	S	7 MI	1	TOW (MICHELL'S)
30	12/23/1995		20:23	20:23	21:36	93	N	S 6 MI	1	
33	12/24/1995	699	19:22	19:24	19:25	59	N	KR	1	
38	12/25/1995	111	15:01	15:01	15:06	56	S	11	1	
41	12/25/1995	111	17:26	17:27	17:50	53	N	S 20	1	
43	12/27/1995		12:09	12:09	12:43	65	N	50	1	TOW (MICHEL'S) @ 12:14
50	12/28/1995	111	10:38	10:39	10:47	52	S	N 7 MI	1	
54	12/29/1995	111	11:41	11:41	12:01	63	N	C	1	TOW (MICHEL'S)
55	12/29/1995	111	19:44	19:44	20:12	57	N	NK	1	
60	1/24/1996		19:15	19:17	20:42	61			1	
66	1/25/1996		15:39	15:41	16:11	54	N	NG	1	LT. LANE
67	1/25/1996		15:39	15:41	16:11		N	NG	1	
79	1/26/1996		18:08	18:22	19:31	52	S	11	1	TOW (MICHEL'S) @ 18:40
87	1/27/1996	111	8:15	8:15	8:34	53	N	N KRAUT	1	
88	1/27/1996		8:48	8:51	9:46	51	N	G	1	TOW @ 8:55
90	1/27/1996		10:46	10:46	10:51	51	N	7 MI	1	
91	1/27/1996	699	13:03	13:03	13:27	51	S	SK	1	
95	1/27/1996	421	16:45	16:45	17:06	54	S	NC	1	
112	1/29/1996	111	14:17	14:17	14:31	61	N	NG SCALE	1	TOW @ 10:45
113	1/29/1996	111	14:34	14:34	14:34	61	S	NG SCALE	1	
116	1/30/1996	106	6:50	6:50	6:57		S	20	1	
120	1/30/1996	106	8:56	8:59	9:05	64	N	K	1	TOW @ 9:05

Kenosha County Sheriff Dispatch Electronic Database.

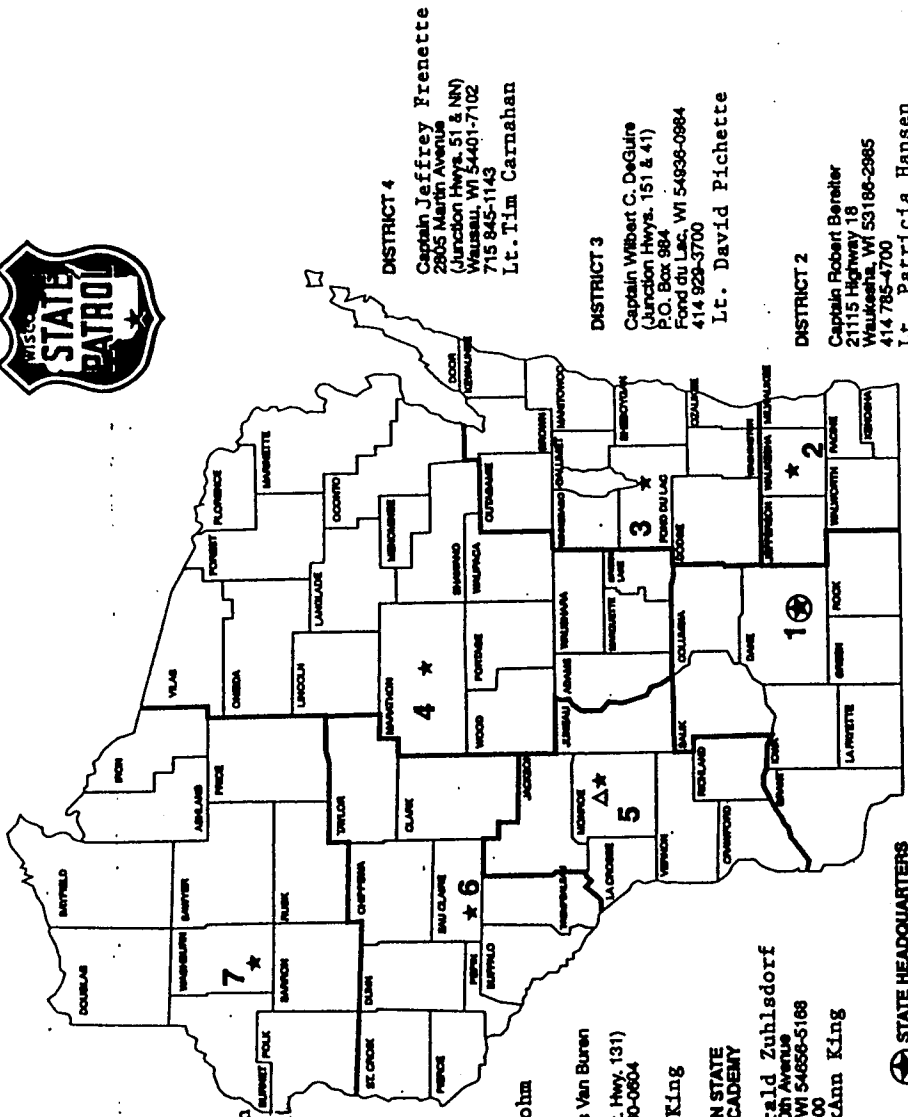
Kenosha Sheriff Record

Agency	Event #	Date-mm	Date-dd	Date-yr	Off-1	Off-2	Off-3	Off-4	House #	Street	Priority
1	95145583	12	22	1995	0ZERO				800	194	6
1	95146205	12	24	1995	170				3101	194	9
1	95146394	12	25	1995	66				1200	194	5
1	95146451	12	25	1995	183	172			7501	194	9
1	95146453	12	25	1995	172				7401	194	9
1	95148706	12	26	1995	166	188			101	194	4
1	95143575	12	17	1995	0ZERO				0	194-339SB	3
1	95143714	12	17	1995	169				0	194-337SB	9
1	95143759	12	17	1995	172	00WSP			0	194-338NB	9
1	95143939	12	18	1995	127				0	194-338NB	5
1	95144170	12	18	1995	169				0	194-338SB	9
1	95144987	12	20	1995	66				0	194-337NB	5
1	95145004	12	20	1995	66				0	194-339SB	9

Kenosha Sheriff Record

Call type	Grid	How-rec	Dispo	Time-rec	Time-disp	Time-arr	Time-clear	Hold-time	Resp-time	Work-time
CAD-LIQ LAW VIO	C29F	P	2	1516	1519	1520	1520	1522	3	4
SRV/MOTORIST AS	A23E	O	2	1525	1528	1526	1526	1528	0	0
ASSIST OTH AGEN	C29I	P	2	1200	1200	1203	1203	1203	1	3
SRV/MOTORIST AS	I26E	P	2	1721	1738	1744	1744	1844	17	23
SRV/MOTORIST AS	I26A	O	2	1732	1733	1733	1733	1738	1	1
CAD-SUSPICIOUS	A22A	P	2	1558	1558	1612	1612	1622	2	16
SEX/INDECENT EX	C29I	P	2	6	8	9	9	18	2	3
SRV/MOTORIST AS	C29C	P	2	1417	1418	1433	1433	1441	1	17
SRV/MOTORIST AS	A22A	C	2	1615	1619	1629	1629	1846	4	14
DWI/ALCOHOL	A22A	T	1	229	229	229	229	540	0	0
SRV/MOTORIST AS	C29F	P	2	1837	1838	1844	1844	1856	1	7
CAD-TRAF VEH LA	A22A	T	2	2108	2109	2109	2109	2133	0	0
SRV/MOTORIST AS	C29I	O	2	2134	2135	2135	2135	2145	1	1

Wisconsin
Division of State Patrol



DISTRICT 7
 Captain Ben Mendez
 W 7102 Green Valley Rd.
 Spooner, WI 54801-6603
 715 635-2141
 Lt. Lee McMenamin

