



**STAFFING AND WORKLOAD ANALYSIS FOR THE NORWOOD (OH)  
POLICE DEPARTMENT**

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## Executive Summary

The purpose of this report of the Norwood Police Department (NPD) is to examine where NPD fits in relation to the recommended staffing policies for police agencies, as well as instrumental effectiveness, and to highlight areas where NPD could examine potential workload policies. A number of important findings are illustrated below.

- Norwood PD is proactively engaged with local citizens and businesses in their community, which is a staple of a well-integrated service-based police agency. In 2017 Norwood PD patrol officers devoted the vast majority of their time to address the following citizen-generated requests for emergency assistance (N = 18,337) and specifically police assistance (N = 14,743): Alarm Calls (#1 in CFS), Auto Accidents (#3 CFS and #1 in time devoted); Trouble with Persons (#3 in CFS and #4 in time voted); wellness checks for trouble breathing and sick persons (both top 5 in CFS and both in top 10 for time devoted). Finally, NPD devotes a large proportion of time (#2 in time devoted) to domestic violence calls for service. In sum, NPD patrol dedicates the vast majority of their time to addressing and assessing the wellness and safety of Norwood residents.
- Currently, Norwood PD has 32 sworn patrol officers out of 42 sworn police personnel, which equates to 76% of its workforce. This workload distribution at (actually above) the International City Management Association (ICMA) recommendation that at least 60% (and roughly 60-70%) of uniformed officers should be assigned to patrol to address citizen assistance. Thus, the NPD cannot gain any additional patrol coverage by reallocating their current organizational distribution; they likely have committed as many resources to patrol as is organizationally possible.

- The number of uniformed officers per citizen in Norwood is slightly higher than other police agencies in similar sized settings, including within the state of Ohio. Specifically Norwood PD has a uniformed officer to citizen ratio of 2.10 per 1,000 residents (42/19,207), which is slightly higher than similarly sized Ohio agencies in cities between 15,000 and 25,000 residents (1.6 per 1,000 residents).
- Analysis of citizen generated calls for service indicates that Norwood PD currently has just slightly less than the required number of patrol officers necessary to address citizen generated calls for service (by roughly four patrol officers) based on ICMA and COPS national standards.
  - Using a shift relief factor and following the recommendation that patrol officers have 33% unallocated time to address issues beyond citizen generated calls for service, we recommend patrol staffing increase from 32 uniformed patrol officers to 33 uniformed patrol officers in the agency.
  - Work shifts appear almost adequately staffed; thus, the current workforce distribution per shift appears to be most appropriate when compared with the data for requests for assistance. We do recommend that should NPD follow our recommendation and staff 33 patrol officers (including patrol sergeants) that 17 patrol officers be devoted to the day shift and 16 be devoted to the night shift.
  - We strongly recommend NPD consider a variety of approaches that might reduce current workload factors (e.g., examining a cap on the allowed alarm calls) and a problem-analysis on the allocation of the time devoted to domestic violence calls given the disproportionate number of calls and amount of time these citizen-generated requests have on NPD resources. This is particularly important given

that 22.5% of all calls for service have 3 or more officers devoted to citizen-generated calls. The time spent on calls and multiple officer calls (beyond two officers) encompass a significant portion of calls for service.

- The NPD is committed to twelve hour work shifts, which has been shown to be the most potentially cost efficient (though extremely cumbersome) police workload distribution (see Amendola et al., 2011). Thus, NPD cannot reallocate their workforce into any different model to gain efficiency.
- Currently NPD should be commended for ‘stretching their resources’ to address citizen generated requests for assistance. Organizationally, they simply could not have reasonably operated more efficiently than they have since 2017 from an organizational standpoint. However, there may be opportunities to reduce the time devoted to multiple calls for service for three and more officers. We recommend an organizational analysis of such calls. Additionally, as the NPD continues to experience retirements among current sworn personnel, and as the number of citizen-generated CFS changes over time, we recommend the City of Norwood and Norwood PD continue to monitor the current staffing levels relative to the current citizen requests placed on NPD personnel.

