
REPORT BY THE

OFFICE OF THE CITY AUDITOR

CITY OF PORTLAND, OREGON

REVIEW OF
BUREAU OF POLICE:
PATROL STAFFING AND DEPLOYMENT PRACTICES

BARBARA CLARK, C.P.A.
CITY AUDITOR

APRIL 1987

IAR 2-87



REPORT BY THE
INTERNAL AUDIT DIVISION
OFFICE OF THE CITY AUDITOR

BUREAU OF POLICE:
PATROL STAFFING AND DEPLOYMENT PRACTICES

INTERNAL AUDIT REPORT
#2-87

APRIL 1987



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PORTLAND, OREGON

OFFICE OF CITY AUDITOR

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DATE: April 16, 1987

TO: J.E. Bud Clark, Mayor
Earl Blumenauer, Commissioner
Dick Bogle, Commissioner
Mike Lindberg, Commissioner
Robert Koch, Commissioner
Richard D. Walker, Chief of Police

SUBJECT: Audit of Patrol Staffing and Deployment Practices
of the Bureau of Police

Attached is Internal Audit Report #2-87 concerning our review of the patrol operations of the Bureau of Police. The audit was conducted in accordance with our FY 1986-87 audit schedule. A summary of our findings is included at the beginning of the report.

We have discussed our findings and recommendations with the Mayor and the Chief of Police. Their written responses are included at the back of the report.

We would appreciate receiving a written status report from the Bureau of Police in six months indicating what actions have been taken on our audit findings. This response should be circulated to the Mayor, the City Commissioners, and the City Auditor.

We appreciate the cooperation and assistance we received from the Mayor's office and from personnel within the Bureau of Police.

Barbara Clark

Barbara Clark, CPA
City of Portland Auditor

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SUMMARY

The major responsibility of the Bureau of Police is to patrol city streets and respond to citizen calls for emergency service. The Bureau's patrol function, comprising about half of the Bureau's staff and budget, responded to over 296,000 calls for service in 1986. We limited the scope of our audit to patrol operations and identified ways to make more efficient and effective use of existing patrol personnel.

Change Work Schedules

Opportunities exist to modify the work schedules of patrol officers so that police personnel are more available when most needed. The Bureau's current shift schedule deploys too few staff during some busy times and more officers than needed during slow periods. As a result, patrol response to emergency calls is 15% slower during certain hours and call workload is unevenly distributed among patrol officers. More even work distribution can improve the quality of patrol services and enhance officer morale and safety.

To achieve a closer match between staffing and call workload we recommend alternative shift schedules, improved workload and deployment analysis, and more control over officer time-off.

More Telephone Reports

The Bureau's telephone report unit effectively handles low priority calls and reduces the call workload of patrol staff. We found that telephone report takers handle four times as many low priority calls per month as street officers. However, the telephone unit was unavailable to take calls 27% of the time in 1986 because of inadequate staffing.

Although the Bureau has expanded the telephone report criteria twice since 1984, it may be able to further expand the types of calls that can be resolved by telephone. Citizen surveys in Portland and other cities show high satisfaction with telephone reports. A 10 percent increase in telephone reports could add the equivalent of 4.8 additional patrol officers to the street.

To expand the number and types of calls handled by telephone, we recommend full staffing of the existing telephone report writing unit. Also the Bureau should regularly review the operating criteria of the telephone report unit and increase telephone reporting when appropriate.

Assessing Staff Needs

The level of police staffing is a policy decision requiring informed participation by Council and the public. The Bureau currently estimates that the patrol function is understaffed by 111 officers and requests 30 additional patrol officers in its FY 1987-88 proposed budget. In addition, the Bureau estimates that it is understaffed by 86 sworn positions in other sections of the Bureau. However, we found limitations in the standards and methods used to estimate staffing needs. Consequently, the Bureau's budget request describes an understaffing condition in patrol operations that is not adequately supported.

The Bureau bases its staffing analysis on the principle that patrol staff need to spend less time responding to calls and more time on proactive activities. Pro-active patrol includes a wide range of pre-planned work such as saturation patrol in high crime areas, neighborhood crime prevention, and special missions. We found that this goal is consistent

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with modern trends in police management. However, the Bureau may already have sufficient unallocated time to pursue these activities and could gain even more time by improving shift scheduling and telephone reporting procedures. The Bureau also lacks a clearly defined program to carry out pro-active patrol.

We recommend that the Bureau improve its methods for determining patrol staffing needs. The Bureau should provide the City Council with a broader range of workload and performance information, and staffing alternatives based on several levels of police services. In addition, the Bureau should develop and implement a detailed program of pro-active patrol activities.

INTRODUCTION

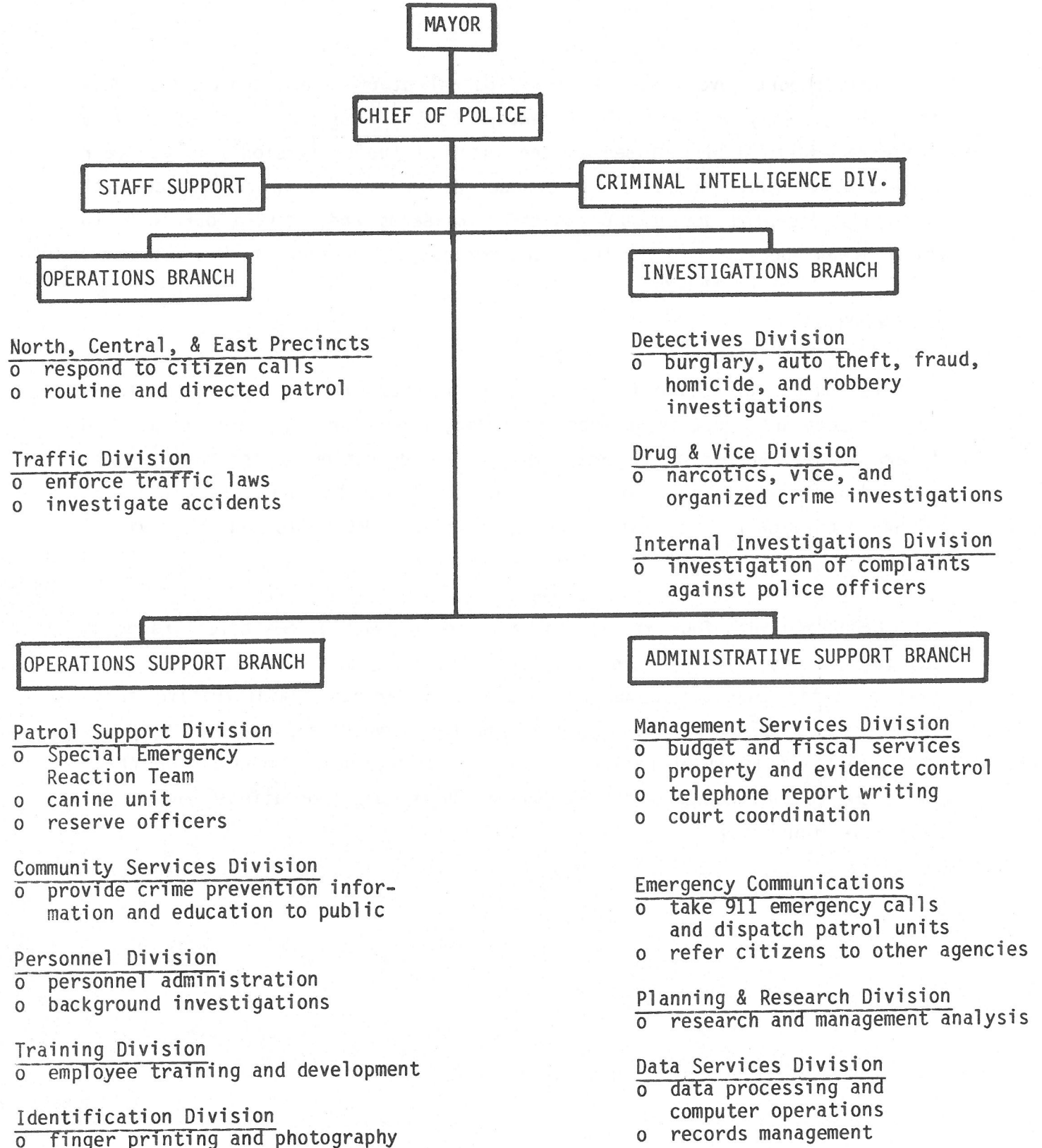
This report covers our review of patrol staffing and deployment practices in the City of Portland's Bureau of Police. The audit was approved by the City Auditor and included in the Internal Audit Division's fiscal year (FY) 1986-87 audit schedule. We conducted this review in accordance with generally accepted government auditing standards and limited our work to those areas specified in the scope and methodology section of this report.

BACKGROUND

The Bureau of Police is responsible for preserving the peace, protecting citizens and property, preventing crime, and enforcing state, local, and federal laws. The Bureau is under the overall direction of the Mayor and is managed by an appointed Chief of Police. The Bureau has a FY 1986-87 budget of \$48.3 million and is staffed by approximately 960 uniformed and civilian employees.

Organized into four major branches, the Bureau provides a full range of police services including emergency call response, preventive patrol, criminal investigation and community education. Various administrative functions, such as planning and research, training, and data processing, support the direct provision of police services. The following organization chart lists the four branches of the Bureau and their major operational and administrative functions.

BUREAU OF POLICE ORGANIZATION CHART



Bureau Budget, Staffing and Workload - 1981-1987

Over the last seven years, the Bureau of Police has experienced increases in budget, staffing and workload. As shown in Table 1, the Bureau's budget has increased from \$30.3 million in FY 1980-81 to \$48.3 million in FY 1986-87, a 22% increase after discounting inflation. The police budget as a percent of the total general fund appropriation has grown from 21% in FY 1980-81 to 23% in FY 1986-87.

TABLE 1

COMPARISON OF BUREAU OF POLICE BUDGET
 TO TOTAL GENERAL FUND BUDGET
 FY 1980-81 THROUGH FY 1986-87

<u>FISCAL YEAR</u>	<u>POLICE BUDGET*</u>	<u>GENERAL FUND</u>	<u>POLICE AS A % OF GENERAL FUND</u>
1980-81	\$30,256,987	\$145,498,339	21%
1981-82	32,800,544	146,059,842	22%
1982-83	34,823,969	143,490,253	24%
1983-84	35,546,982	150,494,617	24%
1984-85	42,038,501	178,313,818	24%
1985-86	46,668,727	184,052,755	25%
1986-87	48,341,873	206,745,260	23%
% increase, FY 81 - FY 87	22%**	15%**	

Source: City of Portland Annual Financial Reports and FY 1986-87 approved budget. General Fund dollars are appropriated expenditures. Adjustments to the General Fund were made beginning in FY 1984-85 to add Transportation Operating and Construction Funds appropriations which were included in the General Fund in prior years.

*Police budgets do not include costs associated with officer retirement and disability that are funded by the Fire and Police Disability and Retirement Fund.

**Percentage increases after adjusting for inflation.

As shown in Table 2, Bureau staffing has grown from 868 in FY 1980-81 to 960 in FY 1986-87, an 11% increase.

TABLE 2

BUREAU OF POLICE STAFFING
FY 1980-81 THROUGH FY 1986-87

FISCAL YEAR	STAFF		TOTAL
	Sworn	Nonsworn	
1980-81	677	191	868
1981-82	693	196	889
1982-83	712	193	905
1983-84	700	184	884
1984-85	767	204	971
1985-86	732	204	936
1986-87	759	201	960

% increase, FY 81-FY 87	12%	5%	11%
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Source: Approved City budget documents including major midyear adjustments.

The Bureau has also seen increases in workload as measured by service population, calls for service, and Portland's crime index. As shown in Table 3, the Bureau's service population increased by 18% and Portland's crime index increased by 31% from 1981 through 1986. Service calls increased by 38% from 1982 through 1986.

TABLE 3

BUREAU OF POLICE SERVICE POPULATION,
 CALLS FOR SERVICE, AND CRIME INDEX
 CALENDAR YEARS 1981 through 1986

<u>CALENDAR YEAR</u>	<u>SERVICE POPULATION*</u>	<u>CALLS FOR SERVICE**</u>	<u>CRIME INDEX***</u>
1981	366,960	---	50,432
1982	368,100	213,869	48,092
1983	370,000	207,903	48,318
1984	372,892	228,946	50,267
1985	432,646	281,704	62,255
1986	433,000	296,001	66,225
% increase, 1981-1986	18%	38%****	31%

*Source: Yearly average service population figures reported by Bureau of Police.

**Source: BOEC's Response Time Summaries and telephone reporting records, and Bureau of Police TRU records. Calls include officer-initiated calls and telephone reports. Call data for 1981 was not included because records prior to 1982 were incomplete.

***Source: Annual FBI Uniform Crime Reports. Included are seven categories of reported offenses -- murder and non-negligent homicide, forcible rape, robbery, aggravated assault, burglary, larceny-theft, and motor vehicle theft. 1986 crime data was obtained from Oregon State Law Enforcement Data System reports.

****Percentage increase from 1982 to 1986.

A variety of factors have contributed to the increase in service calls and crime index from 1981 to 1985. One major reason is the City of Portland's Urban Services Policy. This policy resulted in the City assuming police responsibility for 18 additional square miles with 56,000 residents in East Multnomah County. The Multnomah County Sheriff's office was responsible for policing this area prior to transferring the authority to the Bureau of Police. The Sheriff's office generally provided a lower level of service than does the Bureau of Police as measured by officers per 1,000 residents. In 1983 the Sheriff provided law enforcement services to the

area at a level of approximately .80 sworn personnel per 1,000 compared to the Bureau's 1985 staffing level of 1.75 per 1,000.

Table 4 below shows that Portland's crime rate in 1985 was the highest of seven other comparably-sized western U.S. cities. The Bureau of Police's staffing ratio of 12 sworn personnel per 1,000 index crimes was lower than the seven other cities. The number of Bureau sworn personnel per 1,000 population was comparable to the seven other cities.

TABLE 4

1985 CRIME RATES AND POLICE STAFFING RATIOS OF CITY OF PORTLAND
 AND SEVEN OTHER COMPARABLY-SIZED WESTERN U.S. CITIES

CITY	POPULATION	CRIMES PER 100,000 POPULATION				TOTAL CRIME INDEX	SWORN OFFICERS PER 1,000 INDEX CRIMES	SWORN OFFICERS PER 1,000 POPULATION
		RAPE	ROBBERY	BURGLARY	MURDER			
Portland	432,646*	108	810	3,960	9.9	14,378	12.17	1.75
Seattle	495,190	89	574	3,285	12.3	12,748	16.47	2.10
Sacramento	312,944	67	665	3,187	12.5	10,833	14.81	1.60
Oakland	362,095	147	916	3,272	26.2	11,830	14.42	1.70
Long Beach	389,728	60	617	2,121	16.2	7,896	21.17	1.67
Las Vegas**	493,595	56	355	2,019	11.5	7,124	20.68	1.47
Albuquerque	357,051	67	349	2,573	11.8	9,288	19.49	1.80
Tucson	381,473	78	276	2,602	8.4	10,039	19.06	1.70

Source: FBI's 1985 Uniform Crime Reports. See Table 3 footnote for explanation of Crime Index.