DISTRICT 6
 Captain Martha M. Wiley
 5005 Hwy. 53
 (Hwy. 53 at 194)
 Eau Claire, WI 54701-8848
 715 838-3800
 Lt. Douglas Notbohm

DISTRICT 5
 Captain Douglas Van Buren
 Box 604
 (80, Tomah Exit, Hwy. 131)
 Tomah, WI 54680-0604
 608 374-0513
 Lt. Arnie King

WISCONSIN STATE PATROL ACADEMY
 Major Gerald Zuhlendorf
 95 South 10th Avenue
 Ft. McCoy, WI 54656-5188
 608 289-2500
 Lt. RoxAnn King

DISTRICT 4
 Captain Jeffrey Frenette
 2805 Main Ave.
 (Junction Hwy. 51 & Nn)
 Neenah, WI 54901-7102
 715 845-1143
 Lt. Tim Carnahan

DISTRICT 3
 Captain Wilbert C. DeGuire
 Junction Hwy. 151 & 41)
 P.O. Box 984
 Fond du Lac, WI 54936-0984
 414 928-3700
 Lt. David Pichette

DISTRICT 2
 Captain Robert Bereller
 21115 Highway 18
 Waukesa, WI 53186-2985
 414 785-4700
 Lt. Patricia Hansen

DISTRICT 1
 Captain Angelo Bishop
 911 W. North St., PO Box 610
 DeForest, WI 53532-0610
 Lt. David Heinle 608-846-8500

STATE HEADQUARTERS
 Administrator William L. Singletary
 Colonel Roger F. Harvacka
 4902 Sheboygan Avenue
 P.O. Box 7912
 Hill Farms State Transit Bldg., Rm. 551
 Madison, WI 53707-7912
 608 289-3212
 Lt. Col. David L. Schumacher

LEGEND

- ★ District Headquarters
- △ State Patrol Academy
- ⊙ State Headquarters

5/98
 Revised 5/98

Wisconsin State Patrol Dispatch Database.

Station: KSB433/KSF760
 District: 2 PNTR1

WISCONSIN STATE PATROL
 Station Log

12-15-1998
 Page: 22

Unit	Time	IO	Message Text	
	1824		PC1 Operator on duty is: D26	
WKSO	1824	R 43	EB WOF 18 NO PROBLEMS IF U CAN SEND SOMEONE	T 1
	1824		PC2 Operator on duty is: XXX	
230	1824	R 43	BE OUT W/ANOTHER 10-50 EB AT EAST CNTY LINE	D 1
WKSO	1825	S 21	TO ADV ONLY UNIT IS AT 10-50 // 10-22	T 1
227	1828	R 43	AT YOUR CONVENIENCE CHECK ANY PRIOR 961 VIOLATIONS	D 1
PH	1829	R 43	94WB PAST HWY 50 SEMI IN FRONT OF ME SWITCHED LANES INTO ME AND RAN ME OFF RD GASOLINE TRK	T 1
251	1830	R 8		D 1
PH	1830	R 43	// WILL TRANSF U WKSO	T 1
230	1831	R 43	2 VEH RDG NEXT NO. 387 // AFFIRM // WHAT TIME DID I ADVISE 10-8 FROM PREV // 1819	D 1
PH	1832	S 43	LOCATION // COMING UP TO HWY 67	T 1
PH	1833	R 43	COMPLAINANT IN MAROON CHEV BLAZER	T 1
251	1833	S	// WB AT 258 // GVN INFO ABOV // WILL HEAD THAT WAY // SEMI POSS GAS TRK COMPLAINANT IN MAROON CHEV BLAZER // STILL ON LINE // AFFIRM // KEEP THEM	D 1
251	1835	S	ON 250 HAS SOMETHING GOING WILL NEED BOTH TO STOP	D 1
PH	1836	R 43	1874 SILVER TRK EMBLEM ON TRK SAYS WALKER WB HWY F	T 1
251	1838	S 20	// EB BETWEEN ROCKLAKE RD AND 89 // NOW WB AT F // SHOULD MEET THEM AT HWY 26 // GVN INFO ABOV	D 1
PH	1839	R 43	TRK IS IN FRONT 2 CAR LENGTHS IN RITE HAND LANE EB 274	T 1
251	1841	S	NOW WB AT 274 // JUST COMING UP BY WBRA WILL BE WAITING AT 268.5 EOF 26	D 1
228	1841	S 42	SHOULD HAVE BEEN ENTERED AT 1727	D 1
PH	1841	R 43	WB PAST 272	T 1
251	1843	R 43	SET UP AT CROSSOVER EOF 26 // JUST PAST 272 WILL ADVISE TO PUT HAZARDS ON	D 1
PH	1844	R 43	IN RITE HAND LANE TRK IS 2 CAR LENGTHS AHEAD	T 1
251	1845	S 43	TRK IS IN RITE HAND LANE TRK IS 2 CAR LENGTHS AHEAD COMPLAINANT ADVISED TO PUT HAZARDS ON	D 1
PH	1845	R 43	WB 269	T 1
PH	1847	R 43	WB PAST HWY 26	T 1
251	1848	R	WILL BE STOPPING 266 WB =SB1874//AP // COMPLAINANT WIL BE STOPPING BEHIND	D 1
227	1849	R 7	[RAC JAIL] END MILES 97100.2	D 1
230	1849	R DV	+FOWLER/ELISE/M/F/W/070371	D 1
230	1849	R 28	=ROKHED	D 1
230	1849	R 28	=ROKHED//ML +RYAN/KIMBERLY/A/F/W/060671	DC1
230	1850	R 28	=PZZ522	D 1
230	1851	S DV	// IF VAL JUST SV	D 1
251	1852	R	=SB1874//TK	D 1
230	1855	R 8		D 1
251	1858	R 27	+KOWITZ/NORM/J/M/W/103173	D 1
WKSO	1859	R 43	94 WB WOF SS SUSPICIOUS ACTIVITY ON TRAF STOP IF U HAVE SOMEONE TO ASSIST // NEG UNIT AT 10-50 EAST END // 10-22	T 1
251	1900	S DV	RETD AS GIVEN // ANY VIOLATIONS IN LAST YR FOR DRIVER // NOTHING IN LAST YR LAST ITEM FOR SP 5/97 // SV	D 1

Pt2Pt: 0 Wispern: 0 StWide: 0 Total: 33

Wisconsin State Patrol Dispatches Coded in Marquette University Electronic Database.

WI State Patrol- Daily dispatch log: Incidents

Date	Report	Acc. Time	Received (priority) T	Acc. T	Comp. T	Location on site	County	Incident type	Action taken
12/13/1998	PH		1144			NB (past K)			
		224	1706					Mot. Asst.	Notify to KESO (@1706) and Gateway (1710)
		224	1757	1759		NB		Mot. Asst.	Gateway towing
		252	1813	1821		(Rac scale)	Rac	Mech. Problem	Notify MCSC (3 veh. flasher lights on)
12/14/1998		2218	0608			NB (s of Oakwood)	Mk	Abond/Mot. Asst	Monitored Gateway assisting
		245	0712				(Ke/Ra)		
		231	0834	0838		SB (kraut)	Rac		
		231	0909			NB (20)	Rac		
		231	0930			NB (2 mi rd)	Rac		
		231	1005	1007		SB (s of 20)	Rac		
		231	1128	1128		SB (KR)	Rac		
		2218	1244			(C)	Rac		
		224	1428	1248		(rest area/inv.site)	(Ke/Ra)	Mot. Asst./Towed	Info./ Gateway towed (12/13/98 night)

WI State Patrol- Daily dispatch log: Incidents

Speed stopped ?	Seat. Obs	Year requested	Year req. T	Year an. T	Heavy duty TT ?	Reasons	Queries, OVI, vehicles, etc
						informed to MCSCO (@ 1146)	high speed / reckless
							DV (query)
N						asked to inform SHO	DV (query)
Y							DV (query)
							DV (query)
							DV (query)
							DV (query)
							DV (query)
							DV (query)