## **Norwood Police Department Staffing and Workload Analysis**

In 2018 the City of Norwood, the Norwood Police Department and the Institute of Crime Science (ICS) housed in the School of Criminal Justice at the University of Cincinnati worked to assess the workload and staffing distribution for the city police department. The ICS drew upon nationally recommended staffing models to conduct the NPD staffing analysis. This report reflects the major findings from this data-driven assessment.

The City of Norwood (OH) has experienced a notable population decade-to-decade decrease since the 1950s, with its greatest decline corresponding with the closure of various factories and industrial sites (including the General Motors auto assembly plant in 1987). The population of the city in 2010 was 19,207. However population estimates from 2010 to 2017 suggest a marginal increase with a population estimate in 2017 just over 19,800 (suggesting population changes have likely stabilized). The city police department in Norwood has also experienced declines in their sworn officer personnel over this period. In 2010, NPD had 52 sworn personnel; Today NPD has 42 sworn personnel. Given the population stabilization (and slight estimated growth) it is important to examine necessary and optimal workloads for NPD.

There are several important factors when assessing staffing and workload needs for a police agency: 1) the crime levels and structural features of a given community; 2) the workload distribution for patrol officers; and 3) the balance between organizational efficiency and community needs related its police department.

We initially provide overview of the number of sworn officers as compared to city population size. This information is used to compare Norwood to other townships and cities nationally and by region.

Next, we present a patrol staffing analysis based upon calls-for-service (CFS) data within Norwood to measure workload demands for the NPD. We further break these analyses down by season, type of call, day/time, the cumulative response time devoted to CFS, and the recommended number of responding officers based upon these analyses to determine the necessary number of officers that are needed to address citizen requests as well as other fundamental policing activities, such as proactive police patrol at any given time. Finally, we provide a series of recommendations that are specifically crafted to fit the unique circumstances of the City of Norwood and the NPD.

The workload analysis presented here suggests that the NPD patrol officers spend the vast majority of their time 1) responding to vehicle calls, accidents, and stops, and 2) conducting business checks for local business, 3) addressing the vast needs related to citizen generated calls for assistance. The proximity to one of the largest cities in the states places a structural constraint on additional patrol time and community outreach for NPD officers as they are responsible for policing the urban transience of Cincinnati residents as well.

### **Norwood Police Department Organizational Structure and Local Context**

As of July 2017, the Norwood PD had roughly 42 sworn officers: A police Chief, A Captain, Five Lieutenants, Eight Patrol Sergeants, and 27 Patrol Officers (including two detectives and a DEA officer). These uniformed officers are responsible for community outreach, public safety, crime investigations, and suppressing local crime problems.

#### ***Officer-to-Citizen Ratio***

The first phase of our staffing analysis is to examine the per capita method to determine the expected number of sworn police officers per person based on the population size (see Orrick, 2008). One of the most common, though limited, analytical approaches to staffing has

been to examine the number of police officers per population (i.e., rate calculation) to approximate the number of sworn officers needed to address community crime problems. A relative comparison against other regional jurisdictions or other police departments is a common approach for the per capita staff analysis. Since the FBI collects both police employee and crime data for each reporting agency, calculating the officer ratio is a popular technique due to its relative ease of analysis. A simple cross-sectional analysis of 2017 Uniform Crime Reports data illustrates that there were 2.10 sworn police officers in Norwood per 1,000 residents (FBI, 2016).<sup>1</sup>

As expected, police force size per population varies across city population size (i.e., larger cities contain more officers per citizen) and thus we disentangle these averages further. An examination of national population ratios shows there were 2.20 sworn police officers per 1,000 residents among all U.S. cities of a similar population demography (0-50K residents) as reported to the FBI in 2017. Table 1 below presents the geographic and population specific averages from 2017. Thus, among similarly sized cities Norwood PD is slightly higher the national average (2.1 compared with 1.95 for all US cities) for the uniformed officer to citizen ratio per 1,000 residents.

