


FINN

THE JOHN F. FINN INSTITUTE
FOR PUBLIC SAFETY, INC.

Analysis of Motor Vehicle Crashes: Troy, NY

Sarah J. McLean, Ph.D.
Robert E. Worden, Ph.D

423 New Karner Rd
Suite 5
Albany, NY 12205
PH: 518-456-6323
FAX: 518-456-6312
<http://finninstitute.org>

2006

Robert E. Worden, Ph.D.
Director

Sarah J. McLean, Ph.D.
Associate Director

This report was prepared for the Traffic Unit of the Troy Police Department's Community Services Bureau. The work was conducted under the auspices of the Collaborative Crime Analysis Project. CCAP operates in conjunction with a New York State initiative known as Operation IMPACT (Integrated Municipal Police Anti-Crime Teams), which provided funding for strategic crime-reduction interventions by multi-agency task forces in each of seventeen jurisdictions across New York State.

Introduction

In 2005 there were 2,420 motor vehicle crashes in the city of Troy, NY. Just over half of all crashes were property damage crashes extensive enough to require a report (n=1,287), about 10 percent were personal injury crashes, and the remainder were crashes where information was exchanged but no report was necessary or incidents where involved parties left the scene and officers could not take a report (see Table 1).

Prior to the writing of this report, in-house analysis included counts of only those crashes for which a report was taken, which may make it appear that traffic crashes have gone up significantly in Troy. In order to get an understanding of all crashes in Troy, we have analyzed crashes with and without reports taken. As a point of comparison it should be noted that overall the number of crashes has decreased since 2003 (see Table 2).

	#	%
Personal Injury Crashes	223	9.2
Property Damage Crashes	1287	53.2
Crashes-Exchange of Information/Other	910	37.6
Total	2420	100

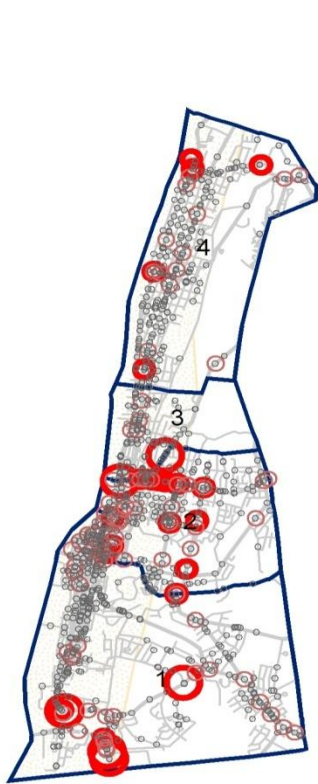
	2003	2004	2005
Crashes with report	1447	1685	1510
Crashes-Exchange of Information/Other	1585	894	910
Total Crashes	3032	2579	2420