Variables in the East-West Freeway Database

E_W Direction of Travel
LANE Lane Incident Occurred in

Value	Label
1	1st=Median
2	2nd
3	3rd
4	4th
12	1st & 2nd
23	2nd & 3 rd

COMP_REC 911 Call Received or Time Officer Initiated Dispatch

RC_1	1st Dispatch Code
RC_2	2nd Dispatch Code
RC_3	3rd Dispatch Code
RC_4	4th Dispatch Code
RC_5	5th Dispatch Code
RC_6	6th Dispatch Code

Value	Label
1	Abandoned
2	Crash
4	Ambulance
5	Arrest
6	Assist
7	Auto/Truck
8	Backup
9	By Phone
10	Citizen
11	Complaint
12	Cone Detl
13	Conveyance
15	Debris
16	Disabled
17	Disregard
26	In Traffic
29	No cause
32	Pedestrian
35	Query
37	Removed
42	Violation

Variables in the East-West Freeway Database (Continued)

FINISH Time Dispatch Terminated
START Time Dispatch Initiated
MOT_CODE Motorist Service Code
SQUAD Squad Number
LOCATION Dispatch Location
NOTES Dispatcher Notes

DATE Day of Week

Value	Label
1.00	Sunday
2.00	Monday
3.00	Tuesday
4.00	Wednesday
5.00	Thursday
6.00	Friday
7.00	Saturday

SQTYPE Squad Type

Value	Label
1	Enhancement Squads
2	Sector 2 Squads
3	Other Squads

BEFAFT Before-After Study Period

Value	Label
1	11-15-95 to 2-4-96
2	11-15-98 to 2-4-99

MOTORIST Motorist Assist Code

Value	Label
15	Motor Trouble
17	Tire
19	Other
20	Self Service
95	Motor Trbl-Tow
99	Other Tow

Variables in the East-West Freeway Database (Continued)

ARN ACCIDENT REPORT NUMBER
DISP_NO Dispatch Number
WHEN Date
NEARLOC DISPATCH CROSS-STREET

CNTYCODE COUNTY CODE

Value	Label
30	KENOSHA
40	MILWAUKEE
51	RACINE

ACCDSVR ACCIDENT SEVERITY

Value	Label
0	BLANK
1	FATAL
2	INJURY
3	PDO
4	NON-REPORTABLE

ROADCOND PAVEMENT WETNESS

Value	Label
0	UNKNOWN
1	DRY
2	WET
3	SNOW/SLUSH
4	ICE
5	SAND/MUD/DIRT/OIL
6	OTHER
7	UNKNOWN

TOTVEH TOTAL # OF VEHS INVOLVED IN CRASH

TOW_FLAG TOW DUE TO DAMAGE?

Value	Label
0	NO TOW
1	TOWED FROM SCENE

Variables in the East-West Freeway Database (Continued)

ACCDTYPE ACCIDENT TYPE

Value	Label
0	UNKNOWN
1	VEHICLE IN OPERATION
2	PARKED MV
3	DEER
4	PEDALCYCLE
5	PEDESTRIAN
6	TRAIN
7	OTHER ANIMAL
8	MV IN OTHER ROADWAY
9	OTHER NON-FIXED OBJECT
10	TRAFFIC SIGN POST
11	TRAFFIC SIGNAL
12	UTILITY POLE
13	LUMINAIRE LIGHT SUPPORT
14	OTHER POST
15	TREE
16	MAILBOX
17	GUARDRAIL FACE
18	GUARDRAIL END
19	MEDIAN BARRIER
20	BRIDGE PARAPET END
21	BRIDGE/PIER/ABUTMENT
22	IMPACT ATTENUATOR
23	OVERHEAD SIGN POST
24	BRIDGE RAIL
25	CULVERT
26	DITCH
27	CURB
28	EMBANKMENT
29	FENCE
30	OTHER FIXED OBJECT
31	UNKNOWN
32	OVERTURN
33	FIRE/EXPLOSION
34	IMMERSION
35	JACKKNIFE
36	OTHER NON-COLLISION

Variables in the East-West Freeway Database (Continued)

MNRCOLL MANNER OF COLLISION

Value	Label
0	BLANK
1	NO COLLISION W/MV IN TRANSPORT
2	REAR END
3	HEAD-ON
4	REAR TO REAR
5	ANGLE
6	SS SAME DIRECTION
7	SS OPPOSITE DIRECTION
8	UNKNOWN

PEAK_CM Peak/Off Peak Hours

Value	Label
1.00	AM peak
2.00	PM peak
3.00	OFF peak

LGTCOND LIGHT CONDITION

Value	Label
0	UNKNOWN
1	DAYLIGHT
2	DARK NOT LIGHTED
3	DARK LIGHTED
4	DAWN
5	DUSK
6	UNKNOWN

WEEK_END Weekday/Weekend

Value	Label
1.00	Weekday
2.00	Weekend

Variables in the East-West Freeway Database (Continued)

VEHDMG VEHICLE DAMAGE FLAG

Value	Label
0	BLANK
1	VERY MINOR
2	MINOR
3	MODERATE
4	SEVERE
5	VERY SEVERE
6	UNKNOWN
88	NONE

Gateway Patrol Tow Truck Log ("Time on Call" Recorded).

Kenosha Gateway Patrol Daily Log:																								
Time	Location	Description	Flat	Accident	Stalled	Out of Gas	No Service	Maint.	Relocated To:	Site 1	Site 2	Site 3	15 min	30 min	45 min	1 hour	Telephone Use	Pay phone	Cell phone	Time On Call				
												Date:	12	6	98									
												Customer Walked						For Service:						
10:00A	I-94SB Hwy 50	NJM 50					X													2 miles				
10:20A	I-94SB At Hwy Racine Co	TRANSRAT PASSENGERS								X										15 mins				
11:00P	I-94SB S of Hwy 80	TRANSRAT 2 PASS.								X										13 miles				
2:00P	I-94SB S of Hwy 80	Chery Camion BLUE TPUJ317			X															13 miles				
3:53P	I-94SB S of Hwy E	TSN186 CARVY			X															20 mins				
3:32	I-94SB N. 142	D58691			X															27 mins				
7:00P	I-94SB At Hwy Gr	Chery Pickup GREEN		X								X								30 min				
												Assigned Driver:	Start Time	End Time	Start Miles	End Miles	Break Time	Fuel \$ Used						
												501 Bill	10:00AM	9:11PM	32667	32331	15 mins							

Gateway Patrol Mileage Log Kept at the Traffic Operations Center (TOC).

GATEWAY PATROL KENOSHA DEC 98		
DATE	HRS	Comments
12-1 AM	3hrs	
12-1 PM	3hrs	
12-2 AM	3hr	
12-2 PM	3hrs	
12-3 AM	3hrs	
12-3 PM	3hrs	
12-4	10hrs	
12-5	10hrs	
12-6	10hrs	
12-7 AM	3 hrs	
12-7 PM	3 hrs	
12-8 AM	3hrs	
12-8 PM	3hrs	
12-9 AM	3hrs	
12-9 PM	1 1/2 hrs	
12-10 AM	3 hrs	
12-10 PM	3 hrs	
12-11-98	10hrs	
12-12-98	10hrs	TOTAL HRS FOR MONTH
12-13-98	10hrs	
12-14-98	3hr	
12-14-98	3hrs	222hr
12-15-98	2 1/2 hrs	
12-15-98	3hrs	

Sample Gateway Patrol Response Form.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 21086 MILWAUKEE, WI

POSTAGE WILL BE PAID BY ADDRESSEE

WISCONSIN DEPT OF TRANSPORTATION
633 W WISCONSIN AVE STE 1200
MILWAUKEE WI 53203-9924



WISCONSIN GATEWAY PATROL RESPONSE FORM

Dear Motorist:
The Wisconsin Department of Transportation in cooperation with the Racine and Kenosha County Sheriffs' Departments, is pleased to introduce the WISCONSIN GATEWAY PATROLS. This program provides road assistance free of charge in the event your vehicle becomes inoperable on the highway. It is our goal to help keep Wisconsin Interstate Highways clear of disabled vehicles and to continue the flow of traffic following an accident. The GATEWAY PATROLS provide road service to stranded motorists, including: towing to designated safe zones, changing tires, and temporary repairs to breakdowns. All of the services mentioned will be performed at no charge, and no gratuities will be accepted.
Please let us know that you think of our service by completing and returning this postage paid response form. Thank You and Drive Safe!