However, relative comparisons to other staffing levels are inadequate for a variety of reasons including the arbitrariness that nearby staffing levels may be utilizing in their staffing approach. Smaller cities with higher tax bases and lower crime rates can inflate officer personnel numbers; conversely, cities with marginal tax bases and higher crime rates often suffer from staffing inadequacies. Additionally, the number of sworn to non-sworn personnel varies across

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<sup>1</sup> The data for this analysis were obtained from the Uniform Crime Reports, Table 78, Crime in the United States, Full Time Law Enforcement Employees by State by City.



context, which makes ratio comparisons difficult to interpret. A more comprehensive review takes into account the role of police in the local context.

**Table 1: Comparing the Norwood Police Department Sworn Police Officer per 1,000 Residents with Other U.S. Police Departments in 2017**

<b>Population Category</b>	<b>Average</b>
0 – 49,999	2.20
15,000 – 25,000 (U.S.)	1.95
15,000 – 25,000 (Ohio)	1.60
<b>Norwood PD</b>	<b>2.10</b>

### **Calls for Service Staffing Analysis - Patrol**

The cornerstone of police operations is the patrol division. This is particularly the case when handling public requests for assistance since patrol officers are the tasked with the vast majority of such requests. As a result, patrol encompasses the bulk of a police organization’s personnel resources.

The International City/County Management Association (ICMA – McCabbe, 2012) suggests that police agencies follow the “rule of 60” in that 1) at least 60% of the total number of sworn officers should be assigned to patrol; 2) the average workload (respond to CFS) should not exceed 60%; and 3) the total service time should not exceed a factor of 60. Additionally, the U.S. Department of Justice Community Oriented Policing Services (COPS) staffing guidelines recommend that both police and citizen services should not encompass more than 33% of a patrol officer’s time (see Wilson and Weiss, 2012).

Additionally for both citizen and police generated CFS combined, the ICMA (as well as Shane, 2007) cites a 60% rule for both citizen and police generated CFS (i.e., that roughly 60% of patrol time should be used to address both citizen and police generated CFS). Thus, our

staffing models draw from both guiding models, and the results from both sets of analyses provide highly comparable performance objectives.

In terms of the first recommended standard, we found that within NPD approximately 76% (32 patrol officers out of 42 sworn officers) were assigned in the patrol division as of July 2017. Thus, NPD falls very much in-line (is actually on the high side) with the recommended threshold of the recommended patrol personnel distribution. Indeed, it would be virtually impossible for NPD to devote any more of their current resources to patrol and maintain other components.

The next step in our analysis was to assess the commitment to citizen-generated calls for police assistance based on prior CFS data. In terms of a general assessment of services, Table 2 shows that NPD is been responsible for addressing between over 35,000 CFS, of which 18,337 were citizen-generated CFS for emergency assistance (and 14,743 were specifically devoted to NPD for police assistance).

**Table 2: Calls for Service (2017)**

<b>Year</b>	<b>Number of CFS</b>	<b>Emergency CFS</b>	<b>Police CFS</b>
2017	35,433	18,337	14,743

Table 3 below shows the percentage distribution for CFS by call type for 2017. Consistent with most police agencies, alarm and traffic related calls for assistance comprise the majority of all CFS in Norwood. Additionally, public service requests (e.g., citizen welfare and business checks) also comprise a large majority of patrol time for Norwood patrol officers. Investigations and responding to suspicious activity also account for a large proportion of citizen generated requests.