Spatial Distribution

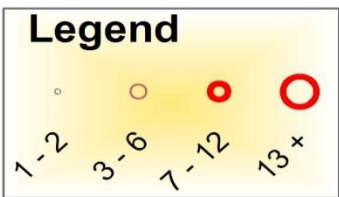
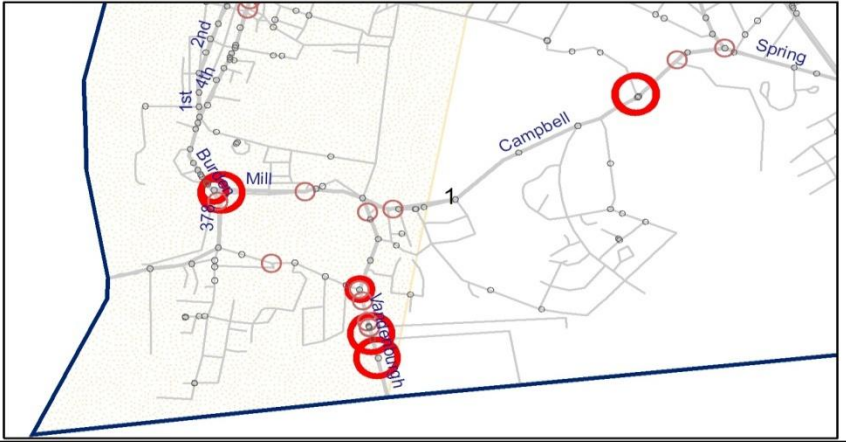
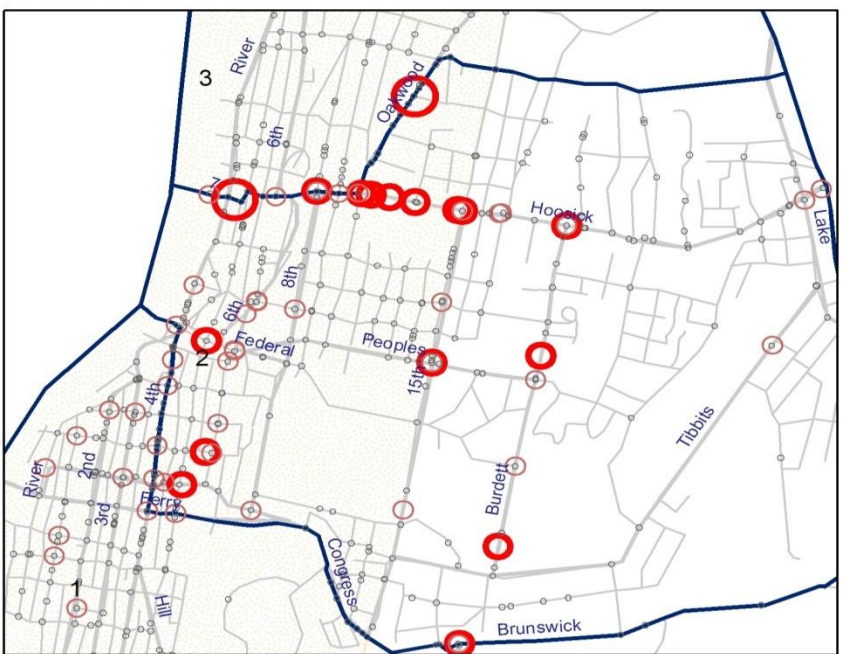
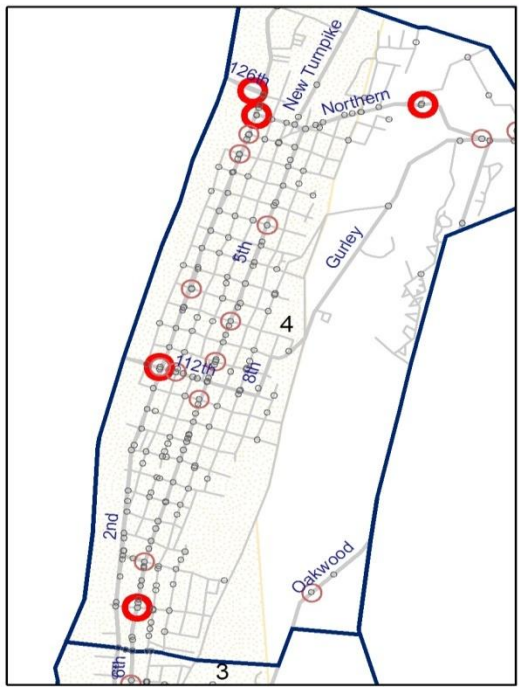
While motor vehicle crashes were dispersed across the City in 2005, there were several areas that emerged as having a markedly high volume of crashes (Figure 1). Four of the busiest hotspot areas are the subject of separate analyses for this report (results begin on page 9) and are shown in a more detailed map on Page 10, Figure 5.

Figure 1

ALL CRASHES 2005 (TROY, NY)



(N=2,420)



Created by:
 Collaborative Crime Analysis Project (CCAP)
Research Team
University at Albany, SUNY

Source: Troy PD
Map Date: 04/07/2006

Temporal Patterns

Motor vehicle crashes were at their highest in January, December and March (See Table 2). For crashes overall, Friday was the most common day of occurrence (16.9%) with two times the number of crashes as the least common day, Sunday. The day of week pattern is consistent across the three accident types (see Table 4).

Just over half of all accidents occurred during the second platoon (52.8%), which runs from 7:30-15:30. While this pattern holds across the three accident types, it is more pronounced for property damage only crashes (see Table 5). Injury and exchange of information crashes are both fairly evenly distributed across the second and third platoon. For crashes overall and for each type individually, the first platoon is markedly less busy.

Figure 2

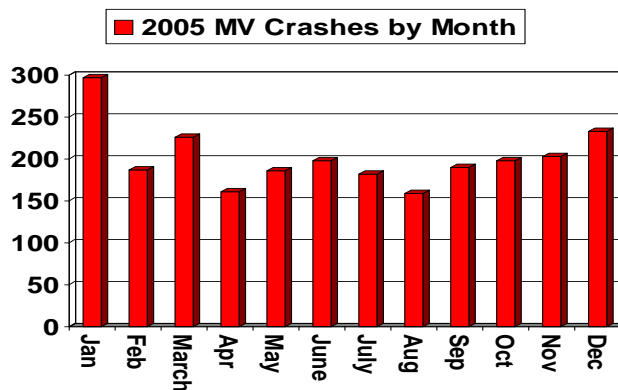


Table 3

Crash Type by Month

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Personal Injury Crashes	25 11.2%	0	21 9.4%	12 5.4%	24 10.8%	28 12.6%	14 6.3%	9 4.0%	22 9.9%	16 7.2%	27 12.1%	25 11.2%	223 100%
Property Damage Crashes	181 14.1%	10 .8%	151 11.7%	94 7.3%	105 8.2%	112 8.7%	70 5.4%	57 4.4%	114 8.9%	132 10.3%	124 9.6%	137 10.6%	1287 100%
Crashes-Exchange of Information/Other	91 10%	177 19.5%	54 5.9%	55 6.0%	57 6.3%	58 6.4%	98 10.8%	93 10.2%	54 5.9%	50 5.5%	52 5.7%	71 7.8%	910 100%
Total	297 12.3%	187 7.7%	226 9.3%	161 6.7%	186 7.7%	198 8.2%	182 7.5%	159 6.6%	190 7.9%	198 8.2%	203 8.4%	233 9.6%	2,420 100%