DATE OF ASSISTANCE: ____/____/____ TIME OF ASSISTANCE: ____:____ AM ____:____ PM

REASON FOR ASSISTANCE: (check all that apply)
 INVOLVED IN CRASH MECHANICAL BREAKDOWN OTHER
 TYPE OF SERVICE YOU RECEIVED FROM THE GATEWAY PATROL: (check all that apply)
 TOW OR PUSH CHANGED A TIRE
 BATTERY BOOST/JUMP OVERHEATED
 FUEL OTHER (please describe) _____

LENGTH OF TIME YOU WERE STRANDED BEFORE GATEWAY PATROL ARRIVED:
 0-5 minutes 5-10 minutes 10-20 minutes MORE THAN 20 minutes

Please take time to answer the following questions if you were taken to, or chose to drive to a Crash Investigation Site (CIS). Please check the appropriate box.

1 Which CIS did you make use of? 1-94 and _____
 Site #1 (HWY 165) Site #2 (HWY 20) Site #3 (HWY 6)

2 Were the CIS signs helpful in directing you to the site?
 Yes No Did not see signs Was escorted to the site

3 Was the area provided large enough for vehicle parking, and for you to complete the required activities?
 Yes No

4 Was there sufficient lighting for you to complete the required activities?
 Yes No Daytime occurrence

5 Did you make use of the phone which was available?
 Yes No With difficulties (comment) _____

6 Is the location of this site convenient?
 Yes No (no comment)

7 How would you rate your level of safety at this site, compared to being on the freeway shoulder, to complete the required activities?
 Much Safer Somewhat Safer Not Particularly Safer Not at All Safer

HOW WOULD YOU RATE THE GATEWAY PATROL SERVICE? (please circle)
 VERY GOOD GOOD POOR VERY POOR

OTHER COMMENTS/SUGGESTIONS: _____

(THE FOLLOWING IS OPTIONAL)
 NAME: _____
 ADDRESS: _____
 CITY: _____ STATE: _____ ZIP: _____
 TELEPHONE: _____

Gateway Activity Spreadsheet Kept at the Traffic Operations Center (TOC).

Gateway Patrol Spread Sheet													
	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99	Total
Flat Tires	36	56	49	65									206
Accidents	59	5	12	4									80
Towed Vehicle	57	34	61	50									202
Stalled Vehicles	54	45	46	58									203
Out Of Gas Vehicles	12	14	21	16									63
Abandoned Vehicles	12	14	28	20									74
Cell Phone Gateway	103	35	28	33									199
No Service Rendered Stop	43	33	46	75									197
Maintenance Road Debris	8	13	17	15									53
Service In Racine County	89	70	75	90									324
Service In Kenosha County	80	77	65	68									290
Crash Site At S.T.H. 165 Tourist Info.	16	15	24	16									71
Crash Site At Scale At K	6	8	12	14									40
Crash Site At Sheriff's Sub. At S.T.H.20	28	19	34	23									104
Time Waiting For Service .15 Min.	25	22	55	55									157
Time Waiting For Service .30 Min.	0	4	1	4									9
Time Waiting For Service .45 Min.	0	2	0	0									2
Response Forms Handed Out	169	91	125	139									524
Response Forms Recieved Back	13	23	22	20									78
Hours Patrolled	479.5	431.75	470	467									1848.25

Enhancement Squads 23A, 23B, 26A and 26B
 Sunday, Nov 15 1998--Thursday, Feb 4, 1999

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
16-NOV-1998	26B	.	17:02:00	17:52:00	84	CRASH
16-NOV-1998	26B	.	17:53:00	18:12:00	ZOO	QUERY/VIOL
17-NOV-1998	23A	.	10:03:00	10:50:00	E 84	BKUP
18-NOV-1998	23B	.	7:09:00	7:15:00	E HAW	ABAND/DIS
19-NOV-1998	23B	.	14:31:00	14:31:00	SUNNY	ABAND/DIS
23-NOV-1998	23B	.	9:11:00	9:23:00	MITCH	QUERY/VIOL
23-NOV-1998	26B	.	16:32:00	16:44:00	E MITCH	QUERY/VIOL
23-NOV-1998	26B	.	16:51:00	17:23:00	E 92	QUERY/VIOL
24-NOV-1998	23B	.	8:19:00	9:06:00	35	BKUP
24-NOV-1998	23B	.	9:15:00	9:20:00	60	CRASH
24-NOV-1998	26A	.	15:18:00	15:25:00	27	ABAND/DIS
25-NOV-1998	23B	.	7:52:00	8:05:00	29	ABAND/DIS
30-NOV-1998	26B	16:06:00	16:08:00	16:35:00	STAD	ABAND/DIS
02-DEC-1998	23B	.	11:01:00	11:10:00	23	QUERY/VIOL
02-DEC-1998	26A	.	16:21:00	16:53:00	E 16	CRASH
02-DEC-1998	26A	.	21:54:00	22:18:00	92	BKUP
03-DEC-1998	23A	.	6:47:00	6:49:00	22	QUERY/VIOL
03-DEC-1998	23B	.	11:46:00	11:46:00	100	DEBRIS
04-DEC-1998	23A	.	6:57:00	.	68	ABAND/DIS
08-DEC-1998	23A	.	7:36:00	7:44:00	76	QUERY/VIOL
08-DEC-1998	23B	.	9:46:00	9:59:00	E STAD	ABAND/DIS
08-DEC-1998	23B	.	9:58:00	10:15:00	25	BKUP
09-DEC-1998	23B	.	11:38:00	11:46:00	E 35	DEBRIS
10-DEC-1998	23B	.	10:48:00	11:13:00	92	CRASH
10-DEC-1998	26A	.	14:50:00	15:17:00	16	CRASH
11-DEC-1998	26A	.	15:08:00	15:11:00	35	DEBRIS
11-DEC-1998	26B	.	15:09:00	15:10:00	35	BKUP
11-DEC-1998	26A	.	15:16:00	17:17:00	35	DEBRIS
11-DEC-1998	26A	.	18:28:00	18:38:00	68	BKUP
14-DEC-1998	26B	.	16:27:00	16:28:00	35	ABAND/DIS
14-DEC-1998	26B	.	16:34:00	16:36:00	E 92	QUERY/VIOL
15-DEC-1998	23A	.	8:27:00	8:27:00	22	ABAND/DIS
15-DEC-1998	23B	.	8:31:00	8:31:00	100	ABAND/DIS
15-DEC-1998	26B	.	16:26:00	16:37:00	W 35	QUERY/VIOL
16-DEC-1998	23A	.	10:03:00	10:04:00	STAD	QUERY/VIOL
16-DEC-1998	23B	.	11:30:00	11:33:00	20	QUERY/VIOL
17-DEC-1998	23A	.	7:40:00	8:17:00	16	CRASH
17-DEC-1998	23B	.	7:50:00	8:17:00	16	ABAND/DIS
17-DEC-1998	23B	.	13:08:00	13:12:00	HAW	ABAND/DIS
17-DEC-1998	26A	.	15:55:00	15:58:00	W 13	ABAND/DIS
17-DEC-1998	26B	.	16:02:00	16:02:00	E 16	ABAND/DIS
17-DEC-1998	26B	.	16:06:00	16:16:00	E 35	QUERY/VIOL
17-DEC-1998	26B	.	16:33:00	16:43:00	E 35	QUERY/VIOL
17-DEC-1998	26B	.	16:45:00	16:58:00	STAD	QUERY/VIOL
18-DEC-1998	23B	.	11:32:00	11:59:00	MARQ	ABAND/DIS
18-DEC-1998	23A	.	11:38:00	11:59:00	MARQ	ABAND/DIS
18-DEC-1998	26B	.	16:05:00	16:14:00	E 35	QUERY/VIOL
18-DEC-1998	26B	.	16:15:00	16:57:00	W 35	QUERY/VIOL
18-DEC-1998	26A	.	17:37:00	17:58:00	E 22	BKUP
18-DEC-1998	26B	.	19:30:00	19:52:00	E 25	CRASH
21-DEC-1998	23A	.	8:00:00	8:02:00	16	OTHER
21-DEC-1998	23A	8:53:00	8:54:00	9:02:00	STAD	DEBRIS
21-DEC-1998	23B	.	12:47:00	12:50:00	ZOO	QUERY/VIOL
21-DEC-1998	26B	.	21:46:00	21:48:00	ZOO	QUERY/VIOL
22-DEC-1998	26A	18:27:00	18:29:00	19:12:00	84	CRASH