**Table 3: Nature of CFS by Category January 1, 2017 to December 31, 2017 (N = 18,337)**

<b>CFS Category</b>	<b>Percent</b>
Alarms	6.4%
Public Service Checks	6.3%

Parking Complaints	4.3%
Auto Accidents	3.9%
Suspicious Activity	3.0%

Table 4 displays the citizen generated CFS, on average, by the hours in the day. Table 4 shows the peak hours typically occur between 1pm and 7pm, with the lowest call volume occurring between 4am and 7am, on average. Additionally, the total service hours required to clear citizen-generated CFS are in the late afternoon to early evening hours.

**Table 4. 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	706	416.27	1.94	1.14
1	608	381.86	1.67	1.05
2	462	288.34	1.27	0.79
3	381	282.18	1.06	0.78
4	288	257.78	0.79	0.71
5	247	179.19	0.68	0.49
6	359	199.01	0.99	0.55
7	423	279.82	1.16	0.77
8	580	406.06	1.6	1.12
9	669	447.29	1.84	1.23
10	697	471.32	1.91	1.29
11	804	555.61	2.21	1.53
12	865	593.52	2.38	1.63
13	1016	702.83	2.79	1.93
14	956	609.36	2.63	1.67
15	1063	693.11	2.92	1.9
16	1138	724.7	3.13	1.99
17	1168	677.16	3.21	1.86
18	1158	659.58	3.18	1.81
19	1057	610.98	2.9	1.68
20	1022	563.19	2.81	1.55
21	947	568.21	2.62	1.57
22	906	575.97	2.49	1.58
23	817	516.98	2.24	1.42
<b>Total</b>	<b>18337</b>	<b>11660.32</b>	<b>50.42</b>	<b>32.04</b>

Table 5 displays a distribution plot of CFS for the Norwood PD by both day of the week and time of day. The results reveal that CFS are consistently the lowest between 1:00am and 6:00am (with an exception for 12:00 midnight to 2:00am on Saturdays and Sundays), and the most heavy concentration between 12:00pm through 9:00pm across all days of the week.

**Table 5. Citizen Initiated Calls for Service by Days (January 1, 2017 - December 31, 2017)**

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
0	87	83	78	103	116	108	131	706
1	78	64	74	71	73	115	133	608
2	53	46	72	45	59	87	100	462
3	45	49	52	43	48	64	80	381
4	43	35	40	35	42	42	51	288
5	46	27	23	34	41	36	40	247
6	41	40	82	47	58	45	46	359
7	62	64	64	73	73	51	36	423
8	87	100	90	89	102	64	48	580
9	118	120	108	106	88	61	68	669
10	98	104	115	106	93	99	82	697
11	134	123	125	107	106	118	91	804
12	117	143	136	123	128	117	101	865
13	158	151	148	136	154	126	143	1016
14	152	162	139	142	142	101	118	956
15	156	164	147	163	177	140	116	1063
16	184	171	155	189	173	147	119	1138
17	178	164	186	162	183	160	135	1168
18	185	176	177	184	164	132	140	1158
19	159	152	156	147	158	147	138	1057
20	144	141	155	150	149	128	155	1022
21	131	149	151	129	126	123	138	947
22	118	127	112	117	145	155	132	906
23	97	102	105	125	130	145	113	817
<b>Total</b>	<b>2671</b>	<b>2657</b>	<b>2690</b>	<b>2626</b>	<b>2728</b>	<b>2511</b>	<b>2454</b>	<b>18337</b>

Table 6 displays seasonal daily percentages of CFS for Winter (December-February), Spring (March-May), Summer (June-August), and Fall (September-November). It is important to

note that the daily percentages were obtained by using column totals for each day to minimize possible disproportional effects of seasonal variation. Table 6 shows that the average CFS percentage is roughly uniformly distributed across seasonal variations. Thus, NPD is required to be fully and commensurately staffed at all seasons of the year.