Figure 3

2005 MV Crashes by Day of Week

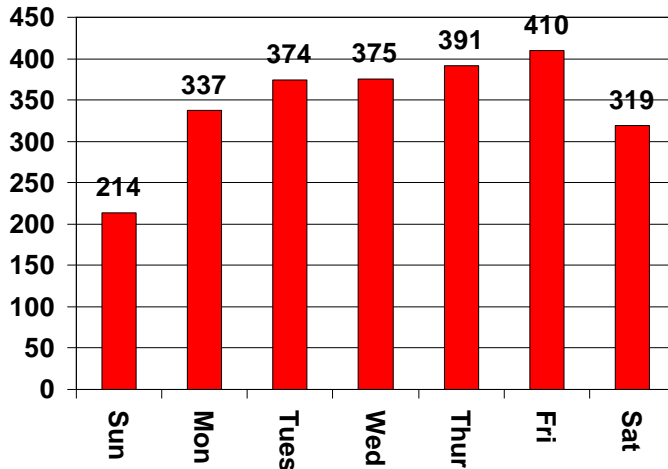


Table 4

2005 Crashes by Type and Day of Week

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
Personal Injury Crashes	15 6.7%	29 13.0%	33 14.8%	36 16.1%	37 16.6%	35 15.7%	38 17.0%	223 100%
Property Damage Crashes	108 8.4%	172 13.4%	201 15.6%	207 16.1%	217 16.9%	213 16.6%	169 13.1%	1287 100%
Crashes-Exchange of Information/Other	91 10.0%	136 14.9%	140 15.4%	132 14.5%	137 15.1%	162 17.8%	112 12.3%	910 100%
Total	214 8.8%	337 13.9%	374 15.4%	375 15.5%	391 16.1%	410 16.9%	319 13.2%	2,420 100%

Table 5				
2005 Crashes by Shift Crash Occurred on and Type of Crash				
	Platoon 1 (23:30-07:30)	Platoon 2 (07:30-15:30)	Platoon 3 (15:30-23:30)	Total
Personal Injury Crashes	21 9.4%	108 48.4%	94 42.2%	223 100%
Property Damage Crashes	117 9.1%	719 55.9%	451 35.0%	1287 100%
Crashes-Exchange of Information/Other	63 6.9%	451 49.6%	396 43.5%	910 100%
Total	201 8.3%	1278 52.8%	941 38.9%	2,420 100%

Time Spent on Crashes

The average length of time an officer spent on a call, for crashes as a whole, was forty-three minutes. As one would expect, personal injury crashes account for the crash type requiring the longest amount of officer time, averaging seventy-six minutes (see Table 6).

Table 6	
Average Time on Call	
Personal Injury Crashes	76 minutes
Property Damage Crashes	46 minutes
Crashes-Exchange of Information/Other	32 minutes
Total Crashes	43 minutes

Number of Vehicles Involved

Information on the number of vehicles involved is only available for those accidents where a report was taken: personal injury crashes and property damage crashes (n=1510). Over three-quarters of all accidents, overall and by individual type, involved only two vehicles. Personal injury crashes were slightly more likely than property damage to involve more than two vehicles (see Table 7).

Table 7							
Number of Vehicles by Crash Type							
	1	2	3	4	5	7	Total
Personal Injury Crashes	26 11.7%	165 74.0%	24 10.8%	6 2.7%	1 .4%	0 -	223 100%
Property Damage Crashes	169 13.1%	1022 79.4%	82 6.4%	12 .9%	1 .1%	1 .1%	1287 100%
Total	195 12.9%	1187 78.6%	106 7.0%	18 1.2%	2 .1%	1 .1%	1510* 99.9%
*Missing data for 1 case							

Apparent Contributing Factors

In 14.6 percent of all crashes an apparent contributing factor was not identified (see Table 8).¹ The list of unique apparent contributing factors listed on the New York State Police Accident Report (MV-104A) was collapsed based on the classification scheme provided on the report. The individual factors were collapsed into the following categories: Human, Environmental or Vehicular. As shown in Table 8 on page 7, any one incident can have more than one of the three classifications identified as an apparent cause. However, in over three-quarters of all crashes only a single category of contributing factor was identified. This held true when one differentiated by crash type as well.