Enhancement Squads 23A, 23B, 26A and 26B
 Sunday, Nov 15 1998--Thursday, Feb 4, 1999

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
22-DEC-1998	26B	.	21:57:00	22:00:00	E 84	QUERY/VIOL
23-DEC-1998	23B	.	14:00:00	14:23:00	92	CRASH
23-DEC-1998	26B	.	16:24:00	16:36:00	STAD	QUERY/VIOL
24-DEC-1998	23A	.	6:14:00	6:18:00	100	ABAND/DIS
24-DEC-1998	23A	.	10:50:00	10:50:00	16	ABAND/DIS
24-DEC-1998	23A	.	10:51:00	11:30:00	100	CRASH
24-DEC-1998	23B	.	13:43:00	13:51:00	100	ABAND/DIS
28-DEC-1998	23B	.	6:42:00	6:43:00	35	ABAND/DIS
28-DEC-1998	23B	.	13:19:00	13:27:00	STAD	QUERY/VIOL
28-DEC-1998	26B	.	17:40:00	18:00:00	27	BKUP
28-DEC-1998	26B	21:53:00	21:54:00	22:05:00	W COLINE	OTHER
29-DEC-1998	26B	18:01:00	18:03:00	18:08:00	W 27	DEBRIS
30-DEC-1998	23B	7:27:00	7:42:00	8:00:00	76	CRASH
30-DEC-1998	26A	.	18:19:00	18:43:00	100	QUERY/VIOL
31-DEC-1998	23B	.	10:05:00	10:14:00	MITCH	ABAND/DIS
04-JAN-1999	23B	.	7:56:00	8:15:00	20	ABAND/DIS
04-JAN-1999	26A	.	15:29:00	17:34:00	84	ABAND/DIS
04-JAN-1999	26A	.	15:35:00	15:37:00	84	BKUP
05-JAN-1999	23A	8:52:00	9:06:00	9:25:00	E 92	CRASH
05-JAN-1999	23A	9:42:00	9:42:00	9:48:00	70	ABAND/DIS
05-JAN-1999	26B	.	15:39:00	15:39:00	E 16	ABAND/DIS
05-JAN-1999	26B	.	21:57:00	22:05:00	ZOO	ABAND/DIS
07-JAN-1999	23B	.	7:12:00	7:15:00	COLINE	ABAND/DIS
07-JAN-1999	23B	.	8:43:00	8:49:00	92	CRASH
07-JAN-1999	23B	.	11:27:00	12:09:00	35	OTHER
07-JAN-1999	26B	.	19:00:00	19:05:00	ZOO	QUERY/VIOL
08-JAN-1999	23B	.	.	.	100	OTHER
08-JAN-1999	23B	8:22:00	8:22:00	.	84	ABAND/DIS
08-JAN-1999	26A	.	17:53:00	18:25:00	STAD	ABAND/DIS
11-JAN-1999	23A	9:53:00	9:52:00	10:00:00	HAW	DEBRIS
11-JAN-1999	23A	10:01:00	10:03:00	10:26:00	92	CRASH
11-JAN-1999	23A	10:26:00	10:24:00	.	84	CRASH
11-JAN-1999	23B	10:45:00	10:44:00	12:20:00	70	CRASH
11-JAN-1999	23B	.	14:03:00	14:12:00	100	ABAND/DIS
13-JAN-1999	26A	.	21:26:00	21:29:00	ZOO	BKUP
14-JAN-1999	26A	.	14:46:00	15:02:00	100	BKUP
15-JAN-1999	23A	7:21:00	7:22:00	8:37:00	100	CRASH
15-JAN-1999	26A	18:07:00	18:19:00	19:11:00	E US 41	CRASH
18-JAN-1999	23A	.	7:22:00	7:57:00	E COLINE	CRASH
18-JAN-1999	23A	.	13:32:00	10:34:00	W 35	OTHER
19-JAN-1999	23A	.	6:33:00	7:02:00	16	ABAND/DIS
19-JAN-1999	23A	.	7:32:00	7:36:00	22	QUERY/VIOL
19-JAN-1999	23A	.	9:37:00	9:38:00	16	QUERY/VIOL
19-JAN-1999	23A	.	9:42:00	9:58:00	16	ABAND/DIS
19-JAN-1999	23B	.	13:13:00	13:14:00	92	QUERY/VIOL
21-JAN-1999	23A	.	9:00:00	9:09:00	35	QUERY/VIOL
21-JAN-1999	23B	.	10:08:00	10:10:00	W 84	ABAND/DIS
21-JAN-1999	23B	.	10:36:00	10:43:00	ZOO	ABAND/DIS
21-JAN-1999	23B	.	12:04:00	12:18:00	MARQ	ABAND/DIS
22-JAN-1999	23A	.	11:57:00	13:07:00	.	OTHER
22-JAN-1999	26B	.	19:30:00	19:35:00	E 35	QUERY/VIOL
22-JAN-1999	26B	.	19:46:00	19:55:00	E 22	BKUP
25-JAN-1999	23B	7:44:00	7:52:00	8:34:00	W 84	CRASH
25-JAN-1999	26A	.	16:33:00	16:47:00	W 13	CRASH
25-JAN-1999	26B	.	17:30:00	18:33:00	W 35	CRASH

Enhancement Squads 23A, 23B, 26A and 26B
 Sunday, Nov 15 1998--Thursday, Feb 4, 1999

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
26-JAN-1999	23A	.	14:14:00	14:29:00	26	QUERY/VIOL
26-JAN-1999	26B	.	16:20:00	16:31:00	E 121	QUERY/VIOL
27-JAN-1999	23B	7:34:00	7:35:00	7:43:00	E ZOO	ABAND/DIS
27-JAN-1999	26B	.	16:59:00	17:01:00	116	DEBRIS
27-JAN-1999	26A	.	17:39:00	17:43:00	W 16	ABAND/DIS
27-JAN-1999	26A	.	20:34:00	21:12:00	W 16	BKUP
28-JAN-1999	23B	.	13:23:00	13:23:00	COLINE	OTHER
28-JAN-1999	26B	.	15:36:00	15:54:00	E 92	QUERY/VIOL
28-JAN-1999	26B	21:50:00	21:51:00	22:26:00	100	CRASH
29-JAN-1999	23B	.	6:53:00	7:07:00	21	ABAND/DIS
29-JAN-1999	23B	.	9:26:00	9:27:00	MITCH	ABAND/DIS
29-JAN-1999	23A	.	9:41:00	9:41:00	W 16	ABAND/DIS
29-JAN-1999	26B	.	17:21:00	17:53:00		ABAND/DIS
01-FEB-1999	26B	16:33:00	16:37:00	16:40:00	STAD	ABAND/DIS
01-FEB-1999	26B	16:52:00	16:53:00	17:15:00	E 35	ABAND/DIS
01-FEB-1999	26B	.	16:55:00	.	W 16	DEBRIS
02-FEB-1999	26B	.	16:09:00	16:19:00	W 100	QUERY/VIOL
02-FEB-1999	26B	.	16:19:00	17:04:00	28	BKUP
02-FEB-1999	26A	.	17:16:00	17:18:00	E 100	QUERY/VIOL
03-FEB-1999	23B	7:59:00	8:00:00	8:49:00	E 92	CRASH
03-FEB-1999	23B	.	9:43:00	9:46:00	MITCH	QUERY/VIOL
04-FEB-1999	23A	.	7:24:00	7:26:00	16	QUERY/VIOL
04-FEB-1999	23B	.	7:31:00	7:42:00	121	QUERY/VIOL
04-FEB-1999	23B	.	12:18:00	12:21:00	W ZOO	ABAND/DIS
04-FEB-1999	23A	13:10:00	13:32:00	13:32:00	100	ABAND/DIS
04-FEB-1999	26A	.	15:41:00	15:31:00	HAW	BKUP
04-FEB-1999	26B	.	20:09:00	20:22:00	84	QUERY/VIOL
04-FEB-1999	26B	.	21:40:00	21:52:00	68	QUERY/VIOL
Total Activity						
138	138	22	137	133	138	138

