



Village of Silverton Police Staffing Study

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EXECUTIVE SUMMARY

The Village of Silverton, Ohio contracted with the University of Cincinnati's Institute of Crime Science (ICS) to determine the police staffing needs for the village. Currently, the village does not have its own police department and instead contracts with the Hamilton County Sheriff's Office to provide police patrol services. To prepare this report, ICS researchers analyzed calls for service data, crime data, and interviewed the Village manager to better understand Silverton's current staffing situation. Following the data collection and analysis processes, ICS employed two different methodologies to examine the staffing needs of Silverton. Generally, three different methodologies are used to determine staffing needs. However, due to data limitations discussed later, ICS only employed two of the three methodologies; peer comparison and citizen initiated calls for service workload. It is also important to note that most staffing analyses are conducted to determine staffing levels of an existing police agency. Staffing analyses generally look at patrol staffing as part of the overall staffing of a police agency, as well as officer assignment to non-patrol functions and organizational structure.

The peer comparison analysis compares jurisdictions that have their own police departments. There are no standards for comparison among jurisdictions that contract for police services. As mentioned above, Silverton does not have its own police department, therefore comparisons among peer agencies may be informative if Silverton would ever consider reconstituting its police department or perhaps consider forming a joint police district with one or more other contiguous jurisdictions.

In the peer comparison model, ICS researchers first compared the village of Silverton with other comparable United States villages/cities that have a similar population size and crime level. *National analysis revealed that the average number of sworn police officers in the villages/cities most similar to Silverton is 9.*

Next, ICS conducted a peer comparison only looking at Ohio cities in order to account for possible regional differences. In-state only comparisons provide a more robust estimation of staffing needs since each region has its own unique characteristics. *Based on the in-state comparison, ICS researchers found that the average number of sworn personnel in these departments is 9 which is the same as the national average.* Another note of interest is that prior to disbanding, the Village of Silverton police department had 10 sworn officers, which is just above the average of the in-state and national comparisons.

Since the Village of Silverton does not have its own police department and receives contracted police services from the HCSO, in the per capita approach we should look at the number of officers *assigned solely to uniformed patrol* instead of the total number of sworn officers in a police department. Using the International City/County Management Association's (ICMA) recommendation that 60% of total sworn personnel should be allocated to uniformed patrol functions, *the per-capita comparison method indicates that Silverton should have 5 officers assigned to uniformed patrol functions if it operated its own police department.*

ICS researchers do not rely solely on the peer comparison staffing model because it does not consider the workload of police departments. Therefore, using 2017 Silverton calls for service

(CFS) data, ICS applied a workload-based calculation method to determine the number of officers needed to answer and clear calls for service.

The workload-based calculation method used only citizen initiated calls for service data. This approach strictly follows the International Association of Chiefs of Police (IACP)'s recommendation that patrol officers should spend one third of their time on citizen initiated calls for service, one third of their time on administrative tasks, and one third of their time on proactive policing. *This workload based calculation method suggests that one officer on each shift can clear all calls for service that occur on that particular shift.* This could change if Silverton desired, or had a comprehensive plan for proactive policing or self initiated activity for officers as a percentage of their patrol time.

Three scenarios are presented as part of this staffing analysis. Scenario 1 presents staffing requirements for only reactive policing provided by HCSO (answering citizen calls for service with no proactive time) and indicates that 1 officer per shift can handle all calls for service. Scenario 2 presents staffing for minimal proactive time provided by HCSO and indicates that 2 officers on day shift and 1 officer on night shift can handle all calls for service, and Scenario 3 which presents a patrol staffing level if Silverton had its own police department and its patrol force engaged in minimal proactive time indicates that 2 officers on day shift and 1 officer on night shift using a four squad deployment can handle all calls for service.

STAFFING ANALYSIS

One of the fundamental questions for police departments is how many sworn personnel are needed to efficiently and effectively perform policing functions in a given jurisdiction? Unfortunately, there is no single standard method for answering this question. There are different methods/approaches used to determine the staffing needs of police departments, such as the per capita approach, the minimum staffing approach, and a workload based approach. Each approach has certain advantages and disadvantages. In this report, the University of Cincinnati's Institute of Crime Science (ICS) combines both the per capita and the workload-based approaches to calculate police staffing needs for the Village of Silverton (Silverton).

A unique aspect of this staffing analysis is that Silverton does not operate its own police department. Previous staffing analyses conducted by ICS have been for jurisdictions with their own police departments. Many factors can influence agency staffing decisions. This report will only show the minimum number of patrol units needed to answer calls for service. We make no recommendations on deployment and give no opinion on the percentage of time that Silverton wants, or should dedicate to proactive policing functions. One of the reasons to point this out is because many of the functions and activities regularly performed by police agencies may not take place in a jurisdiction that contracts with an outside entity for its police services. Often these contracts are for a specific number of hours of police patrol services with only a few specific details of how that service will be provided. Jurisdictions with their own police departments have far better control and influence over the activities of their police officers. A jurisdiction that contracts out police services generally has very limited influence over those same activities, unless the precise scope of work to be performed is clearly articulated in the Service Contract or Agreement. Consequently, a staffing analysis may not be able to include a recommendation of optimal agency

staffing other than for responding to citizen initiated calls for service. If no proactive activities are undertaken by the contracting entity (e.g., problem solving, formal community policing programs, targeted enforcement or patrols) there is no empirical methodology currently available to determine optimal staffing while also including those activities.

Silverton currently contracts with the Hamilton County Sheriff's Office (HCSO) for their police patrol services. HCSO provides contract police patrol services to other jurisdictions as well. In this HCSO model, each jurisdiction contracts for a specific amount of daily police coverage. Usually, HCSO and the contracting jurisdiction jointly determine what coverage is needed to provide the police services. This may be the result of analyzing calls for service and crime data, or it may be coverage based on what a community can afford to pay. The cost of a contract or agreement is derived from the actual number of hours of police service provided. In a recent discussion with the Silverton village manager, researchers learned that cost was the primary deciding factor in determining their staffing levels. There was only minimal reliance on calls for service or other data in determining appropriate staffing needs.

Silverton currently contracts for one 24-hour car per day 7 days per week and two power shift cars per week. Power shift cars are scheduled for 40 hours per week shifts with no replacement for off days or other days when the assigned officer is not available (sick, vacation, training etc.). Power shift cars are designed to provide additional coverage during peak service demand times. Currently, one power shift car works Monday-Friday from 7:00 AM to 3:30 PM and the second power shift car works Monday-Friday from 4:00 PM to 12:30 AM.

As part of the existing contractual agreement, HCSO provides, at no extra cost, a Lieutenant to oversee the officers assigned to Silverton, and recently assigned 1 Sergeant to their east side patrol districts, including Silverton, to handle their cumulative administrative and support services as needed, including: criminal investigations, traffic crash investigation, bomb squad response and helicopter assistance. These positions are not included the ICS staffing analysis.

