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Case Studies of Effective Management Practices within Public Housing Agencies

Volume 2

Maintenance and Custodial

CASE STUDIES OF EFFECTIVE MANAGEMENT PRACTICES WITHIN PUBLIC HOUSING AGENCIES

Volume 2:

MAINTENANCE AND CUSTODIAL

by

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Harvey Dickerson
Project Director
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INTRODUCTION

OVERVIEW

The purpose of the contract under which this report has been prepared is to document, in a series of case studies, the effective management practices of selected well-managed public housing agencies (PHAs), such that other PHA managers can make assessments, and, where applicable, implement similar practices at their agencies. The series includes eighteen case studies that are presented in volumes addressing six functional categories of public housing operations:

Volume 1--procurement and inventory
Volume 2--maintenance and custodial
Volume 3--rental and occupancy
Volume 4--finance and accounting
Volume 5--general administration
Volume 6--security.

Generally, within each of the six functional categories, three case studies have been developed that address practices at a small (1-499 units), a medium (500-1249 units), and a large (1250+ units) PHA. There are two exceptions to this organization, as follows. The rental and occupancy category contains only two studies, which address practices at a medium and a large PHA. And second, an additional report has been prepared for a very large PHA in the area of finance and accounting, bringing the total in this functional category to four.

It must be emphasized that the effective practices described herein are not perfect. Within the universe of public housing agencies, they may not even be the "best" practices. However, the programs and activities that follow have proven to be effective for the agencies which have implemented them. These practices are offered to the public housing community as a potential means for improving agency functions, especially if a PHA has identified a particular problem area of its operation.

For further guidance in improving agency operations, the reader is referred to the Insider's Guide To Managing Public Housing (HUD-PDR-638, August 1983), the Troubled Public Housing Handbook (7475.14), and the Field Office Monitoring of Public Housing Agencies Handbook (7460.7 REV).

The case studies described herein reflect the state and local laws and federal laws which were in effect at the time that the management practices were documented. Prior to any attempt to replicate these practices, the reader is advised to consult current applicable laws and regulations to ensure compliance.

ORGANIZATION OF THIS REPORT

This report addresses the maintenance and custodial functional category and contains three case studies. Each study is similarly organized into three chapters. Chapter I provides a detailed review of the effective management practice. Chapter II describes why the practice is effective and has improved agency operations. Chapter III discusses the transferability of the practice to other agencies and key considerations in doing so. Additionally, each study is prefaced by an executive summary that provides a quick overview.

OVERVIEW OF THE MAINTENANCE AND CUSTODIAL FUNCTION

The area of maintenance and custodial is perhaps the most visible set of activities undertaken in public housing management. Not only does this function have a direct impact on the daily lives of tenants, it is also a strong indicator of the quality of management in a PHA.

The maintenance and custodial functional area naturally divides into two related subfunctions in most PHA operations. The maintenance subfunction involves the routine upkeep of a PHA's entire physical plant, including the housing stock, grounds, and operating facilities of the agency. Maintenance tasks typically encompass routine and emergency repairs, pre-

ventive maintenance, groundskeeping, and vacant unit preparation. Most PHA maintenance operations are structured to handle nonrepetitive, unpredictable demands for work. That is, maintenance problems arise, usually reported by residents, and the PHA responds to the requests for work. The work order system is commonly employed to organize the necessary maintenance tasks. This system is relatively complex; it entails establishing workloads and schedules, performing the tasks, and supervising and monitoring the work activity.

The custodial subfunction involves the routine cleaning of public areas of housing projects and PHA operating facilities, as well as the occasional cleaning of vacant apartments. Custodial responsibilities are related to maintenance tasks but are distinguished by their predictability, and therefore are much easier to schedule in advance. Indeed, the line drawn between maintenance and custodial jobs varies depending on the PHA. Custodial operations are comparatively simple, entailing scheduling the workload, deploying the staff, and performing and supervising the duties.

The maintenance and custodial functions are linked to other management functions of PHAs, most clearly to procurement and inventory. Because of the obvious demand for materials and supplies, this linkage is more aptly described as a strong dependence. In addition, the functional areas of security and general administration (especially project management) have a significant impact on the maintenance and custodial operations of most PHAs. Effective practices in the areas of security, project management and tenant relations all affect the upkeep of a PHA's physical plant.

ABOUT THE MAINTENANCE AND CUSTODIAL STUDIES

This document contains case studies describing practices at three PHAs: the Cumberland, Maryland Housing Authority, a small agency; the Housing Authority of Lawrence County, Pennsylvania, a medium-sized agency; and the Huntsville, Alabama Housing

Authority, a large agency.

Cumberland Housing Authority (CHA) began to decentralize its maintanance operations in 1981 in an attempt to increase efficiency and management oversight. Centralization of CHA's maintenance operations has resulted in faster, better service and improved inventory and management control.

The Housing Authority of the County of Lawrence (HACL) terminated its in-house maintenance program several years ago and signed a maintenance contract with a private firm. The transfer of maintenance responsibility was done to reduce the costs associated with this functional area. HACL has achieved its goal, while maintaining the quality of maintenance services.

Huntsville Housing Authority (HHA) instituted a formal preventive maintenance program four years ago, based on successful, informal practices that had already been in place for six years. By officially designating preventive maintenance crews from its regular maintenance staff, HHA has significantly improved the quality of its housing stock and the appearance of its entire physical plant, at no additional cost.

With this brief overview of the maintenance and custodial function, three case studies of effective management practices are presented in the remainder of this document.

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FUNCTIONAL AREA:	**Maintenance and Custodial**
EFFECTIVE MANAGEMENT PRACTICE:	**Centralized Maintenance Operation**
AGENCY:	**Cumberland Housing Authority (Cumberland, MD)**
SIZE:	**Small**

EXECUTIVE SUMMARY

This case study describes effective management practices in the maintenance department of the Cumberland Housing Authority (CHA). An overview of CHA operations appears on the following page.

In late 1981, CHA began to centralize its maintenance operations and upgrade its maintenance facilities. When the transition began, CHA had one maintenance worker assigned to each of the five projects and three maintenance workers operating from a central office. By 1983, all eight operated from a central office.

Centralization has resulted in better response to tenants' requests for services, faster turnover of vacant units, better adherence to procedures, greater inventory control, and improved management control and information. As well, centralization did not have an adverse impact on CHA's maintenance budget.

Agencies of similar size and physical characteristics may want to consider centralization as a means of improving maintenance responsiveness and management control. Chapter III discusses some key considerations in doing so. These include: the number and types of units under management; the geographic dispersal of its sites and buildings; the availability of proper equipment and vehicles; and possible impacts on tenant relations.

CUMBERLAND AT A GLANCE

CHARACTERISTICS	DATA
Total Stock:	435 units of LIPH in 5 projects
• Projects for Families:	3 projects
• Projects for Elderly Tenants:	2 projects
• Unit Sizes:	efficiencies ..... 23 percent one-bedroom ..... 30 percent two-bedroom ..... 27 percent three-bedroom ..... 17 percent four-bedroom ..... 3 percent
• Largest Project:	Frazier (125 units)
• Smallest Project:	Banneker (30 units)
• Oldest Project:	Frazier (1952)
• Newest Project:	Queen City (1971)
Demographics:	
• One-Parent Households:	38 percent
• Minority Tenants:	11 percent
• Children Under 18:	38 percent
Operations:	
• Operating Expenditures:	$156.13 (PUM)
• Dwelling Rentals:	$ 97.49 (PUM)
• Operating Reserve:	71 percent of allowable level
• Staffing:	16 employees: 7 administrative; 9 maintenance and custodial

I. MAINTENANCE OPERATIONS IN CUMBERLAND HOUSING AUTHORITY

This chapter describes the Cumberland Housing Authority's (CHA) centralized maintenance operation. It begins with background on why the agency moved away from a project-based arrangement previously used. Next, the key actors in the maintenance function are described, followed by a brief description of the agency's project sites and their geographic layout. The chapter's fourth section comprehensively reviews how the centralized operation is organized and how work assignments are made and carried out. Management information is a key factor in the agency's successful operation; this topic is addressed in a separate section. Finally, the chapter concludes with some anticipated refinements to operations that will soon be implemented.

BACKGROUND

Until November 1981, maintenance at Cumberland was project-based. In this system, one maintenance worker was assigned to each of CHA's five projects. These workers were supplemented by the foreman, three other mechanics or aides, and two laborers who worked from CHA's central offices. The workers assigned to the projects had responsibility for routine maintenance and custodial work at their individual projects. The workers reported directly to the project for work and maintained their own inventory of supplies and equipment on-site. These workers also took some on-site tenant requests for service. The remaining maintenance staff working from CHA's central office prepared vacant units, performed landscaping tasks, filled in for workers who were

absent or on vacation, repaired equipment, and performed other centralized tasks.

An investigation into alternative procedures came about as the result of three principal problems:

- inequitable work loads: in one notable example, a worker at one site was responsible for 30 units, while another worker had responsibility for 125 units.
- inadequate supervision: some on-site workers would be permitted to fall behind in their work, which caused resentment among members of the central staff who were assigned to help them catch up.
- inadequate administrative control: requests for service made to CHA's offices were not always communicated to the workers at the projects and requests for service made directly to on-site staff were not always communicated to the administrative staff members who issued work orders. This made it difficult to track and monitor work flows.

The change to a centralized system began late in 1981 and took nearly two years to fully implement. The switch took place more gradually than it otherwise might have because of a change in executive directors, and the need to make major capital expenditures that required planning and approval.

The first step in the changeover occurred in November 1981 when the homebases of the five on-site staff were moved to the central CHA offices. This action coincided with changes that made work order forms more structured and compact, thereby encouraging greater uniformity in their use.

The executive director who initiated the centralization left abruptly in February 1982, and CHA was without a director for some seven months. Before leaving, however, the director undertook steps that would help implement the new system. For example, he included plans to expand the central maintenance and

storage area in the 1981 CIAP application, he budgeted to hire a person specifically to serve as dispatcher in a centralized system, and he allowed for the procurement of a maintenance van in the FY 1982 operating budget.