Log B
Dedicated Sector 2 Squad Activity Squads 21 and 24
Sun, Nov 15 1998--Tue, Dec 1, 1998

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
15-NOV-1998	21	.	7:45:00	7:53:00	STAD	QUERY/VIOL
	21	.	8:09:00	8:15:00	22	QUERY/VIOL
	21	.	8:23:00	8:30:00	23	QUERY/VIOL
	21	.	8:39:00	8:44:00	40	QUERY/VIOL
	24	.	14:46:00	14:56:00	68	BKUP
Daily total	5	0	5	5	5	5
16-NOV-1998	24	.	17:06:00	17:17:00	84	BKUP
	24	.	17:37:00	17:42:00	E ZOO	BKUP
	24	.	20:37:00	20:49:00	E 27	QUERY/VIOL
Daily total	3	0	3	3	3	3
17-NOV-1998	21	.	7:29:00	7:46:00	92	CRASH
	21	.	8:42:00	8:57:00	E ZOO	CRASH
	21	.	8:57:00	9:12:00	92	ABAND/DIS
	21	.	9:45:00	11:01:00	W 84	OTHER
	21	13:19:00	13:22:00	13:29:00	COLINE	CRASH
	24	.	15:21:00	16:02:00	E 35	ABAND/DIS
	24	.	16:51:00	.	18	ABAND/DIS
	24	.	20:29:00	20:35:00	16	QUERY/VIOL
Daily total	8	1	8	7	8	8
18-NOV-1998	21	.	10:44:00	10:59:00	35	ABAND/DIS
	21	.	11:56:00	12:14:00	17	OTHER
	24	15:05:00	15:06:00	15:15:00	84	CRASH
Daily total	3	1	3	3	3	3
19-NOV-1998	21	.	8:58:00	9:00:00	STAD	QUERY/VIOL
	21	.	10:04:00	.	COLINE	OTHER
	24	.	18:27:00	18:31:00	ZOO	ABAND/DIS
	24	.	19:43:00	19:46:00	W 76	ABAND/DIS
Daily total	4	0	4	3	4	4
22-NOV-1998	21	.	8:08:00	8:15:00	28	QUERY/VIOL
	21	.	9:20:00	9:30:00	100	ABAND/DIS
	21	.	19:05:00	19:07:00	37	QUERY/VIOL
	21	.	19:05:00	19:07:00	37	QUERY/VIOL
Daily total	4	0	4	4	4	4
23-NOV-1998	21	.	6:24:00	7:06:00	STAD	QUERY/VIOL
	21	.	7:28:00	7:35:00	E 25	OTHER
	21	.	7:35:00	7:35:00	E 68	ABAND/DIS
	21	.	9:06:00	9:06:00	16	ABAND/DIS
	24	14:34:00	14:37:00	15:16:00	W 35	CRASH
	24	.	16:04:00	16:15:00	100	QUERY/VIOL
	24	.	16:47:00	17:04:00	100	QUERY/VIOL
	24	17:10:00	17:12:00	17:31:00	E 16	CRASH
Daily total	8	2	8	8	8	8

Log B
Dedicated Sector 2 Squad Activity Squads 21 and 24
Sun, Nov 15 1998--Tue, Dec 1, 1998

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
24-NOV-1998	21	8:15:00	8:17:00	9:02:00	35	CRASH
	21	.	9:47:00	9:55:00	16	QUERY/VIOL
	21	.	10:32:00	10:48:00	MARQ	QUERY/VIOL
	21	11:38:00	11:38:00	11:42:00	HAW	CRASH
	21	11:48:00	11:48:00	12:05:00	HAW	CRASH
	24	.	16:56:00	18:03:00	W 108	CRASH
	24	.	18:46:00	19:26:00	W 84	QUERY/VIOL
Daily total	7	3	7	7	7	7
25-NOV-1998	21	.	12:14:00	12:33:00	W 27	OTHER
	21	.	12:55:00	13:12:00	68	QUERY/VIOL
	21	.	13:17:00	13:25:00	COLINE	QUERY/VIOL
	24	.	17:16:00	17:26:00	W 84	QUERY/VIOL
Daily total	4	0	4	4	4	4
26-NOV-1998	21	.	6:41:00	6:47:00	116	QUERY/VIOL
	21	.	7:26:00	7:32:00	40	QUERY/VIOL
	21	.	7:59:00	8:01:00	16	ABAND/DIS
	24	.	14:23:00	14:25:00	E ELM GRO	ABAND/DIS
	24	14:49:00	14:52:00	15:03:00	ZOO	ABAND/DIS
	24	16:53:00	16:58:00	17:03:00	70	ABAND/DIS
Daily total	6	2	6	6	6	6
27-NOV-1998	21	.	7:08:00	7:19:00	116	QUERY/VIOL
	21	.	9:05:00	9:19:00	STAD	QUERY/VIOL
	24	.	14:56:00	15:02:00	76	DEBRIS
Daily total	3	0	3	3	3	3
28-NOV-1998	21	.	7:16:00	7:21:00	121	QUERY/VIOL
	21	.	7:26:00	7:36:00	E 92	QUERY/VIOL
	21	13:01:00	13:03:00	13:11:00	STAD	DEBRIS
Daily total	3	1	3	3	3	3
29-NOV-1998	21	.	7:09:00	7:23:00	116	QUERY/VIOL
	21	.	7:42:00	7:54:00	STAD	QUERY/VIOL
	21	.	7:59:00	8:13:00	116	QUERY/VIOL
	21	.	10:01:00	10:13:00	116	QUERY/VIOL
	21	.	11:05:00	11:11:00	116	QUERY/VIOL
	21	11:38:00	11:41:00	11:46:00	W ZOO	ABAND/DIS
	24	.	17:01:00	17:18:00	W 16	QUERY/VIOL
	24	.	17:50:00	17:59:00	W ZOO	QUERY/VIOL
Daily total	8	1	8	8	8	8
30-NOV-1998	21	.	11:40:00	11:47:00	28	QUERY/VIOL
	21	13:09:00	.	13:10:00	STAD	OTHER
	24	.	17:03:00	17:15:00	COLINE	ABAND/DIS
	24	.	17:48:00	18:17:00	W 13	CRASH
	24	.	21:08:00	21:24:00	E 121	QUERY/VIOL

Log B

Dedicated Sector 2 Squad Activity Squads 21 and 24
Sun, Nov 15 1998--Tue, Dec 1, 1998

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
Daily total	5	1	4	5	5	5
01-DEC-1998	21	.	9:55:00	10:04:00	84	DEBRIS
	24	.	17:22:00	17:23:00	30	BKUP
Daily total	2	0	2	2	2	2