This staffing analysis will only determine the minimum number of officers needed to respond to Silverton citizen calls for service and does not include the other self initiated activities many communities have their officers engage in such as: problem solving, proactive traffic enforcement, directed patrols or other programs that would use dedicated officer time throughout a shift. Since the village does not have its own police department, any additional staffing needs (such as detectives/investigators, or other sworn officers working in a non-patrol capacity) are not calculated or included in this report.

Calls for Service Data

The calls for service data used in this analysis came from the Hamilton County Communications Center (HCCC). ICS used 2017 calls for service (the last full year of data available when the analysis started). HCCC dispatches for almost all police agencies in Hamilton County. After cleaning the data, by removing duplicate calls, removing calls with no associated call times, and removing calls where no unit was dispatched, ICS researchers noticed that calls for service in Silverton were not always answered by the contract cars assigned to Silverton. Sometimes calls were answered by other HCSO contract cars from neighboring communities or by an HCSO unit

assigned to the east side district of Hamilton County that was not contracted by any specific jurisdiction. It is unknown why these calls were answered by units other than those assigned to Silverton. However, in the final analysis, the number of calls answered by non-Silverton units did not impact the required number of units to answer citizen calls for service. This does raise the question, however of why Silverton units are sometimes unavailable to answer calls for service and how is it determined which other unit(s) respond to and handle the call.

Per Capita Approach¹

The per capita approach is fairly easy to understand and provides a rough and quick staffing estimate for a police department, based on similar law enforcement agencies in terms of their populations, crime rates, and geographic area (e.g., Southern states, Western states, etc.).

Although it does not rely on any scientific calculations, it still offers a good starting baseline to see how the rest of the nation handles their safety needs based on certain similar characteristics (e.g., population, crime rates). In this report, ICS did not use a traditional per capita approach, which principally uses citizen-officer ratios and the population size of cities, because there are many drawbacks to using citizen-officer ratios to determine proper staffing levels. These drawbacks include: differential workload of cities (in terms of calls for service), varying crime levels, and topographical differences (including population density per square mile). For this reason, ICS researchers generally employ FBI Uniform Crime Report (UCR) data to better compare cities, based on their various types of crime levels (e.g., property crimes, violent crimes), with the matching cities.

The per-capita approach does have certain advantages, such as quickly identifying the basic level of appropriate police staffing for Silverton when compared to police departments in similarly sized United States cities².

The Population of Silverton

The current population of Silverton, Ohio is 4,757 and this population number has been fairly stable since 2010. Therefore, we do not expect any significant population changes in the next year and established the population range of Silverton as 5,000 residents for our comparisons with other US and Ohio cities.

¹ Revised as peer comparison in this study

² In our experience, using a peer comparison approach is safe and generates very similar results if it is done correctly. In statistics, we compare our results with the population (or hypothetical sampling distributions/populations) in order to determine whether the study outcome is rare or not. If the result/outcome substantially deviates from the norm (in this case, national average), then, we conclude that the outcome is very rare (high or low depending on the positional score on the population distribution). Given this context, we try to replicate statistical procedure with a peer comparison model in order to quickly identify the positional score of Silverton when compared to the national average (in statistical terms: population).

Table 1 below shows that there are 1198 US police departments³ whose jurisdictional population falls within a range of 3,000 to 5,000 citizens. Silverton specifically falls into this jurisdictional population range. When ICS researchers looked at the national staffing average for police departments in this population range, we found they have an average of 9 sworn officers assigned. In this context, Table 1 below suggests that the appropriate staffing level is 9 officers (this is the average of the two population range average number sworn officers) for the entire Silverton Police Department (if one existed).

Table 1. Average Number of US Law Enforcement Employees Based on Population

Number of Cities	Population Range	Average Sworn Officers	Average Civilians	Average Total Employees
646	3,000 - 3,999	8	1	9
552	4,000 - 5,000	10	2	12

Using the above formula, our next analysis only looks at Ohio cities, in order to account for regional differences, because in-state comparisons provide a more robust estimation since each region has its own unique characteristics. Table 2 below shows there are 23 police departments in Ohio jurisdictions that have a population between 3,000 and 5,000 people. *The average number of sworn personnel in these departments is 9 which is the same as the national average.*

Table 2. Average Number of Ohio Law Enforcement Employees Based on 2017 UCR Data

Cities	Population	#of Violent Crimes	#of Property Crimes	#of Sworn Personnel	Number of Civilians	Total Employees	Officer Ratio Per 1000 Citizens
Ashville	4211	3	53	10	0	10	2.37
Bluffton	4157	1	48	8	0	8	1.92
Carey	3566	1	8	11	3	14	3.93
Catawba Island Township	3504	--	--	5	0	5	1.43
Chagrin Falls	3991	2	39	12	1	13	3.26
Coldwater	4519	3	53	8	1	9	1.99
East Palestine	4503	11	82	6	2	8	1.78
Greenhills	3584	1	43	10	1	11	3.07
Lexington	4686	0	9	9	4	13	2.77
Lockland	3427	16	131	15	1	16	4.67
Lordstown	3242	3	44	9	4	13	4.01
Mariemont	3435	--	--	10	1	11	3.20
Marlboro Township	4374	--	--	4	1	5	1.14
Mogadore	3829	--	--	7	0	7	1.83

³ This number is based on the number of police departments reporting to UCR.

Northfield	3669	5	39	14	1	15	4.09
Ottawa	4394	6	14	8	0	8	1.82
Perry Township	3758	2	53	11	1	12	3.19
Perry Township	3322	--	--	5	0	5	1.51
Plain City	4379	--	--	9	0	9	2.06
Silverton*	4757	9	125				
South Russell	3819	0	7	9	0	9	2.36
West Jefferson	4347	2	58	12	4	16	3.68
Whitehouse	4622	--	--	10	0	10	2.16
Yellow Springs	3713	11	72	7	3	10	2.69
Averages	3959	4	47	9	1	10	3

*Numbers for Silverton not included in Averages

Summary of Per Capita Comparison Approach

The International Association of Chiefs of Police (IACP) advises that it is inappropriate to use a per capita approach when calculating the staffing needs of police departments because staffing allocation should be made as a result of more complex analyses, such as workload-based calculations. For this reason, any per capita comparisons should be interpreted with a caveat.

As stated earlier, the Village of Silverton does not have its own police department and receives contracted police services from the HCSO, therefore, in the per capita approach we should look at the number of officers *assigned solely to uniformed patrol* instead of the total number of sworn officers in a police department. To approximate the number of patrol officers that would be in a Silverton Police Department, if one existed, we use the International City/County Management Association (ICMA) recommendation that 60% of total sworn personnel should be allocated to uniformed patrol functions. Using this recommendation, the average number of sworn police officers in comparable Ohio jurisdictions is 9 as seen in Table 2 above, and 60% of this number is 5 sworn officers. *Using this analysis, the per-capita comparison method indicates that Silverton should have 5 officers assigned to uniformed patrol functions if it operated its own police department.*

Workload-based Approach

A workload-based approach requires a thorough data cleaning process and additional calculations, using available calls for service data, to calculate staffing. The idea behind a workload-based approach is that police maintain order for the public; therefore, public service requests (e.g., responding to citizen calls for service, investigating a crime, etc.) should determine the staffing size of a police department. While this approach generally has a valid base, researchers should always keep certain rules in mind about a workload-based approach before applying it to any police department. Using 12 months of calls for service data is a widely accepted data set to conduct a

workload based staffing analysis as it provides actual numbers of calls for service, response times, and time spent on calls for that time period.