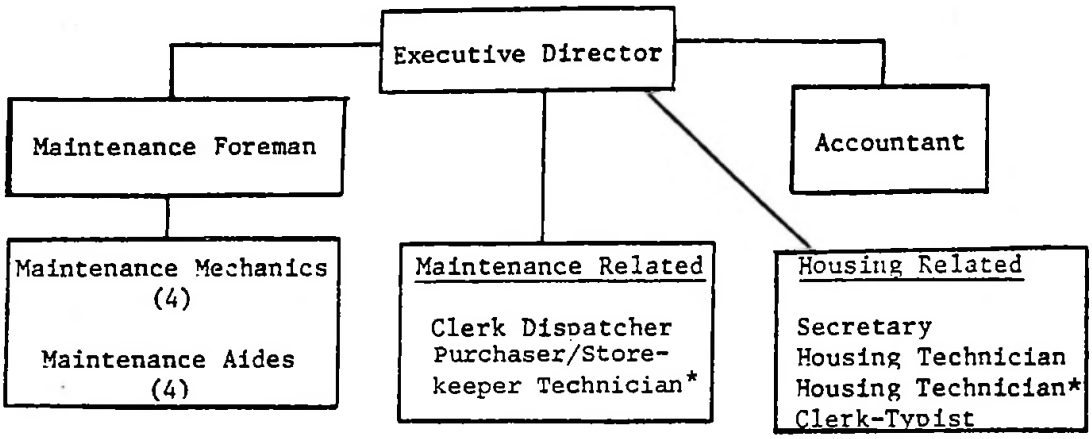
In the early stages of transition, maintenance workers reported to the central office to receive their work assignments. Staff who were assigned to respond to work orders traveled in a CHA pickup truck to the job sites and used parts that were stored at the housing development.

The system took its present shape under the current executive director. Now, all work is based on work orders issued by the clerk dispatcher. All maintenance parts and supplies are stored at the central maintenance shop or on the maintenance van, which operates out of the central shop. Two workers respond in the van to all tenant-initiated work orders. All of the six maintenance workers report to the central shop, where they receive daily assignments from the maintenance foreman. Each week, two other staff members are always assigned directly to the two high-rises to perform custodial tasks. A review of the key actors in maintenance operations is provided in the following section.

KEY ACTORS

CHA currently operates with a permanent staff of seventeen, of which two are part-time employees. Exhibit I-1 is an organizational chart indicating the number of employees in each position. In the FY 1985 budget, the maintenance foreman and his eight staff are considered maintenance personnel, and the other eight employees (approximately seven full-time equivalent or FTEs) are considered as administrative personnel. This breakdown yields a ratio of forty-eight units per maintenance employee and sixty-one units per administrative employee.

EXHIBIT I-1
ORGANIZATION CHART



*Indicates part-time employees.

However, in reality, maintenance currently is carried out by eleven staff members: one maintenance foreman; four maintenance mechanics; four maintenance aides; one clerk dispatcher; and one purchaser/storekeeper technician. CHA's budget designates the foreman, mechanics, and aides as maintenance staff, and the dispatcher and purchaser as administrative staff.

In practice, there is little functional distinction between the mechanics and aides at CHA--any of these eight people may be, and routinely are, assigned to perform any of the agency's maintenance tasks. All eleven staff members operate out of the central maintenance shop. At the shop there are offices for the foreman, dispatcher, and purchaser/storekeeper; lockers for the maintenance persons; central storage for maintenance inventory and vehicles; and work, meeting, and lunch space for maintenance staff. The central shop is part of CHA's administrative offices, so communications between maintenance and administrative staff merely requires picking up an intercom or taking a short walk.

The remainder of this section discusses the maintenance positions, the qualifications of staff members, and the function each performs at CHA.

Maintenance Foreman

Cumberland's maintenance foreman has been with CHA for more than six years, all of which have been spent in his present capacity. Some of the foreman's duties require him to function as a mechanic. For example, on a day with a heavy workload and high absenteeism, the foreman may lead the team responding to tenant-initiated work orders. The foreman's primary tasks, however, are to direct and supervise maintenance. In this capacity, he:

- monitors the amount of maintenance work to be done and schedules each task;
- makes daily work assignments for the eight maintenance men;
- inspects work quality;
- helps procure maintenance contractors and monitors their performance;

- communicates with tenants regarding maintenance matters;
- helps monitor modernization and extraordinary maintenance needs; and
- assists in procurement by meeting with sales representatives and informing the purchaser about needed supplies and equipment.

The foreman's most important tasks are monitoring, prioritizing, and assigning maintenance tasks. In assessing work needs, he maintains daily contact with the executive director and other administrative staff (especially to anticipate and track vacant units). He shares office space with the dispatcher, which allows him to monitor requests for service as they are received.

Clerk Dispatcher

The clerk dispatcher at CHA was hired about three years ago to fill a new position in the centralized maintenance system. Previously, work orders had been issued by central administrative staff, who also were responsible for rental and occupancy functions. The creation of a formal position specifically to issue work orders and to control the flow of work through central maintenance was intended to improve coordination, control, and responsiveness in the maintenance function.

The principal duties of the clerk dispatcher are to:

- receive tenant calls and write work orders;
- monitor outstanding work orders and keep foreman abreast of workload;
- maintain radio contact with maintenance workers;
- file work orders and prepare reports for the executive director on work and materials used;
- record hours worked by maintenance staff;

- perform housekeeping inspections on all units at least once per year;
- monitor open purchase orders by number, and provide copies to persons involved with purchasing as needed (e.g., Executive director, purchaser/ storekeeper, other staff); and
- perform inspections and prepare a record of the work needed to prepare vacant units.

The dispatcher shares an office with the foreman and the purchaser/storekeeper. The dispatcher's work station is equipped with a telephone, an intercom to the administrative offices, and a radio for communication with maintenance men.

Purchaser/Storekeeper Technician

Like the clerk dispatcher's position, the position of purchaser/storekeeper technician was formally created as part of centralization. Under the previous system, purchasing had been central but maintenance inventories had been maintained both at the central office and at each project by the maintenance workers assigned to them. With the new system, all maintenance-related procurement and inventory became the responsibility of the purchaser/storekeeper. Although the purchaser/storekeeper's main function is procurement and inventory, he also contributes to CHA's maintenance functions. The purchaser/storekeeper:

- computes the costs of the labor and materials used to fulfill each work order;
- replenishes the inventory on the maintenance van each day;
- dispenses parts and equipment to the maintenance workers; and
- performs the dispatcher's functions in the dispatcher's absence.

Maintenance Mechanics and Aides

The mechanics and aides together form a pool from which the foreman selects individuals to perform specific tasks based on who is best suited for the tasks and who is available. All of the maintenance workers have held their jobs for at least three years, and a few have been with CHA twenty years or more. Thus, most of maintenance workers have experience with most of the systems in most of the agency's buildings. Additionally, two members of the staff have received special training in refrigeration, which has eliminated the need for contracted help for refrigerator repairs.

PHYSICAL AND GEOGRAPHICAL STRUCTURE

Cumberland Housing Authority operates five relatively small public housing developments for low-income tenants. The projects include Jane Frazier Homes, Benjamin Banneker Apartments, Fort Cumberland Homes, John F. Kennedy Apartments, and Queen City Tower. The Kennedy and Queen City projects are high-rise developments for elderly tenants. Exhibit I-2 describes the size and age of each of CHA's housing developments. As Exhibit I-2 indicates, the projects for families all are low-rise and those for elderly tenants are high-rise. Kennedy and Queen City are one-building projects, eleven and nine stories tall respectively, with roughly ten apartments on each floor. Jane Frazier and Fort Cumberland are two-story townhouse developments with about seventen and twelve buildings respectively. Benjamin Banneker is a single three-story brick structure, a rather unusual design for public housing. The buildings in the family projects (although not built on large tracts of land) are far enough apart to provide sufficient open space.

EXHIBIT I-2
KEY CHARACTERISTICS OF CHA PROJECTS

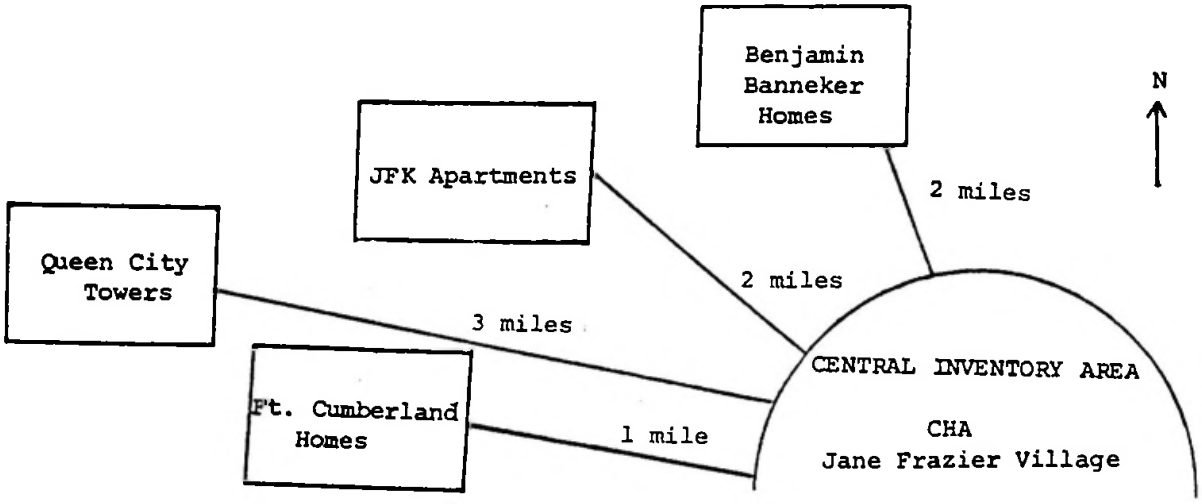
Project	Built	Tenants	Units	Height
Frazier	1952	Family	125	Low-rise
Banneker	1955	Family	30	Low-rise
Fort Cumberland	1957	Family	80	Low-rise
Kennedy	1967	Elderly	100	High-rise
Queen City	1971	Elderly	100	High-rise
			435	

Location

All of Cumberland's projects are in the City of Cumberland. (Allegany County Housing Authority serves the rest of the county.) CHA's administrative offices, as well as the maintenance and inventory offices, are located at the Jane Frazier development. The projects are dispersed such that no two are in the same neighborhood, and yet the furthest is only about a mile and a quarter from CHA's central offices. Exhibit I-3 illustrates the spatial relationship between the CHA and its developments.

An important consideration about the relatively short distances between the projects in Cumberland is that the time and travel costs associated with the centralized maintenance shop are less than they would be in a system where the projects were more dispersed.

EXHIBIT I-3
GEOGRAPHIC LAYOUT OF CHA



WORK FLOW

This section describes how work is accomplished under the centralized maintenance operation with regard to routine maintenance requests; the two high-rise apartments; and the central maintenance shop. The section is prefaced with an overview of general work assignments and CHA's maintenance priorities.