**Table 6. 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	38	56	61	51	57	70	71	76	67	52	56	51
1	56	40	60	62	39	48	46	50	40	57	56	54
2	26	33	31	44	33	37	50	49	37	43	42	37
3	25	22	39	33	29	34	34	41	37	37	21	29
4	15	20	24	35	23	22	26	29	29	17	14	34
5	20	22	24	12	24	23	16	15	28	22	19	22
6	20	25	31	36	31	35	28	31	30	28	22	42
7	34	38	23	32	35	39	39	39	34	42	41	27
8	37	45	44	53	50	51	45	54	53	51	48	49
9	34	66	53	46	59	53	53	60	57	64	63	61
10	55	63	49	62	58	58	54	67	66	49	55	61
11	59	75	58	67	59	68	91	51	82	66	69	59
12	66	68	71	75	75	71	63	67	68	90	74	77
13	76	85	80	86	79	100	75	92	88	83	89	83
14	72	87	74	73	74	83	95	73	95	95	70	65
15	81	98	87	108	96	107	81	71	93	72	87	82
16	76	93	95	98	107	106	81	82	97	90	90	123
17	84	105	98	97	102	110	93	94	95	93	105	92
18	70	104	95	101	115	96	102	84	105	110	81	95
19	67	100	83	94	91	95	77	87	101	93	94	75
20	78	82	69	82	97	88	101	96	83	106	84	56
21	63	66	82	60	92	99	80	66	75	95	87	82
22	64	69	56	74	77	92	105	79	94	73	78	45
23	40	54	67	82	64	92	81	70	71	79	65	52
<b>Total</b>	<b>1256</b>	<b>1516</b>	<b>1454</b>	<b>1563</b>	<b>1566</b>	<b>1677</b>	<b>1587</b>	<b>1523</b>	<b>1625</b>	<b>1607</b>	<b>1510</b>	<b>1453</b>
<b>Seasonal Totals</b>	<b>4,226</b>			<b>4,806</b>			<b>4,735</b>			<b>4,570</b>		

When estimating the total time devoted to citizen-generated CFS it is also important to consider the number of calls that are responses by a single officer responses (45%), dual-officer responses (32%), or three or more officers responding (23%). Table 7 displays a distribution plot of CFS for the Norwood PD by time of day across the permutation of single and multiple officer responses. The results reveal that CFS are consistently cleared quicker for single response calls than for multi-response calls; however, the nature and degree of risk of the calls (required additional officers) undoubtedly contributes to the time needed to clear such calls. We account for the time devoted to single and multi-response calls based on annual totals and averages across the various response types.

**Table 7. Total Service Hours by Backup Units for Citizen Initiated CFS Data**

Hour	One Officer		Two Officers		Three Officers		Four Officers		Five and 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	252	23.76	273	30.85	121	41.20	39	68.44	21	138.76
1	213	21.77	206	29.31	119	44.61	39	79.52	31	123.42
2	152	21.19	174	29.90	88	53.52	31	73.22	17	111.66
3	123	27.26	134	32.17	79	46.03	27	97.22	18	166.97
4	116	26.10	95	36.19	45	43.97	17	97.04	15	358.13
5	87	29.00	99	34.34	41	45.53	11	83.94	9	226.51
6	163	17.88	120	27.56	46	35.41	17	61.70	13	233.97
7	194	24.79	152	34.23	44	47.07	16	106.14	17	176.92
8	292	23.56	181	38.55	53	67.92	28	82.90	26	176.39
9	346	21.45	214	37.04	65	47.71	21	63.89	23	306.35
10	358	22.64	199	37.19	77	65.70	37	78.72	26	184.69
11	429	22.14	223	39.08	83	57.90	36	106.57	33	196.48
12	441	20.96	250	37.98	98	53.06	36	93.23	40	207.89
13	534	20.63	273	38.83	118	63.65	53	72.14	38	242.54
14	498	20.35	270	37.62	97	54.81	50	80.77	41	168.61
15	522	21.35	317	39.65	117	53.97	63	60.08	44	176.69
16	559	21.74	338	33.42	137	44.58	66	78.75	38	229.80
17	593	20.11	358	35.68	130	49.66	51	79.18	36	151.13
18	593	19.30	337	30.69	138	52.68	53	75.62	37	175.95
19	485	21.81	330	33.82	144	46.41	57	68.85	41	105.17