The first rule is that researchers need to know whether the police department currently applies any problem-oriented policing strategy to reduce calls for service in their jurisdiction. Failing to consider ongoing crime prevention efforts may yield underestimated staffing needs. Note that like responding to calls for service, conducting proactive policing takes either a similar or an increased amount of time and resources for a police department. For this reason, researchers should conduct interviews with police departments to better learn the nature of their calls for service data *prior* to workload-based calculations being performed.

The second rule is that many calls for service data points are highly complex. Researchers should investigate the data for errors, missing cases, duplicate entries, and logical errors (e.g., the closing time of a call for service is earlier than dispatch time) *prior* to performing calculations. Any data error can lead to a fatal calculation error –thereby creating more or less staffing needs– since a workload-based approach uses every single source of information to determine the staffing needs of a police department.

Third, in certain cases, relying solely on agency data to calculate the staffing needs of a police department can be a harmful error for a police department because of the possible mistakes/additions/omissions in the police data/database. For this reason, the calculated results should be discussed with the police department in order to confirm whether their suggested staffing numbers accurately match with the realities of the police department workload.

Calculating Patrol Unit Size for Silverton

The uniformed patrol force of a police department has three main duties in any given jurisdiction: (1) responding to calls for service, (2) administrative tasks, and (3) proactive policing to support public order and build community relationships. IACP recommends that police officers working in a patrol assignment need to divide their time into three equal parts:

- one third of their time is allocated for responding to calls for service,
- one third of their time is allocated for administrative tasks, and
- one third of their time is allocated for proactive policing.

There are two different widely used formulas to calculate the uniformed patrol size of a police department based on calls for service data. The first formula was developed by Dr. Alexander Weiss, Ph.D. and takes into account only citizen-initiated calls for service time. In addition to this, Weiss's formula also requires calculation of the shift relief factor by considering officers' off days, vacation time, in-service training times, and sick time usage in determining overall agency staffing needs. This formula also suggests that the police officers working in a patrol function should spend one third of their time responding to citizen initiated calls for service, considering the shift relief factor.

The second formula was developed by the International City/County Management Association (ICMA) and takes into account all calls for service data (both citizen initiated and officer initiated) for calculations. ICMA calls this formula the 60% rule. The formula essentially states that a police

officer working on patrol should spend a maximum 60% of his/her time on all types of calls for service, after considering off days, vacation, in-service training and sick time.

The two formulas are very close in their calculation methods. Dr. Weiss's formula considers only citizen-initiated calls for service; whereas the ICMA formula takes into account all calls (both citizen initiated calls⁴ and police initiated calls⁵). ICS researchers generally employ both formulas in a staffing study to confirm the results from the two different calculation methods. However, in this analysis we will only use Dr. Weiss's formula using citizen generated calls for service. Using the data provided by HCSO, ICS was unable to determine, with precise certainty, the number of self initiated calls for service and officer proactive activity to include the ICMA formula in this analysis.

Regardless of which formula is being used, they both require calculating the number of calls for service by hour, day of the week, month, and season because both approaches suggest that the optimum number of officers assigned to patrol duties should be calculated based on the highest month or season's activity in order to maintain the IACP standard of at least 33% of an officer's time be available for proactive policing over the course of the entire year.

Due to the data limitations explained above, this study will only employ Dr. Weiss's formula for the Silverton staffing calculation.

Silverton Patrol Unit Calculation based on Weiss's Formula

Table 3 below shows the 2017 citizen-initiated calls for service (CFS) for Silverton (the last full year of available data). The total number of Silverton citizen-initiated CFS was 3,021. As mentioned earlier, calls for service in Silverton were not always answered by the contract units assigned to Silverton. Sometimes calls were answered by other HCSO contract units from neighboring communities or by an HCSO unit assigned to the east side district of Hamilton County that was not contracted by any specific jurisdiction. It is unknown why these calls were answered by units other than those assigned to Silverton. ICS found 305 calls for service in Silverton that were answered by units other than those specifically assigned to Silverton. The analysis shown in Table 3a below was run and included the calls answered by other non-Silverton based HCSO units. Including those calls did not change the required number of units to answer Silverton's citizen calls for service.

As the heat map colors of Table 3 below suggest, Silverton showed a higher volume of CFS between 10 AM and 8 PM. On average, 3.54 officer hours were spent to clear Silverton's CFS in a given day. That is, if we considered the patrol officers like a robot, .44 Silverton officers would need to work non-stop (8 hours a day) just to clear daily citizen initiated calls for service ($3.54 \text{ hours} / 8 \text{ hours} = .44 \text{ officers}$).

⁴ For instance, a call to report a crime or a situation that requires police assistance to resolve

⁵ For instance, a traffic stop or investigative contact

Table 3. Citizen Initiated Calls for Service (January 1, 2017 - December 31, 2017)

Hour	Number of CFS	Total Service Hours	Average Number of CFS in a Day	Total Daily Service Hours to Clear Daily CFS
0	101	43.45	0.28	0.12
1	83	57.69	0.23	0.16
2	75	28.07	0.21	0.08
3	60	31.67	0.17	0.09
4	44	13.94	0.12	0.04
5	42	10.83	0.12	0.03
6	53	16.79	0.15	0.05
7	76	30.25	0.21	0.08
8	114	46.17	0.31	0.13
9	136	53.02	0.38	0.15
10	153	69.07	0.42	0.19
11	160	64.61	0.45	0.18
12	161	66.18	0.44	0.18
13	163	80.44	0.45	0.22
14	145	62.6	0.4	0.17
15	177	66.5	0.5	0.19
16	179	70.43	0.5	0.2
17	182	60.26	0.5	0.17
18	169	84.39	0.47	0.23
19	185	70.67	0.51	0.2
20	169	58.41	0.47	0.16
21	144	73.1	0.4	0.2
22	123	52.76	0.34	0.15
23	127	60.62	0.36	0.17
Total	3021	1271.92	8.39	3.54

Table 3a below includes the calls for service in Silverton that were answered by units other than the Silverton contract cars. In this analysis, on average, 4.85 officer hours were spent to clear CFS in a given day. Using the same formula from above, .60 officers would need to work non-stop (8 hours a day) just to clear daily citizen initiated calls for service (4.85 hours / 8 hours = .60 officers). So, in both analyses, one officer would be able to handle all of Silverton's CFS in a given day.