At CHA, work is prioritized around the following objectives. First, emergencies (defined as tenant lockouts, gas leaks, clogged commodes, lack of heat, broken refrigerators, fires, sewer backups, or major water leaks) are to be handled immediately. Second, tenant-initiated work orders are to be kept current, which ordinarily means service requested in the morning is to be completed the same day and service requested in the afternoon is to be completed the following day. Third, vacant units are to be prepared for occupancy as soon as possible, which usually means within seven work days after the keys are received.

In any given week, the eight maintenance workers are assigned to work in one of three general task areas, as follows:

- two workers are assigned to the maintenance van;
- two workers are assigned to the high-rise apartments; and
- four workers are assigned to the central maintenance shop.

Except for the people assigned to the high-rises, the maintenance workers report to the central shop each day. Here they receive their daily work assignments in an informal meeting with the foreman. The workers at the high-rises remain on-site to perform custodial services. The van crew reports to the shop initially and then spends the day traveling among the five projects responding to tenant or inspection-generated work orders. However, the dispatcher maintains radio contact with this crew so that assignments can be changed as circumstances warrant. Finally, the staff members who work out of the shop respond to the foreman's on-going direction regarding vacant units, landscaping, or other tasks.

Exhibit I-4 displays a sample of work assignments among the eight workers over a six-week period. Generally, Al always handles work orders with assistance from another person who changes from week to week. Bob, Chuck, Dan, and Frank are responsible for custodial work in the high-rises. Each of them spends a month in a high-rise and then has a month during which he is assigned to respond to work orders or to work in the shop. Ed, George, and Harry usually are assigned to the shop, but occassionally respond to work orders. Within a given week, modifications to work schedules are made based on absenteeism, vacations, and the numbers of work orders and vacant units.

EXHIBIT I-4
SAMPLE WORK ASSIGNMENTS

WORKER	WEEK 1	2	3	4	5	6
Al	Van/ Work Orders	Van/ Work Orders	Van/ Work Orders	Van/ Work Orders	Van/ Work Orders	Van/ Work Orders
Bob	High-Rise	High-Rise	High-Rise	High-Rise	High-Rise	Van/ Work Orders
Chuck	High-Rise	High-Rise	High-Rise	High-Rise	High-Rise	Shop
Dan	Van/ Work Orders	Van/ Work Orders	Shop	Van/ Work Orders	Shop	High-Rise
Ed*	Shop	Shop	Shop	Shop	Shop	High-Rise
Frank	Shop	Shop	Van/ Work Orders	Shop	Shop	Shop
George*	Shop	Shop	Shop	Shop	Shop	Shop
Harry*	Shop	Shop	Shop	Shop	Van/ Work Orders	Shop

*Occasionally responds to work orders.

How the staff functions in each of the three general maintenance task areas is discussed next.

Routine Maintenance

The core of CHA's central maintenance policy is that two workers operating from a large step-van, with a homebase at the central shop, can handle virtually all telephone requests from tenants and all work orders that may result from housing inspections. Even in the two high-rises, which have on-site maintenance workers, tenant requests for maintenance are answered by the crew in the van. The dispatcher is the central coordinating point. The dispatcher's job is to receive requests for service and to provide the foreman with written, dated work orders that include statements as to the probable scope of the work. After the work is assigned and completed, the dispatcher transmits the work orders to the purchaser for costing. After the costing is completed, the dispatcher extracts and records management information from the work orders, communicates tenant charges to occupancy staff, and files the work orders. Exhibit I-5 diagrams how a work order flows, and Exhibit I-6 provides a sample work order.

The dispatcher also performs maintenance inspection tasks. Before a vacant unit is prepared for occupancy she (or the foreman or the purchaser) inspects the unit and writes an estimate of the scope of the work for the work order. Also, for about half a day over a four month period annually, she inspects the housekeeping of every unit in CHA and often issues work orders for corrective maintenance. When the dispatcher is out of the office for inspections, the purchaser usually takes over the dispatcher tasks.

EXHIBIT I-5
WORK ORDER FLOW

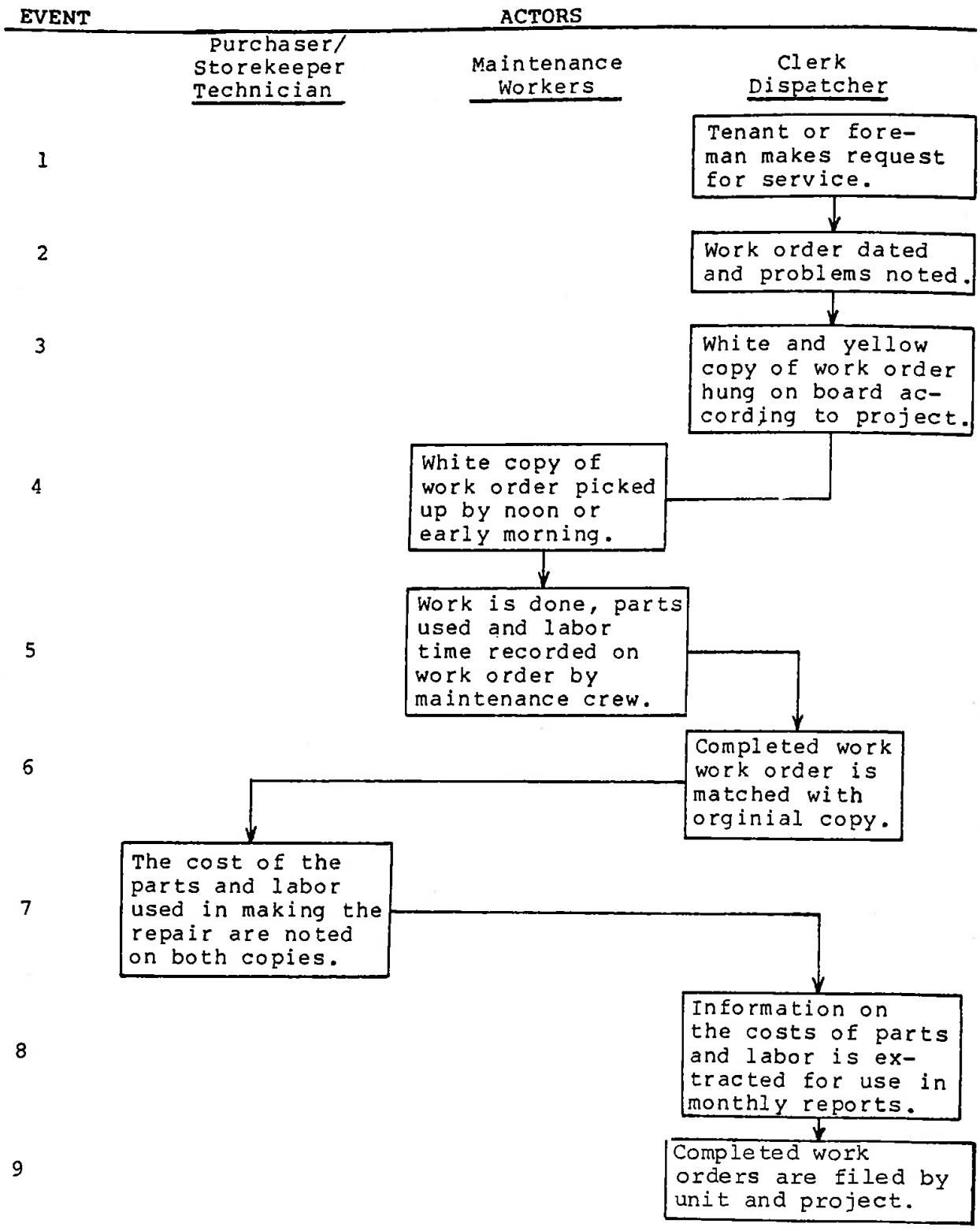


EXHIBIT I-6
SAMPLE WORK ORDER

THE HOUSING AUTHORITY
OF THE CITY OF CUMBERLAND, MARYLAND

MAINTENANCE SERVICE REQUEST

05702

DATE RECEIVED 6-12-85

TIME RECEIVED 2:20 A.M. (P.M.)

RECEIVED BY _____

LOCATION 5-1 UNIT NO. 8E OCCUPANT

Authorization to enter in Occupant's Absence YES ☒ NO ☐ Phone 222-2222

WORK REQUESTED

Repair kitchen faucet—it drips.
Issue 3 wood screws for cabinet door

Assigned To Frank Date 6-13 TIME OUT 10:30 TIME IN 10:15

WORK COMPLETED

Repaired kitchen faucet—Took cartridge out. replaced washer and replaced cartridge.

AMT.	MATERIALS USED AND PART NO.	LABOR	COST
2	washers 002452	2.35	.20
	TOTAL	2.35	.20

Charge to ☐ Occupant ☒ Management

☒ Job Complete

☐ Not Complete

☐ Service Request No _____

Do not sign this order if work is not complete.

_____
TENANT'S SIGNATURE

As mentioned previously, a mobile van is used to handle most routine work requests. The maintenance van is a Ford step-van that CHA purchased with $11,500 from the 1982 operating budget. It is stocked with a rolling inventory that includes most of the supplies and equipment necessary to make routine repairs to all of CHA's property. The van is equipped with a radio so that the central staff can provide direction and communicate with the crew regarding emergencies, the availability of parts, or other such factors. The mechanic who is usually assigned to drive the van has been with CHA for many years. Although he is not necessarily CHA's best mechanic, he is experienced, has wide-ranging skill, and can quickly make most routine repairs.

At the beginning of the work day, the clerk dispatcher gives to the driver of the van copies of all outstanding work orders that are not "on hold" for parts or other reasons. The driver reviews these work orders to be sure that no job needs additional equipment. If additional parts or supplies are needed they are checked from central inventory to the van and the work order crew leaves. During the day, the crew tries to take care of urgent needs first, but otherwise, makes all repairs in one project before going on to another.

At lunch time the van usually returns to the central shop, where the crew turns in completed work orders for costing and for inventory control. Work orders received during the morning are given to the driver of the van, and the van is stocked with parts to replace those used that morning or likely to be required that afternoon.

This centralized procedure of having one mobile crew respond to all telephone requests for service apparently has been successful in establishing rapid response to tenant problems. There is no backlog of tenant-initiated work orders. On most days, the afternoon requests are met by noon the next day, morning requests

by the close of the day they were made. Complaints about emergencies, such as gas leaks, major water leaks, or lack of heat during the winter, are addressed as soon as they are received.