20	421	18.87	333	31.55	174	44.63	56	63.24	38	106.14
21	383	19.44	322	30.41	141	44.34	55	68.08	46	149.12
22	351	19.84	320	29.31	144	48.55	52	69.72	39	194.82
23	287	20.29	285	32.18	149	50.95	56	78.01	40	101.60
	<b>8,392</b>	<b>526.24</b>	<b>5803</b>	<b>817.54</b>	<b>2448</b>	<b>1203.85</b>	<b>967</b>	<b>1886.95</b>	<b>727</b>	<b>4409.70</b>

The next component of our staffing model is the shift relief factor. We relied upon a standard shift relief factor for patrol as 0.36, which means staffing must have roughly 36% more patrol availability time to compensate for allocated patrol sick days, training days, and paid days off per shift.

***Performance Objectives***

In Table 8 we account for the total number of required patrol officer hours needed to respond to **citizen-generated CFS** for every working hour. If patrol officers commit 67% of their time to responding to citizen-generated CFS, and we take into account the needed shift relief factor (.36) to address available benefit time for patrol, we see that a total of 33 patrol officers are needed to respond to citizen generated CFS.<sup>2</sup> This analysis indicates that 17 patrol officers are needed for the day shift and 16 patrol officers are needed for the night shift. Finally, the minimum estimated number of patrol officers needed to respond to CFS appears to be roughly 4 officers per shift (i.e., the highest estimated number per hour is 3.23 at 100% devoted to calls for service).

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<sup>2</sup> For this analysis we only examine the 14,743 calls for service that were allocated only to NPD (and not other emergency respondents). The count of 33 is derived by the sum of minimum officers per hour (55 total), divided by the service hours/day factor. There were on average 40.59 average number of calls per day over a 24 hour day (1.66 factor);  $55/1.66 = 33$  patrol officers needed.

**Table 8. Norwood 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 Shift Relief Factor	50% obligated with Shift Relief	33% obligated with Shift Relief	Min - Max Staffing Per Shift
<b>Night Shift</b>	0	576	299.36	1.58	0.82	0.14	0.28	0.42	<b>2</b>
	1	506	256.16	1.4	0.71	0.12	0.24	0.37	<b>2</b>
	2	374	209.64	1.04	0.58	0.10	0.20	0.30	<b>2</b>
	3	302	194.12	0.84	0.54	0.09	0.18	0.28	<b>1</b>
	4	232	151.94	0.64	0.42	0.07	0.14	0.22	<b>1</b>
	5	187	100.65	0.52	0.28	0.05	0.10	0.14	<b>1</b>
<b>Day Shift</b>	6	282	113.74	0.78	0.31	0.05	0.11	0.16	<b>1</b>
	7	332	172.01	0.91	0.47	0.08	0.16	0.24	<b>1</b>
	8	450	253.65	1.24	0.7	0.12	0.24	0.36	<b>2</b>
	9	518	229.27	1.43	0.63	0.11	0.21	0.32	<b>2</b>
	10	527	284.75	1.45	0.78	0.13	0.27	0.40	<b>2</b>
	11	625	321.55	1.72	0.88	0.15	0.30	0.45	<b>2</b>
	12	697	360.88	1.91	0.99	0.17	0.34	0.51	<b>3</b>
	13	790	424.92	2.18	1.17	0.20	0.40	0.60	<b>3</b>
	14	745	378.35	2.05	1.04	0.18	0.35	0.54	<b>3</b>
	15	843	430.34	2.32	1.18	0.20	0.40	0.61	<b>3</b>
	16	918	452.62	2.52	1.24	0.21	0.42	0.64	<b>3</b>
	17	956	451.72	2.63	1.24	0.21	0.42	0.64	<b>3</b>
	<b>Night Shift</b>	18	942	446.35	2.59	1.23	0.21	0.42	0.63
19		844	400.47	2.32	1.1	0.19	0.37	0.57	<b>3</b>
20		846	393.08	2.32	1.08	0.18	0.37	0.56	<b>3</b>
21		791	371.02	2.19	1.02	0.17	0.35	0.53	<b>3</b>
22		761	383.42	2.09	1.05	0.18	0.36	0.54	<b>3</b>
23		699	385.7	1.92	1.06	0.18	0.36	0.55	<b>3</b>
<b>Total</b>		<b>14743</b>	<b>7465.71</b>	<b>40.59</b>	<b>20.52</b>	<b>3.49</b>	<b>6.98</b>	<b>10.57</b>	<b>--</b>