Table 3a. Citizen Initiated Calls for Service (January 1, 2017 - December 31, 2017)

Hour	Number of CFS	Total Service Hours	Average Number of CFS in a Day	Total Daily Service Hours to Clear Daily CFS
0	112	60.26	0.31	0.17
1	91	101.06	0.25	0.28
2	83	44.98	0.23	0.12
3	66	59.21	0.18	0.17
4	48	45.15	0.13	0.13
5	54	24.61	0.15	0.07
6	55	25.96	0.15	0.07
7	81	38.72	0.23	0.11
8	122	53.28	0.34	0.15
9	145	76.94	0.4	0.21
10	165	80.3	0.45	0.22
11	176	87.23	0.49	0.24
12	174	75.82	0.48	0.21
13	182	108.19	0.51	0.3
14	158	73	0.44	0.2
15	191	84.05	0.54	0.24
16	202	81.29	0.56	0.23
17	208	91.42	0.57	0.25
18	194	120.84	0.54	0.33
19	198	91.1	0.55	0.25
20	186	80.71	0.51	0.22
21	158	99.99	0.44	0.28
22	139	68.35	0.38	0.19
23	137	74.3	0.38	0.21
Total	3325	1746.76	9.21	4.85

Table 4 below displays more detailed information for citizen-initiated calls for service. ICS analyses show that the average HCSO response time to citizen initiated calls for service is 4.47 minutes and average total service time to clear the call is 25.11 minutes. Further analyses suggest that 65.2% of citizen initiated calls were responded to and handled by one officer (1969 / 3021 = 652). That is, no back up unit was needed for 65.2% of the citizen initiated calls for service. Table 4 also shows that two officers together responded on 31.6% of citizen-initiated calls. It is a rare situation where three or more officers together respond to a citizen initiated call (3.2%). It is important to calculate backup unit involvement to correctly determine the total amount of officer service time used for citizen-initiated calls. Failing to consider backup units for citizen-initiated calls might yield significantly underestimated staffing levels for a police department. For this reason, we carefully cleaned the data and calculated multiple patrol officers' involvement for all of Silverton's citizen-initiated calls.

Table 4. Total Service Hours by Backup Units for Citizen Initiated CFS Data

Hour	One Officer		Two Officers		Three Officers		Four Officers		Five or More Officers	
	# of CFS	Avg Service Minutes	# of CFS	Avg Service Minutes	# of CFS	Avg Service Minutes	# of CFS	Avg Service Minutes	# of CFS	Avg Service Minutes
0	71	15.90	28	27.92	2	19.00	--	--	--	--
1	47	24.69	33	30.67	2	44.40	1	16.46	--	--
2	53	16.82	21	17.35	1	78.61	--	--	--	--
3	42	24.39	18	28.38	--	--	--	--	--	--
4	43	17.60	--	--	1	57.58	--	--	--	--
5	40	14.34	2	19.07	--	--	--	--	--	--
6	44	20.46	8	7.54	1	15.88	--	--	--	--
7	57	17.75	17	23.04	1	4.60	1	1.51	--	--
8	67	14.83	41	18.27	6	25.02	--	--	--	--
9	88	18.45	46	17.50	2	12.37	--	--	--	--
10	109	15.63	41	31.35	2	20.25	1	19.46	--	--
11	107	13.66	46	16.70	6	48.57	1	21.78	--	--
12	118	17.78	38	19.72	5	37.23	--	--	--	--
13	96	19.40	60	21.77	7	31.38	--	--	--	--
14	83	16.48	57	19.62	5	17.47	--	--	--	--
15	100	17.08	70	14.68	7	19.31	--	--	--	--
16	116	13.15	58	16.61	4	22.41	1	129.41	--	--
17	121	16.70	56	15.26	5	9.20	--	--	--	--
18	106	16.58	53	15.25	7	61.57	2	22.04	1	91.38
19	122	16.01	59	20.24	4	16.84	--	--	--	--
20	110	14.73	50	16.62	8	11.71	1	5.82	--	--
21	76	19.33	64	21.41	3	40.24	--	--	1	28.76
22	79	18.00	41	20.14	3	20.72	--	--	--	--
23	74	17.07	48	26.88	4	12.90	1	11.74	--	--
	1,969	416.83	955	465.98	86	627.24	9	228.22	2	120.14

Table 5 below shows the percentage distribution for CFS by call type for 2017. Medical related calls for service comprise the highest percentage of dispatched CFS in Silverton. Public service related calls come in second, and the third highest percentage is traffic related calls for service (does not include self initiated traffic stops or enforcement). When looking at the table, it is also important to note the total hours spent per year on the various calls for service. For example, even though Crimes in Progress make up only 4.33% of calls, the time spent servicing those calls ranks third in overall hours per year. Appendix A at the end of this report is a complete list of call types responded to in 2017 and the total time spent servicing the calls. This table was included for reference and to stimulate further discussion with HCSO on calls for service and workload in Silverton.

Table 5. Classification of Calls for Service By Percentage of Calls 2017 and Time Spent

Call Type 2017	Number of Calls for Service	Total Min per Year	Total Hrs per Year	% of CFS
Trouble	220	9637.5	160.6	6.62
Traffic Related	347	14089.3	234.9	10.44
Medical Response	698	17285.2	287.9	20.99
Alarm	341	5518.7	92	10.26
Public Service	649	8062.7	134.3	19.52
Reports	272	10437.3	173.9	8.18
Information	80	1216.4	20.2	2.41
Investigation	151	6568.8	109.5	4.54
Domestic Trouble	152	10234.8	170.6	4.57
Disorderly/Noise	71	1056.4	17.6	2.14
Suspicious Activity	128	3752	62.5	3.85
Fire Related	67	2962.8	49.4	2.02
Crimes in Progress	144	13639.6	227.4	4.33
Miscellaneous	5	343.9	5.7	0.15
TOTAL	3325	104805.4	1746.5	100%

Table 6 below displays citizen-initiated CFS by hour and day of the week. Even though throughout the year the number of CFS substantially varies across the hours of the day, it is fairly stable for the days of the week, except for Sundays. On average, each weekday generated approximately 431 citizen-initiated CFS in 2017.

Table 6. Citizen Initiated Calls for Service by Weekdays (January 1, 2017 - December 31, 2017)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
0	19	5	13	16	17	18	13	101
1	10	14	10	12	13	9	15	83
2	11	14	12	6	9	12	11	75
3	5	11	6	12	8	10	8	60
4	8	4	4	4	8	9	7	44
5	8	4	7	7	6	7	3	42
6	6	13	9	5	8	8	4	53
7	13	13	11	11	9	13	6	76
8	18	18	17	17	23	11	10	114
9	20	22	20	18	18	20	18	136

10	16	27	24	26	23	22	15	153
11	20	22	16	25	26	29	22	160
12	20	18	26	30	24	21	22	161
13	27	17	19	21	21	35	23	163
14	22	22	12	27	22	25	15	145
15	31	28	21	26	32	21	18	177
16	35	21	28	29	31	22	13	179
17	27	28	27	21	25	28	26	182
18	30	23	29	19	26	20	22	169
19	24	26	30	25	43	24	13	185
20	24	25	22	24	37	15	22	169
21	16	23	29	14	24	22	16	144
22	14	15	18	18	15	18	25	123
23	17	18	18	14	21	18	21	127
Total	441	431	428	427	489	437	368	3021