The High-Rise Apartments

Each of Cumberland's two projects for the elderly is approximately fifteen years old and contains one hundred units. Custodial duties in these buildings are the only maintenance functions at Cumberland that are not handled centrally. Each month one maintenance worker is assigned full-time to each of the high-rise projects. These workers report to work at their assigned buildings and may not have occasion to report at all to the central maintenance shop during the week.

Duties of staff assigned to the high-rise projects are principally custodial. They include cleaning halls, elevators, and common areas; cleaning and servicing trash facilities; and tending the grounds and landscaping. These staff also may perform tasks that are more closely related to maintenance. If there is a vacant unit in a high-rise, for example, ordinarily the on-site person will be assigned to work with one or two other maintenance staff in preparing the unit for occupancy. If an emergency occurs in a high-rise project, the on-site maintenance worker will tend to it until the van arrives and will assist the van crew as needed. Also, although CHA mildly discourages such work, the on-site person sometimes assists tenants in their apartments by changing light bulbs or moving furniture. It is important to note that on-site staff are not supposed to respond to tenant requests for repairs to their apartments. In order to maintain the control afforded by the centralized work order system, CHA workers are instructed to call the central maintenance shop with requests for service, to which the van crew responds.

Maintenance workers are assigned to the high-rises in a way that lets tenants get to know them, while allowing for staff rotation to other tasks. Four staff members--two at a time--handle this assignment, with a monthly rotation. The fact that these workers spend half of their time working out of central maintenance enhances the team concept by encouraging maintenance staff, and other CHA staff, to recognize maintenance problems in a particular building as the responsibility of the maintenance department rather than that of a particular mechanic.

Compared with other maintenance tasks, custodial work in the high-rises appears to receive a lower priority than other tasks. Moreover, in the event of short-time absenteeism among high-rise staff, the tendency is to leave their work undone rather than to divert manpower from other tasks.

The Central Maintenance Shop

The four staff persons assigned to work in the shop operate at the daily direction of the maintenance foreman. In general, their tasks include:

- preparing vacant apartments for rental;
- performing lawn and landscape work (frequently assisted during the summer by youths in job training programs);
- performing custodial and cleanup work in the administrative offices and maintenance shop;
- assisting contractors in performing their tasks (e.g., spraying for vermin);
- making repairs to equipment, vehicles, stoves, and refrigerators;
- performing preventive maintenance; and
- handling other miscellaneous tasks.

As a rule, the staff deemed by the foreman and executive director to be the quickest and most skillful are assigned to the shop (although most of the maintenance workers express a preference for working in the van) because of the variety of tasks and the high level of effort needed to respond to them.

The chief factor determining the tasks of the shop staff is the number of vacant units in the projects. In a less typical month, when six or seven vacancies occur, all four workers might spend the entire time trying to prepare as many units as possible for rental. In a more typical month, when only two or three apartments are vacant, two workers might spend a given day preparing one vacant unit while another cleans stoves and refrigerators from a different vacant unit, and the other worker repairs a lawn mover and performs custodial tasks.

MANAGEMENT INFORMATION PROCEDURES

A by-product of centralizing maintenance at CHA was the development of systematic and consistent records. In processing maintenance work orders, and communicating between administrative and maintenance staff about vacant housing units, the clerk dispatcher routinely extracts useful management information. This provides insight to others in gathering good management information even without the benefits of automation.

CHA's maintenance management information system (MIS) includes two monthly reports: a monthly register of vacancies; and a monthly summary of labor and materials (see Exhibits I-7 and I-8). The register of vacancies tracks each unit that becomes vacant, providing milestone data about occupancy, costs, and maintenance requirements. Key maintenance milestones include the date tenants move out, the date the maintenance department is notified of the vacancy, the date maintenance begins, the date the unit is inspected, and the date a new lease is signed.

EXHIBIT I-7
MONTHLY REGISTER OF VACANCIES

MONTH _____ 19 _____ MONTHLY REGISTER OF VACATES FORM CHA-1

PROJECT NO. _____

1 UNIT NO.	2 BR's	3 OUTGOING TENANT	4 RENT	5 DATE NOTICE GIVEN	6 TO BE VACATED	7 RENT PAID TO	8 OUT	9 MAINT. NOTIFIED STARTED	10 READY ESTIMATED ACTUAL	11 INSPEC. BY FOREMAN	12 DAYS VACANT	13 APPLICANT DATE SELECTED	14 HOME INSPEC.	15 RENT	16 VERIF.	17 LEASE SIGNED	18

EXHIBIT I-8
MONTHLY SUMMARY OF LABOR AND MATERIALS

September 1984

MONTHLY SUMMARY OF LABOR & MATERIALS

	MD005001		MD005002		MD005003		MD005004		MD005005		
CODE	4410	4420	4410	4420	4410	4420	4410	4420	4410	4420	Total
1	97 1/4	427.12	0	0	32 3/4	436.69	0	0	0	0	
2	10 1/2	0	0	0	3/4	0	98	0	70	0	
3	6	13.60	1/2	0	1/2	0	0	5.10	1	0	
4	16	0	2 1/2	0	9 1/2	51.62	42 1/4	70.41	3 1/2	3.53	
5	4 1/2	0	2	0	2	0	9 1/2	0	2	0	
6	A 4 1/4 B 1/2	A 0 B 0	0	0	A B 1/2	A .45	0	0	A 3/4 B 2	B 4.3	
7	45	83.89	45	146.85	0	0	0	0	1/4	40.08	
8	8 1/4	0	0	0	1	4.65	1/2	0	1/4	2.99	
9	3	0	0	0	6	0	0	0	2	0	
10	1	0	3/4	0	0	0	3/4	0	1 1/2	0	
11	0	0	0	0	5	0	5	0	1/2	0	
12	0	0	0	0	0	0	0	0	0	0	
13	1/2	0	0	0	0	0	2 3/4	0	0	0	
14	6	21.96	1	7.66	1 3/4	3.28	9 1/4	118.88	14 1/4	0	
15	26 1/2	0	0	0	0	0	16 3/4	0	5 1/4	0	
16	1 1/2	0	0	0	0	0	8	0	43 3/4	0	
17	39	0	1	0	1	0	3 3/4	0	1	0	
Total	277 3/4	246.57	52 3/4	153.51	61 1/4	496.69	196 1/2	194.29	148	50.90	

The relevant parts of these forms are kept both by maintenance and administrative (occupancy) staff, and a complete profile of each vacancy is compiled at the end of every month.

Producing this form serves two important maintenance functions:

- it promotes and ensures cooperation between administrative and maintenance staff; and
- it lets the executive director know at a glance whether excessive vacancy losses reflect a maintenance problem or an administrative problem.

The monthly summary of labor and materials is produced by 7the clerk dispatcher. Each day, before she files completed work orders, the dispatcher extracts and records the following information from each work order on the form presented in Exhibit I-9.

- the project and unit;
- the month;
- the system (e.g., screens, glass, plumbing, heating, painting);
- the labor cost; and
- the cost of parts.

This information is synthesized into the monthly summary report on the parts and labor expended on each of the sixteen systems for each project (see Exhibit I-8).

Cumberland's executive director believes that the information in this report is indispensible for documenting to HUD both the need for, and potential cost savings in, particular modernization projects and the potential they offer for lowering costs.

EXHIBIT I-9
COST OF LABOR AND MATERIALS

4410- Labor - Time
4420 - Material

X = Emergency
T = Inspection
Y = Routine
W = Tenant Request

1 - Unit Prep.
2 - Central Cleaning
3 - Screens/Glass
4 - Plumbing
5 - Heating
6 - Appliances 6A-Stoves 6B-Refrig.
7 - Painting
8 - Carpentry
9-Exterminat.
10-Locks
11-Grounds
12-Mechnical
13-Structural
14-Electrical
15-P.M.
16-Garb. Disp.
17-Misc.

COST OF LABOR & MATERIALS

MONTH September 1984 Project MD00500 5-2

DATE	WORK ORDER NO.		Management 4410	Management 4420	Tenant Charges 4410	Tenant Charges 4420	Employee	Comments
9-2-8	05684		2A - 14- ½	0		14 7.66	Bob	
9-4-8	05693		3A - 14- ¼	0			Bob	
9-4-8	05695	W	2-C - 3- ½	0			Barney	
9-8-84	05763	W	2-A - 4 - 2	0			Bob	
9-14-84	05797	Y	3-B -14 - ¼	0			Barney	
9-20-84	05844	W	3A - 10- ¼	0		10 1.50	Sam	
9-21-84	05828	Y	2-B - 7 - 15	7- 50.18			Bob-Dave	
9-21-84	05827	Y	2-A - 7 - 30	7- 95.67			Bob-Dave	
9-25-84	05858	W	4-C - 10- ¼	0		10 1.50	Barney-Mexie	
9-26-84	TM	Y	-17- 1	0			Bob	
9-27-84	TM	Y	-5- 1	0			Barney-Rick	
9-27-84	05879	W	5-E -10- ¼	0		10 5.09	Barney	
9-27-84	05883	W	3-E -4- ½	0			Barney	
9-29-84	TM	Y	-5- 1	0			Bob	

Although such reports could be produced in a decentralized maintenance system, the previous system at CHA did not lend itself to this end. The following reasons highlight some of the relevant operational deficiencies of the prior system:

- at least seven different people could initiate work orders and uniformity of presentation frequently was lacking;
- when maintenance workers had sole responsibility for particular projects, work could be done without being recorded on a work order;
- when maintenance workers had responsibility for their own inventories, systematic notation of parts and labor costs was lacking; and
- when no single person had responsibility for processing work orders, systematic extraction of information was a task that fell "between the cracks."

ANTICIPATED REFINEMENTS

The current maintenance operations at the Cumberland Housing Authority have been developing for about two years. The executive director and foreman are fairly satisfied with the overall procedures, but they anticipate two modifications. One is the incorporation of a formal preventive maintenance (PM) system. The other involves the development of an automated work order system.

Preventive Maintenance

Cumberland currently has features of a preventive maintenance program, including annual housekeeping and maintenance inspections, and periodic review of other systems. As happens at many public housing agencies, however, the requirement that roofs or drains be checked "as time permits" usually means that work does not get done because there are too many other things to

do. CHA has designed a PM program to be implemented soon. For each of CHA's buildings, the maintenance department has compiled a list of all the systems and parts that require service, the service needed, and the service intervals. The department has set up a filing system based on service intervals, to identify tasks that need to be done each month. At the beginning of the month, the dispatcher will review the file and draw up PM work orders. A PM crew, which includes the best of those workers who ordinarily work out of the shop, has been designated to handle these work orders.