*1985 average service population reported by the Bureau of Police.

**Las Vegas police serve unincorporated Clark County as well as the City of Las Vegas. Population and staffing figures were obtained from Las Vegas police personnel and exclude sworn jail staff.

Patrol Operations

The primary function and most visible activity of the Bureau of Police is patrol operations. Police patrol is provided by the Operations Branch from its Central, North, and East precincts. The patrol function involves police response to citizen calls for service, routine patrol in assigned areas, and special directed patrol to detect or suppress specific criminal activity. Patrol is the most costly function of the Bureau, comprising 47% of the Bureau's total budget and 66% of its uniformed personnel.

Precinct staff levels are established by the Police Chief and the Deputy Chief of Operations. Precinct commanders determine shift staffing levels. The precincts currently operate three eight hour shifts, seven days a week beginning at 8 a.m., 4 p.m. and 12 midnight.¹ Since June 1986, East precinct has been experimenting with an additional "overlay" shift during peak workload hours from 6 p.m. to 4 a.m., Wednesday through Saturday. The following table shows the number of sworn personnel assigned to each precinct and the Traffic Division.

TABLE 5

BUREAU OF POLICE SWORN PATROL
 AND TRAFFIC PERSONNEL, BY PRECINCT

	<u>Central Precinct*</u>	<u>North Precinct</u>	<u>East Precinct</u>	<u>Traffic Division</u>
Captains	1	1	1	1
Lieutenants	3	3	3	2
Sergeants	13	12	17	6
Officers	<u>120</u>	<u>118</u>	<u>161</u>	<u>42</u>
TOTAL	<u>137</u>	<u>134</u>	<u>182</u>	<u>51</u>

Source: Bureau of Police budget documents.

*Includes one sergeant and four officers assigned to Mounted Police Unit, and two officers assigned to City Hall security.

¹ To provide patrol coverage during shift change, precincts employ an "early relief" system. See Appendix C for discussion of this system.

Patrol is augmented by a variety of special field operations. The Traffic Division, consisting of 51 officers, is located at East precinct and provides city-wide traffic surveillance and enforcement. Other services are available when needed and include the Special Emergency Reaction Team for hostage or high risk situations; the Canine Unit when police dogs are needed for their keen sense of smell and hearing; and the Reserve Unit with 51 specially trained volunteers.

Police Service Calls

The primary workload element of patrol operations is service calls from the public. Calls for service are received and patrol officers dispatched by the Bureau of Emergency Communications (BOEC). Staffed by civilian and uniformed employees, the BOEC provides a computer-aided 911 dispatch service to the Bureau of Police, the Multnomah County Sheriff's Office, and other local jurisdictions. Since 1985, the Bureau of Police has administered BOEC.

The BOEC receives, prioritizes and dispatches police units in accordance with policies developed by local law enforcement agencies. Some calls require immediate patrol dispatch, while others can be delayed or even resolved by a telephone report. Other calls do not require police services and are referred to other agencies.

Recent Management and Administration Changes

The Bureau of Police has undergone considerable leadership and organizational changes during the past three years. Since FY 1984-85 there have

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been four Police Chiefs and two interim Police Chiefs. The current Police Chief, Richard D. Walker, was appointed April 7, 1987. The prior Police Chief, James T. Davis, made several organizational changes, including:

- o re-establishing a separate division for investigation of drug, vice, and criminal enterprise activities, plus doubling personnel assigned to narcotics;
- o increasing the number of precinct patrol officers;
- o reducing the number of officers assigned as juvenile and traffic enforcement officers;
- o re-establishing a small, but separate, division for criminal intelligence gathering; and
- o amending the City Code to reorganize and establish a fourth major branch within the Bureau (Operations Support).

SCOPE AND METHODOLOGY

The objectives of this audit were to evaluate the efficiency and effectiveness of police patrol staffing and deployment practices. Specifically, we analyzed methods used to allocate and schedule officers at East, Central, and North precincts. Staffing information from precinct daily assignment records for sample periods during 1986 were compared to call loads to determine whether staff resources matched workload fluctuations.

We also reviewed the handling of service calls at the 911 dispatch center to determine how efficiently the Bureau manages its call workload. We reviewed the Bureau's call prioritization system and the efficiency of the Telephone Report Writing Unit in handling low priority calls.

We analyzed methods used for determining patrol staffing needs and compared the Bureau's procedures with staffing criteria advanced in police management literature and national police associations, and practiced by various police departments. We also reviewed the Bureau's use of the computerized Patrol Car Allocation Model (PCAM) for simulating patrol activities and projecting staffing needs.

We collected and analyzed records and documents such as computer data produced by the Bureau's central data processing system and the 911 computer-aided dispatch system. We interviewed Bureau personnel, including patrol officers, precinct commanders, and Planning and Research Division staff.

To collect comparative data on police operations, we contacted over twenty municipal police departments in the western United States and interviewed representatives from national police organizations. We also interviewed representatives of the Police Foundation, the International Association of Chiefs of Police, the Police Executive Research Forum, the National Institute of Justice, and various police management consulting firms. (See Appendix D for listing of cities and organizations contacted.)

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During the course of our review we identified three other areas that may warrant additional detailed study. We recommend additional study of:

- o Investigative operations - Detective case load management.
- o Information management - Police reporting, recordkeeping, and computer applications.
- o General Bureau management - Civilianization of sworn positions, organizational structure, performance reviews and supervisory control.

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AUDIT RESULTS

CHAPTER I

OPPORTUNITIES EXIST TO IMPROVE DEPLOYMENT OF PATROL STAFF

Chapter Summary

Over the years the Bureau has taken a number of actions to improve the effectiveness of patrol operations. However, more can be done to improve the work schedules of officers so that patrol staff are available when most needed. We found that patrol staffing is reduced to half-strength or less during certain busy times and remains higher than needed during slow periods. Additionally, while the number of service calls fluctuate during the week, staffing remains fairly constant each day.

Mismatches between staffing and call workload result in slower response to citizens and an uneven distribution of work among patrol officers. During certain busy times of the day, patrol units respond 15% slower to emergency calls and 36% slower to non-emergencies. In addition, we found the percent of time officers are busy handling calls can range from 18 to 70 percent.

Deployment problems are caused by the Bureau's existing shift schedule, insufficient analysis of workload data, and policies on officer leave. Although the Bureau indicates that other shift schedules are less effective and more costly, our evaluation of three alternative shifts shows significant improvements in patrol effectiveness with minimal cost increases.

Objectives of Effective Patrol Deployment

A major goal and challenge in managing the patrol function is to match personnel resources to a fluctuating call for service workload. To the extent possible, police managers attempt to distribute the patrol force to equalize the workload by time of day, day of week and geographic area. Staffing in proportion to the service calls can ensure that police are available when needed and that service quality remains generally constant during both busy and slow workload periods.

The Bureau has recognized the need for matching staff resources to workload and has generally allocated resources in accordance with time of day work fluctuations. For example, staffing is higher from 4 pm to 12 midnight, when calls are most frequent, and lowest during the slow morning periods. The Bureau has also used various computer models to study shift schedules and to deploy staff by geographic area. Table 6 below shows the current shift schedules and the workload associated with each shift.*

TABLE 6
CALL WORKLOAD AND PATROL UNITS BY SHIFT

	<u>Night Shift</u> (12-8 am)	<u>Morning Shift</u> (8-4 pm)	<u>Afternoon Shift</u> (4-12 am)
Average Patrol Units Per Hour	36.3	38.8	52.5
Average Calls Per Hour	20.5	24.5	35.5

Source: Internal Audit Division analysis of Police Bureau dispatch data and daily assignment records.

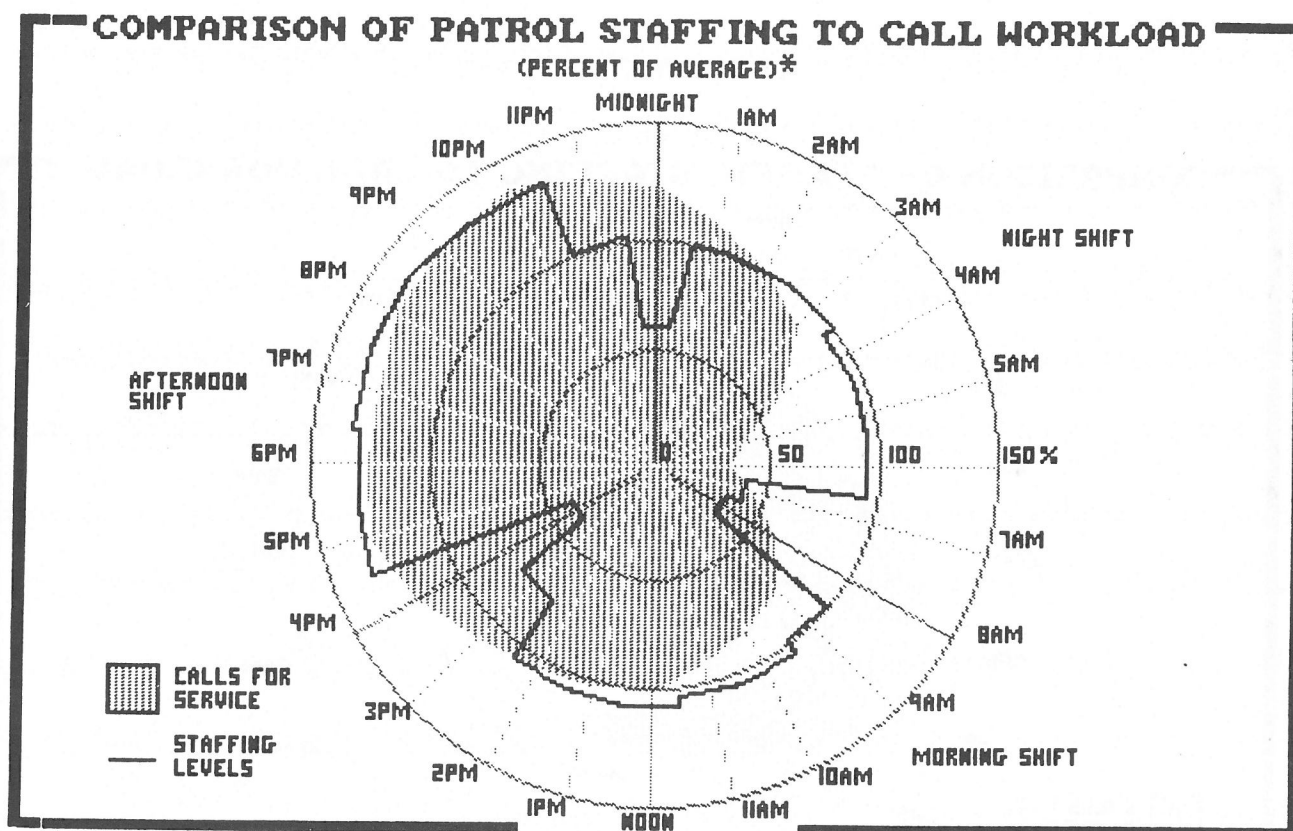
*The terms "staffing" and "patrol units" refer to deployed patrol cars, and do not include lieutenants, sergeants, desk officers, walking beat officers, canine officers, special details, or administrative assignments.

Staffing and Workload Mismatches

Our review of Bureau shift schedules shows that the Bureau can further improve the effectiveness of their patrol and traffic officer deployment. While the Bureau's current scheduling system deploys the majority of staff resources during busy times, a closer look at deployment patterns revealed several problem areas that reduce the effectiveness of patrol staff. These problem areas occur at three times: during shift changes, in the morning, and during the middle of the work week.

Graph 1 shows the Bureau's current patrol staff deployment pattern (outlined by solid line) and the fluctuating workload (shaded area) over a 24-hour period. As shown, significant reductions in staff occur between 2:30 and 4:30 pm and 10:30 pm and 12:30 am, two of the busiest periods of day. During these periods, staffing is at half strength while call load is high. Conversely, deployment appears to be higher than is warranted by the level of calls during the morning, 3:30 to 6:30 am.

GRAPH 1

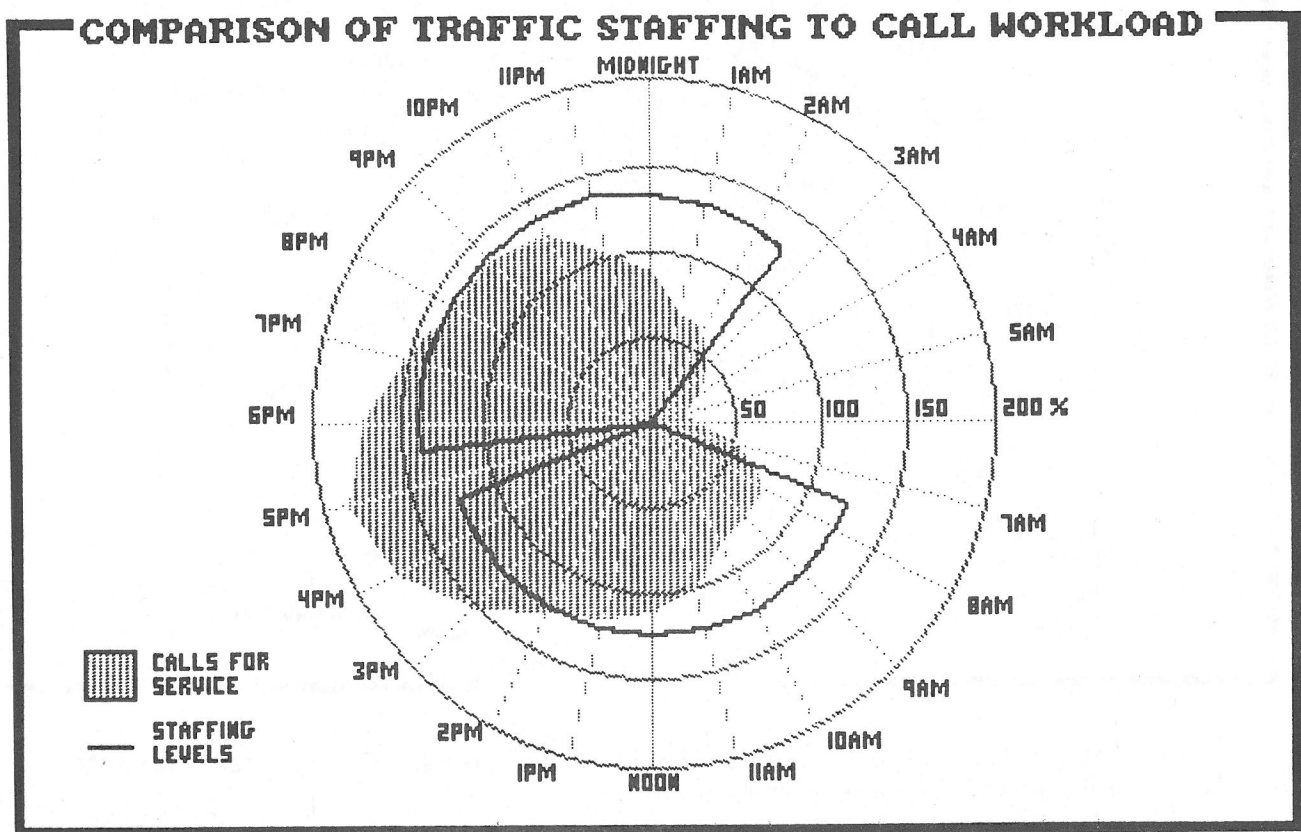


Source: Internal Audit Division analysis of Portland Police Bureau dispatch data and daily assignment records.

