

Preliminary Analysis of Patrol Issues

COLUMBIA, MISSOURI

DRAFT



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Columbia, Missouri

The following interim report is designed to provide a preliminary analysis of issues in our study of Patrol services in the Columbia Police Department. This document is in draft form, based on the data and analysis conducted to date. It is intended to foster discussion with the Police Department on potential areas of change and improvement in Patrol services, deployments and operations. Based on feedback from the Police Department the project team will continue its analysis toward development of the project report in the next month.

1 Community Trends and Emerging Service Areas

Potential Issue Areas to Examine:





How will the service needs of the community change over the next five years?

What types of resources will best address the changing public safety needs over the next several years – do service gaps exist more in patrol, proactive enforcement, community outreach, etc.?

Are there are long-term trends in crime and other workloads that should be addressed through new or additional resources?

1. Impacts of Population and Major Crime Trends on Service Needs



- The population of Columbia has been expanding in recent years, as illustrated by the chart below:

Year	Total Pop.	+ / –
2010	108,500	
2011	111,128	
2012	113,277	
2013	115,311	
2014	116,906	
5YR Change	7.7%	
3YR Avg. Growth Rate	1.7%	

- The column on the right, denoted by green bars of different sizes, corresponds to the number of additional residents added from the previous year.
 - Overall, while the rate of increase has slowed somewhat since 2010-2011, the City of Columbia expects that the community will continue to grow in the coming years.
- The sustained growth of the city will present impacts to the service needs of the community, which may or may not significantly increase law enforcement workloads.
 - It is important, to consider that population growth does directly translate to additional workload in a linear manner – ratio-based comparisons are largely misleading.

- Instead, a more detailed analysis of emerging growth patterns is can provide the department with more accurate projections that can help steer the process of planning and prioritizing staffing needs.
- While violent crime totals have diminished significantly over the last five years of available data, property crimes have steadily increased over the same time period, as shown in the chart below:

Part I Crimes Reported to the FBI UCR Program, 2009 – 2013

	2009	2010	2011	2012	2013	
Violent Crime	501	530	582	476	416	
Murder and nonnegligent manslaughter	3	3	2	3	5	
Forcible rape	32	37	37	41	67	
Robbery	157	131	166	162	112	
Aggravated assault	309	359	377	270	232	
Property crime	3,906	3,816	4,263	4,221	4,359	
Burglary	692	552	798	784	703	
Larceny-theft	3,082	3,129	3,323	3,294	3,490	
Motor vehicle theft	132	135	142	143	166	
Arson	11	7	16	14	14	
Part I Crimes Per 1,000 Pop.	40.8					
5YR Violent Crime Change						▼ -17%
5YR Property Crime Change						▲ 12%

- It should be noted that the spike in incident totals for the forcible rape category from 2012 to 2013 is primarily the result of a change in the FBI's definition of the crime for reporting purposes.
- Larceny-thefts have experienced one of the highest rates of increase over the last five years, rising by over 13% by 2013 in comparison to the 2009 total.

2 Assessment of the Patrol Beat Structure

Potential Issue Areas to Examine:

Is workload equalized among beats?

Are boundaries between beats logical and effective?

Is the beat structure a key focus in decisions regarding patrol deployment?
How is geographic accountability affected by other deployment considerations (e.g., overlapping shift schedules, two-person patrol cars, etc.)?

1. The Role of an Effective Beat Structure

The beat structure used for field unit deployment plays a pivotal role in the effectiveness of patrol services. By assigning areas of geographic accountability, officers are able to develop expertise, familiarity, and knowledge at a very local level. This expertise, whether in the form of community contacts, past experience in dealing with particular offenders, or awareness of community dynamics, increases the ability of patrol officers to solve problems within a community.

Geographic accountability is maintained through a combination of factors, including the effectiveness of a beat structure, the role played by supervisors in directing accountability for assigned areas, and staffing constraints which may render a beat structure 'unworkable.'