Another aspect of preventive maintenance in Cumberland features the van crew. Although for most jobs one worker is adequate for handling work orders, various security problems necessitate that two workers respond to all work orders. In order to maximize productivity, the second worker has been directed to make a quick PM inspection of each unit the crew works in. These inspections focus on utility waste by identifying leaky sinks, drains, and commodes.

Automation of Work Orders

CHA has been authorized to spend some $20,000 in CIAP funds during 1985 to automate procedures for tracking inventory and work orders. At present, none of the management systems at CHA are on computers. Automating the work order process will have virtually no impact on how operations are organized but will reduce filing costs and significantly expand workflow tracking capabilities. The principal advantage of automation is that it will enable the extraction of any information in the file rapidly in any level of aggregation. In sum, Cumberland's manual information system is a good system; automation will enhance it by allowing better and more convenient access to the records.

II. WHY CENTRALIZED MAINTENANCE IS AN EFFECTIVE PRACTICE IN CUMBERLAND

As discussed in this chapter, the centralization of maintenance operations at CHA has improved management control, maintenance responsiveness, and has facilitated better record-keeping and management information. As well, the change has been achieved without significantly increasing the relative cost burden of maintenance operations and without adverse tenant reaction. Each of these topics is addressd below.

Management Control

A key feature of centralization is the control over operations held by the maintenance foreman. The key to the success of CHA's and any other centralized operation is heavily dependent on the skills of the foreman and that individual's ability to plan, schedule and supervise activities at multiple sites. In this regard, centralization facilitated more effective control of the flow and allocation of maintenance work at CHA. For example, under the previous system most work was allocated on the basis of projects. That is, five of the maintenance workers each worked at their particular project regardless of the volume of work on a given day. If there was too much work, things did not get done, and if there was too little work, manpower was wasted. Under the centralized system, work is allocated based on the tasks that the foreman, executive director, or tenants (through requests) direct to be done. Only two maintenance men (those performing as custodians in the high-rises) are assigned work based on a fixed unit allocation. Thus, centralization has improved the ability of the foreman to allocate manpower.

The flow of paperwork also indicates better control in the centralized system. With all work orginating from a central source, and with one individual responsible for generating work orders and monitoring their flow, CHA has ensured that all work

now is written on work orders, that all work orders are complete and accurate, and that immediate work needs are identified. Under the centralized system, information on both the volume of work to be done, and the tasks currently being performed are available to the foreman or executive director at a moment's notice.

Operating Costs

There is apparently no significant difference in the operating costs of the maintenance systems that CHA has employed between FY 1980 and FY 1984. Exhibit II-1 provides an overview of the cost of routine maintenance during this period and demonstrates that maintenance has made up of between twenty-two and twenty-eight percent of all operating costs.

EXHIBIT II-1
COSTS OF ROUTINE MAINTENANCE
FY 1980 - FY 1984

Fiscal Year	Total Operating Costs ($000s)	Routine Maintenance Costs ($000s)	Percent of Operating Cost
1980	$517.4	$146.0	28%
1981	620.8	153.2	25%
1982	673.7	150.8	22%
1983	755.0	190.2	25%
1984	803.7	194.2	24%

Because centralization began in November 1981 (FY 1982) and was fully implemented by March 1983 (end of FY 1983), fiscal years 1981 and 1984 provide the best years for comparing costs of the two systems. Exhibit II-2 compares the costs of budgetary line items for ordinary maintenance during these two fiscal years. Administrative salaries are also included because

otherwise it might incorrectly appear--due to a change in the line item to which staff salaries are charged--that maintenance costs have been reduced.

EXHIBIT II-2
MAINTENANCE AND TOTAL OPERATING COSTS--FY 1981 AND FY 1984

Line Item	FY 1981 Cost ($000s)	FY 1981 Percent of Total Operating Costs	FY 1984 Cost ($000s)	FY 1984 Percent of Total Operating Costs
Labor	$105.8	17.0%	$127.9	15.9%
Materials	20.5	3.3%	26.8	3.3%
Contract Cost	26.9	4.3%	39.5	4.9%
Administrative Salaries	69.6	11.2%	100.7	12.5%
Total Maintenance	222.8	35.9%	294.9	36.7%
Total Operating Costs	620.8	100.0%	803.7	100.0%

Exhibit II-2 indicates essentially no change in the relative cost of maintenance materials and contracts in FY 1981 and FY 1984. In both years, these costs accounted for about three, and four and one-half percent of the budget, respectively.

Although labor costs are somewhat lower under the centralized maintenance system, the savings are cancelled by higher administrative salaries. This is because the salaries of the clerk dispatcher and purchaser/storekeeper technician are included within administrative costs. Previously, costs of fulfilling these functions were included within maintenance costs (because they were performed by maintenance workers). Thus, in

sum, centralization was achieved without positive or negative impact on the CHA budget.

Maintenance Responsiveness

One key indicator of maintenance responsiveness is the length of time required to complete routine work requests. To assess the effect of centralization on maintenance responsiveness, an analysis of work orders for 1981 and 1983 was conducted (pre- and post-centralization). Exhibit II-3 presents a comparison of the average and median elapsed times between call-ins and job completion for seventy-four randomly selected units in the years 1981 and 1983, respectively.

Exhibit II-3 illustrates that while the volume of tenant-generated work orders was essentially unchanged between the two comparison years, under the centralized system most work orders were completed in a shorter period, although the response time under both was reasonably good. However, the data indicate that the average response time in 1981 was nearly a week, thus, even though most work was done the next day, many work requests took substantially longer. Under the new system, the average time of 1.8 days indicates that almost all work orders are taken care of quickly. This rapid rate was verified in interviews with randomly selected tenants who, when asked how long it took to have repairs made the last time they called, overwhelmingly said the same or next day. Only one respondent noted that the time was as long as three days, because the work involved taking a door to the central shop for repairs. Improved response rates are even more noteworthy in light of the fact that the annual unit inspections were not conducted by maintenance staff in 1981. All seventy-four units sampled in the above analysis had been inspected in 1983. Also shown in Exhibit II-3 is that recordkeeping also improved, as evidenced by a lower percentage of completely recorded work order forms. This improvement is likely a result of the designation of the clerk dispatcher as

fully responsible for ensuring that these maintenance records are completed in an accurate manner.

EXHIBIT II-3
ANALYSIS OF 1981 AND 1983 WORK ORDERS

Performance Measure	Year 1981	1983
Number of Units Sampled	74	74
Number of Tenant-Initiated Work Orders	268	264
Average Number of Days Elapsed from Work Order Call-In to Completion	6.8	1.8
Median Number of Days Elapsed from Work Order Call-In to Completion	1.0	0*
Percent Work Orders with No Completion Data Noted	2.7%	.3%

* Indicates response during the same day

Tenant Satisfaction

In order to gauge tenant opinions of the change in systems, thirty-four tenants were interviewed, randomly selected. All interviewees had lived in CHA projects long enough to be familiar with both maintenance systems. Generally, tenants expressed satisfaction with the condition and maintenance of their apartments and buildings. On questions concerning whether they were more satisfied with maintenance under the centralized system, and whether they thought the condition of their projects was better or worse under the central system, most respondents said that there was no difference; and about as many expressed

preference for the current system as did for the project-based system.

Tenants who preferred the centralized system generally noted that response time on work orders was better. Those who were less satisfied with maintenance now preferred to have a person on site whom they could contact directly. Those who said the condition of the buildings and grounds was worse, primarily lived in a family project that they noted had a problem with litter and vandalism.

In summary, Cumberland's tenants were largely indifferent about whether maintenance was centralized or project-based, and they liked both systems. Many tenants expressed displeasure with the loss of the presence of a given on-site person as a result of CHA's centralization. This presence fulfilled a security need and probably provided needed interpersonal contact to many tenants; however, its loss should be viewed as a tenant-relations issue rather than a maintenance one.

Condition of Buildings

It was not possible to assess the condition of the buildings under the old system because objective indicators are unavailable for that time period. As noted above, the concensus among tenants was that the condition of buildings and grounds had not changed in the past three years. Additionally, site inspections conducted by the study team indicated that maintenance and custodial-related conditions now were quite good, so that it is unlikely that the project-based system performed materially better in this regard. Only one of CHA's projects (which is located in an attractive middle class neighborhood) failed to appear at least as clean and well maintained as other buildings in the surrounding neighborhood. Moreover, only one project displayed characteristics that may have indicated a maintenance problem. A site inspection confirmed tenants' observations that debris and graffiti were a problem there.

III. CONSIDERING CENTRALIZED MAINTENANCE IN OTHER PHAs

This chapter analyzes some of the factors that make Cumberland's system more or less applicable to other public housing agencies (PHAs). Chief among these are the PHA size, the geographic dispersal of its stock, the availability of proper equipment, and the type of relationship the PHA wants to maintain with its tenants.

Size

In order for centralization to be a viable option, a PHA must have a large enough staff to make specialization feasible. A PHA must have at least two projects and two maintenance staff before any centralizing can begin, and the agency probably could not have fewer units than Cumberland to justify a full-time clerk dispatcher or a specially designated crew to respond to work orders. For PHAs that are much larger than Cumberland, but are still sufficiently concentrated geographically to warrant centralizing, specialization within the central shop may more advisable. In a PHA with one thousand units, for example, instead of all employees assigned to the shop being available for all assignments, there might be one team assigned to do only carpentry and another to repair appliances, and still another vacant-unit crew.

Geographic Dispersal

Perhaps the most important factor in deciding whether to employ a maintenance system in which staff are deployed and directed from a central site is the distance those staff will have to cover in getting to and from work sites. In Cumberland, the maximum distance between work sites is less than three miles,

so transportation is quick and cheap. Where one-way distances between sites approach ten miles in length or thirty minutes in duration, it is manifest that large savings in performance must be realized in order to offset such travel costs. Such distances are not unusual in PHAs that are countywide or are in rural areas.

Even where a PHA's projects are dispersed geographically, a modified version of Cumberland's operation may be appropriate. Thus for example, if CHA had an additional one hundred-unit project that was fifteen miles from any of the rest, they might well keep their present system and just assign a person to work the remote site as if it were project-based. Alternatively, if CHA had two additional projects that were close to one another but fifteen miles from the rest, they might adopt a system that operated similarly to their central system, but from two regional centers.