*"Percent of Average" is the comparison between the level of activity each hour and the average level of activity over 24 hours. For example, over 24 hours, the Bureau deployed an average of 42.6 cars per hour. At midnight, the Bureau deployed 26.1 units or 61% of the average 42.6 units. At 1 am, the Bureau deployed 42.6 units, or 100% of the average number of cars deployed over 24 hours.

Our review of traffic officer workload and scheduling practices shows even greater mismatches. As shown by Graph 2, no traffic units are available to respond to traffic calls from about 4:30 to 5:30 pm, the busiest time of day for traffic calls. When traffic officers are unavailable to respond to calls, patrol units are dispatched, placing an additional burden on patrol.² According to Bureau personnel, the afternoon traffic shift is scheduled in order to deploy officers during the midnight to 2:30 am period when there is a high incidence of drunk driving.

GRAPH 2

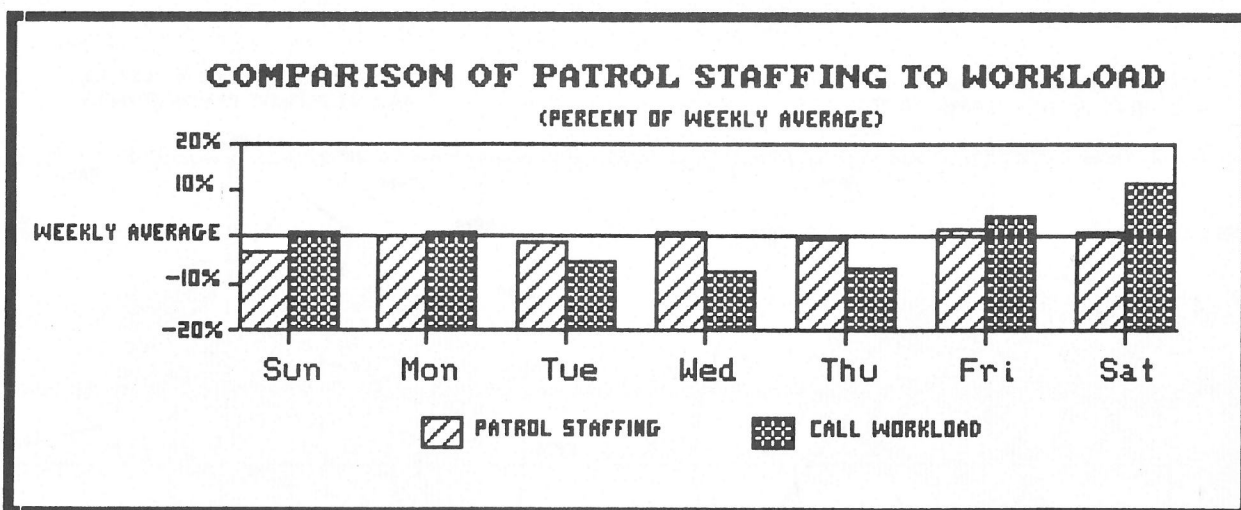


Source: Internal Audit Division analysis of Portland Police Bureau dispatch data and daily assignment records.

² Beginning in November of 1986, the Traffic Division was reorganized, and is no longer the primary responder for most traffic calls.

Workload and staffing patterns by day of week also show some mismatches. While staffing fluctuations should follow the trend in workload each day, Graph 3 below shows that staffing levels remain fairly constant during the slow middle week days. Staffing also does not increase in proportion to workload increases that occur on Fridays and Saturdays, with workload increasing by 10% but staffing only by 2%.

GRAPH 3



Source: Internal Audit Division analysis of Police Bureau dispatch data and daily assignment records.

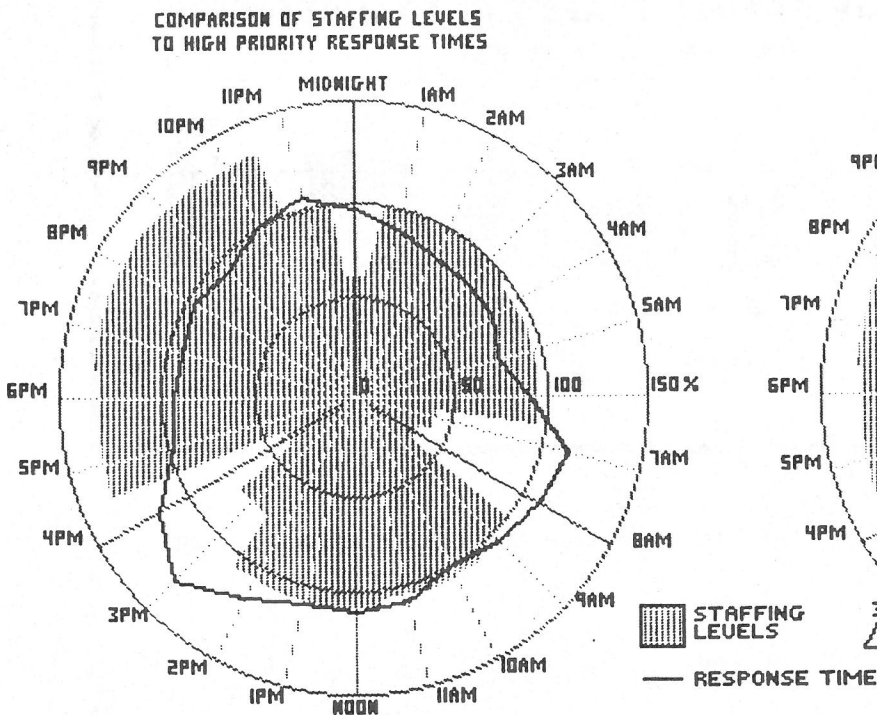
Impact of Staffing and Workload Mismatches

The inability to achieve a better distribution of staffing to address workload fluctuations has caused slower responses to emergencies during busy times and uneven distribution of work by shift and day of week. Uneven workload distribution can reduce the amount of free time officers have to conduct pro-active patrol work and may also contribute to lower officer morale and less safe patrol conditions.

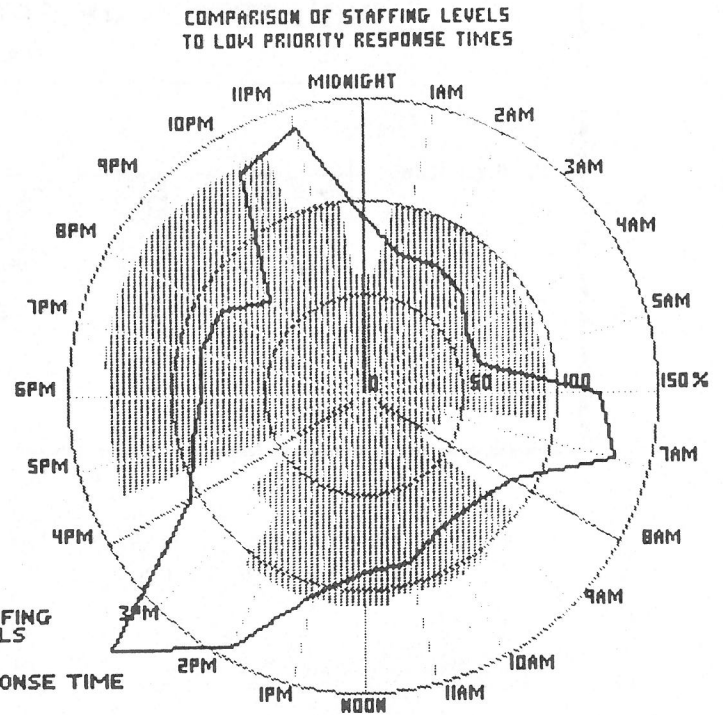
Our review of response time data showed slower response times during low staffing periods. Response times for high priority calls slowed by 15%, from an average of 8.11 minutes to 9.47 minutes, while lower priority calls slowed by 36%, from 26.0 minutes to 35.3 minutes.

Graphs 4 and 5 show response times for emergency and non-emergency calls by hour of day. As shown, response times (solid dark lines) increase considerably during the periods of shift change corresponding to the low deployment level (shaded areas) occurring at these times. Low priority calls do not require immediate response and the effect of the Bureau's policy of holding these calls during shift change is apparent on Graph 5.

Graph 4



Graph 5

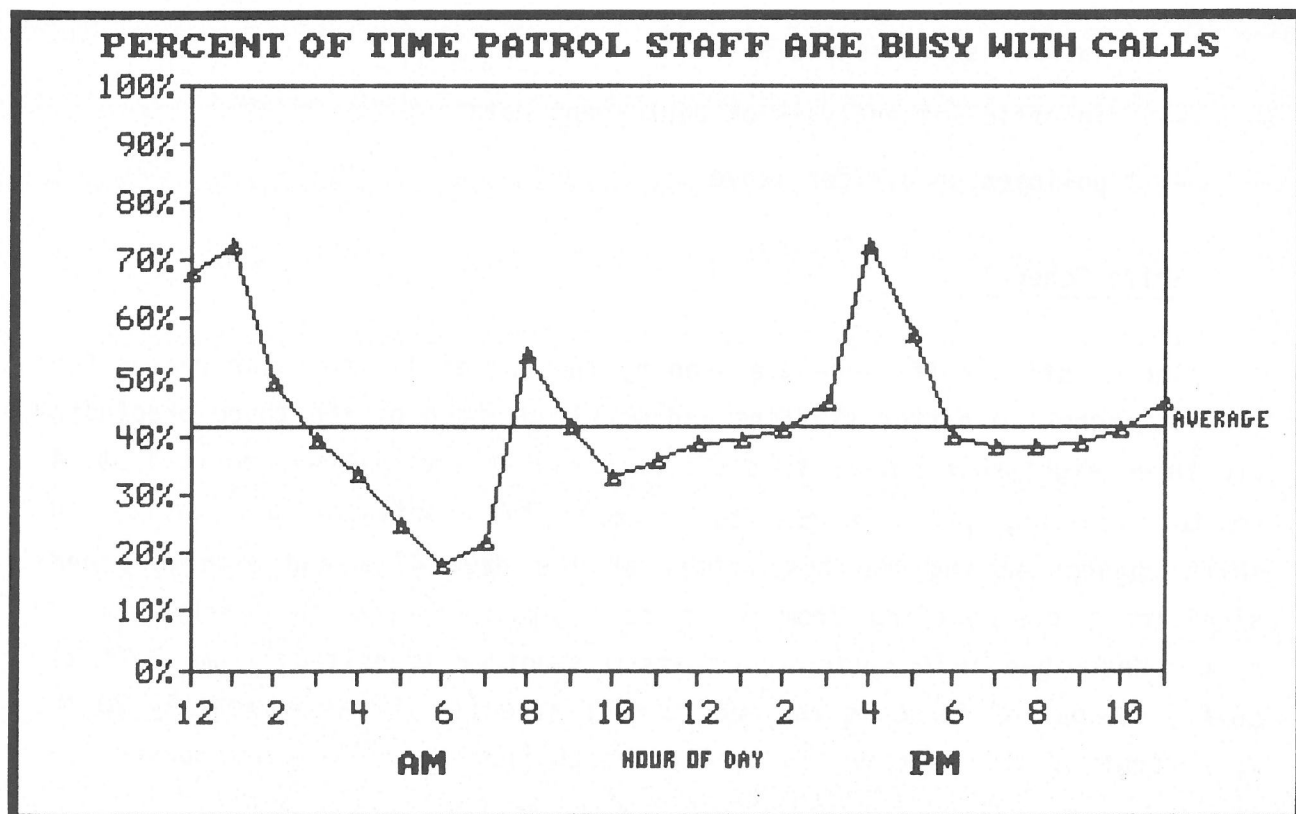


Source: Internal Audit Division analysis of Police Bureau dispatch data and daily assignment records.

Patrol and BOEC personnel indicate that responses to all calls, both emergency and non-emergency, are delayed during periods of insufficient patrol. Since emergency calls receive priority over all other calls, non-emergency calls are held until officers are available. Consequently, officers just starting their shifts at 8 am, 4 pm and midnight are busy clearing backlogged low priority calls as well as responding to normal service workload, leaving little time for other patrol work.

Workload and staffing mismatches also restrict the ability to distribute the patrol force so that workload is equalized by time of day and day of week. Consequently, officers experience great variations in the amount of time they are busy. Graph 6 shows that officers are busy with service calls 18 percent of the time at 6 am but are busy over 70 percent of the time at 1 am and 4 pm.

Graph 6



Source: Internal Audit Division analysis of Police Bureau dispatch data and daily assignment records.

Uneven workload distribution can reduce the quality of patrol services and negatively affect officer morale and safety. Studies we reviewed indicate that officers can provide better police service if they have sufficient time to handle calls. Job stress can be reduced and satisfaction increased when workload is more constant.

In addition, when workload is more even, officers have more time to conduct desired pro-active patrol work as described in Chapter III. Also, because officer assaults occur most often during peak work periods, allocating more staff during these periods will enhance office safety by increasing the likelihood that cover cars will be available when needed.