Table 8A displays the category of contributing factor for those crashes where an apparent cause was identified (N=1,289). Human factors were identified as the apparent cause in the majority of all accidents, regardless of crash type. Vehicular and environmental factors were seldom listed as the sole contributing factor of a crash: in overall crashes, vehicular factors were the sole cause in only .5 percent and environmental was identified as the sole factor in 4.9 percent (see Table 8A).

In order to better understand the specific factors identified in crashes we looked at each contributing cause encompassed by the category “Human” (N=1,219). Illness was the most commonly cited human contributing factor (36%), followed by failure to yield right of way (23.9%), and backing unsafely (21.2%). The following factors were identified in ten to twenty percent of accidents: physical disability, following too closely, fell asleep, driver inattention and driver inexperience.

Apparent cause of crashes was analyzed to help provide some purchase for strategic interventions and resource allocation. Additionally, “hot spot” maps can be used to guide selective enforcement, particularly where the highest frequency causes are enforceable violations.

¹ “No apparent cause” identified includes those reports where the officer only checked the factors of: “does not apply”, “none” or “unknown”.

Table 8				
Apparent Contributing Factors				
	No Factor Identified	Multiple Factors	Single Factor	Totals
Personal Injury Crash	28 12.6%	23 10.3%	172 78.0%	223 100%
Property Damage Crashes	193 15%	105 8.2%	989 76.8%	1287 100%
Total Crashes	221 14.6%	128 8.5%	1161 76.9%	1510 100%

Table 8A						
Apparent Contributing Factor Identified by Crash Type						
	Human Only	Vehicular Only	Environmental Only	Human and Vehicular	Human and Environmental	Total
Personal Injury Crash	156 80%	2 1.0%	14 7.2%	4 2.1%	19 9.7%	195 100%
Property Damage Crashes	935 85.5%	5 .5%	49 4.5%	24 2.2%	81 7.4%	1094 100%
Total Crashes	1091 84.6%	7 .5%	63 4.9%	28 2.2%	100 7.8%	1289 100%

Injury Severity

In order to describe the pattern of injury across personal injury accidents the most serious level of injury sustained in the crash was selected (e.g. if two parties sustained injuries in a single incident and one party's injuries were severe and the other party's were minor, then that incident was recorded as an incident where severe injuries were sustained). Injuries sustained in personal injury crashes were most commonly minor level injuries (65%) (see Table 9). Minor injury includes: minor bleeding, minor burn, contusion, and complaint of pain.

Table 9	
2005 Personal Injury Crashes: Most Severe Level of Injury	
Severe	9 4.0%
Minor	145 65.0%
Non-Visible	59 26.5%
Missing	10 4.5%
Total	223 100%

HOT SPOT ANALYSIS

Figure 4

HOTSPOTS: CRASHES 2005 (TROY, NY)