Configuration of Equipment

The facilities and equipment that a PHA owns or can afford to buy also play a key role in determining the feasibility of centralizing. In running a central system, a PHA must have:

- adequate central facilities from which staff can operate;
- adequate transportation between sites; and
- adequate communication between the central office and maintenance workers.

When Cumberland initially decided to centralize, these items were not present. Thus, CHA incurred substantial start-up costs including:

- $175,000 to enlarge the central maintenance and inventory area (funded by CIAP);

- $11,500 to acquire a step-van from which the work order crew could operate (funded from the operating budget); and
- $2,400 for radio communication equipment (also funded from the operating budget).

Clearly, other PHAs would incur different start-up costs, depending on their current facilities and the size of their operation. However, without adequate central facilities, or the resources to create facilities appropriate to the scope of its operation, it would be a mistake for a PHA to centralize maintenance, regardless of its size and geographic dispersal. One less costly option in this regard, is to retrofit an existing facility to house a centralized maintenance function using agency resources.

Tenant Relations

Project-based maintenance may have consequences that go beyond performing the maintenance function. On-site PHA staff members, just by virtue of their presence, may help promote security, improve tenant behavior, and provide psychological comfort to tenants. In Cumberland, tenants who were unhappy with the centralized system complained principally about the lack of these nonmaintenance functions. Indeed, in Cumberland where custodial staff are regularly assigned to the project for elderly tenants, the rationale is as much for tenant relations as it is for performing maintenance. To the extent that a PHA is willing to sacrifice efficiency in maintenance for continuity in tenant relations, a project-based system may be preferrable.

Other Considerations

Even if it had the size, location, and facilities for a centralized operation, and even if centralization would not adversely affect tenant relations, a PHA might properly choose to retain a project-based system. If there are no maintenance

problems, there is little reason to change. Project-based maintenance is not inherently inferior. The fixed allocation of work based on projects may be equally efficient and cost effective especially where most projects are of similar size.

FUNCTIONAL AREA:	Maintenance and Custodial
EFFECTIVE MANAGEMENT PRACTICE:	Contract Maintenance
AGENCY:	Housing Authority of the County of Lawrence (Lawrence County, PA)
SIZE:	Medium

EXECUTIVE SUMMARY

This case study describes maintenance operations in the Housing Authority of the County of Lawrence, Pennsylvania (HACL). The study focuses on HACL's successful replacement of its in-house maintenance operation with a new system in which all routine maintenance services are provided by an outside contractor. An overview of HACL's operations appear on the following page.

For several years prior to moving to contract maintenance, HACL experienced skyrocketing labor costs and poor maintenance services. When HUD informed the agency that it was in "financial jeopardy," HACL tried unsuccessfully to renegotiate its contract with the union representing in-house maintenance workers. When the negotiations reached an impasse, HACL turned to a private contractor to provide maintenance services.

Under contract maintenance, as described in Chapter II, HACL has been able to contain maintenance costs, increase the volume of work orders handled while reducing response time, and enhance maintenance recordkeeping procedures.

Chapter III addresses how other agencies could implement a similar contractual relationship. Discussed are key considerations in making the basic decision to seek a contractor, how to conduct cost and performance comparisons between in-house and contract arrangements, and some other nonmonetary "costs" that should be considered in the analysis process.

LAWRENCE COUNTY AT A GLANCE

CHARACTERISTICS	DATA
Total Stock:	990 units of LIPH in 12 projects, plus a small Section 8 existing program
• Projects for Families:	8 projects
• Projects for Elderly Tenants:	4 projects
• Unit Sizes:	efficiencies ... 26 percent one-bedroom .... 26 percent two-bedroom .... 23 percent three-bedroom .. 21 percent four-bedroom ... 3 percent five-bedroom ... 1 percent
• Largest Project:	Lawrence Manor (150 units)
• Smallest Project:	Big Run Homes (22 units)
• Oldest Project:	Walnut Ridge (1948)
• Newest Project:	McGrath Manor (1972)
Demographics:	
• One-Parent Households:	29 percent
• Minority Tenants:	22 percent
• Children Under 18:	37 percent
Operations:	
• Operating Expenditures:	$156.26 (PUM)
• Dwelling Rentals:	$ 92.29 (PUM)
• Operating Reserve:	92 percent of allowable level
• Staffing:	11.5 administrative staff for LIPH operations; 11 full-time contract maintenance workers; and part-time administrative staff for Section 8 and grant-funded social services.

I. HOW CONTRACT MAINTENANCE OPERATES AT HACL

This chapter describes the organization and operations of the Housing Authority of the County of Lawrence's (HACL's) contract maintenance arrangement. It begins with contextual background concerning why the agency sought a private contractor, the bidding process, and how the transition was accomplished. The remainder of the chapter addresses various aspects of the relationship, including: staffing and organization; how interactions between the contractor and agency staff are conducted regarding routine work order processing, vacant unit preparation, and after-hours maintenance; and how HACL monitors contractor performance. Where it is appropriate, the chapter compares the characteristics of maintenance under the previous, in-house system with those of the current arrangement.

BACKGROUND

Lawrence County is a highly unionized, industrial area located north of Pittsburgh in western Pennsylvania. Until July 1981, its 990-unit public housing agency had a maintenance department, whose workers were represented by the International Brotherhood of Electrical Workers (IBEW). At that time, faced with escalating labor costs, rapidly declining reserves, and increasing pressure from HUD to control its finances, HACL put its maintenance services out for competitive bid. This step was initially intended to give the agency leverage with its labor negotiations, despite the fact that three of its five board members at that time were business managers or staff member representatives of union locals or internationals. The major cause of this contemplated change in procedure was a cost-of-living adjustment (COLA) in the IBEW contract. During the high inflation of the late 1970s and early 1980s, this COLA was placing HACL in what HUD called "financial jeopardy."

In order to negotiate a more favorable arrangement with IBEW when the contract expired in June 1981, HACL's executive director drafted a document outlining the scope of work for maintenance services that he intended to put out for bid in the spring of 1981. The purpose of soliciting bids was to obtain an indication of the fair market value of HACL's maintenance services, so that the agency would have some leverage for negotiating a more favorable contract with the IBEW. The low bid by Systems Management, Inc. (Systems) was roughly thirty-six percent below what had been paid to the in-house IBEW workers during the previous year. Based on this information, HACL offered nineteen percent less than the existing contract in its final negotiations with IBEW in June 1981. When the IBEW turned down this offer, HACL contracted with the low bidder to perform its maintenance services. Since the initial award, the contract has been re-bid two additional times. The original firm won one of these awards, but another competitor won the second award (based on the lowest bid).

HACL's financial fortunes have rebounded since the agency opted for contract maintenance, as this case study shows. But there have been considerable costs associated with the decision. The IBEW has (unsuccessfully) brought suit in front of the Pennsylvania Labor Relations Board for unfair labor practices, and bad feelings about the switch linger among tenants, employees, and the board at HACL.

The Bidding Process and Transition to Contract Maintenance

The invitation to bid issued by HACL during April 1980 was drafted by the executive director based largely on his experience in the construction field. It has proven to be more than adequate in HACL's contracting experience. The major subjects addressed by the package (see Appendix A) are:

- the invitation to bid;

- instructions for the bidder;
- the proper format for the bid;
- the bid bond requirements;
- the affadavit that the bidder is bona fide;
- the statement of the bidder's construction experience;
- the proper format for the contract;
- the performance and payment bonds;
- the stipulation against liens on the bidder;
- equal opportunity forms;
- the statement of wages and fringe benefits of the bidder's employees; and
- general specifications of the task.

Of course, many elements of a bid package are "boiler plate," for which standard forms are available. The most important aspect of the bid package is the section that details the specific tasks the contractor must perform. The central elements of the description of the duties HACL provided for its bidders includes:

- an overview of the physical plant, including:
  - -- a description of the buildings, their locations, number of units, and whether they were for families or the elderly; and
  - -- a description of the systems and areas in each building that are to be included in the work of the contractor.
- a description of contractor duties, including:
  - -- a minimum level of service that must be provided (one person on duty all the time);
  - -- a description of the contractor's general duties (painting, plumbing, electrical, carpentry, roof repair, servicing tenant requests for service, and preparing vacant units); and

-- a set of specifications for preventive maintenance to be carried out under the contract.

- contract performance standards, including:

  -- a series of performance standards, including a vacant-unit turnover rate and an emergency-response rate; and

  -- a set of particular items that are included in the contract and their performance standards, such as exterior lights to be replaced by the contractor, emergency generators to be serviced monthly, and elevators to be cleaned and serviced on a regular basis.

- contract terms and HACL practices, including:

  -- the specification that parts, supplies, and vehicles will be provided by the agency;

  -- stipulations regarding maintenance employees, such as that they be compensated according to applicable law, that they work 8:30 until 5:00, Monday through Friday, and that the contractor have liability insurance for damages they might cause; and

  -- contract terms, including the duration of the contract and payment terms (fixed price broken down into twelve monthly payments), as well as the stipulation that HACL retained the right to terminate the contract after giving the contractor sixty-days' notice.

Transition to Contract Management. HACL received several bids in response to its initial invitation. Generally, they were from small, local construction firms. Systems, the lowest and successful bid, is a firm based in New Castle, PA, specializing in building maintenance and custodial services for private property management firms, although the company also does some construction work. A union represents many of Systems'

employees, a large number of whom were specifically hired and trained to work on the HACL contract.

Early in the contract period, it was necessary for the contractor to bring on more than twenty maintenance workers to tackle the severe backlog of work that had accumulated at HACL. During the negotiations between HACL and the IBEW, maintenance work at HACL nearly reached a standstill. The contractor arrived to find literally hundreds of unanswered work orders, as well as a large accumulation of vacant units to prepare. The problems were exacerbated by the fact that the IBEW workers continued to picket HACL and even to follow and allegedly threaten the contractor's employees as they went about their work. Tenants also complained about the contractor's employees, apparently to make them "look bad" and to make their work even more difficult. Nonetheless, despite the heavy initial cost (which was absorbed by the contractor, because it was a fixed-price contract) and the difficult working conditions, the backlog of work was retired within the first three months, and the contractor apparently made money on the first contract.