Proactive capabilities, or rather, the ability of officers to have time available outside of responding to calls to act proactively – are central to determining whether these kinds of problem solving and community policing activities can occur within their areas of responsibility. Assuming that officers are expected to be primarily responsible for handling the calls for service that occur in their beats, it is critical that the workload levels represented by each beat be relatively equal. Otherwise, as is commonly case in

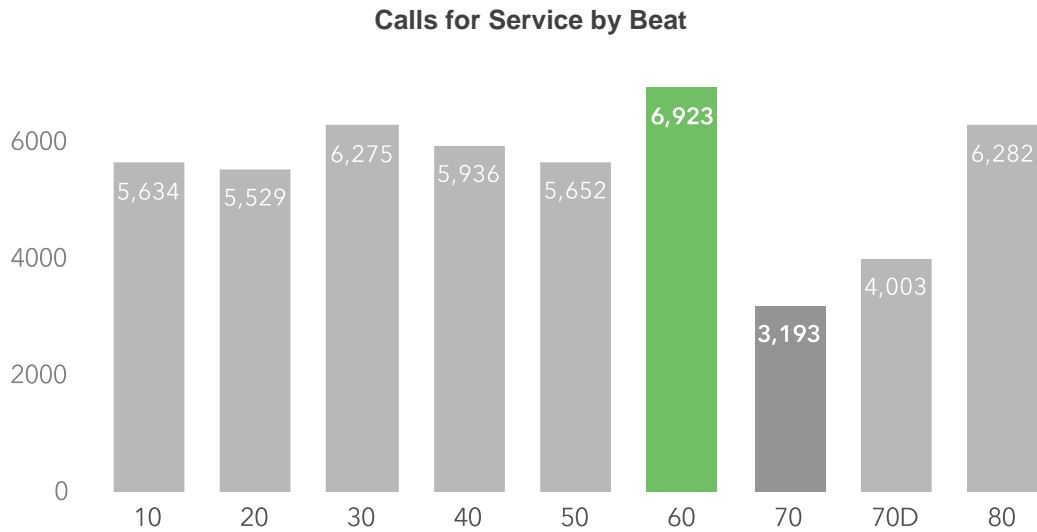
many jurisdictions throughout the country, the ‘busiest’ areas – where proactive policing may potentially have the greatest impact on improving public safety outcomes – often feature the *least* amount of time available for officers to be able to function in a proactive capacity.

2. Evaluation of Beat Structure Effectiveness

As a result, analysis of the number of calls handled by each beat is an effective method for assessing the ability of a beat structure to provide for community policing and high levels of service. To determine the distribution of calls for service handled by CPD units among individual beats, the project team mapped the locations of calls for service and totaled the number within each beat area.

The following table and chart present the results of this analysis, comparing the totals for each beat to the average for all beats, with 70 and 70D listed separately:

Beat	# of CFS	% from Avg.
10	5,634	3%
20	5,529	1%
30	6,275	14%
40	5,936	8%
50	5,652	3%
60	6,923	26%
70	3,193	-42%
70D	4,003	-27%
80	6,282	14%
Total	49,427	—



- Patrol workloads are well-distributed throughout the group, with the vast majority of beats featuring call for service totals that are within $\pm 15\%$ of the group average.
- Beat 70, which has the lowest total, should be viewed in conjunction with beat 70D, the beat with the second-lowest total number of calls.
- Although beat 60 has the highest level of workload, its call activity is not greater by an extensive margin, with a total that is only 26% above the group average.

Overall, the relatively equal number of calls for service and other measures of workload across nearly every beat demonstrates that the beat structure itself is effectively positioned to facilitate proactive capabilities among patrol units. The results of the employee survey also largely expressed positive attitudes toward the current beat configuration, including when prompted on the topic of whether beat boundaries are logical and effective. As a result, there are no significant issues with the *structure* for patrol deployment.

3 Patrol Deployment Practices and Shift Schedules

Potential Issue Areas to Examine:

What effects have the switch to two-person patrol units had on field service levels?

How does the shift schedule affect employee morale and retention, and are there other factors driving those issues?

Is the current shift schedule effective in allocating patrol staffing resources against peaks in community-generated workload levels? If not, what favorable alternatives can improve the efficiency of patrol deployment?