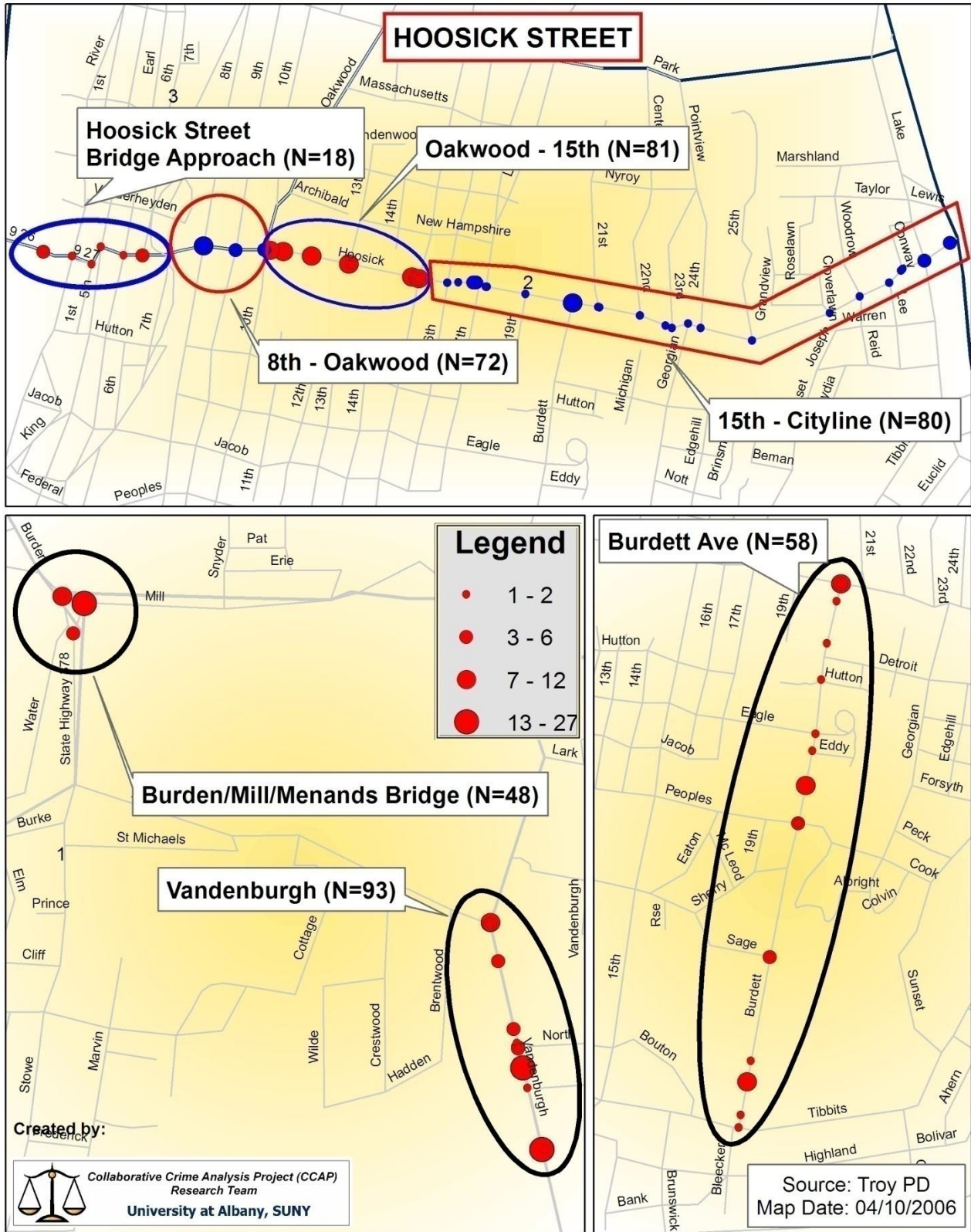
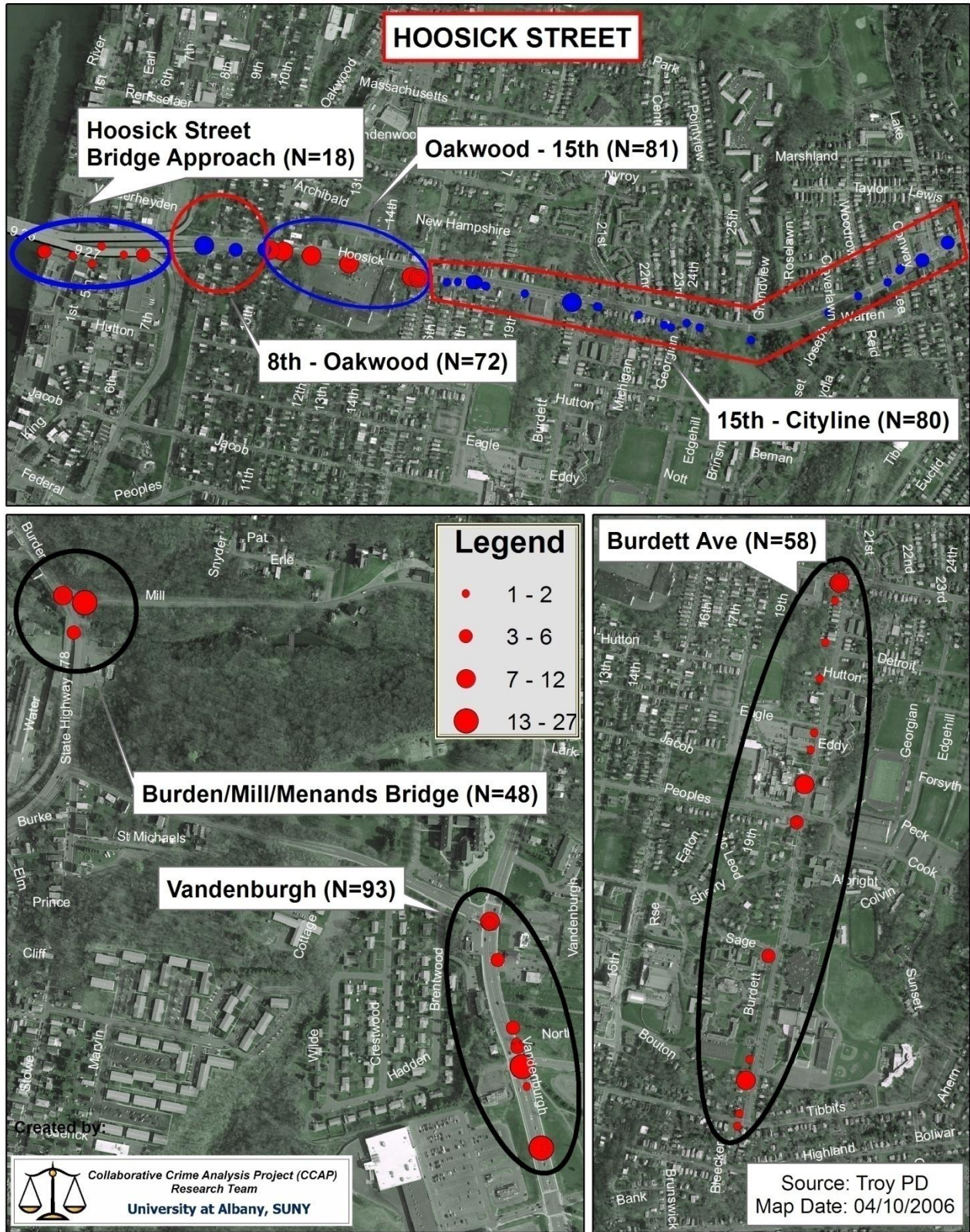