The initial maintenance contract was for a one-year period, running from July 1981 through June 1982. This one-year term sharply contrasts with the three-year contract with IBEW that it replaced. In initiating this practice, HACL decided that a one-year commitment probably was safest. Indeed, it is likely that the 60-day-notice-for-termination provision was included in the contract with a real concern that it might have to be used. However, things went well enough that when the invitation to bid for the second contract was advertised in April 1982, it was for a two-and-a-half-year period. The principal reason for the half year was so that the contract would terminate on the same date as HACL's fiscal year, December 31. When this contract ended in 1984, the third contract was executed. At the time of each contract renewal, there have always been several bidders.

The contract maintenance at HACL was well-conceived, as is indicated by the few changes that have occurred during two subsequent contract awards. There have been modest annual increases in the amounts paid to the contractor. However, the only significant change in the scope of the contract occurred in the second contract. It provided that, if HACL's maintenance vehicles became inadequate, the contractor would provide vehicles and be compensated by HACL for actual mileage at the rate prescribed by the Lawrence County government. The executive director included this provision because he knew, based on an informal analysis, that HACL vehicles had exceeded their useful life, and that it would be easier and less costly to use the contractor's vehicles for a mileage fee. In fact, during the second contract, all of HACL's vehicles were phased out, and by 1984 all maintenance work was being done from contractor vehicles.

CONTRACT MAINTENANCE AT HACL

The employees of the private contractor function very much like housing agency employees in providing maintenance services. The workers assigned to the HACL contract operate out of a central maintenance shop in HACL's administrative offices. Previously, the the in-house maintenance staff worked in the same space, which is located one office away from HACL's procurement and inventory department. The contractor has a full-time, on-site project manager, who functions in much the same way as a working foreman functions in a conventional maintenance system. The work crews include: four maintenance mechanics, who principally respond to tenant requests for service and provide preventive maintenance; four maintenance aides or laborers, who principally assist in preparing vacant units and conducting general cleanup operations; and two painters. Additionally, there are two part-time maids, who work several days a week

performing custodial work at HACL's high-rise buildings. These maids and one maintenance mechanic are the only staff who do not generally work out of the HACL building. The maids work out of the contractor's main offices and the maintenance mechanic is assigned to the buildings in Ellwood City, which is some twelve miles from HACL's central offices.

Although these are the core staff involved in providing HACL's maintenance services, they are supported frequently by additional resources of the private contractor. When HACL has a heavy work load, maintenance workers are supplemented by staff who ordinarily are assigned to other aspects of Systems' operations. In addition, the contractor details a crew twice each year to clean all of the windows in HACL's high rise buildings. Because the contractor's performance ultimately is the responsibility of the principals of the firm, the company president and an area manager frequently visit HACL to check on their staff or to meet with HACL staff.

Previous Organization. The number and organization of contractor staff is somewhat different than the system it succeeded. HACL's in-house maintenance staff operated with a crew of ten mechanics and three aides under the direction of a maintenance supervisor. The contractor usually operates with four mechanics and four aides under a project manager. The general organization remains basically the same--centrally organized maintenance with one mechanic assigned to work in Ellwood City. Today, however, only one mechanic responds to each tenant service request; whereas under the IBEW contract, two-man crews were common.

It is important to note that the contractor's functions at HACL are identical to those previously performed by the in-house maintenance staff. When drafting the invitation to bid, HACL's executive director detailed the tasks that his own staff were

supposed to perform. During the time that Systems has worked for HACL, the company has not had any other maintenance contracts at HACL. Presumably, the contractor could receive contracts to perform, for example, betterments and additions or modernization for HACL. To date, this has not happened, largely because HACL's executive director prefers to avoid the appearance that the routine maintenance contractor has an "in" on other HACL maintenance contracts. Thus, the scope of work under the maintenance contract is restricted to routine and preventive maintenence and custodial work.

Interaction Between the Contractor and HACL

On a day-to-day basis, the contractor's operations are under the direction of its on-site project manager. During the first three and a half years of contract maintenance, the inventory clerk and assistant maintenance superintendent have represented HACL in routine maintenance matters. Late in 1984, the assistant maintenance superintendent retired and his duties were transferred to a new assistant executive director, a position that was unfilled at the time this case study was prepared. The relationship between HACL and the contractor is best illustrated by their staffs' interaction on a daily basis.

Routine Work Order Processing. All requests for service are telephoned into the HACL's central office and are directed to the purchasing clerk. In addition to his duties as the manager of inventory and controller of purchasing, this individual functions as the chief maintenance dispatcher for HACL. In response to each request for service, he initiates a work order by noting on a numbered work order form: the date, time, place, and probable scope of work. Throughout the day, particularly first thing in the morning and the afternoon, he gives routine work orders to the contractor's project manager for distribution to maintenance crews. Copies of work orders are maintained by: the purchasing/

dispatching clerk as a control on inventory and contractor performance; by the project manager as a detailed record of performance; and by individual maintenance mechanics for internal appraisals of productivity. At the end of the morning and afternoon, completed work orders are submitted to the project manager, who gives the originals to the purchasing/dispatching clerk. The purchasing/dispatching clerk then computes the costs of the material and makes inventory adjustments, notes tenant charges for maintenance, and gives the work orders to secretarial or accounting staff for processing tenant charges and for filing.

The purchasing/dispatching clerk also maintains radio contact by walkie-talkie with the maintenance mechanics. As priority work orders are called in, he can contact the maintenance workers directly in the field and instruct them to respond to urgent requests.

The purchasing/dispatching clerk and the project manager work together very closely. They are usually the only two people working in the maintenance and inventory area of the HACL offices. Thus, even though they have separate and defined functions, to a large extent they cover for and assist one another. If the purchasing/dispatching clerk is out of the office, for example, the project manager receives service requests and responds to radio contacts from the field. These individuals work closely in deciding whether to charge tenants for maintenance items and in selecting the quality of materials to be used. The contractor's staff do not have formal access to the stockroom.

Vacant-Unit Preparation. Vacant units are a particular problem at HACL. At the time of data collection in Lawrence County, there was no one on the waiting list for HACL's four- and five-bedroom apartments, and there were twenty-eight such apartments vacant. Eventually, HACL hopes to eliminate the long-

term vacancies in the large-family apartments by converting many of these units to two- and three-bedroom units. In the meantime, however, vandalism has become a very serious problem. The contractor and HACL work together to ensure that apartments are ready as soon as they can be rented and that time and materials are not wasted on units that cannot soon be rented.

The tenant-selection staff at HACL monitors vacancies on a daily basis. The staff identifies units that will become available (usually within thirty days) and the need for units to be prepared for rental. Vacant-unit work ordinarily takes one of three forms: a newly vacant unit may be prepared for immediate rental; a newly vacant unit may be prepared to be out of circulation for a while; or a unit that has been out of circulation for a while is prepared to be rented. Whenever a unit becomes vacant, notice is given to the contractor, who in turn removes all debris, cuts off all unnecessary utilities, broom cleans, and boards up the unit immediately to minimize damage from vandalism. If the unit is likely to be vacant for a long time as are the five-bedroom apartments, for example, equipment such as the stove, refrigerator, and water heater are removed to avert theft. For brief vacancies, these appliances may be left in the unit during the vacancy period.

When a tenant for a vacant unit is found, a member of the tenant-selection staff asks the purchasing/dispatching clerk to have the unit prepared for rental. The request notes the target date for occupancy. The purchasing/dispatching clerk then prepares a work order listing what is necessary to make the unit rentable. The clerk gives this work order to the project manager and the work is timed so that the preparation is completed as the tenant is moving in. By waiting until the unit is actually occupied before completing the work, the maintenance workers generally avoid having to re-prepare a vacant unit that may be vandalized between the time of its preparation and the time tenants move in.

After-Hours Maintenance. The contractor is required to have staff available twenty-four hours a day and seven days a week to receive and respond to maintenance requests. Work performed after regular working hours is not covered by the maintenance contract but is billed to HACL on an hourly basis. To ensure that the contractor does not defer ordinary maintenance until after hours, the executive director carefully reviews all after-hours charges and pays them only if the work could not have been deferred until the next regular workday.

After-hours telephone requests for service go directly to the person the contractor designates to take such calls. That person determines whether the problem qualifies as an emergency or is something that can wait until regular work hours. For emergencies, which include lack of heat in the winter, major leaks, major electrical problems, and tenant lockouts, a work crew is dispatched. If there is any doubt about whether a problem constitutes an emergency under the scope of the contract, the contractor may call the executive director or assistant maintenance superintendent (until recently) for a determination. If they are unreachable, the contractor simply responds to the request in anticipation that the expense will be allowed when HACL reviews the maintenance charges.

By placing the burden for disallowed costs on the contractor, this system theoretically could cause the contractor to avoid handling even serious problems if they might not be covered by the contract. This does not appear to have happened, however. To be sure, there have been instances in which HACL has disallowed after-hours maintenance expenses, but over time, the contractor has learned what problems to address, and misunderstandings have been few.

Maintenance Travel Costs. Another type of payment to the maintenance contractor beyond the fixed-price contract is for the

use of maintenance vehicles. Starting with the second maintenance contract, which was executed in July 1982, the HACL-owned vehicles were phased out of service and replaced by vehicles owned by the contractor, for which HACL pays a standard mileage rate. Each maintenance worker must account for all of the mileage on his truck daily. HACL reimburses the contractor for mileage monthly--but only after the executive director has approved the daily mileage reports.

MONITORING THE CONTRACTOR'S PERFORMANCE

Although contract maintenance might decrease HACL's operating expenses, unless the buildings and grounds were being properly cared for, the maintenance contract would be a poor bargain for the agency. Thus, monitoring to assure that all of the work is being done--promptly and properly--is important to HACL. Some of the informal procedures for contract monitoring have been discussed already. For example, the purchasing/dispatching clerk continuously monitors the backlog of routine work orders and vacant-unit work orders. The tenant-selection staff continually notes whether units are ready for occupancy on the requested dates. At the inspection performed when a new tenant moves in, the staff notes whether the work was proper and complete. Also, the executive director and board members frequently visit many of the projects and note the condition of the buildings and grounds. Moreover, given the animosity that resulted from the hiring of the maintenance contractor, former maintenance workers who are still residents, as well as tenants and townspeople who are sympathetic to their cause, are extremely willing to check the contractor's performance and report deficiencies.