Table 7 below shows that the highest number of citizen initiated calls for service was recorded in August of 2017. The lowest number of CFS occurred in November. Current research shows most US police departments report their highest level of calls for service numbers in August and their lowest level of calls for service in February. *Table 7 below suggests that there is a seasonal trend and the Spring and Summer months receive higher volume of calls for police service in Silverton. ICS analysis also reveals that we need to take into account seasonal differences when calculating the optimum number of personnel. Existing studies suggest if there are seasonal differences, the required staffing numbers should be calculated by considering the month that generates the higher number of calls. The reasoning behind this is to keep the personnel number at the optimum level regardless of the fluctuations of individual seasons and months.*

Table 7. Citizen Initiated Calls for Service by Month & Season (January 1, 2017 - December 31, 2017)

Hour	Winter			Spring			Summer			Fall		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
0	8	3	8	7	7	10	13	7	13	9	12	4
1	7	9	8	7	3	13	7	8	7	7	5	2
2	9	9	4	5	3	6	5	5	7	10	9	3
3	5	4	6	1	1	12	6	3	6	7	5	4
4	6	8	2	3	3	3	2	7	4	1	4	1
5	2	1	4	4	2	4	2	3	6	5	6	3
6	4	8	2	3	3	7	3	2	7	3	9	2
7	9	6	3	5	10	6	8	5	6	3	8	7
8	7	7	9	14	9	6	13	6	14	12	11	6
9	12	11	5	10	11	14	15	7	14	14	15	8
10	10	19	11	11	13	13	13	12	12	15	11	13
11	10	11	10	11	13	14	17	14	19	10	15	16

12	5	13	7	22	7	14	10	21	21	17	11	13
13	12	9	14	16	15	9	16	14	13	13	16	16
14	6	15	6	7	13	12	18	19	16	11	14	8
15	14	8	16	18	13	15	12	19	21	21	14	6
16	7	17	13	11	14	20	20	18	22	16	16	5
17	18	11	12	16	18	8	13	18	20	18	15	15
18	11	16	16	10	11	19	17	20	13	9	17	10
19	9	10	14	22	20	12	21	15	24	17	7	14
20	8	17	9	9	8	25	17	18	11	23	19	5
21	8	11	14	12	17	9	14	13	14	11	11	10
22	7	8	10	8	14	14	6	13	7	12	17	7
23	13	8	7	15	9	6	15	14	11	9	14	6
Total	207	239	210	247	237	271	283	281	308	273	281	184
Seasonal Totals	656			755			872			738		

Shift Relief Factor

Dr. Weiss's formula requires the calculation of a shift relief factor in order to compensate for officers' time off including: regularly scheduled off days, training, vacation, and sick times. Because Silverton has no police department, we do not have historical personnel data to calculate their precise shift relief factor. Based on ICS researcher's experiences with different police departments' staffing analyses, the average shift relief factor is 0.36. Thus, we will use this common finding as the shift relief factor for Silverton.

Calculating Staffing of Silverton

Using the average shift relief factor of .36, we then calculated the required number of patrol officers using Dr. Weiss's formula. The calculations in Table 8 below are dependent on the citizen-initiated calls for service (N=3,021) that occurred between January 1, 2017 and December 31, 2017. According to Table 8 below, Silverton requires 3.54 hours on average to clear all CFS that occur in a single day. The same table suggests that the average required time to clear the call varies according to time of the day. For instance, average service hours to clear calls for service that occur during the midnight hour is 0.12 hours.

For the next step, ICS added the shift relief factor as explained above. Continuing the midnight hour example, if we added a shift relief factor of 0.36 to 0.12, the required hours will increase to 0.16 ($[0.12 \times 0.36] + 0.12 = 0.16$). IACP recommends that a patrol officer spend one third of their time on citizen-initiated calls, and that the remaining two thirds of their time should be equally split between proactive policing and administrative tasks. Given this context, the ideal patrol officer obligated time for citizen initiated calls is 33%. In this scenario, Silverton needs 1 patrol officer during the midnight hour to appropriately clear citizen calls for service as well as maintaining 66% of their time available for proactive policing and administrative tasks.

The numbers displayed in Table 8 below, under the title of ‘50% obligated with shift relief’, are absolute numbers which represent the precise number of personnel required to exclusively handle citizen calls for service during the listed hours and perform no other police functions (no administrative tasks, proactive patrol or self initiated activities). In our example, Silverton requires 0.04 officers dedicated strictly to handling citizen calls for service during the midnight hour. In order to convert these absolute numbers to the number of required personnel per shift, ICS multiplied by 8 hours because our math is based on 8 hour shifts⁶.

Table 8. Silverton Required Patrol Officers Based on Citizen Initiated CFS

Shifts	Hour	Number of CFS	Total Service Hours	Average Number of CFS in a Day	Total Service Hours Needed To Clear Daily CFS	Adding in Shift Relief Factor of .36	Staffing Need with 50% Obligated	Staffing Need with 33% Obligated	Min - Max Staffing Per Shift
Night Shift	0	101	43.45	0.28	0.12	0.16	0.04	0.06	1
	1	83	57.69	0.23	0.16	0.22	0.05	0.08	1
	2	75	28.07	0.21	0.08	0.11	0.03	0.04	1
	3	60	31.67	0.17	0.09	0.12	0.03	0.05	1
	4	44	13.94	0.12	0.04	0.05	0.01	0.02	1
	5	42	10.83	0.12	0.03	0.04	0.01	0.02	1
Day Shift	6	53	16.79	0.15	0.05	0.07	0.02	0.03	1
	7	76	30.25	0.21	0.08	0.11	0.03	0.04	1
	8	114	46.17	0.31	0.13	0.18	0.04	0.07	1
	9	136	53.02	0.38	0.15	0.20	0.05	0.08	1
	10	153	69.07	0.42	0.19	0.26	0.06	0.10	1
	11	160	64.61	0.45	0.18	0.24	0.06	0.09	1
	12	161	66.18	0.44	0.18	0.24	0.06	0.09	1
	13	163	80.44	0.45	0.22	0.30	0.07	0.11	1
	14	145	62.6	0.4	0.17	0.23	0.06	0.09	1
	15	177	66.5	0.5	0.19	0.26	0.06	0.10	1
	16	179	70.43	0.5	0.2	0.27	0.07	0.10	1
	17	182	60.26	0.5	0.17	0.23	0.06	0.09	1
Night Shift	18	169	84.39	0.47	0.23	0.31	0.08	0.12	1
	19	185	70.67	0.51	0.2	0.27	0.07	0.10	1

⁶ Even though HCSO generally uses 12 hours shifts in Silverton, ICS’s calculation is based on 8 hours shifts. The math is the same for both. With 8 hours shifts, police officers work 5 days a week and get two days off, and with 12 hours shifts, police officers work either three days for 12 hours or 4 days for 12 hours and take 2 day regular off days. Note that sleeping/rest time does not count as regular off days. Regular off days are weekends (2 days) in most governmental jobs. The same rule is valid for a police department with a rotating off days schedule (regular off days are not required to be weekends only).