1. Preliminary Analysis of the Advantages and Effects of the Switch to Two-Officer Patrol Units

Within the last 16 months, the department has gradually shifted toward the deployment of patrol units in two-person cars. Beginning with the transition of those assigned to the swing shift, the deployment practice is now standardized throughout the entire division. The project team discussed this topic with a number of department officers, supervisors, and managers, gaining input on perceptions of the practice's strengths, drawbacks, and long-term effects of the change to be.

It is clear there are a number of advantages to the use of two-person patrol cars, including the following:

- Foremost in importance among the advantages, however, are those relating to officer safety, including the following considerations:
 - Backup is automatically on the scene of the incident should it be needed.
 - In situations featuring rapidly changing dynamics, having additional 'eyes' on the scene increases awareness of potential dangers.
- Because officers do not have to wait for backup to accomplish certain tasks that require an additional unit to be present, the handling time required to handle some types of calls for service is decreased as a result.

- As a single patrol unit, some workloads and other activities may be completed simultaneously, such as in the following instances:
 - Two officers can follow-up with citizens on different issues concurrently.
 - A second officer is better able to review information about a call or suspect while in transit than a single officer would be able to as he or she is driving.

The employee survey echoed the positive impact that two-person patrol cars have on officer safety, with the vast majority of respondents making that indication.

It is also clear, however, that the switch has brought about a number of largely adverse effects on the service levels provided in the field. By reducing the number of units available at any given time, the number of calls that the department can respond to simultaneously, as well as the rate at which calls can be handled, decreases significantly.

In recent months, this has been demonstrated by extensive queues of calls awaiting response by an officer, particularly during the afternoon to early evening hours. While the project team was on-site, call holding queues of up to 30 were observed while in the field, although on other days, the number would be somewhat smaller. However, it is difficult to statistically represent this effect with the current export of CAD data as it does not capture the time frame following the switch to two-person cars for all shifts (*see the “Next Steps” section later in the document*).

Instead, proactivity analysis provides a window into evaluating this operational issue – calls for service workload is being generated at a greater rate than patrol staffing levels are able to handle at desired levels of service. Given that the proportion of time officers have available to be proactive, versus the time they are handling

workloads, is a measure of this, the impact of the change is expressed directly through these numbers.

The following page contains a comparative analysis of the service levels achieved from deploying two-person patrol units, versus deploying only one-person units. using the same time period and data. The dot points below provide some of the assumptions used in this analysis:

- Patrol proactivity has been calculated in the same manner and process as in the descriptive profile.
- However, refinements have been made to the calculation of primary unit handling time, resulting in a more accurate number.
 - The average primary unit handling time is now slightly higher as a result of the change.
 - Consequently, the total number of patrol workload hours is greater, and the overall proactivity level is about 2.4 points lower.
- Because the additional officer in a two-person patrol unit is not recorded as a backup unit, the rate of backup responses has been doubled in the single-person car calculations.
- Similarly, two-person cars potentially increase the efficiency patrol units, which may reduce the amount of the handling time needed to handle certain types of calls for service. Given that this effect is difficult to measure within the exported CAD data, an estimated four minutes have been added to the average primary unit handling time in the single-person car calculations.

Comparison of Patrol Workload Capacity by Unit Configuration

Two-Officer Patrol Units

Breakdown of Patrol Workload Factors

Category	Value	Pct.
Total Number of Calls for Service	49,427	
Avg. Primary Unit Handling Time (min.)	28.3	48%
Backup Units Per CFS	0.47	
Avg. Backup Unit Handling Time (min.)	20.4	16%
Reports Written Per CFS	0.33	
Time Per Report (min.)	45.0	25%
Jail Transports/Bookings Per CFS	0.10	
Time Per Jail Transport/Booking	60.0	10%
Avg. Workload Per Call (min.)	58.9	
Total Workload Hours	48,526	

Patrol Unit Proactivity by Time Block

Time Range	Avg. # Ofc.	% Proactivity
0200 - 0600	6.7	67.2%
0600 - 1000	5.7	-1.0%
1000 - 1400	5.7	-34.4%
1400 - 1800	9.9	11.5%
1800 - 2200	10.6	41.6%
2200 - 0200	10.9	62.0%
Overall	8.0	24.3%