Figure 5

HOTSPOTS: CRASHES 2005 (TROY, NY)



HOOSICK STREET HOT SPOT

There were motor vehicle crashes along the entire length of Hoosick Street in 2005, but several areas of high concentration emerged (see Figure 4). We analyzed four hot spots along Hoosick Street separately to explore whether details of crashes were distinct enough to impact strategy decisions.

The type of accident was analyzed for the four areas. In the Hoosick St. Bridge area property damage with report and property damage exchange of information crashes both accounted for 44.4 percent of crashes and 11.1 percent were personal injury. Along 8th to Oakwood, 66.7 percent were property damage with report, 23.6 percent were property damage exchange of information and the remainder was personal injury accidents. The breakdown of crash types from Oakwood to 15 was: 49.4 percent property damage with report, 38.3 percent property damage exchange of information, and 12.3 percent involved personal injury. The last area along the Hoosick St. Hotspot runs from 15th to the Cityline and accident types were as follows: 51.3 percent property damage with report, 42.5 percent property damage exchange of information/other, and 6.3 percent personal injury crashes.

Crashes along Hoosick Street were fairly evenly distributed among the four areas, excepting the Hoosick Street Bridge approach, which only accounted for only seven percent of all Hoosick Street crashes. Across all four Hoosick St. areas, December, January and March were typically the busiest months, though the month of August had the highest volume for the 15th to City line area (see Table 10). Crashes were evenly distributed by day of week for the Hoosick Bridge approach. The days of week breakdowns fluctuated a bit in the 8th to Oakwood area as well as in the 15th to Cityline stretch, with Saturday, Sunday and Wednesday as the busiest days in both (see Table 11).

The majority of crashes in the Hoosick Bridge area and from 8th to Oakwood fell on the third platoon (55.6% & 51.4%, respectively) while just over half of the crashes in the remaining two Hoosick Street areas occurred during the second platoon (see Table 12).

In all four areas, when an apparent contributing factor for the crash was identified it was overwhelmingly characterized as a human factor (see Table 13). We selected all accidents that had at least one human factor identified and analyzed the individual factors noted on the accident report (see Table 14 through 17).² The contributing factors consistently identified among the top three causes were: failure to yield the right of way, driver fell asleep and backing unsafely. Following too closely was identified among the top four reasons in three of the areas.

² Tables 13 through 16 do NOT contain all the human factors identified, only those that occurred with some regularity.

Table 10**Hotspot Crashes by Month: Hoosick St. Bridge**

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Bridge Approach	4 22.2%	1 5.6%	4 22.2%	0 -	1 5.6%	2 11.1%	1 5.6%	0 -	0 -	2 11.1%	2 11.1%	1 5.6%	18 100%
8 th to Oakwood	11 15.3%	2 2.8%	8 11.1%	2 2.8%	6 8.3%	6 8.3%	4 5.6%	6 8.3%	7 9.7%	9 12.5%	6 8.3%	5 6.9%	72 100%
Oakwood to 15 th	6 7.4%	7 8.6%	10 12.3%	6 7.4%	6 7.4%	7 8.6%	7 8.6%	1 1.2%	5 6.2%	6 7.4%	8 9.9%	12 14.8%	81 100%
15 th to Cityline	6 7.5%	6 7.5%	7 8.8%	4 5.0%	4 5.0%	7 8.8%	5 6.3%	10 12.5%	8 10.0%	9 11.3%	6 7.5%	8 10.0%	80 100%
													251

Table 11**Hotspot Crashes by Day of Week: Hoosick St. Bridge**

	Mon	Tue	Wed	Thur	Fri	Sat	Sun	Total
Bridge Approach	2 11.1%	4 22.2%	2 11.1%	2 22.2%	3 16.7%	3 16.7%	2 11.1%	18 100%
8 th to Oakwood	4 5.6%	8 11.1%	16 22.2%	5 6.9%	10 13.9%	15 20.8%	14 19.4%	72 100%
Oakwood to 15 th	10 12.3%	11 13.6%	12 14.8%	7 8.6%	17 21.0%	13 16.0%	11 13.6%	81 100%
15 th to Cityline	6 7.5%	5 6.3%	17 21.3%	8 10.0%	11 13.8%	16 20.0%	17 21.3%	80 100%
								251