***Conclusion and Summary***

While the officer-to-citizen ratio might suggest that Norwood Police Department is abundantly staffed relative to other similar sized agencies, the workload distribution in Norwood suggests that NPD officers devote a considerable volume of time to handle citizen generated



calls for service. Indeed, the current staffing level of 32 officers appears almost sufficient to handle the current call volume and still allow for proactive patrol and shift relief factor considerations. We recommend that 33 patrol officers are needed to address citizen generated calls for service while still accounting for proactive policing efforts and a standard shift relief factor.

The current staffing study also suggests that NPD have stretched their resources to maximize efficiency by adopting twelve hour work shifts, which have been shown to maximize efficiency despite their considerable taxation of officers (Amendola et al., 2011). Well over 60% of officers at NPD are devoted to calls for service, which is again consistent with COPS and ICMA recommendation thresholds. In short, there does not appear to be many wasted organizational design at NPD that are readily identifiable that would lead to greater patrol efficiency.

Finally, the sheer number of calls for alarm checks is considerable. The City of Norwood and NPD may want to work through ways to alleviate these calls, or at a minimum consider how many repeat calls to the same addresses burdens current resource allocations. Additionally, the volume of time that officers spend to respond to domestic violence calls is considerable in the City of Norwood. NPD devotes a large proportion of time (#2 in time devoted) to domestic violence calls for service. While the call volume is just outside the top 10 for types of calls, once initiated domestic violence calls take a considerable amount of time by officers at the scene. A detailed problem analysis is suggested once NPD staffing levels are sufficiently staffed to attempt proactive approaches to address these particular types of calls. And, as NPD continues to experience population shifts, call volume changes, and officer hires and retirements, we

recommend that NPD and the City of Norwood balance its needs and resources in a data-consistent manner obtained in the current report.

## **References**

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## Appendix A: Description of Patrol Recommendation Hourly Designation

Table 8 calculates the required number of patrol officers using Dr. Alex Weiss's formula. According to Table 8, and adding the shift relief factor which is 0.36, we calculate the number of officers needed per hour. Using the midnight hour as an example, if we added a shift relief factor of 0.14 required patrol officers to clear calls for service requested at midnight, the number of required personnel would be 0.14 ( $[0.82*0.36]+0.82 = 0.86$ ).

Following the calculation of required number of personnel with the shift relief factor at the midnight, we calculated the minimum number of personnel needed to perform Norwood PD patrol functions. Therefore, we adopted the standard<sup>3</sup> that a patrol officer should spend a maximum of 50% of their time on citizen-initiated calls. This number provides us the bare minimum number of required personnel. In this case, the required minimum personnel on the midnight hour for example becomes 0.38 cops ( $0.86/.50 = 1.72$  patrol cops which we round to 2 patrol police officers per hour).

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<sup>3</sup> Recall that the IACP recommendation is 33% unallocated time.