Factors Causing Workload and Staffing Mismatch

The major factors contributing to the uneven distribution of workload by time of day and day of week are:

- current shift schedules
- insufficient analysis of deployment data
- policies on officer leave

Shift Schedule

The existing shift schedule used by the Bureau is the major reason for the mismatches in patrol staffing and workload. Each of the three precincts use three eight-hour shifts to staff each day of the week - 8 am to 4 pm, 4 pm to midnight, and midnight to 8 am.³ This configuration results in shift changes during two busy times of the day, 4 pm and midnight, and significant overstaffing from 4 am to 6 am. Although the early relief system described in Appendix C permits a smoother transition from shift to shift, the patrol force is reduced to half strength for approximately 20 to 25 percent of the workday. The shift change problem is more pronounced for

³ East precinct implemented an experimental four day, 10-hour overlay shift from 6 p.m. to 4 a.m. in June, 1986. Managers told us that it is too early to fully assess the impact of this new shift.

traffic officers, resulting in no traffic officers on the street for nearly one hour between 4:30 and 5:30 pm - the busiest time of the day for traffic incidents.

The Bureau managers indicate that they have tried a number of different shift schedules over the years and have found them to be more costly and more difficult to supervise than the existing shift schedule. Specifically, the Bureau told us that alternative shifts would increase court overtime, and vehicle and equipment costs. Additionally, alternative shifts may cause poor supervisory control over patrol officers. The Bureau also indicated that new shift schedules would adversely impact the private off-duty time of patrol officers.

In order to demonstrate the potential for improved deployment of patrol staff, we adapted three shift schedules being used by other cities to Portland's workload and staffing resources. We evaluated the match of staffing to workload, and the impact on overtime, supervision, and equipment and vehicle costs. We also interviewed police personnel at five cities that use similar alternatives to learn of their experiences with alternative shifts. We contacted police departments in: Akron, Ohio; Charlotte, North Carolina; Phoenix, Arizona; San Diego, California, and Long Beach, California. The results of our analysis are discussed below and Appendix A provides more detailed descriptions and analysis of the three alternative shift schedules.

Our analysis shows that each of the alternatives would provide a better match between staffing and workload than the Bureau's present schedule with minimal impact on costs or supervision. The alternatives would provide two to three times better fit between workload and staffing, and could increase the number of patrol units available during busy times by as much as 27%. More officers during busy times would increase the amount of time available to spend on calls, provide more time for pro-active patrol activities, and enhance the quality of patrol services.

Court overtime costs would increase a minimum of \$8,000 to a maximum of \$93,000 but could be partially offset by savings in "relief" overtime which patrol managers currently use to ensure adequate staff is on duty during busy periods. Five of the cities we contacted indicated that alternative shifts had little or no impact on court overtime costs and resulted in lower relief overtime costs.

Alternative shift schedules will require more equipment and vehicles at certain times because more officers are on the streets during busy periods. We estimate that additional portable radios would cost less than \$30,000. However, based on our analysis, vehicle costs should not increase because the current fleet size is sufficient to meet the vehicle demands of each of the three shifts we reviewed. (See Appendix B for patrol car analysis.) Three of the five cities we surveyed said that the new shifts did not require additional vehicles and equipment. The other two cities said they had to acquire more vehicles, with Long Beach, California, indicating a 30% increase in their fleet.

Alternative shifts do not require additional supervisory positions or a higher ratio of supervisors to patrol officers. Police officers represent 84 to 85 percent of patrol personnel for cities using alternative shifts and for cities using configurations similar to Portland's. Using the Bureau's current officer to sergeant ratios, we found that sergeants could be assigned to the same shifts as the officers they would be supervising, for each of three precincts. Four of the five cities we contacted indicated that alternative shifts caused no supervisory control problems. Charlotte, North Carolina personnel said there were some minor administrative problems. Each city told us that patrol officers were pleased with alternative shifts.

Use of Deployment Data

Another obstacle to better patrol deployment is the lack of effective analysis of deployment data, and the development and use of management information for schedule decisions. Although the Bureau has a six member Planning and Research unit which performs management analysis, the unit lacks a personal computer to perform basic workload and staffing analysis and does not periodically review deployment and staffing decisions. Although a wide variety of basic data is available from the computer aided dispatch system (CAD) and daily assignment reports, we found little evidence that the Bureau regularly uses this information to make shift scheduling decisions.

We also found that the Bureau has two sophisticated police patrol software programs, the Patrol Car Allocation Model [PCAM] and the Hypercube. However, the programs are rarely used to analyze and improve patrol deployment practices. Although Police Bureau General Order 620.00 states that PCAM shall be used to make deployment decisions, Planning and Research Division personnel indicate that PCAM has not been used regularly to evaluate present scheduling systems or to assist in making precinct staffing decisions.

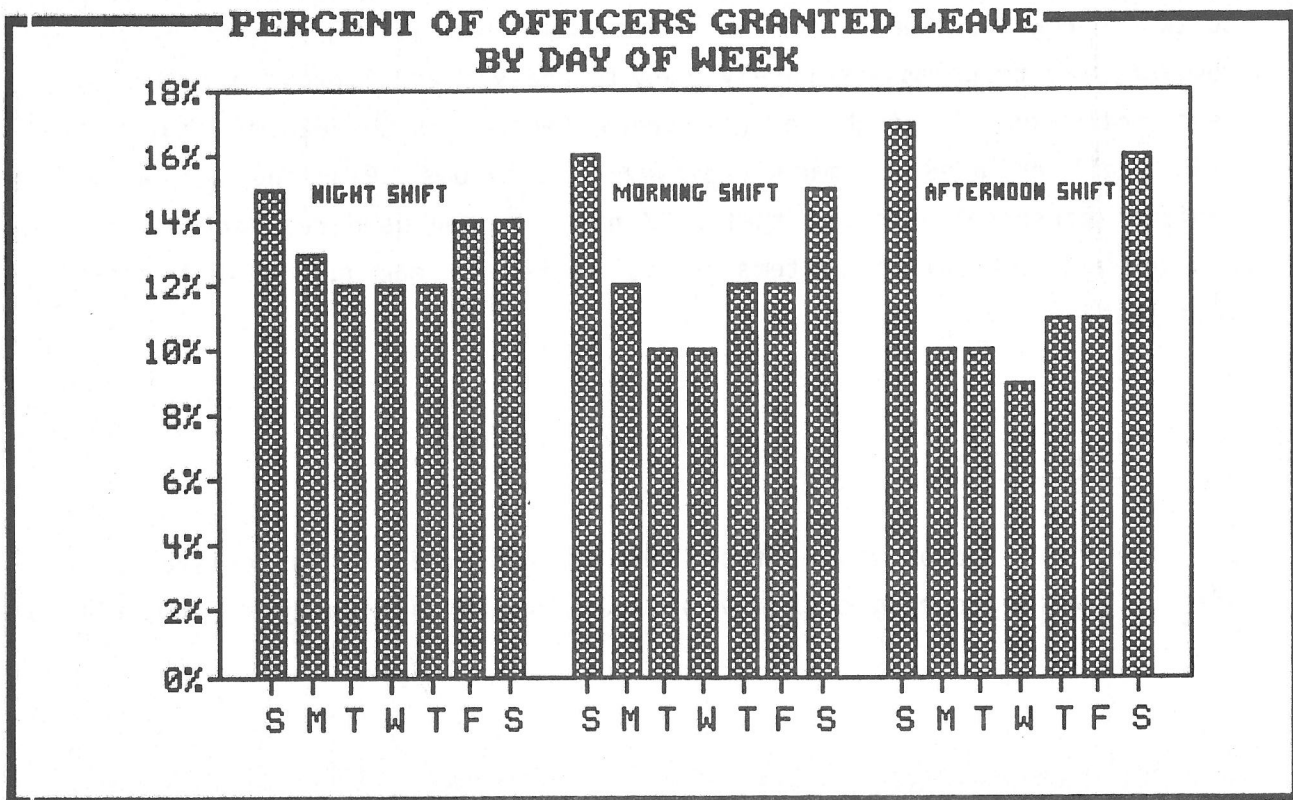
Officer leave

The final factor that affects the Bureau's ability to achieve proportionate staffing during each day of week is the difficulty in controlling

officer leave requests. As shown on Graph 7, a higher percentage of officers are given vacation and compensatory time on Fridays, Saturdays, and Sundays than on the less busy days of Tuesday and Wednesday. This condition may contribute to the fairly constant staffing during the middle of the week, as illustrated in Graph 3, when workload is lowest but does not increase proportionately when workload increases on the weekends. The Bureau has a policy controlling vacation time during the May through November period, but no policy to control days off on weekends.

Our discussions with patrol supervisors indicates that there is considerable pressure to grant vacation and compensatory time on weekends (Saturday and Sunday) and it is difficult to deny requests.

Graph 7



Source: Internal Audit Division analysis of Police Bureau daily assignment records.

RECOMMENDATIONS

In order to ensure more effective use of patrol officers, we recommend that the Bureau of Police:

1. Review, develop and implement an alternative shift schedule that better matches patrol staff to service call workload. The Bureau should utilize available deployment data and computer scheduling tools to optimize staff deployment by hour of day, day of week, and geographic area.
2. Conduct on-going monitoring and review of patrol work schedules. Prepare summary reports on staff deployment and workload to assist patrol managers in making scheduling decisions.
3. Establish a policy on patrol officer time-off to ensure that adequate staffing is available during busy days of the week.

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CHAPTER II

MORE TELEPHONE REPORTING CAN INCREASE PATROL PRODUCTIVITY

Chapter Summary

The Police Bureau has taken a variety of actions to manage calls for police services. These steps include prioritizing calls according to need, delaying response to low priority incidents, and handling some calls by telephone. These actions help ensure efficient use of patrol resources and prompt response to emergency calls when required.

We found that the bureau has effectively reduced the calls-for-service workload of patrol officers by handling some low-priority calls by telephone. Telephone Report Writing Unit (TRU) officers are four times as productive as patrol officers in handling low priority calls. However, we found that the Bureau could further improve patrol productivity by fully staffing the Telephone Report Writing Unit. In 1986, the TRU was unavailable to accept calls 27% of its scheduled hours. We estimate that the calls-for-service workload of 16 officers would have been freed for other police work had the TRU always been available when scheduled.

In addition, while the Bureau has increased the types of calls handled by telephone since 1984, there may be further opportunities to increase TRU calls. Surveys in Portland and in other jurisdictions indicate little citizen resistance to telephone reports. A 10% increase in TRU calls could replace the call workload of 4.8 patrol officers, freeing this time for other police activities.

Call Management Procedures

Citizens call the police for a number of reasons. While some are for life-threatening situations and require immediate police response, others require only information. Effective call management requires that the Bureau identify emergency calls and provide a sufficient and timely response to meet the emergency with minimum risk to officers and citizens alike. Police studies also show that the successful resolution of most non-emergency calls does not depend on an immediate response. Officers can be dispatched to lower priority calls as the emergency workload permits.

The Bureau has taken positive steps to manage its calls-for-service workload by prioritizing calls in four major categories: "Emergency", "Immediate", "Prompt", and "Routine" response.¹ The Bureau's top priority is to promptly respond to emergency requests for assistance. The Bureau responds to low priority calls as high priority workload permits.

Beginning in 1977, the Police Bureau directed that certain lower priority calls be handled over the telephone rather than by dispatching an officer. From July 1977 through March 1984, non-sworn personnel assigned to the Bureau of Emergency Communication (BOEC) took these lower priority calls, writing pertinent information on a standard police report. Between 1980 and 1984, BOEC report writers handled an average of 1,147 calls per month, many of which would otherwise have been dispatched. In April 1984, telephone report writing duties were assumed by sworn officers assigned to the Police Bureau's Telephone Report Writing Unit located at Central Police headquarters. The TRU performs the same function that was performed by report writers at BOEC, but handles more types of calls.

⁴ These needs are categorized as Priority 1, 2, 3, and 4, respectively.

Benefits of Telephone Reporting

Our analysis shows that using the Telephone Report Writing Unit is an efficient and effective way to manage low priority calls. We found that the TRU unit handled four times as many calls per officer as did patrol officers. In 1986, the Bureau would have required the services of 43 patrol officers to respond to the call workload handled by the 9 to 13 TRU officers.

In addition, the cost of handling a call by telephone is significantly lower than dispatching an officer. Patrol officers have higher equipment costs, take longer to handle calls, and perform other police activities. As shown on Table 7, the TRU answered approximately 41,000 lower priority calls in FY 1985-86. In the same time period, patrol officers were dispatched to about 246,000 calls for service. Average direct costs of a telephone report was only \$12.73 per call while the direct cost of a dispatched call was \$65.69.²

TABLE 7
COMPARISON OF TELEPHONE REPORTING AND DISPATCHING COSTS
FY 1985-86

	<u>TELEPHONE UNIT</u>	<u>PATROL UNITS</u>
Number of Calls	41,280	245,792
1985-86 Expenditures	<u>\$525,628</u>	<u>\$16,145,587*</u>
Cost per Call	\$12.73	\$65.69

Source: Computer Aided Dispatch data and Police Bureau budget

*Expenditures of operational units at Central, East, and North precincts.

⁵ Patrol costs are even higher if overhead and associated administrative costs are included.

We also found acceptance of telephone reporting among Bureau officers, emergency communications personnel, and the public. Bureau personnel we interviewed indicated that telephone reporting frees patrol officers from low priority calls, allowing more time for pro-active patrol work and high priority calls. Emergency communications personnel stated that telephone reporting significantly reduces the "stacking" of low priority calls.

As indicated by a 1985 Police Bureau survey of 372 citizens who were served by the TRU, the public feels that telephone report taking is an acceptable method for reporting crimes. Of those responding to the survey:

- o 87% found that a telephone report was acceptable;
- o 78% believed that an officer's presence at the scene would accomplish nothing additional; and
- o 88% agreed that telephone reports are necessary to increase Bureau efficiency.

Nationally, telephone reporting has gained acceptance in many jurisdictions as a method for increasing the efficiency of patrol time. Half of 175 police departments responding to an independent 1980 survey indicated that they use some form of telephone reporting as an alternative to deployment. Examples of jurisdictions which use telephone reporting include Los Angeles, San Diego, and San Jose, California; St. Louis and Kansas City, Missouri; Toledo, Ohio; and Dallas, Texas.

Telephone Report Writing Unit is Underutilized

Despite the demonstrated benefits of the Telephone Report Writing Unit, we found that the TRU was often unavailable to take calls. Our review of the Unit's time records and reports showed that during 1986, the TRU was unavailable to receive calls an average of 148 hours each month, or 27% of

the approximately 548 hours it was scheduled to be in operation.⁶ Based on the average number of calls per hour handled by the TRU when operational, we estimate that TRU could have responded to an additional 1,100 calls per month if it were available all hours scheduled. We estimate that the workload which the TRU was unable to handle in 1986 required the resources of approximately 16 patrol officers.

The major cause of TRU downtime is that adequate and stable staffing has not been provided. When established in 1984, the TRU was staffed with four regular officers and with 9 to 13 limited duty officers on work disability. In August 1986, all regular duty officers were reassigned to patrol duty, leaving only the limited duty officers. Telephone reports dropped 15% after the reassignment of the regular duty officers. This drop appears to be due to the decrease in TRU staff and not a decline in calls for service, because the number of calls increased after the staff reassignment.