20	169	58.41	0.47	0.16	0.22	0.05	0.08	1
21	144	73.1	0.4	0.2	0.27	0.07	0.10	1
22	123	52.76	0.34	0.15	0.20	0.05	0.08	1
23	127	60.62	0.36	0.17	0.23	0.06	0.09	1
Total	3021	1271.92	8.39	3.54	4.81	1.20	1.82	--

The last column of Table 8 above reports the required number of patrol officers by both shift and hour. Our rule of thumb is not to exceed 50% obligated time for citizen calls during any hour of the day. For this reason, we would normally take the average of the minimum and the maximum number of required personnel to efficiently perform the daily patrol tasks. In this staffing analysis, as seen in Table 8 above, the minimum and maximum number are the same. In this context, *ICS recommends that day shift should have 1 patrol officer assigned and the night shift should have 1 patrol officers assigned, excluding supervisors.*

However, as explained above, Silverton has seasonality variances in its calls for service requests. Therefore, we calculated the required number of personnel based on the month of August which generated the highest volume of CFS as shown in Table 8a below. *In this context, even with the highest volume of CFS, ICS recommends 2 patrol officers for the day shift and 1 patrol officer for the night shift. This is the average of the minimum and maximum number of officers (1.5 rounded up) needed to clear calls for service which is based on the 50% and 33% obligated time for answering calls for service and includes some proactive policing time.* It does not take into account how a jurisdiction or contracted agency decides to handle calls for service that require more than one officer response.

Table 8a. Silverton Required Patrol Officers Based on the Highest Citizen Initiated CFS in August

Shifts	Hour	#of CFS	Total Service Hours	Average Number of CFS in a Day	Total Service Hours Needed To Clear Daily CFS	Adding in Shift Relief Factor of .36	Staffing Need with 50% Obligated	Staffing Need with 33% Obligated	Min - Max Staffing Per Shift
Night Shift	0	13	5.61	0.54	0.23	0.31	0.08	0.12	1
	1	7	10.64	0.29	0.44	0.60	0.15	0.23	1
	2	7	2.21	0.37	0.12	0.16	0.04	0.06	1
	3	6	1.49	0.38	0.09	0.12	0.03	0.05	1
	4	4	1.33	0.19	0.06	0.08	0.02	0.03	1
	5	6	1.47	0.2	0.05	0.07	0.02	0.03	1
Day Shift	6	7	2.06	0.37	0.11	0.15	0.04	0.06	1 - 2
	7	6	3.88	0.22	0.14	0.19	0.05	0.07	1 - 2
	8	14	6.78	0.52	0.25	0.34	0.09	0.13	1 - 2
	9	14	7.27	0.52	0.27	0.37	0.09	0.14	1 - 2
	10	12	4.37	0.46	0.17	0.23	0.06	0.09	1 - 2
	11	19	6.56	0.63	0.22	0.30	0.07	0.11	1 - 2

	12	21	8.11	0.72	0.28	0.38	0.10	0.14	1 - 2
	13	13	9.89	0.54	0.41	0.56	0.14	0.21	1 - 2
	14	16	5.82	0.53	0.19	0.26	0.06	0.10	1 - 2
	15	21	13.77	0.72	0.47	0.64	0.16	0.24	1 - 2
	16	22	5.65	0.79	0.2	0.27	0.07	0.10	1 - 2
	17	20	9.62	0.69	0.33	0.45	0.11	0.17	1 - 2
	18	13	5.78	0.62	0.28	0.38	0.10	0.14	1
	19	24	11.36	0.92	0.44	0.60	0.15	0.23	1
Night Shift	20	11	4.54	0.39	0.16	0.22	0.05	0.08	1
	21	14	7.69	0.5	0.27	0.37	0.09	0.14	1
	22	7	2.72	0.47	0.18	0.24	0.06	0.09	1
	23	11	5.39	0.58	0.28	0.38	0.10	0.14	1
Total		308	144.01	12.16	5.64	7.67	1.92	2.91	--

Discussing Silverton Staffing Needs

Silverton currently contracts for one 24-hour car per day 7 days per week and two power shift cars per week. Power shift cars are scheduled for 40 hours per week shifts with no replacement for off days or other days when the assigned officer is not available (sick, vacation, training etc.). This staffing level allows Silverton to have 2 cars working per shift 5 days per week (except between the hours of 12:30 am and 7:00 am) and 1 car for each shift the other 2 days. From the analysis shown above, Silverton currently staffs at an adequate or higher level to simply answer citizen calls for service. Whether or not Silverton has its own police department, the actual number of officers needed to *only* answer calls for service has been calculated as seen in the provided Tables. What is different is how these officers are provided.

Scenario 1:

ICS researchers calculated the staffing needs of Silverton assuming they continue to contract for policing services from HCSO and the officers only answer citizen calls for service. From Table 8a above, we calculate the reactive policing needs of Silverton. The total time required to clear calls for service for the midnight hour is 0.31 hours (including shift relief factor). That means a police officer can handle and clear all calls for service received at the midnight hour in slightly over ½ an hour. This number/hour is an absolute number and we need to convert this absolute number in order to reflect how many officers would be needed to clear calls for service for the entire shift. The night shift is 12 hours (from 6 pm to 6 am), and the total required time is 3.54 hours (the sum all of the absolute numbers in Table 8a from 6 pm to 6 am). Given this context, the required number of personnel for the night shift should be $3.54 / 8 = 0.44$ officer. In addition to this number, we add an additional 33% time block to account for the many administrative tasks of police officers. Thus, the required personnel for the night shift becomes $(0.44 * 0.33) + 0.44 = .59$. In other words, one police officer will be enough to clear calls for services for Silverton during the night shift. Using the same formula for the day shift (6 am to 6 pm), the total required time is 4.14 hours. The required personnel for the day shift should be $4.14 / 8 = .52$ officers. Again, we add an additional 33% time block to account for the administrative tasks. Thus, the required personnel for the day shift

becomes $(.52 * 0.33) + .52 = .69$. In other words, one police officer will be enough to clear calls for service for Silverton for the day shift with no other proactive or undedicated time.

So, if Silverton contracted for 1 officer per shift, that officer could clear all citizen calls for service during the shift. This does not take into account how multiple officer calls are handled nor do we make any inference or recommendation on how HCSO determines the number of officers they need to provide this level of service or how that cost is calculated.

Scenario 2:

If Silverton continued to contract with the HCSO for policing services and determined it wanted some proactive policing time, 2 patrol officers for the day shift and 1 patrol officer for the night shift (the average of the minimum and maximum number of officers need to clear calls for service based on the 50% and 33% obligated time for answering calls for service) could answer all calls for service. This only provides a minimal amount of undedicated or proactive time.