Table 12**Hotspot Crashes by Platoon: Hoosick St. Bridge**

	Platoon 1	Platoon 2	Platoon 3	Total
Bridge Approach	1 5.6%	7 38.9%	10 55.6%	18 100%
8 th to Oakwood	5 6.9%	30 31.7%	37 51.4%	72 100%
Oakwood to 15 th	5 6.2%	41 50.6%	35 43.2%	81 100%
15 th to Cityline	0 -%	46 57.5%	34 42.5%	80 100%
				251

Table 13**Hotspot Crashes by Apparent Cause: Hoosick St. Bridge**

	HUMAN ONLY	VEHICULAR ONLY	ENVIRONMENTAL ONLY	HUMAN AND VEHICULAR	HUMAN AND ENVIRONMENTAL	UNKNOWN	TOTAL
Bridge Approach	4 22.2%	-	2 11.1%	1 5.6%	1 5.6%	10 55.6%	18 100%
8 th to Oakwood	38 52.8%	1 1.4%	1 1.4%	2 2.8%	6 8.3%	24 33.3%	72 100%
Oakwood to 15 th	40 49.4%	-	1 1.2%	-	5 6.2%	35 43.2%	81 100%
15 th to Cityline	36 45.0%	-	1 1.3%	-	4 5.0%	39 48.8%	80 100%
							251

Table 14		
Hotspot Crashes Specific Human Causes Hoosick Bridge Approach (N=6)		
	#	%
Failure to Yield Right of Way	2	33.3%
Fell Asleep	2	33.3%
Physical Disability	1	16.7%
Driver Inexperience	1	16.7%
Alcohol Involvement	1	16.7%
Illegal Drugs	1	16.7^
Backing Unsafely	1	16.7%
Total	9	150%

Table 15		
Hotspot Crashes Specific Human Causes 8th to Oakwood (N=46)		
	#	%
Fell Asleep	13	28.3%
Failure to Yield Right of Way	12	26.1%
Backing Unsafely	10	21.7%
Passenger Distraction	7	15.2%
Following Too Closely	7	15.2%
Driver Inattention	6	13.0%
Total	55	119.5%

Table 16		
Hotspot Crashes Specific Human Causes Oakwood to 15th (N=45)		
	#	%
Failure to Yield Right of Way	19	42.2%
Fell Asleep	16	35.5%
Backing Unsafely	14	31.1%
Following Too Closely	13	28.9%
Total	62	137.7%

Table 17

**Hotspot Crashes Specific Human Causes
Oakwood to Cityline (N=40)**

	#	%
Failure to Yield Right of Way	16	40.0%
Backing Unsafely	12	30.0%
Following Too Closely	7	17.5%
Fell Asleep	5	12.5%
Total	40	100%

BURDEN/MILL/MENANDS BRIDGE HOTSPOT

Forty-eight motor vehicle crashes occurred in the area of concentration identified as Burden/Mill\Menands Bridge. The majority of crashes in this area were property damage not extensive enough to require a report (64.4%), followed by property damage with report (31.3%), and only 4.2% were personal injury crashes.

Most of these crashes occurred in January, February and September (see Table 18). The busiest days of the week were Saturday, Tuesday and Wednesday (see Table 19) and most crashes occurred during the second platoon (see Table 20). Consistent with crashes citywide, human contributing factors were the category most often identified (see Table 21). When we selected only those accidents where at least one human factor was identified (N=14), failure to yield right of way (28.5%), backing unsafely (21.4%), and alcohol involvement (21.4%) were the top three human causes identified (see Table 22).

Table 18

Hotspot Crashes by Month: Burden/Mill

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
10	8	2	3	1	1	5	3	7	4	4	0	48
20.8%	16.7%	4.2%	6.3%	2.1%	2.1%	10.4%	6.3%	14.6%	8.3%	8.3%	-	100%

Table 19

Hotspot Crashes by Day of Week: Burden/Mill

Mon	Tue	Wed	Thur	Fri	Sat	Sun	Total
2	10	10	9	3	11	3	48
4.2%	20.8%	20.8%	18.8%	6.3%	22.9%	6.3%	100%

Table 20

Hotspot Crashes by Platoon: Burden /Mill

Platoon 1	Platoon 2	Platoon 3	Total
3	28	17	48
6.3%	58.3%	35.4%	100%

Table 21**Hotspot Crashes by Apparent Cause: Burden/Mill**

HUMAN ONLY	VEHICULAR ONLY	ENVIRONMENTAL ONLY	HUMAN AND VEHICULAR	HUMAN AND ENVIRONMENTAL	UNKNOWN	TOTAL
13 27.1%	-	1 2.1%	-	1 2.1%	33 68.6%	48 100%

Table 22**Hotspot Crashes Specific Human Causes (N=14): Burden Mill**

	#	%
Failure to Yield Right of Way	4	28.5%
Backing Unsafely	3	21.4%
Alcohol Involvement	3	21.4%
Physical Disability	2	14.3%
Fell Asleep	2	14.3%
Passenger Distraction	2	14.3%
Total	16	114.3%

VANDENBURGH HOT SPOT

In 2005, there were ninety-three crashes in the hot spot along Vandenburg Avenue. The majority were property damage only with report taken (58.2%), followed by property damage exchange of information/other (34.4%) and personal injury crashes (7.5%).