Limited duty officers do not provide a stable personnel base for the TRU. Disabled officers recover and return to full duty, leave the Bureau on total disability, or are assigned to other duties. During 1986, TRU staffing varied from 9 to 13 persons. TRU personnel also told us that assigned officers are often unavailable during their shifts because of physical therapy sessions and sick leave. In 1986, the limited duty TRU officers used an average of 73 hours of sick leave, 45% more than patrol officers as a whole. Furthermore, TRU personnel assume the duties of certain other administrative units when those units are short on staff.

Emergency communications personnel report that public satisfaction with telephone reporting is lessened when TRU is unavailable. When the Unit is not taking calls, callers are advised by BOEC that a car can be dispatched, or they can call back later. We were told that in many cases citizens call several times before the TRU is available, increasing the 911 call load. Also, citizens who request an officer may receive a TRU call instead, if TRU becomes available before the call is dispatched.

⁶ The TRU does not operate a Night Shift (12:00a.m. to 6:00a.m.).

Expand TRU Call Criteria

Although the types and number of calls which the Bureau considers appropriate for the TRU have been increased twice since 1984, additional expansion of the criteria may still be possible. We were told by both Bureau and Emergency Communications personnel that the existing criteria for telephone dispatch could be expanded further if the TRU were sufficiently staffed. For example, residential and commercial burglaries over 24 hours old are handled by TRU if the loss is less than \$200. Police and dispatch personnel suggested that the \$200 limit is too low and higher dollar loss could be appropriately handled by telephone. Similarly, some minor fraud incidents also have a \$200 limit that could be raised.

Because the cost of telephone report taking is approximately 19% of the cost of a dispatched officer, an increase in the types and number of TRU handled calls would result in significant added efficiency. Table 8 illustrates potential patrol dollars which could be freed by increasing the use of the TRU.

TABLE 8

ESTIMATED COST AND SAVINGS
 FROM INCREASING TELEPHONE REPORTING*
 FY 1985-86

<u>CALL INCREASE</u>	<u>ADDITIONAL TRU CALLS</u>	<u>ADDITIONAL TRU COST</u>	<u>PATROL SAVINGS</u>	<u>PATROL OFFICER EQUIVALENT**</u>
0%	0	\$ -0-	\$ -0-	0
5%	2,064	\$26,275	\$135,584	2.4
10%	4,128	\$52,549	\$271,168	4.8
15%	6,192	\$78,824	\$406,752	7.2

*Based on FY 1985-86 calls taken and costs.

**Based on average monthly calls for service handled by patrol officers. The additional TRU calls would eliminate the calls for service workload for this many officers.

Alternate Methods to Increase Telephone Reporting

To increase the effectiveness and productivity of the Telephone Report Writing Unit, the Bureau can pursue a number of options to meet staffing needs, as discussed below.

Utilize Non-Sworn Personnel

The majority of the jurisdictions we surveyed about telephone reporting use, or are considering using, some non-sworn personnel for telephone report taking. Non-sworn personnel are less costly than sworn personnel and do not require taking sworn officers from patrol duty. Including disability costs, base salary and fringe benefits per officer is \$44,776. The salary and fringe benefits of a non-sworn Police Clerical Assistants is \$26,117, 42% less than a uniformed employee.⁷

Our study indicates that there is good precedent for successfully using non-sworn personnel. Prior to 1984, telephone reports were taken exclusively by Police Clerical Assistants working in the Bureau of Emergency Communications. These personnel answered many of the same types of calls as are now handled by the TRU. Our review of telephone call criteria indicates that civilian call takers were required to make many of the same judgments now made by TRU officers.

Although sworn officers may be better trained to perform thorough phone investigations, we question whether staffing the TRU with only sworn officers is cost effective. First, tangible evidence cannot be collected over the phone and TRU criteria often require that there be no suspect in the area. Many telephone reports contain only a description of the incident and an approximate time of occurrence. Second, we were told by BOEC, TRU, and other Bureau personnel that the Bureau rarely investigates minor crimes

⁷ The actual costs of sworn officers are even higher when a proportion of the \$40 million annual Fire and Police Retirement benefits are allocated to police officers.

because of pressing high priority caseload. As a result, the increase in report quality gained by using sworn officers appears to have little impact on the resolution of the incident.

Bureau personnel also told us that a 1984 court case against the City prohibits using civilian personnel to perform the same functions as a sworn officer. However, according to the City Attorney, the case was not decided on the civilian vs. sworn distinction. Rather, the court concluded that the City was discriminating against female employees because of sex. The court found that the civilian employees were substantially all female and the sworn personnel were substantially all male. The civilian employees performed the same work as the sworn personnel, but were paid less. Thus, the law does not forbid the use of civilians as telephone report writers but does forbid paying a female dominated class less than a male dominated class for the same work. To avoid a charge of sex discrimination, it would be necessary to ensure that males are fairly represented in the civilian classification that is assigned to telephone report writing.

Staff TRU with Full-Time Officers

TRU officers can handle four times the number of low priority calls as street officers. As a result, it is more cost effective to increase TRU staffing with regular duty sworn officers than to allow the unit to be unavailable. However, TRU personnel told us that Bureau managers often use the TRU as a punishment detail and some officers feel a TRU assignment may adversely affect their careers. If regular officers are to be satisfied with TRU duty, this perception should be changed. The Los Angeles police department placed sufficient emphasis on its telephone reporting unit that it rotated all officer-trainees through their telephone unit as part of the training program.⁸

⁸ Los Angeles recently began staffing its telephone reporting unit with non sworn personnel.

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Bureau managers, concerned about the safety of officers, are reluctant to take officers from the street for telephone report duty. However, because the TRU effectively reduces the need to respond to low priority calls, patrol officers should have additional non-committed time for cover and proactive patrol work if the TRU is available to handle additional low-priority calls.

Use of Officers from Precincts

As an alternative to assigning full-time officers to the TRU, the Bureau could require each precinct to "loan" one or more officers to the TRU each shift. We were told by Police personnel that there are often officers at the precincts who are restricted from patrol duties because of a minor, temporary injury. Temporary assignment of these officers to the TRU unit could be accomplished without taking additional officers from patrol duty. Alternatively, the Bureau should consider requiring precinct desk officers to handle phone reports when the TRU is unable to meet its workload. East Precinct already has a policy which allows BOEC to transfer calls to precinct desk officers when the TRU is busy. According to the TRU manager, about 20 telephone reports per day are handled by East Precinct officers.

RECOMMENDATIONS

To improve the management of service calls and to increase patrol officer productivity, we recommend that the Bureau:

1. Staff the Telephone Report Writing Unit at a sufficient level to meet its workload. The Bureau should consider alternative staffing methods, including permanent regular officers, more report writing at precincts, and civilian report takers.
2. Consult with TRU, BOEC and patrol personnel to determine how telephone dispatching can be further expanded. The Bureau should consider expanding the types of calls and the maximum dollar amount appropriate for TRU dispatch.

CHAPTER III

IMPROVED METHODOLOGY NEEDED TO DETERMINE PATROL STAFFING NEEDS

Chapter Summary

In response to increasing citizen calls for police services, the Bureau is requesting an additional 30 patrol officers for FY 1987-88 and projecting a need for additional officers during the next five years. The Bureau indicates that additional staff are needed in order to limit the amount of time patrol staff currently spend reacting to service calls so that additional time is available to perform more "pro-active" and directed patrol work.

The Bureau's goal to increase pro-active police work is consistent with national trends in police management and should be continued. However, we found limitations in the Bureau's use of a call-for-service time standard as the basis for determining staffing needs. As a result, the Bureau's budget portrays an understaffing problem that is not adequately supported. In addition, it appears that patrol staff may currently have enough time to perform pro-active work and could further increase free time by improving patrol deployment and call management procedures. Moreover, the Bureau lacks a defined directed patrol program to ensure patrol staff effectively use their free time.

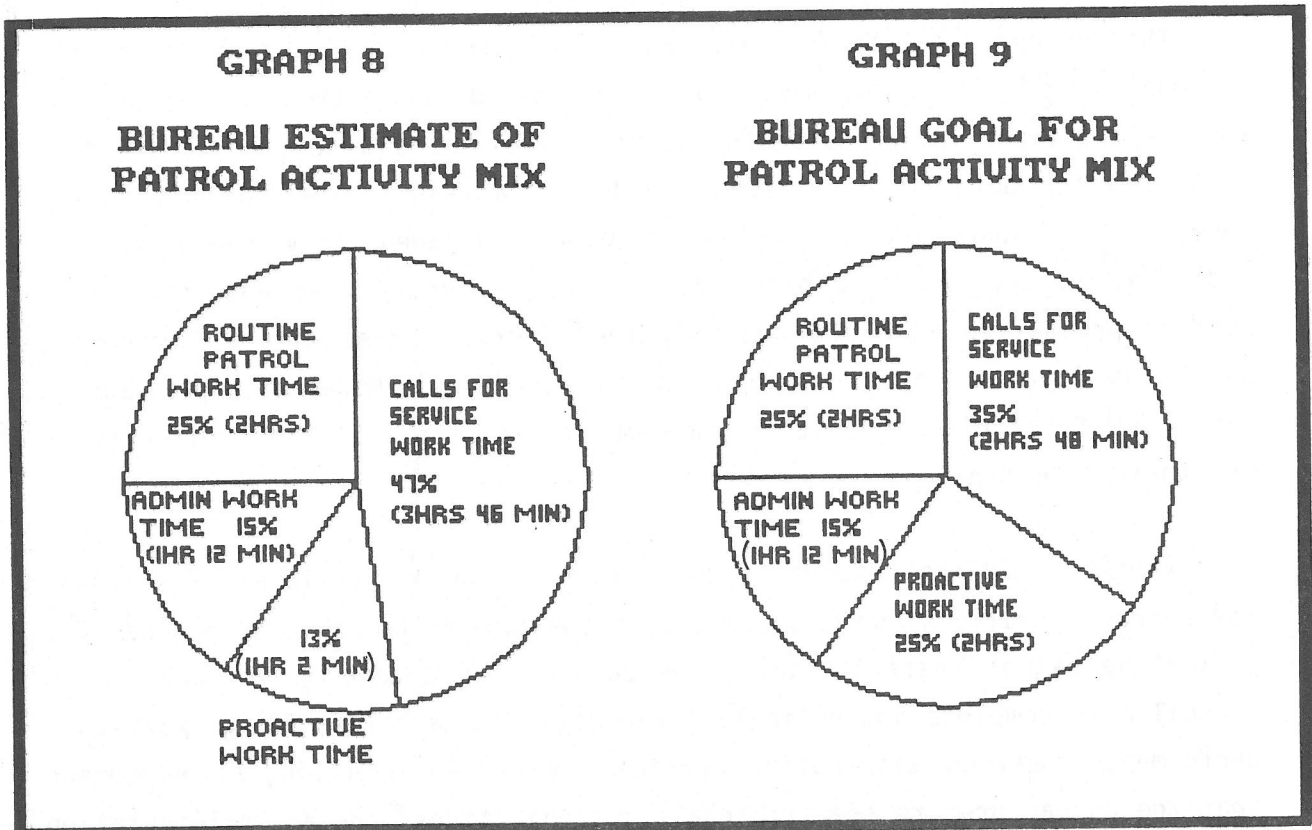
While we did not attempt to determine an appropriate level of staffing for patrol operations, we recommend that the Bureau improve its methods for estimating patrol staffing needs. The Bureau should develop and provide to Council more complete and reliable information on patrol staffing, workload, performance, and on alternative service levels. In addition, we recommend that the Bureau prepare specific goals and objectives, and an implementation plan, to guide the development of a directed patrol program.

Bureau's Methodology for Determining Staffing Needs

The Bureau estimates in its FY 1987-88 budget that it is understaffed by 197 sworn personnel, including 111 in the patrol function. To address

this staffing deficit, the Bureau has requested 30 new officers in FY 1987-88 and projects a need for additional officers over the next five years.

The Bureau bases its staffing analysis on the principle that the amount of time patrol staff currently spend responding to calls for service needs to be reduced in order to provide officers more time to conduct directed patrol work.⁹ The following two graphs show the Bureau's estimate of how patrol officers currently spend their workday compared to the Bureau's proposed work activity goals. According to the Bureau, the goal of spending no more than 35% of patrol staff time on service calls is based on a recommendation from the International Association of Chiefs of Police and other police organizations.



⁹ Directed patrol includes a wide range of pre-planned and "pro-active" work intended to prevent and deter crime, and to apprehend criminals. Examples of this work include special details such as stake-outs, saturation patrols in high crime areas, and neighborhood crime prevention.

In order to estimate how many additional officers were needed to achieve the goal of 35% of patrol staff time spent on calls, the Bureau used a computer program called the Patrol Car Allocation Model (PCAM). PCAM is a computer program developed by the RAND Corporation to help police departments determine the number of patrol cars to have on duty at different times and locations.

The Bureau used PCAM to estimate that an additional 111 officers were needed to handle the existing patrol workload and to reduce the amount of time spent on calls from 47% to 35%. The Bureau further estimated that an additional 86 sworn personnel were needed elsewhere in the Bureau to support the patrol function.

Problems With Bureau Staffing
Standard and Work Activity Data

Our review of the Bureau's method for estimating patrol staffing needs identified problems with the standard and work data used to project staffing requirements. Specifically, we found that there is not a standard activity level for calls for service work. Patrol staff spend 43% rather than 47% of their time on calls and PCAM was used inappropriately to project precise staffing needs. In addition, patrol staff time on calls for service appears to be comparable to other police departments we surveyed. Consequently, the Bureau's methodology does not adequately support its request for additional patrol staffing.