Scenario 3:

If Silverton had a police department, the minimum staffing for patrol *only*, using the numbers scenario 2 above, would be 2 officers for day shift and 1 officer for the night shift, given minimal proactive patrol activity, problem solving, or other community policing activities. One has to take into account off days since officers don't work 7 days per week so each shift would have 2 squads for a total of 6 patrol units. This level would provide one officer on night shift, but as mentioned earlier, approximately 33% of calls are answered by more than one officer. An agency would need to make a determination on how to handle multiple unit calls if only one officer was available. Keep in mind that the number of officers will need to be increased if an agency decides to provide policing services within the IACP or ICMA guidelines for proactive or undedicated patrol time in order to engage in problem solving, community policing activities or other proactive measures as well as providing supervision.

Also, if Silverton had its own police department, the total number of officers required would be more than the minimum number of patrol only officers required to solely answer citizen calls for service. The actual number of sworn personnel needed for a full service police department, operated by Silverton, would be higher to take into account administration (a Chief), supervision, and support functions such as detectives.

Table 9 below shows the Staffing scenarios from the above analysis and discussion.

Table 9. Staffing Scenarios						
Scenario 1		Scenario 2		Scenario 3		
Shift	Officers	Shift	Officers	Squad	Shift	Officers
Day Shift	1	Day Shift	2	A squad	6am -6pm	2
Night Shift	1	Night Shift	1	B squad	6pm - 6am	1
				C squad	6am -6pm	2
				D squad	6pm - 6am	1

Recommendations

Ensure hours of work for power shift cars are determined using calls for service data, including the times when multiple officer dispatches occur more frequently, to ensure proper staffing. Based on information in Table 3 above, ICS recommends changing the shift hours of the power shift cars to 8:00 am - 4:30 pm and 4:30 pm - 1:00 am to coincide with the highest call volume.

The Village of Silverton should engage its citizens in determining the level and type of services it desires from the HCSO and communicate those service level desires to HCSO. The type and level of service has a direct impact on staffing needs. This staffing analysis only recommended the staffing level required to answer citizen calls for service with little or no other proactive time such as problem solving, community based programs, etc.

Determine how much non-obligated, or pro-active patrol time is desired for patrol officers (pro-active time target) and mandate activities for that unencumbered time for officers. Adopt a formal problem-oriented policing approach. See Appendix B for more details about problem-oriented policing.

Determine how many calls for service in Silverton are answered by other HCSO contract cars from neighboring communities or by an HCSO unit assigned to the east side district of Hamilton County and determine how many times a Silverton unit answers calls for service outside of Silverton.

Regular meetings with HCSO staff assigned to oversee operations in Silverton are important to ensure appropriate provision of policing services using high quality data to help inform decision making and that officers are deployed with a purpose so that time not spent answering calls for service (proactive time) is productive and is being properly used to maximize the benefit to Silverton.

Ensure that robust, accurate data is gathered for all police activity in Silverton to enable crime analysis and deployment of resources. (See list below). Because the HCSO does not have an electronic Records Management System, consider using a local data collection (RMS) system to allow for easier access and retrieval of information specific to Silverton but with the possibility of sharing with surrounding jurisdictions.

Specific incident data for all Part I crime reports, including:

- Address of offense, including zip code, jurisdiction, and X, Y coordinates if available.
- Unique incident number
- Date of offence
- Time of offence
- UCR Code for offence

Appendix A. Silverton Citizen Initiated CFS in 2017

CFS Type	Number of CFS (N=3325)	Total Minutes per Year	Total Hours per Year
Domestic Trouble	152	10234.8	170.6
Auto Accident	105	4888.2	81.5
Intrusion Alarm	182	3867.3	64.5
Shooting (PD)	2	3264.1	54.4
Psychiatric Emer (PD)	48	2982.8	49.7
Trouble	53	2886.1	48.1
Report-Theft	74	2638.4	44.0
Trouble Brewing	59	2464.5	41.1
Check On Well Being	60	2247.5	37.5
Non-Breather/Cardiac Arr (PD)	16	2228.7	37.1
Sick Person (PD)	139	2204.4	36.7
Theft In Prog/Just Occ	25	2202.1	36.7
Person With A Gun	12	2201.5	36.7
See Compl At Station	76	1994.9	33.2
Unconscious (PD)	44	1988.4	33.1
Telephone Call	366	1971.5	32.9
See Complainant	47	1613.5	26.9
Attempt/Threat Suicide (PD)	32	1586.0	26.4
Suspicious Person	58	1540.6	25.7
A/A-Injury (PD)	18	1519.4	25.3
Disabled Vehicle	65	1506.2	25.1
A/A-Entrapment (PD)	2	1443.7	24.1
Burglary In Progress	27	1433.5	23.9
Robbery In Prog/Just Occurred	4	1410.4	23.5
Suspicious Veh-Occupied	40	1365.8	22.8
Neighbor Trouble	25	1352.8	22.5
Injury From A Fall (PD)	64	1349.2	22.5
Trouble Breathing (PD)	76	1271.1	21.2
Unknown Trouble	23	1270.0	21.2
A/A-Advise On Injury	20	1198.7	20.0
Report-Auto Theft	24	1064.4	17.7
Wires Down/Arcing/Fire (PD)	14	1042.8	17.4
Report-Burglary	27	1008.6	16.8
Wanted Person	17	996.4	16.6
Information Incident	48	992.8	16.5
Auto Theft	1	906.6	15.1
Structure Fire (PD)	8	888.7	14.8

Trouble W/A Customer	22	882.4	14.7
Overdose (PD)	15	861.5	14.4
Parking Violation	43	808.9	13.5
Investigate Shots Fired	18	801.1	13.4
A/A-Hit Skip	17	662.4	11.0
Report	21	649.8	10.8
Traffic Hazard	13	635.4	10.6
Critical Missing Adult	12	629.1	10.5
Animal Complaint	25	620.1	10.3
Missing Child	9	613.1	10.2
Report-Harassment/Threats	27	591.3	9.9
Report-Property Damage	26	589.6	9.8
Person With A Knife	4	569.0	9.5
Attempt To Locate	22	560.3	9.3
Assault-Injury (PD)	9	551.7	9.2
Be On Lookout For	56	539.4	9.0
Medical Alarm (PD)	47	537.9	9.0
Recorded Fire Alarm (PD)	52	519.8	8.7
Chest Pain (PD)	36	499.2	8.3
Sexual Assault	2	496.2	8.3
Seizures (PD)	22	496.2	8.3
Suspicious Vehicle	21	487.7	8.1
Report-Assault	8	450.7	7.5
Panic Alarm	36	447.7	7.5
Silent E911 Call	24	414.5	6.9
Possible Heart Attack (PD)	17	390.3	6.5
EMS Lift Assist (PD)	32	379.2	6.3
Report-Auto Accident	19	372.0	6.2
Report-Found Property	9	370.7	6.2
Diabetic Emergency (PD)	19	365.8	6.1
Abdominal Pain (PD)	25	360.1	6.0
Report-Phone Harr/Threats	13	349.5	5.8
Fight In Progress	8	343.1	5.7
Head Injury (PD)	19	319.2	5.3
Prowlers	11	291.8	4.9
Trbl-Cell Phone GPS Location	12	290.4	4.8
Loud Music	23	285.5	4.8
Criminal Damaging In Progress	5	280.7	4.7
Abandoned Veh	23	276.4	4.6
Pick Up A Prisoner	1	276.2	4.6
Trespassers	10	275.9	4.6