Log C
Sector 2 All Squads
Week of Sun, Nov 15 1998--Sat, November 21, 1998

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYPE
15-NOV-98	21	.	7:45:00	7:53:00	STAD	QUERY/VIOL
	22	.	8:01:00	8:12:00	W 16	QUERY/VIOL
	21	.	8:09:00	8:15:00	22	QUERY/VIOL
	21	.	8:23:00	8:30:00	23	QUERY/VIOL
	22	.	8:27:00	8:36:00	40	QUERY/VIOL
	21	.	8:39:00	8:44:00	40	QUERY/VIOL
	22	.	8:49:00	9:00:00	13	QUERY/VIOL
	22	.	9:04:00	9:15:00	E 25	QUERY/VIOL
	12	.	14:40:00	14:56:00	68	OTHER
	24	.	14:46:00	14:56:00	68	BKUP
	35	.	15:44:00	15:54:00	E 108	QUERY/VIOL
		16:21:00	16:26:00	.	27	OTHER
	25	21:41:00	21:44:00	21:48:00	E ZOO	DEBRIS
Daily tot	13	2	13	12	13	13
16-NOV-98	67	.	12:09:00	13:40:00		QUERY/VIOL
	15	.	15:42:00	16:17:00	11	CRASH
	25	.	15:45:00	15:49:00	11	BKUP
	26B	.	17:02:00	17:52:00	84	CRASH
	24	.	17:06:00	17:17:00	84	BKUP
	25	17:12:00	17:36:00	18:27:00	E ZOO	CRASH
	24	.	17:37:00	17:42:00	E ZOO	BKUP
	26B	.	17:53:00	18:12:00	ZOO	QUERY/VIOL
	24	.	20:37:00	20:49:00	E 27	QUERY/VIOL
Daily tot	9	1	9	9	9	9
17-NOV-98	22	.	6:50:00	7:17:00	92	OTHER
	21	.	7:29:00	7:46:00	92	CRASH
	22	.	8:24:00	8:29:00	27	QUERY/VIOL
	23	.	8:27:00	.	14	OTHER
	21	.	8:42:00	8:57:00	E ZOO	CRASH
	21	.	8:57:00	9:12:00	92	ABAND/DIS
	21	.	9:45:00	11:01:00	W 84	OTHER
	23A	.	10:03:00	10:50:00	E 84	BKUP
	61	.	12:12:00	12:12:00	27	OTHER
	21	13:19:00	13:22:00	13:29:00	COLINE	CRASH
	24	.	15:21:00	16:02:00	E 35	ABAND/DIS
	44	.	16:44:00	16:46:00	W 84	QUERY/VIOL
	24	.	16:51:00	.	18	ABAND/DIS
	34	16:52:00	16:56:00	17:27:00	E 76	QUERY/VIOL
	25	.	16:57:00	17:15:00	E 76	BKUP
	25	18:58:00	18:59:00	18:59:00	ZOO	ABAND/DIS
	25	.	19:54:00	20:06:00	121	QUERY/VIOL
	24	.	20:29:00	20:35:00	16	QUERY/VIOL
	65	.	21:56:00	22:38:00	16	QUERY/VIOL
	25	.	21:57:00	22:17:00	16	BKUP
Daily tot	20	3	20	18	20	20
18-NOV-98	23B	.	7:09:00	7:15:00	E HAW	ABAND/DIS

Log C

Sector 2 All Squads

Week of Sun, Nov 15 1998--Sat, November 21, 1998

Page

Date	Squad Number	COMP_REC	START	FINISH	Dispatch Location	DISPATCH TYP]
18-NOV-98	12	.	8:34:00	8:39:00	27	ABAND/DIS
	22	.	9:55:00	10:15:00	100	OTHER
	21	.	10:44:00	10:59:00	35	ABAND/DIS
	21	.	11:56:00	12:14:00	17	OTHER
	22	.	12:48:00	13:02:00	COLINE	QUERY/VIOL
	14	.	14:35:00	14:59:00	13	QUERY/VIOL
	24	15:05:00	15:06:00	15:15:00	84	CRASH
	500	.	15:50:00	.	22	ABAND/DIS
	460	.	16:11:00	16:17:00	STAD	QUERY/VIOL
		19:41:00	.	.	28	ABAND/DIS
	25	.	20:56:00	21:07:00	W 16	QUERY/VIOL
Daily tot	12	2	11	10	12	12
19-NOV-98		.	8:32:00	8:32:00	STAD	ABAND/DIS
	22	.	8:35:00	8:44:00	31	QUERY/VIOL
	22	.	8:55:00	9:06:00	100	QUERY/VIOL
	21	.	8:58:00	9:00:00	STAD	QUERY/VIOL
	21	.	10:04:00	.	COLINE	OTHER
	22	.	12:08:00	12:17:00	35	QUERY/VIOL
	25	17:22:00	17:21:00	18:05:00	13	CRASH
	22	.	13:31:00	13:38:00	W STAD	DEBRIS
	23B	.	14:31:00	14:31:00	SUNNY	ABAND/DIS
	24	.	18:27:00	18:31:00	ZOO	ABAND/DIS
	24	.	19:43:00	19:46:00	W 76	ABAND/DIS
Daily tot	11	1	11	10	11	11
21-NOV-98	27	.	11:20:00	11:33:00		QUERY/VIOL
	27	.	11:43:00	11:59:00	16	QUERY/VIOL
Daily tot	2	0	2	2	2	2

Table ST 1. Dispatch Type Distributions During the Before and the After Periods.

		Before-After		Total	
		11-15-95 to 2-4-96	11-15-98 to 2-4-99		
DISPATCH TYPE	ABAND/DIS	Count	290	251	541
		Row %	53.6%	46.4%	100.0%
	CRASH	Count	216	237	453
		Row %	47.7%	52.3%	100.0%
	BKUP	Count	131	129	260
		Row %	50.4%	49.6%	100.0%
	DEBRIS	Count	55	54	109
		Row %	50.5%	49.5%	100.0%
	QUERY/VIOL	Count	364	459	823
		Row %	44.2%	55.8%	100.0%
	OTHER	Count	55	59	114
		Row %	48.2%	51.8%	100.0%
	Total	Count	1111	1189	2300
		Row %	48.3%	51.7%	100.0%

Table ST 2. Crashes by Day of Week.

		Frequency	Percent
Valid	SUNDAY	21	6.8
	MONDAY	62	20.0
	TUESDAY	67	21.6
	WEDNESDAY	49	15.8
	THURSDAY	44	14.2
	FRIDAY	47	15.2
	SATURDAY	20	6.5
	Total	310	100.0

Table ST 3. Crash Severity During Evaluation Time Intervals.

			EFP/NON-EFP HOUR CATEGORIES			Total
			EFP HOURS OF OPERATION	NON-EFP HOURS WEEKDAY	NON-EFP HOURS WEEKEND	
CRASH SEVERITY	INJURY	Count	82	8	12	102
		Column %	32.9%	40.0%	29.3%	32.9%
	PDO	Count	167	12	29	208
		Column %	67.1%	60.0%	70.7%	67.1%
Total		Count	249	20	41	310
		Column %	100.0%	100.0%	100.0%	100.0%

Table ST 4. Manner of Collision During Evaluation Time Intervals.

			EFP/NON-EFP HOUR CATEGORIES			Total
			EFP HOURS OF OPERATION	NON-EFP HOURS WEEKDAY	NON-EFP HOURS WEEKEND	
MANNER OF COLLISION	BLANK	Count	2		1	3
		Row %	66.7%		33.3%	100.0%
	COLLISION W/OTHER THAN MOTOR VEHICLE IN TRANSPORT	Count	37	11	19	67
		Row %	55.2%	16.4%	28.4%	100.0%
	REAR END	Count	139	4	13	156
		Row %	89.1%	2.6%	8.3%	100.0%
	HEAD-ON	Count	2			2
		Row %	100.0%			100.0%
	REAR TO REAR	Count	1			1
		Row %	100.0%			100.0%
	ANGLE	Count	25	2	2	29
		Row %	86.2%	6.9%	6.9%	100.0%
	SS SAME DIRECTION	Count	41	3	6	50
		Row %	82.0%	6.0%	12.0%	100.0%
	SS OPPOSITE DIRECTION	Count	2			2
		Row %	100.0%			100.0%
Total		Count	249	20	41	310
		Row %	80.3%	6.5%	13.2%	100.0%

Table ST 5. Pavement Wetness by Evaluation Time Intervals.