Our extensive review of police literature and discussion with officials of the International Association of Chiefs of Police, the Police Executive Research Forum, the Police Foundation, police consulting firms, and other police jurisdictions indicates that the Bureau's 35% calls-for-service standard is a reasonable goal, but is not a recommended national standard. An acceptable range for the amount of time spent on calls could range from

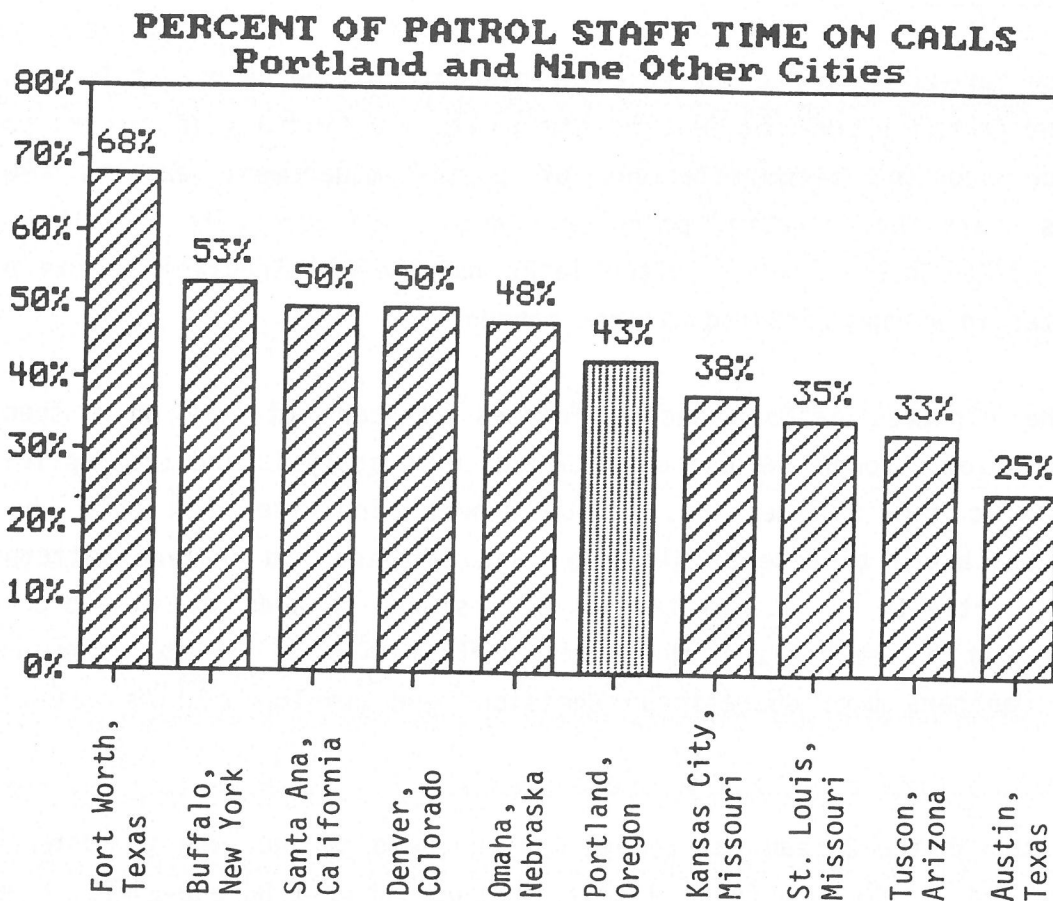
30% to 50% of patrol staff time. The optimum range may vary from city to city, shift to shift, and one section of the city to another. Most experts agree that the acceptable amount of time spent on calls is a local policy decision.

Our review of dispatch data and officer assignment records for sample periods of 1986 shows that patrol staff are spending about 43% of their time on calls for service rather than the 47% reported by the Bureau. The Bureau used staffing data from BOEC dispatch tapes. While this is the best automated data available, we used officer daily assignment records which are a more accurate source of staffing information. Also, Dr. Warren Walker, one of the developers of PCAM, stated that the model consists of mathematical formulas that can only provide approximate measures of patrol unit activities. Dr. Walker told us that PCAM was not designed for making precise projections of staffing needs, but should be used to provide "ballpark" measures for comparing alternative patrol strategies.

We also found that the amount of time Portland patrol staff spend on calls for service is comparable to other jurisdictions. As shown in Graph 10 on the following page, Bureau patrol staff spend approximately 43% of their time on calls for service while officers in nine other cities spend from 25% to 68% of their time on calls for service.*

* Many of the cities we contacted do not collect statistics on the percent of time officers spend on calls. Those cities that did collect this data are presented in Graph 10.

GRAPH 10



Source: Internal Audit Division survey.

After reviewing a variety of police management reports and discussing staffing methods with other jurisdictions and police consultants, we conclude that there is no definitive method or generally accepted standard for projecting staffing needs. Past practices nationally have attempted to justify personnel increases on factors such as staff to population ratios, increases in crime rates, and response times. Such methods are generally viewed as outmoded or at least of limited value in determining staffing levels. Officials we talked to indicated that staffing levels should be determined by assessing public expectations, establishing agreed upon service levels, and determining staffing levels needed to accomplish service levels based on workload and performance standards.

Increasing Directed Patrol Time

The Bureau's goal to increase the percent of time patrol staff spend on directed patrol activities is consistent with the findings of current police research and the recommendations of police management experts. Police experts state that directed patrol activities are more effective than routine patrol. Routine patrol often lacks purposeful direction and is often conducted in a haphazard and aimless manner.

The directed patrol concept focuses officer activity on a specific crime problem through the use of detailed crime analysis and the application of specific tactical methods. Police experts indicate that only when an agency has begun to detect, classify, and describe and analyze patterns of criminal activity can patrol tactics be designed to address crime problems. However, it is emphasized that crime information is of no value unless patrol managers make operational decisions and develop tactics based upon it.

Although the Bureau has recognized the need to increase the time spent on directed patrol, we found little evidence that a Bureau-wide, directed patrol program has been developed or that additional staffing is needed to accomplish this goal. We were told that the Bureau lacks a system that integrates crime analysis information with a formalized and pre-planned system for directed patrol tactics. Although each precinct conducts a number of the activities that are defined as directed patrol efforts, the Bureau has not developed a written policy that describes the goals and objectives, or a procedure for implementation. The directed patrol efforts to date appear largely decentralized, informal, and uncoordinated.

According to the Bureau's own workload data, patrol staff may already have sufficient time to conduct directed patrol. As shown in Graph 8, approximately 38% of patrol staff time is available for both routine and

pro-active patrol. The International Association of Chiefs of Police indicated that 33% was a good goal for routine and pro-active patrol, while Local Government Police Management, prepared by the International City Management Association, reports that 25% to 35% is a good range.

We also believe the Bureau could gain additional time for pro-active work even without hiring additional staff as proposed in their FY 1987-88 budget submission. A representative of the Police Executive Research Forum told us that officers spending too much time on calls for service could be symptomatic of many problems in addition to the lack of staff. For example, inadequate handling of calls by officers and a poorly designed beat plan would tend to increase time spent on calls. Also, too little use of telephone reporting and inadequate call prioritization would also affect the amount of time spent servicing calls.

While we did not review the Bureau's beat plan or the handling of calls by officers, we found that the Bureau could improve its deployment practices and expand its use of the Telephone Report Writing Unit as discussed in Chapters I and II. Both these steps should increase the time that patrol staff have available to perform directed patrol activities.

RECOMMENDATIONS

In order to improve methods for determining patrol staffing needs, we recommend that the Bureau:

1. Assist the Council in defining an appropriate level of police patrol services. The Bureau should develop historical data on staffing and budget levels; analyze police workload and causes for workload changes; continue to refine the application of PCAM for analysis of patrol operations; and measure Portland's staffing and finances in relation to comparable western cities. The Bureau should also develop more accurate data on patrol staff work activities and compare City practices to other police agencies.
2. Present Council with a full range of staffing alternatives based on several levels of police services. Explore methods for achieving service levels within existing personnel resources and explain the impact on overall Bureau operations.
3. Develop patrol performance standards, and monitor and report on patrol efficiency and effectiveness in meeting performance standards.

To ensure that patrol officers have adequate guidelines for expanding directed patrol, we recommend that the Bureau clearly define the goals and objectives of the directed patrol program, develop a detailed implementation plan, implement the program at the precincts, and monitor performance.

ALTERNATIVE SHIFT CONFIGURATIONS

The following alternative shift configurations are based on deployment methods of other police departments that we studied. We took the number of patrol units actually deployed with the Police Bureau's present configuration and rescheduled them on the basis of calls for service by day of week, to develop the average daily staffing that is depicted in the charts. This analysis can be further refined with the aid of such tools as PCAM and Patrol/Plan - two software programs which were developed to assist police managers in scheduling and deploying staff.

To assess cost impacts, we developed a computer program using the overtime provision in the police union contract to predict the court overtime impacts of the alternative shift configurations. Using Bureau fleet information, we determined if the existing patrol car fleet could deploy additional units during peak workload periods.

To assess supervisory control we also assigned the Bureau's current patrol sergeants to the alternative shift configurations using the current officer to sergeant staffing ratio. And finally, we interviewed other departments which are using the configurations to determine the fiscal and operational impacts.

Five Shift Configuration

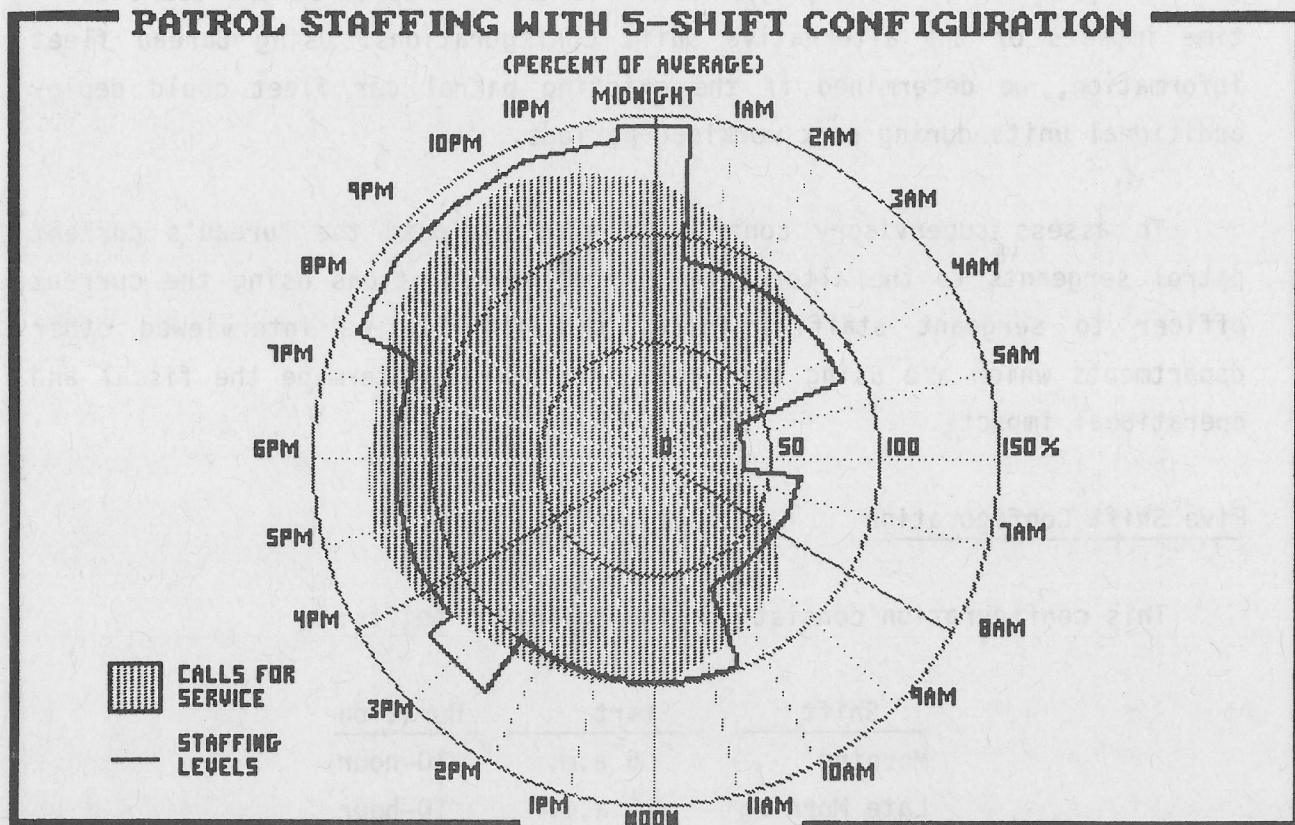
This configuration consists of the following shifts:

<u>Shift</u>	<u>Start</u>	<u>Duration</u>
Morning	6 a.m.	10-hour
Late Morning	10 a.m.	10-hour
Afternoon	2pm/3pm	10-hour (early/late)
Overlay	7 p.m.	10-hour
Night	11pm	8-hour

The 5-shift schedule provides at least three times better fit between patrol units and workload than the Bureau's existing shift. This shift results in a .82 r² (r-squared) between deployed personnel and the call load, as compared to an r² of .25 for the Bureau's existing shift. (A perfect match between staffing and workload would produce an r² of 1.0).

This shift as illustrated in Graph 11, can deploy a maximum of 76 patrol units at midnight on a Saturday night, a peak workload period, as compared with the present maximum level of 63, an increase of 21%. Our analysis (see Appendix B) of the Bureau's marked patrol car fleet indicates existing vehicles could provide for this shift configuration, with twelve cars to spare.

Graph 11



Source: Internal Audit Division analysis of Police Bureau dispatch data.

We found that the five-shift configuration would increase the cost of criminal court overtime by approximately \$93,000, based on actual FY 85-86 expenditures for patrol personnel. We spoke with personnel in the police departments of Akron, Ohio, and Charlotte, North Carolina, regarding the impact of the 5-shift configuration on their costs and operations. They saw no increase in court related overtime. Akron has a minimum 4-hour straight time for off-duty court appearances when they are more than 4 hours from the beginning or end of a work day, and Charlotte has a 2-hour, time-and-a-half minimum for its off-duty court time. Akron noted that the shift reduces "relief" overtime because the overlay shift eliminates the need to dispatch officers at the end of their shifts.

AKRON SAW AN INCREASED NEED FOR PATROL VEHICLES AND OTHER EQUIPMENT, WHILE CHARLOTTE PERSONNEL SAID THAT THEY DIDN'T NEED ANY ADDITIONAL EQUIPMENT. WE WERE ABLE TO SCHEDULE SERGEANTS TO THE FIVE SHIFTS, FOR EACH OF THE THREE PRECINCTS, TO MAINTAIN EXISTING SERGEANT TO OFFICER RATIOS. THERE WOULD BE ONLY ONE SERGEANT SCHEDULED AT NORTH PRECINCT RATHER THAN THE PRESENT TWO, FOR 16 HOURS OUT OF THE TOTAL WORK WEEK. THIS COULD BE A PROBLEM WHEN THE SERGEANT IS ABSENT, WITH ONLY THE PRECINCT LIEUTENANT AVAILABLE TO SUPERVISE THE FOUR TO EIGHT DEPLOYED PATROL UNITS. AKRON PERSONNEL INDICATED THAT THERE WERE NO ADMINISTRATIVE OR SUPERVISORY PROBLEMS SINCE EACH SHIFT STILL HAD AN APPROPRIATE LEVEL OF SUPERVISION. CHARLOTTE PERSONNEL SAID THAT THERE WERE SOME INCREASES IN SUPERVISORY PROBLEMS BUT THEY WERE ADMINISTRATIVE ISSUES, AND NOT SERIOUS. BOTH DEPARTMENTS STATED THAT THE OFFICERS LIKED THE SHIFT SCHEDULE AND STATED THAT IT HELPED THE DEPARTMENTS HANDLE THE CALL LOAD BETTER.