While accidents were dispersed throughout the year, September and January were the two busiest months (see Table 23). Wednesday through Saturday were the four days on which most crashes occurred (see Table 24), and two-thirds of crashes in this hotspot occurred during the first shift (see Table 25). Again, human factor was the type most commonly identified as the apparent contributing factor in the crash (see Table 26). The top four human causes identified as contributing factors were: backing unsafely (41.5%), failure to yield right of way (39.6%), following too closely (22.6%) and driver fell asleep (20.2%) (see Table 27).

Table 23**Hotspot Crashes by Month: Vandenburg**

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
14 15.1%	9 9.7%	4 4.3%	10 10.8%	6 6.5%	3 3.2%	3 3.2%	5 5.4%	15 16.1%	9 9.7%	10 10.8%	5 5.4%	93 100%

Table 24							
Hotspot Crashes by Day of Week: Vandenburg							
Mon	Tue	Wed	Thur	Fri	Sat	Sun	Total
3	13	20	20	17	16	4	93
3.2%	14.0%	21.5%	21.5%	18.3%	17.2%	4.3%	100%

Table 25			
Hotspot Crashes by Platoon: Vandenburg			
Platoon 1	Platoon 2	Platoon 3	Total
2	62	29	93
2.2%	66.7%	31.2%	100%

Table 26						
Hotspot Crashes by Apparent Cause: Vandenburg						
HUMAN ONLY	VEHICULAR ONLY	ENVIRONMENTAL ONLY	HUMAN AND VEHICULAR	HUMAN AND ENVIRONMENTAL	UNKNOWN	TOTAL
50	-	1	1	2	39	93
53.8%		1.1%	1.1%	2.2%	41.9%	100%

Table 27		
Hotspot Crashes Specific Human Causes (N=53): Vandenburg		
	#	%
Backing Unsafely	22	41.5%
Failure to Yield Right of Way	21	39.6%
Following Too Closely	12	22.6%
Fell Asleep	11	20.2%
Alcohol Involvement	6	11.3%
Illness	9	17.0%
Total	81	152.8%

BURDETT AVENUE HOTSPOT

In 2005, fifty eight accidents occurred in the hotspot identified as Burdett Avenue: 55.2 percent were property damage with report, 34.5 percent property damage exchange of information/other, and 10.3 percent involved personal injury.

Crashes in this area were dispersed fairly evenly across months (see Table 28), Friday and Saturday were the busiest days (see Table 29), and 70 percent of all crashes in this area occurred during the first shift (see Table 30). When the apparent cause of the accident was a human factor (55% of all crashes in Burdett hotspot) illness was the most common factor (24.2%) followed by failure to yield right of way (21.2%) (see Table 32).

Table 28												
Hotspot Crashes by Month: Burdett Avenue												
Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
6	5	7	4	4	3	6	3	5	7	3	5	58
10.3%	8.6%	12.1%	6.9%	6.9%	5.2%	10.3%	5.2%	8.6%	12.1%	5.2%	8.6%	100%

Table 29							
Hotspot Crashes by Day of Week: Burdett Avenue							
Mon	Tue	Wed	Thur	Fri	Sat	Sun	Total
4	9	5	8	11	14	7	58
6.9%	15.5%	8.6%	13.8%	19.0%	24.1%	12.1%	100%

Table 30			
Hotspot Crashes by Platoon: Burdett Avenue			
Platoon 1	Platoon 2	Platoon 3	Total
2	41	15	58
3.4%	70.7%	25.9%	100%

Table 31						
Hotspot Crashes by Apparent Cause: Burdett Avenue						
HUMAN ONLY	VEHICULAR ONLY	ENVIRONMENTAL ONLY	HUMAN AND VEHICULAR	HUMAN AND ENVIRONMENTAL	UNKNOWN	TOTAL
31 53.4%	-	1 1.7%	-	2 3.4%	24 41.4%	58 100%

Table 32		
Hotspot Crashes Specific Human Causes (N=33): Burdett Avenue		
	#	%
Illness	8	24.2%
Failure to Yield Right of Way	7	21.2%
Alcohol Involvement	5	15.2%
Driver Inattention	5	15.2%
Backing Unsafely	4	12.1%
Total	29	87.9%