			EFP/NON-EFP HOUR CATEGORIES			Total
			EFP HOURS OF OPERATION	NON-EFP HOURS WEEKDAY	NON-EFP HOURS WEEKEND	
PAVEMENT WETNESS	MISSING	Count	3	1		4
		Row %	75.0%	25.0%		100.0%
	DRY	Count	162	10	20	192
		Row %	84.4%	5.2%	10.4%	100.0%
	WET	Count	39	4	10	53
		Row %	73.6%	7.5%	18.9%	100.0%
	SNOW/SLUSH	Count	36	3	11	50
		Row %	72.0%	6.0%	22.0%	100.0%
	ICE	Count	5	2		7
		Row %	71.4%	28.6%		100.0%
	OTHER	Count	1			1
		Row %	100.0%			100.0%
	UNKNOWN	Count	3			3
		Row %	100.0%			100.0%
	Total	Count	249	20	41	310
		Row %	80.3%	6.5%	13.2%	100.0%

Table ST 6. Number of Vehicles Involved in the Crash by Evaluation Time Intervals.

			EFP/NON-EFP HOUR CATEGORIES			Total
			EFP HRS OF OPERATION	NON-EFP HOURS WEEKDAY	NON-EFP HOURS WEEKEND	
NUMBER OF VEHICLES INVOLVED IN CRASH	1	Count	29	9	19	57
		Row %	50.9%	15.8%	33.3%	100.0%
	2	Count	166	9	17	192
		Row %	86.5%	4.7%	8.9%	100.0%
	3	Count	42	2	3	47
		Row %	89.4%	4.3%	6.4%	100.0%
	4	Count	8		2	10
		Row %	80.0%		20.0%	100.0%
	5	Count	3			3
		Row %	100.0%			100.0%
	6	Count	1			1
		Row %	100.0%			100.0%
Total	Count	249	20	41	310	
	Row %	80.3%	6.5%	13.2%	100.0%	

Table ST 7. Total Number of Injuries in the Crash by Evaluation Time Interval.

		EFP/NON-EFP HOUR CATEGORIES			Total	
		EFP HRS OF OPERATION	NON-EFP HRS--WEEK DAY	NON-EFP HRS--WEEK END		
TOTAL # OF INJURIES IN CRASH	0	Count	167	12	29	208
		Column %	67.1%	60.0%	70.7%	67.1%
	1	Count	55	7	11	73
		Column %	22.1%	35.0%	26.8%	23.5%
	2	Count	18	1	1	20
		Column %	7.2%	5.0%	2.4%	6.5%
	3	Count	8			8
		Column %	3.2%			2.6%
	4	Count	1			1
		Column %	.4%			.3%
	Total	Count	249	20	41	310
		Column %	100.0%	100.0%	100.0%	100.0%

Table ST 8. Injury Severity by Most Serious Vehicle Damage.

			CRASH SEVERITY		Total
			INJURY	PDO	
VEHICLE DAMAGE FLAG	BLANK	Count		1	1
		Row %		100.0%	100.0%
	VERY MINOR	Count	1	5	6
		Row %	16.7%	83.3%	100.0%
	MINOR	Count	9	21	30
		Row %	30.0%	70.0%	100.0%
	MODERATE	Count	43	115	158
		Row %	27.2%	72.8%	100.0%
	SEVERE	Count	27	22	49
		Row %	55.1%	44.9%	100.0%
	VERY SEVERE	Count	10	6	16
		Row %	62.5%	37.5%	100.0%
	UNKNOWN	Count	6	19	25
		Row %	24.0%	76.0%	100.0%
	NONE	Count	6	19	25
		Row %	24.0%	76.0%	100.0%
	Total	Count	102	208	310
		Row %	32.9%	67.1%	100.0%

Table ST 9. Vehicles Towed due to Damage in Crashes that Occurred During EFP Hours.

			Before/After		Total
			Nov/15/95 to Feb/4/96	Nov/15/98 to Feb/4/99	
TOW DUE TO DAMAGE?	NO TOW	Count	77	79	156
		Row %	49.4%	50.6%	100.0%
	TOWED FROM SCENE	Count	56	35	91
		Row %	61.5%	38.5%	100.0%
Total		Count	133	114	247
		Row %	53.8%	46.2%	100.0%

Table ST 10. Number of Crashes-Before and After Evaluation Periods.

	Frequency	Percent
Nov/15/95-Feb/4/96	162	52.3
Nov/15/98-Feb/4/99	148	47.7
Total	310	100.0

Table ST 11. Dispatch Type Distribution by Squad Type During the Before Period

			Squad Type		Total
			Sector 2 Squads	Other Squads	
DISPATCH TYPE	ABAND/DIS	Count	224	66	290
		Row %	77.2%	22.8%	100.0%
	CRASH	Count	163	53	216
		Row %	75.5%	24.5%	100.0%
	BKUP	Count	85	46	131
		Row %	64.9%	35.1%	100.0%
	DEBRIS	Count	45	10	55
		Row %	81.8%	18.2%	100.0%
	QUERY/VIOL	Count	296	68	364
		Row %	81.3%	18.7%	100.0%
	OTHER	Count	36	19	55
		Row %	65.5%	34.5%	100.0%
	Total	Count	849	262	1111
		Row %	76.4%	23.6%	100.0%

Table ST 12. Dispatch Type Distribution by Squad Type During the After Period

			Squad Type			Total
			Enhancement Squads	Sector 2 Squads	Other Squads	
DISPATCH TYPE	ABAND/DIS	Count	45	170	36	251
		Row%	17.9%	67.7%	14.3%	100.0%
	CRASH	Count	24	166	47	237
		Row%	10.1%	70.0%	19.8%	100.0%
	BKUP	Count	15	62	52	129
		Row%	11.6%	48.1%	40.3%	100.0%
	DEBRIS	Count	9	36	9	54
		Row%	16.7%	66.7%	16.7%	100.0%
	QUERY/VIOL	Count	38	315	106	459
		Row%	8.3%	68.6%	23.1%	100.0%
	OTHER	Count	6	34	19	59
		Row%	10.2%	57.6%	32.2%	100.0%
	Total	Count	137	783	269	1189
		Row%	11.5%	65.9%	22.6%	100.0%

Table ST 13. Number of Dispatches by MCS Sector Number

			Before/After		Total
			Before	After	
Squads by Sector	Sector 1 Squads	Count	76	70	146
		Column %	6.9%	5.9%	6.4%
	Sector 2 Squads	Count	855	935	1790
		Column %	78.1%	79.3%	78.7%
	Sector 3 Squads	Count	38	42	80
		Column %	3.5%	3.6%	3.5%
	Sector 4 Squads	Count	31	53	84
		Column %	2.8%	4.5%	3.7%
	Sector 5 Squads	Count	28	10	38
		Column %	2.6%	.8%	1.7%
	Sector 6 Squads	Count	57	59	116
		Column %	5.2%	5.0%	5.1%
	Sector 7 Squads	Count	10	10	20
		Column %	.9%	.8%	.9%
Total	Count	1095	1179	2274	
	Column %	100.0%	100.0%	100.0%	

Table ST 14. Sector 2-Dedicated and Enhancement Squad Activity

Count

		Before/After		Total
		Before	After	
Squad Sector	21	225	208	433
	22	217	165	382
	23A		31	31
	23B		45	45
	24	171	183	354
	25	203	214	417
	26A		22	22
	26B		40	40