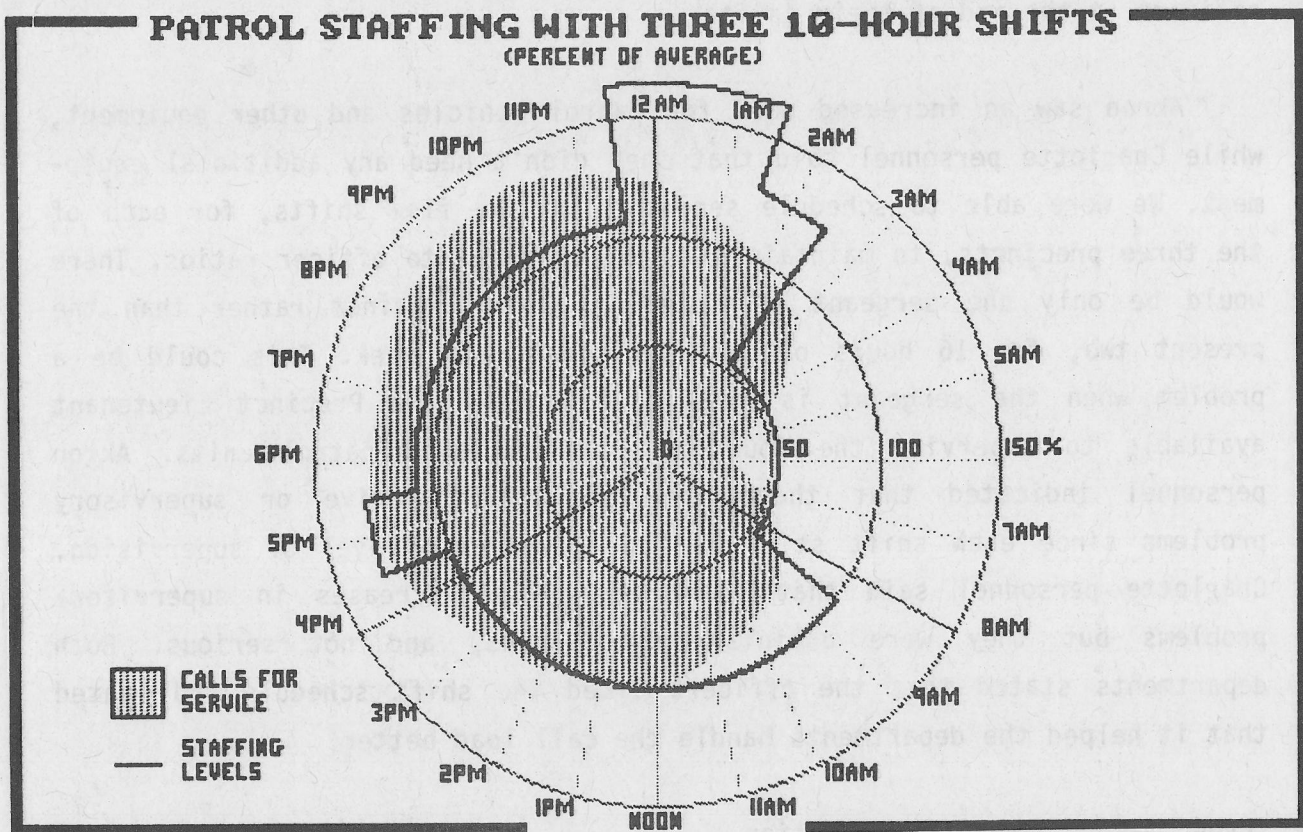
Three 10-Hour Shift Configuration

This schedule consists of the following shifts:

<u>Shift</u>	<u>Start</u>	<u>Duration</u>
Morning	8 a.m.	10-hour
Afternoon	4pm/5pm	10-hour (early/late)
Night	11 p.m.	10-hour

The fit between workload and staffing is twice as good as the Bureau's existing schedule. The r^2 of the 10-hour shift configuration is .54 compared to .25 for the Bureau's schedule. This schedule provides a maximum of 81 patrol units at midnight on Saturdays, compared with the present maximum average of 63 cars, an increase of 29%. Our analysis of the Police Bureau's existing fleet indicates that there is a sufficient number of vehicles for this configuration, with a margin of five cars. Graph 12 illustrates this shift schedule.

Graph 12



Source: Internal Audit Division analysis of Police Bureau dispatch data.

Based upon our analysis of criminal court overtime we anticipate that the three 10-hour shift configuration would cost the Bureau less than \$10,000 more per year. The three departments we spoke to indicated minimal court overtime impact and a small reduction in "relief" overtime.

The 10-hour shifts (with a four-day work week) have been used in a number of other police departments, and are being used in the Police Bureau for its Traffic Unit, the Overlay Shift at East Precinct, and other specialty units. We spoke with police personnel in Phoenix, Arizona, Long Beach and San Diego, California about their experiences with this shift configuration.

Phoenix personnel indicated that they did not increase the size of their fleet when they converted to this configuration but said it may be a problem in the future. San Diego kept 30 cars it had scheduled for replacement but found that they did not need them. Long Beach had to increase its fleet and equipment by 30%.

None of the cities we spoke to indicated that there were any administrative or supervisory problems with this configuration. San Diego kept its Deputy Chiefs, Captains, and Lieutenants on standard five 8-hour day shifts, while Long Beach put its Commanders and Lieutenants on four 10-hour day shifts. We found that the Bureau's present level of patrol sergeants is sufficient for this shift configuration.

Phoenix and Long Beach stated that they began using the three 10-hour shifts to better handle the peak workloads. San Diego had utilized an overlay shift prior to the three 10-hour shifts and indicated that the overlay shift allowed them to better direct staff to work demand.

The departments all agreed that the 4-10 plan was very popular with the officers.

Overlay Shift with 10-Hour Shifts

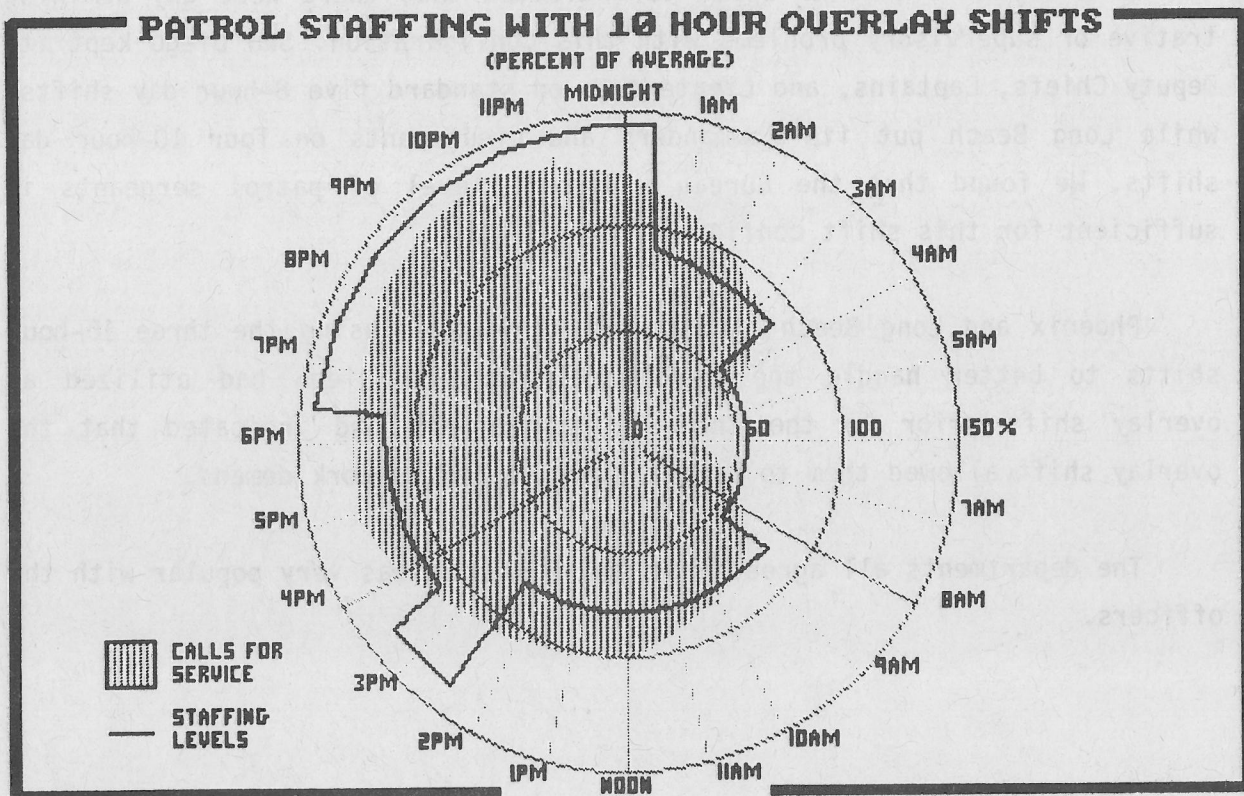
This configuration consists of the following shifts:

<u>Shift</u>	<u>Start</u>	<u>Duration</u>
Morning	8 a.m.	8-hour
Afternoon	1:30pm/3pm	10-hour (early/late)
Overlay	6 p.m.	10-hour
Night	11 p.m.	10-hour

This overlay schedule has an r^2 of .65 compared to the .25 r^2 of the Bureau's present configuration.

This configuration combines the Overlay Shift concept as being practiced at East Precinct with 10-hour shifts to eliminate the drop in staffing during shift change. The schedule deploys 72 patrol cars on Saturday evenings, an increase of 14% over present levels. Graph 13 illustrates this configuration.

Graph 13



Source: Internal Audit Division analysis of Police Bureau dispatch data.

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Based upon our computer analysis of criminal court overtime, this configuration would increase overtime costs by less than \$40,000. The Multnomah County Sheriff's office has used a configuration similar to this for a number of years and personnel stated that it had no significant impact on court overtime and reduced other overtime. When it was introduced it required additional vehicles and equipment because of a one-hour period when three shifts overlap. We modified the configuration with an afternoon relief shift beginning 90 minutes earlier to eliminate the overlap, and we found that the Bureau currently has sufficient patrol vehicles for peak staffing periods with a margin of 18 cars.

We found that the Bureau's patrol sergeants could be scheduled in this configuration, while maintaining present sergeant to officer ratios.

Based upon our computer analysis of overtime cost overruns, this
configuration would increase overtime costs by less than \$40,000. The
Linn County Sheriff's Office has used a configuration similar to this
for a number of years and personnel stated that it had no significant impact
on cost overruns and reduced other overtime. When it was introduced it
reduced overtime vehicle and equipment because of a one-hour period when
three shifts overlap. We advised the investigator with an afternoon
shift beginning 90 minutes earlier to eliminate the overlap, and we
found that the bureau currently has sufficient patrol vehicles for peak
reading periods with a margin of 18 cars.

We found that the bureau's patrol sergeants could be scheduled in this
configuration, with maintenance sergeants to officer ratios.

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PATROL CAR NEEDS ANALYSIS

To determine if the Bureau has sufficient marked patrol cars in its existing fleet to meet the increased vehicle needs of alternative shifts, we analyzed the size of the fleet and compared it to the vehicle requirements of our three alternative shifts.

The Bureau currently has 119 marked patrol vehicles available for deployment. To account for maintenance downtime, we factored in the Bureau's downtime standard of 6.5 vehicles to ensure five are available for service.

As shown in the table below, the existing fleet size is sufficient to meet the increased vehicle needs of the three alternative shifts. The analysis assumes that all officers are available to staff the shifts. Absences due to sick leave, training, and other time-off will increase the cars in reserve.

TABLE 9

ALTERNATIVE SHIFT PATROL CAR REQUIREMENTS

<u>ALTERNATE CONFIGURATIONS</u>	(A) <u>Maximum Cars Needed</u>	(B) <u>Maximum Cars Needed with Downtime Factor</u>	(C) <u>Cars in Reserve</u>
3 10-hour Shift	87.5	113.7	5.3
Overlay Shift	77.8	101.1	17.9
5 Shift	82.1	106.7	12.3

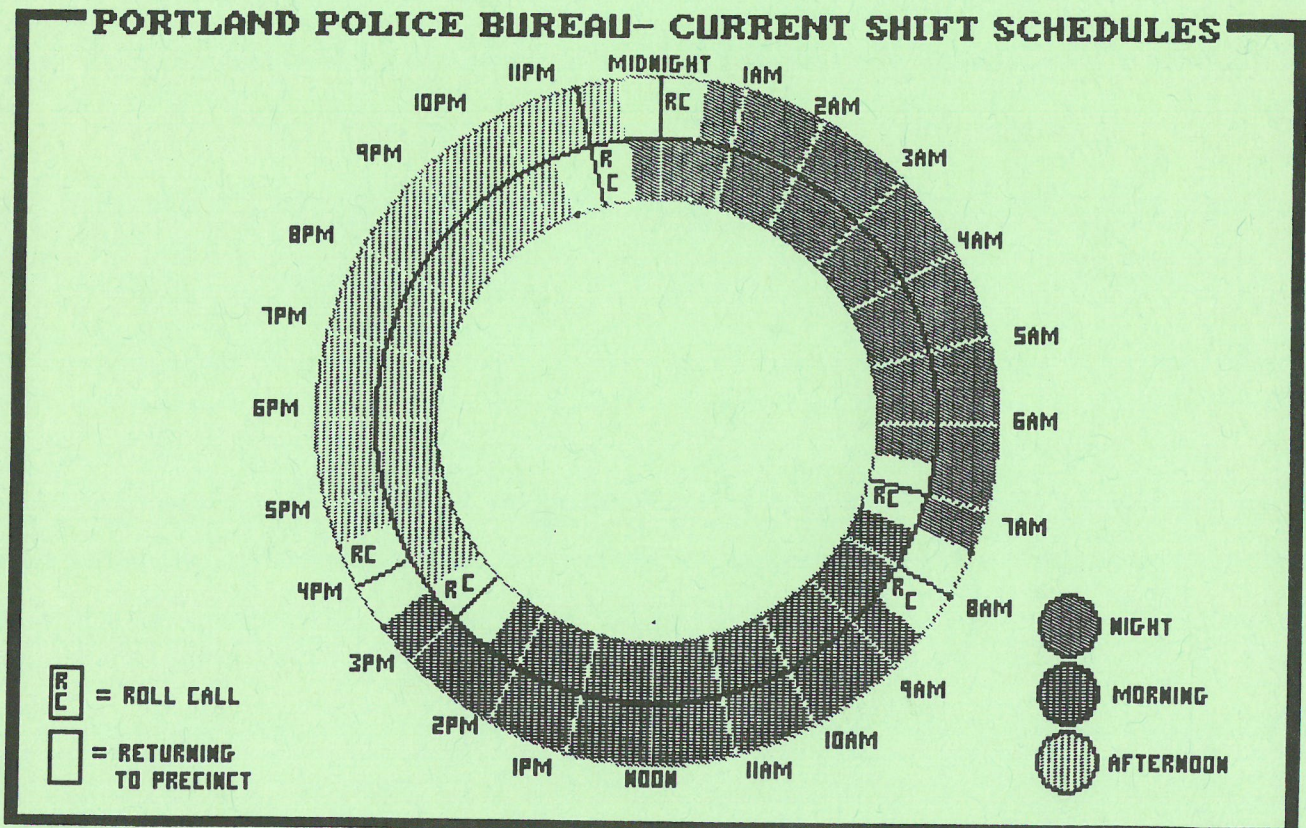
Note: Table assumes all officers available for shifts.