Injured Animal	8	271.7	4.5
A/A-Animal Struck	6	269.1	4.5
Vehicle Fire (PD)	6	266.6	4.4
Assault In Progress	5	266.2	4.4
Place Found Open	6	265.3	4.4
OVI Being Followed	3	264.0	4.4
Noise Complaint	20	263.3	4.4
Fire Alarm (PD)	30	255.4	4.3
Child/Juvenile Endangered	5	254.8	4.2
A/A-Pedestrian Struck (PD)	4	251.9	4.2
Drug Violation	11	242.0	4.0
Hemorrhaging (PD)	18	237.2	4.0
Lock Out Assist	14	235.2	3.9
Report-Supplemental	6	227.2	3.8
Back Pain (PD)	14	216.8	3.6
Debris In The Road	21	216.6	3.6
Injured Person (PD)	13	188.1	3.1
Odor Of Natural Gas (PD)	10	172.3	2.9
FD General Resp (PD)	11	166.2	2.8
Holdup Alarm	15	160.6	2.7
Disorderly Juveniles	7	140.4	2.3
Juvenile Complaint	6	136.5	2.3
Barking Dog	10	132.9	2.2
Smoke/Odor Indoors (PD)	6	130.1	2.2
Audible Alarm	7	128.4	2.1
Stroke (PD)	11	125.7	2.1
Dead Animal In The Road	7	122.3	2.0
All County Broadcast	2	116.7	1.9
Repo Vehicle Information	43	107.0	1.8
Loud Party	5	106.9	1.8
Investigate (See Comments)	10	105.4	1.8
Vehicle Tampering	3	92.6	1.5
Choking (PD)	4	86.4	1.4
Electrical Fire (PD)	2	79.0	1.3
Report-Bad Check	2	77.2	1.3
Trouble W/An Employee	2	76.8	1.3
Smoke/Odor Outdoors (PD)	4	76.1	1.3
Appliance Fire (PD)	1	68.8	1.1
Emergency To Property (PD)	4	67.7	1.1
Disorderly Person	1	67.5	1.1
Report-Missing Person	2	61.2	1.0

A/A-Fire/Fuel Leak (PD)	1	57.8	1.0
Intrusion Alarm-No Code	7	56.8	0.9
A/A-Fire/Fuel Leak w/Inj (PD)	1	54.6	0.9
Person With A Weapon	1	42.4	0.7
Pole/Transformer Fire (PD)	3	42.4	0.7
Miscarriage (PD)	4	41.4	0.7
Laceration (PD)	4	39.9	0.7
CO Alarm (PD)	4	38.1	0.6
High Fever (PD)	5	38.0	0.6
Reckless Operator	4	35.6	0.6
Meet An Officer	2	34.6	0.6
SPCA Respond/Call	9	33.4	0.6
Recorded Intrusion Alarm	5	32.4	0.5
Disorderly Crowd	1	32.4	0.5
Maternity Run (PD)	2	30.9	0.5
Open Burn (PD)	2	29.8	0.5
See Key Holder	1	29.0	0.5
Fireworks Complaint	4	27.5	0.5
Poisoning (PD)	1	26.4	0.4
See Comp-Ref Suspicious Item	1	22.2	0.4
Report-Animal Bite	1	19.6	0.3
Failure To Pay Just Occurred	1	15.8	0.3
Go To Your Station	1	14.4	0.2
Report-Lost Property	1	12.6	0.2
Hyperthermia (PD)	1	11.8	0.2
Elevator Alarm-Rescue (PD)	1	11.2	0.2
Allergic Reaction (PD)	2	8.6	0.1
Recorded Panic Alarm	1	1.0	0.0
Traffic Light Malfunction	1	0.4	0.0
Misc Service Request	1	0.1	0.0
Vehicle (GPS) Alarm	1		0.0

Appendix B The Key Elements of Problem-Oriented Policing

- A problem is the basic unit of police work rather than a crime, a case, calls, or incidents.
- A problem is something that concerns or causes harm to citizens, not just the police. Things that concern only police officers are important, but they are not problems in this sense of the term.
- Addressing problems means more than quick fixes: it means dealing with conditions that create problems.
- Police officers must routinely and systematically analyze problems before trying to solve them, just as they routinely and systematically investigate crimes before making an arrest. Individual officers and the department as a whole must develop routines and systems for analyzing problems.
- The analysis of problems must be thorough even though it may not need to be complicated. This principle is as true for problem analysis as it is for criminal investigation.
- Problems must be described precisely and accurately and broken down into specific aspects of the problem. Problems often aren't what they first appear to be.
- Problems must be understood in terms of the various interests at stake. Individuals and groups of people are affected in different ways by a problem and have different ideas about what should be done about the problem.
- The way the problem is currently being handled must be understood and the limits of effectiveness must be openly acknowledged in order to come up with a better response.
- Initially, any and all possible responses to a problem should be considered so as not to cut short potentially effective responses. Suggested responses should follow from what is learned during the analysis. They should not be limited to, nor rule out, the use of arrest.
- The police must pro-actively try to solve problems rather than just react to the harmful consequences of problems.
- The police department must increase police officers' freedom to make or participate in important decisions. At the same time, officers must be accountable for their decision-making.
- The effectiveness of new responses must be evaluated so these results can be shared with other police officers and so the department can systematically learn what does and does not work. (Michael Scott and Herman Goldstein 1988.)

The concept of problem-oriented policing can be illustrated by an example. Suppose police find themselves responding several times a day to calls about drug dealing and vandalism in a neighborhood park. The common approach of dispatching an officer to the scene and repeatedly arresting offenders may do little to resolve the long term crime and disorder problem. If, instead, police were to incorporate problem-oriented policing techniques into their approach, they would examine the conditions underlying the problem. This would likely include collecting additional information—perhaps by surveying neighborhood residents and park users, analyzing the time of

day when incidents occur, determining who the offenders are and why they favor the park, and examining the particular areas of the park that are most conducive to the activity and evaluating their environmental design characteristics. The findings could form the basis of a response to the problem behaviors. While enforcement might be a component of the response, it would unlikely be the sole solution because, in this case, analysis would likely indicate the need to involve neighborhood residents, parks and recreation officials and others.

Problem-oriented policing can be applied at various levels of community problems and at various levels in the police organization. It can be applied to problems that affect an entire community, involving the highest level of police agency, government, and community resources. It can be applied at intermediate levels (for example, a neighborhood or a police district), involving an intermediate level of resources. Or it can be applied at a very localized level (for example, a single location or a small group of problem individuals), involving the resources of only a few police officers and other individuals.