One-Officer Patrol Units

Breakdown of Patrol Workload Factors

Category	Value	Pct.
Total Number of Calls for Service	49,427	
Avg. Primary Unit Handling Time (min.)	28.3	48%
Backup Units Per CFS	0.47	
Avg. Backup Unit Handling Time (min.)	20.4	16%
Reports Written Per CFS	0.33	
Time Per Report (min.)	45.0	25%
Jail Transports/Bookings Per CFS	0.10	
Time Per Jail Transport/Booking	60.0	10%
Avg. Workload Per Call (min.)	58.9	
Total Workload Hours	48,526	

Patrol Unit Proactivity by Time Block

Time Range	Avg. # Ofc.	% Proactivity
0200 - 0600	12.1	77.1%
0600 - 1000	10.3	34.9%
1000 - 1400	10.3	13.0%
1400 - 1800	18.1	41.2%
1800 - 2200	19.4	59.3%
2200 - 0200	20.0	71.7%
Overall	14.6	47.2%

The findings from this comparison are clear:

- The negative proactivity levels shown in the results of the analysis of two-person patrol cars represents workload that cannot be handled during that time period – translating directly into calls that remain holding for often extended periods of time.
- With two-person patrol cars, the department is only able to reach an overall proactivity level of about 24.3%.
 - The level is far below the 35-40% range, which represents the minimum level of proactivity that can be considered to be an ‘effective.’
 - This level is far below the service capacity possible in one person cars in Columbia – 47.2%
 - **To achieve an overall proactivity level of 40% while mainly deploying two-person patrol cars, the department would need to add 26 additional patrol officer positions¹**, without accounting for any new hires of supervisory or support staff that would likely be made necessary as a result.
- Alternatively, a 40% level of proactivity could perhaps be achieved by having patrol officers respond to a *much* narrower range of calls.
 - In this alternative, the department could either elect to dispatch non-sworn personnel to those incidents, or, given the volume of workload that this would represent, not provide a response at all to lower priority events, such as public nuisance complaints and other quality of life issues throughout the city. The project team will evaluate the number of non-sworn personnel this would take.
 - It is unclear, however, that such a change would conform with community expectations for service, or with those of the elected municipal government.
- Regardless, it is clear that a long-term solution should be planned for in order to resolving the issue, as the significant number of calls pending on a daily basis is not a sustainable practice, particularly regarding the department’s desired relations with the community:
 - Proactivity levels of 24.3% overall, reaching as low as -34.4% during the late morning to early afternoon hours, represent a low level of service – it is

¹ The resulting staffing figure assumes that no other changes are made to deployment, the range of incidents that the department elects to respond to, or any other factor which would present an impact on this analysis. The figure does, however, include an adjustment for turnover at 10.7%, the average for CPD officer-level positions from FY12-14.

evident there are not enough patrol units deployed in the field to handle the workload generated by the community.

- The resources that are needed to return to a high level of patrol service – while still deploying two-person patrol cars – would require a massive increase in funding allocations to be made to the department.

2. Shift Schedule Configurations and Patrol Deployment Efficiency

Even under the scenario in which all shifts deployed in one-officer patrol cars, proactivity issues remain at certain times of the day, despite a markedly high overall level of proactivity of over 47%. To this point, from 1000 to 1400, proactivity drops to just 13%, meaning that calls will often need to hold during those times – even with nearly double the number of patrol units out in the field.

The roots of this issue are tied to the degree to which the patrol shift schedules, as well as allocation of officers to each team, are configured in a manner that deploys more officers during periods of higher workloads, and less officers when call activity recedes. By optimizing both deployments and schedules the Police Department could address workload distribution and potential employee morale issues. The project team will examine opportunities to evaluate shift alternatives to achieve this. Specific alternatives to be analyzed include:

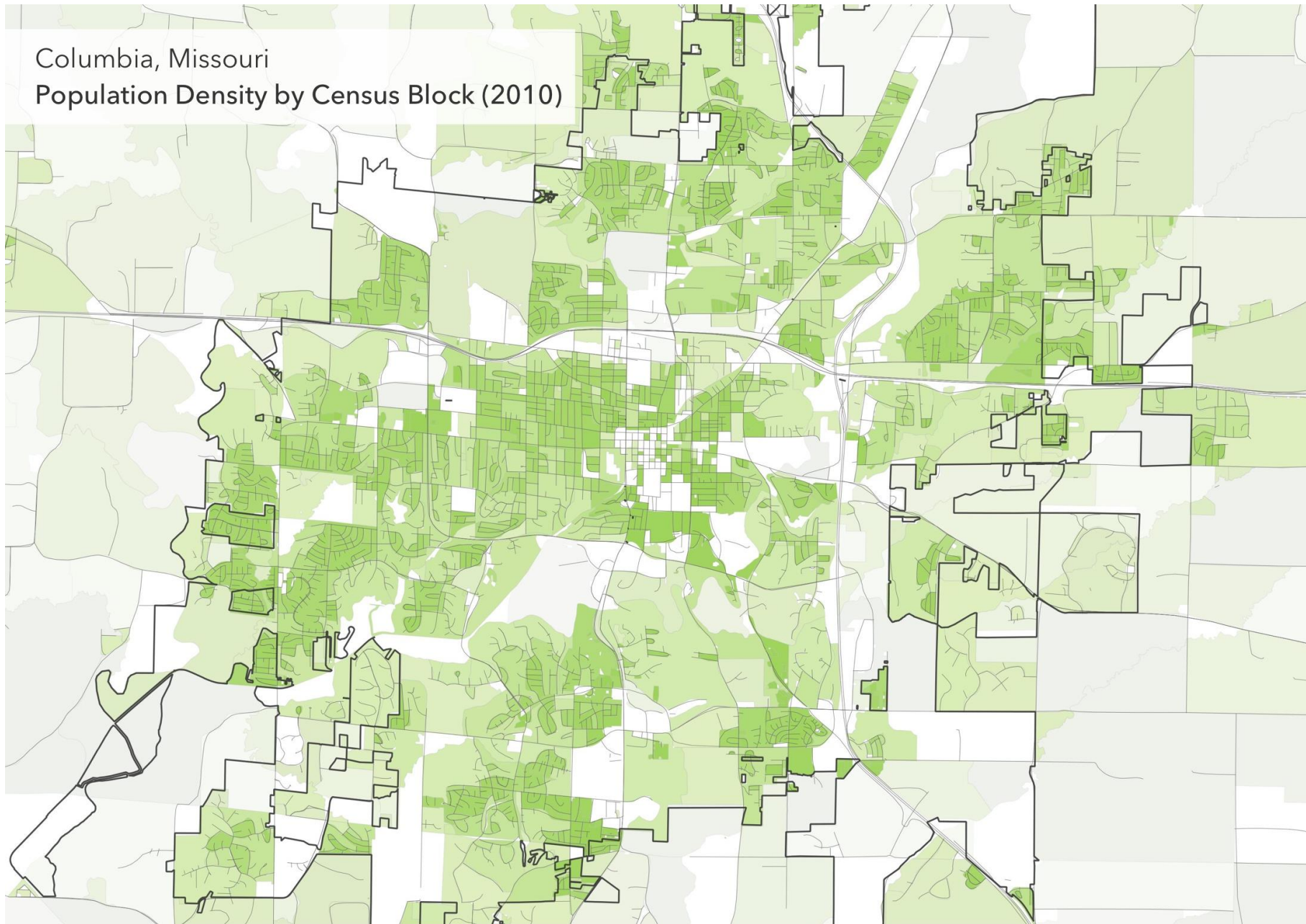
- Other forms of the 12-hour shift.
- 8 and 10-hour shift schedules.
- Hybrid shift schedules.

4 Next Steps

Over the next two weeks, the project team will continue its analysis of patrol deployment and scheduling issues and alternatives. This will include:

- Continued analysis of patrol workloads, and service levels, and staffing needs.
- Development, presentation, and analysis of alternative shift schedules.

The project team will request more CAD data, with the time range beginning with the change to all shifts being on the two-person units, and ending with the current date to enable us to better evaluate the impacts of this operational change.



Columbia, Missouri
Heatmap of Calls for Service