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DESCRIPTION OF EARLY RELIEF SYSTEM

To provide patrol coverage during shift change, precincts employ an "early relief" system that requires a part of each shift to start one hour earlier than the normal shift and quit one hour earlier. As shown in the graph below, "early relief" morning shift, represented by the inner ring, officers start work at 7:00 a.m. rather than 8:00 a.m. Roll call and administrative duties comprise approximately the first half hour of the shift and early relief officers begin to take calls about 7:30 a.m. and stop taking calls about 2:30 p.m. The remainder of morning shift start work at 8:00 a.m., take calls beginning about 8:30 a.m. and return to precincts about 3:30 p.m. "Early relief" afternoon shift start taking calls about 3:30, the time regular morning shift officers are quitting.

Graph 14

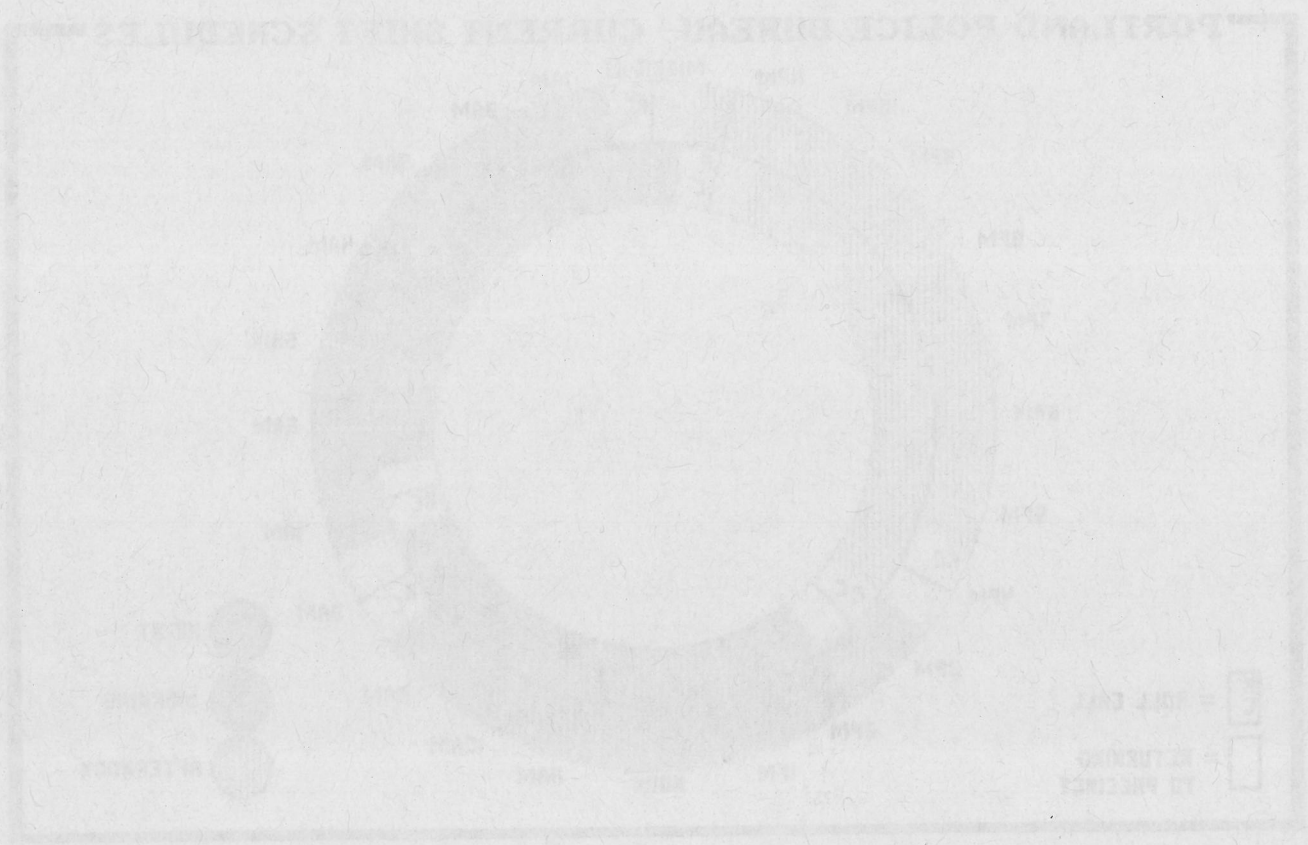


ANNEX D

DESCRIPTION OF EARLY RELEASE SYSTEM

The early release system is a computerized system that provides coverage of the shift changes. The system is designed to provide coverage of the shift changes in a manner that is more efficient than the normal shift and puts one person in the place of another. The system is designed to provide coverage of the shift changes in a manner that is more efficient than the normal shift and puts one person in the place of another. The system is designed to provide coverage of the shift changes in a manner that is more efficient than the normal shift and puts one person in the place of another.

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APPENDIX D

LISTING OF PROFESSIONALS AND ORGANIZATIONS CONTACTED,
AND LITERATURE REVIEWED DURING THIS AUDIT

POLICE DEPARTMENTS

Akron, Ohio	Oakland, California
Albuquerque, New Mexico	Oklahoma City, Oklahoma
Austin, Texas	Omaha, Nebraska
Buffalo, New York	Phoenix, Arizona
Charlotte, North Carolina	Sacramento, California
Cincinnati, Ohio	San Diego, California
Dallas, Texas	San Jose, California
Denver, Colorado	Santa Ana, California
Fort Worth, Texas	Seattle, Washington
Kansas City, Missouri	Simi Valley, California
Las Vegas, Nevada	St. Louis, Missouri
Long Beach, California	Tucson, Arizona
Los Angeles, California	Virginia Beach, Virginia
Multnomah County, Oregon	

PROFESSIONAL ORGANIZATIONS

International Association of Chiefs of Police: Jerry Needle, Manager,
Center for Police Administration

Police Executive Research Forum: Dr. Sheldon Greenburg, Director of Manage-
ment Services

The Police Foundation: Tom Brady, Director of Communications

Research Management Associates: Tom McEwen, President

National Criminal Justice Reference Service, National Institute of Justice:
Ernie O'Boyle, Reference Specialist

The Rand Corporation: Dr. Warren Walker, co-developer of PCAM

Police International: Thompson S. Crockett, former consultant with the
National League of Cities Police Consultation Service

LITERATURE

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Understanding Police Agency Performance, by the National Institute of Justice (1984)

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Patrol Car Allocation Model: Program Description, by Jan M. Chaiken, Warren E. Walker, and Peter Dormont, prepared for the National Institute of Justice (1985)

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Hypercube Queuing Model: Executive Summary, by Jan M. Chaiken, prepared for the Department of Housing and Urban Development (1975)

Synthesizing and Extending the Results of Police Patrol Studies, by the National Institute of Justice (1985)

Differential Police Response Strategies, by the Police Executive Research Forum (1981)

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"The Impact of Police Work Scheduling on Patrol Productivity", Public Productivity Review, Vol. VIII, No. 3, by R. Michael Buren and William Stenzel (Fall 1984)

"Productivity Improvement Opportunities in Police Operations", MIS Report, Vol. 16, No. 4, by the International City Management Association (April 1984)

"Police and Fire Work Scheduling", MIS Report, Vol. 17, No. 12, by the International City Management Association (December 1985)

Staffing Requirements Study for the Dallas Police Department, 1983-1993, by E. Fennessy Associates, for the Dallas, Texas, Police Department (1983)

Analysis and Assessment of the Manpower Needs of the Simi Valley Police Department, by the Simi Valley, California, Police Department (1984)

Directing the Implementation of a Differential Police Response System, by the National Institute of Justice, Professional Conference Series (1985)

Strategies for Supplementing the Police Budget, by the National Institute of Justice (1985)

Police Staffing, Allocation, and Scheduling Audit, by the King County, Washington, Auditor's Office (1982)

Law Enforcement Function, audit by the Multnomah County, Oregon, Auditor's Office (1982)

Cost Containment System Needed in Public Safety, audit by the Washington County, Oregon, Auditor's Office (1982)

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Survey of Police Operational and Administrative Practices - 1981, by the Police Executive Research Forum (1981)

The Effect of the Police on Crime, by James Q. Wilson and Barbara Boland (1979)

"The Impact of Police Work Scheduling on Patrol Productivity," Police Productivity Review, Vol. 11, No. 2, by W. Michael Hurd and William Steiner (Fall 1987)

"Productivity Improvement Opportunities in Police Operations," MIS Report, Vol. 10, No. 2, by the International City Management Association (April 1987)

"Police and Fire Work Scheduling," MIS Report, Vol. 11, No. 12, by the International City Management Association (Summer 1985)

"Staffing Productivity Study for the Dallas Police Department, 1982-1983," by D. S. Sorenson, Journal of the Police Association, Vol. 12, No. 1 (1983)

"Analysis and Assessment of the Workday Needs of the San Jose Valley Police Department," Journal of the Police Association, Vol. 12, No. 1 (1983)

"Implementing a Differential Police Response System," Journal of the Police Association, Vol. 12, No. 1 (1983)

"Budgeting for Supplementing the Police Budget," Journal of the Police Association, Vol. 12, No. 1 (1983)

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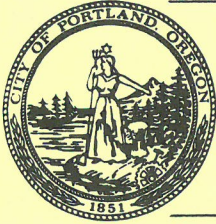
"Law Enforcement Functionality," Journal of the Police Association, Vol. 12, No. 1 (1983)

"Cost Containment System Needed in Public Safety," Journal of the Police Association, Vol. 12, No. 1 (1983)

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"Survey of Police Operations and Administrative Practices - 1985," by the Police Executive Research Forum (1987)

"The Effect of the Police on Crime," by James D. Wilson and George L. Kelling (1982)



CITY OF
PORTLAND, OREGON
OFFICE OF THE MAYOR

Office of
J.E. Bud Clark, Mayor
1220 S.W. 5th
Portland, Oregon 97204
(503) 248-4120

April 13, 1987

MEMORANDUM

TO: Barbara Clark, City Auditor

FROM: Mayor J.E. Bud Clark

SUBJECT: Audit of Patrol Staffing and Deployment Practices,
Bureau of Police

I have reviewed your audit of patrol staffing and deployment practices of the Bureau of Police. Once again, you and your staff have contributed significantly in pointing the direction toward making City services more efficient.

Upon taking office, I declared that two of my highest priorities were public safety and the cost of public services. I am very proud of the successes achieved by the Portland Police Bureau in making Portland safer, particularly regarding drug activities, street safety through the increased use of walking beats, and burglaries. Now we must concentrate on managing the Police Bureau even more efficiently.

Chapter I of your audit recommends that we can ensure more effective use of patrol officers through alternative shift schedules. As you know, East Precinct has been experimenting with a four-day, ten-hour overlay shift. I am very interested in the outcome of this experiment. There will be many factors to evaluate, including impact on court time, fleet costs, supervisory control, and officer morale. Chief Walker will be providing me with an evaluation within the next six months.

In Chapter II, you recommend that the Telephone Report Writing Unit be staffed at a level sufficient to meet its workload. This makes sense to me. Your further recommendations as to how this should be accomplished (whether by more regular officers or more report writing at precincts or more civilian report takers) require additional study. I have asked Chief Walker to report back to me on this subject within six months.

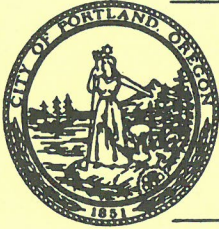
Memo to City Auditor
April 13, 1987
Page 2

Finally, Chapter III concerns the methodology needed to determine patrol staffing needs. This is the most difficult area to quantify objectively. There are many different ways to determine what is an appropriate level of police patrol. Your audit concludes that there is no definite method or generally accepted standard for projecting staffing needs. Yet such projections are critical both for police management and City Council budgeting. However, as important as staffing projections are performance criteria against which we can judge the success of how we are allocating police resources. I have asked Chief Walker to report back to me on the feasibility of evaluating our police resources based on such criteria.

Finally, I cannot conclude without praising the men and women of the Portland Police Bureau. Although your audit understandably did not focus on these people as individuals, we sometimes tend to take their job for granted. Portland patrol officers have the hardest job of anybody in the City. Their work requires them to alternate during an eight-hour shift from being an armed enforcer to being a social worker. I have the greatest respect and appreciation for each and every one of them.

Thank you again for your contribution to making my job as Commissioner of the Portland Police Bureau a better one. I have committed myself to making every Portlander feel safer in our city. I will settle for nothing less. Your report should help me in my effort to provide the people of Portland with maximum public safety at the lowest cost possible.

JEBC:tm:6



CITY OF
PORTLAND, OREGON
BUREAU OF POLICE

J. E. BUD CLARK, MAYOR
Richard D. Walker, Chief of Police
1111 SW 2nd Avenue
Portland, OR 97204

April 7, 1987

TO: Barbara Clark
City Auditor

RE: Report by the Internal Audit Division
Bureau of Police: Patrol Staffing and Deployment
Practices

This is to confirm our conversation today concerning publication of the report. I appreciate having the opportunity to discuss it with you.

I will examine the report in cooperation with the Mayor's Office, and after a thorough examination, will provide a detailed response to your recommendations. I appreciate the response period of six months that you felt would be appropriate. My staff agreed that such a period would be sufficient, and a response will be provided sooner, if it is possible.

Not surprisingly, our examination will probably find areas where we may disagree with the findings of the audit team. I assure you, however, that our purpose is the same as that of your office...to determine ways to provide the best possible level of police service to citizens of our community at a reasonable cost.

Richard D. Walker
RICHARD D. WALKER
Chief of Police

RDW/cht

cc: Mayor Clark
Chris Tobkin