In addition to these indirect and informal means of monitoring perfomance, HACL has designated the assistant executive

director specifically responsible for monitoring performance under the maintenance contract. The individual who formerly fulfilled this responsibility during the first three and one-half years of the maintenance contract had been the supervisor of the in-house maintenance operations. Because his position, an administrative slot, was not part of the contract with IBEW, he was retained during the switch to contract maintenance. This individual (the assistant maintenance supervisor) was formally assigned, among other duties, to: help introduce the contractor to particular aspects of HACL's maintenance environment, such as the nature and layout of the water, sewer, and drainage systems; to spot check the work of maintenance workers; to verify the completeness of work on vacant units; to facilitate the interaction between housing staff and the maintenance contractor regarding vacant units; and to perform quantitative analyses of the contractor's performance. Everyone at HACL and on the contractor's staff agree, however, that although this function was in theory useful, the success of contract maintenance apparently owes more to the informal feedback procedures that developed and to the knowledge and enthusiasm the executive director brought to the effort than to the activities of the assistant maintenance supervisor.

II. WHY CONTRACT MAINTENANCE IS EFFECTIVE AT HACL

As described subsequently in this chapter, available evidence on the performance of HACL's maintenance contractor indicates that it has helped to reduce maintenance costs, especially by reducing the amount of resources spent on maintenance labor and worker benefits. Concurrent with this savings, the data suggest that the speed, quality, and volume of maintenance services are somewhat better than they were with the previous system. However, there are indications that many tenants have been less pleased with the contractor than they were with the prior system, but this appears to reflect sympathy for the in-house maintenance workers rather than a true decline in service. Nevertheless, it is clear that contract maintenance has not notably improved tenant relations; and because of the strong union sentiments in the county, community relations probably have suffered somewhat, as well.

Reportedly, contract maintenance staff have been more responsive to direction and better in keeping records for the maintenance department. The executive director insists that he had little control over his in-house maintenance staff. Now, maintenance workers clearly know their responsibilities and respond to direction. When questions about procedures arise, the contractor's managers come to HACL within hours and resolutions are implemented almost immediately. The purchasing/dispatching clerk reports that he hated to come to work under the old maintenance system, because the in-house workers would not follow established procedures and would not give him the cooperation he needed to do his job. Among the tasks that he could not carry out effectively was maintaining complete maintenance records. As a result, many of the work orders did not contain essential information.

In addition to such narrative indicators, several quantitative indicators of performance show how contract maintenance has proven beneficial. These factors include:

- the costs of maintenance;
- work order volumes and the time required to complete a service request;
- the completeness of HACL's maintenance records; and
- tenant attitudes about the adequacy of maintenance services under the contract.

Before proceeding, it should be emphasized that because the duties of the contractor are equivalent to those of the previous in-house maintenance staff, comparisons of cost and performance are quite meaningful. For example, if the contractor costs less, it is not for lack of equivalent duties. If the contractor responds faster to tenants' requests for service, it is not for lack of preparing vacant units or preventive maintenance.

COST OF MAINTENANCE

During the years since HACL has had contract maintenance, its financial condition has improved substantially. In FY 1979, HACL operated in the red, and its reserves of $181,000 were just thirty-two percent of the maximum approved reserve. By FY 1983, reserves were 103 percent of the maximum approved, spending for nonroutine maintenance had increased, and bad debts from previous tenants were no longer carried as assets. Exhibit II-1 shows the development of the turnaround in HACL's financial condition during this period.

EXHIBIT II-1
TRENDS IN HACL'S OPERATING RECEIPTS AND EXPENDITURES
FY 1979 THROUGH FY 1983

EXPENDITURES AND RECEIPTS	FISCAL YEAR 1979	1980	1981	1982	1983
Operating Receipts & HUD Subsidy*	1,163	1,242	1,345	1,717	1,718
Operating Expenditures*	1,205	1,228	1,253	1,440	1,581
Operating Receipts Exclusive of HUD Contributions*	877	986	1,036	1,072	1,153
Operating Reserve	181	202	288	564	777
Maximum Operating Reserve Approved*	562	586	634	660	751
Percentage of Maximum Operating Reserve Approved	32%	34%	45%	85%	103%

* In thousands of dollars.

Of course, not all the progress indicated by Exhibit II-1 can be attributed to HACL's adoption of contract maintenance. During FY 1982 and FY 1983, the first two complete years of contract maintenance, HACL's total operating expenses actually rose more rapidly than they had during FY 1979 and FY 1980, the last two complete years of in-house maintenance. Moreover, although operating receipts (not including HUD contributions) have risen steadily since FY 1979, they rose more slowly than did operating expenses while HACL was under contract maintenance. The principal reason for HACL's financial turnaround seems to be a large increase in the HUD operating subsidy during FY 1982. This increase reflects a prior-year adjustment by HUD and a supplement to the operating subsidy. However, contract maintenance did help to cut costs and was a major factor contributing to the agency's financial improvement.

Exhibit II-2 provides a comparison of HACL's maintenance expenses for FY 1980, the last full year of in-house maintenance, and FY 1982, the first full year of contract maintenance, revealing how contract maintenance altered and reduced maintenance costs.

EXHIBIT II-2
MAINTENANCE-RELATED ACCOUNTS
FY 1980 AND FY 1982

ACCOUNT	FY 1980	FY 1982
Labor Salaries	$ 196,000	$ 0
Benefits to Maintenance Workers (estimated)	$ 50,000	$ 0
Materials	$ 74,000	$ 102,000
Maintenance Contract	$ 0	$ 178,000
Other Routine Maintenance-Related Contracts	$ 26,000	$ 39,000
TOTALS	$ 346,000	$ 319,000

As Exhibit II-2 indicates, overall maintenance costs between FY 1980 and FY 1982 declined by $27,000. This represents a decline of nearly eight percent during a two-year period in which the inflation rate was quite high. But the results are even more impressive than the bottom-line totals, because at the same time total costs decreased, there was a $28,000 increase in the cost of materials. Some of this increase may be attributed to inflation, but it also reflects the fact that the contractor handled more work orders, probably using more supplies to make needed repairs. In other words, these figures suggest that between FY 1980 and FY 1982 HACL was probably getting increased maintenance work done at a substantially reduced cost.

When the analysis focuses on the cost of acquiring maintenance workers, it reveals the size of the savings HACL has realized by engaging a maintenance contractor. Exhibit II-3 shows the costs of maintenance labor at HACL, including salaries and benefits paid to maintenance workers for FY 1979 through FY 1983 and the cost of the maintenance for FY 1981 through FY 1983. Because maintenance labor costs were $68,000 less in FY 1982 than they were in FY 1980, the agency could reduce this cost component from twenty percent of the operating budget to twelve percent within a two-year period.

EXHIBIT II-3
HACL MAINTENANCE LABOR COSTS
FY 1979 TO FY 1983

Year	Maintenance Labor Costs	Total Operating Costs	Maintenance Labor as a Percent of Total Costs
1979	$205,000	$1,205,000	17%
1980	$246,000	$1,228,000	20%
1981	$225,000	$1,253,000	18%
1982	$178,000	$1,440,000	12%
1983	$200,000	$1,581,000	13%

The savings indicated by Exhibit II-3 are quite remarkable, but they tend to understate the effect of the maintenance contract. The central issue in condsidering the cost savings of the maintenance contract is what HACL would now be paying for maintenance if it had extended the contract of the in-house unionized staff. There can be no definitive answer to this question, but assuming the terms of the contract had remained the same, maintenance labor costs would represent a similar portion of HACL's total costs as they did in the last full year of the contract. Following this reasoning and applying the FY 1980 proportion to FY 1983 costs, one can project that HACL's in-house maintenance labor would have cost the agency $331,000--or $111,000 more than it paid for contract maintenance in FY 1983.

MAINTENANCE RESPONSIVENESS AND RECORDKEEPING

To assess the areas in which the maintenance contractor at HACL has proven beneficial, data were collected on the time that elapsed between the initiation of routine work orders and the completion of the requested work during 1980 and 1983. In addition, the exterior appearance of the buildings and grounds at all HACL projects was rated in late 1984. In general, visual assessments indicated that the projects (which had just undergone modernization) appeared to be very well maintained. Other projects appeared to have maintenance problems but not as a result of poor performance by the maintenance contractor. Two projects showed signs of vandalism due to the high vacancy rates of their many four- and five-bedroom units. Another project had a shabby appearance because routine maintenance had been held to a minimum pending scheduled modernization (which HUD has postponed twice because of disagreements over funding priorities). In other cases, the buildings have asbestos siding, which is

increasingly difficult to procure. Where the siding has cracked (in many cases, due to wear and tear by tenant children), it has been replaced on an ad hoc basis with colors that do not match and in a manner that detracts from the buildings' appearance. No data are available from the period before the maintenance contractor was engaged, but it does not seem likely that these conditions were any better then.

An examination of a random sample of routine work orders completed during 1980 and 1983 reveals that a slightly faster response rate was achieved by the contract maintenance staff in 1983. Probably more significant, essential information on work orders was far more complete in 1983, and the distribution of response times appears to be more accurate for 1983 than for 1980. And moreover, the count of work orders showed that HACL processed 4,157 work orders in 1980 and 4,917 in 1983, which indicates that the contractor did more work. In order to have relatively comparable random samples, researchers selected every thirteenth work order from 1980 (for a sample of 313) and every fourteenth work order from 1983 (for a sample of 342). The results are summarized in Exhibit II-4.

EXHIBIT II-4
WORK ORDER RESPONSE TIMES
1980 AND 1983

Year	Total Work Orders	Sampled Work Orders	Work Orders With Complete Data		Average Number of Days Elapsed from Request to Completion
			Number	Percent	
1980	4,157	313	274	88%	1.25
1983	4,917	342	342	100%	1.08

As Exhibit II-4 demonstrates, the maintenance contractor in 1983 achieved an average response time of just over one day between the initiation and completion of a work order. Data from 1980 indicate that the in-house maintenance staff had achieved a response time that was only slightly slower, at 1.25 days. From these data it does not appear that the speed of response has changed significantly since the maintenance contractor replaced the in-house staff. In 1980, however, fully twelve percent of the work orders were filled out so poorly that it was impossible to determine when they had been initiated or completed. This caused HACL to lose valuable management information with its in-house staff, which is not the case with the contractor. The fact that so much information was lost during 1980 also raises questions about the accuracy of the available information, which indicated the relatively good response time of 1.25 days despite the executive director's assertion that the responsiveness of the in-house crews was terrible. Exhibit II-5 helps to indicate the probable quality of the information from each year by breaking down the response time noted on each work order for which information was available.

EXHIBIT II-5
WORK ORDERS BY ELAPSED DAYS
1980 AND 1983

	1980		1983	
Elapsed Days	Number	Percent	Number	Percent
Less than 1	210	76.6	220	64.3
1	27	9.9	70	20.5
2	8	2.9	8	2.3
3-7	20	7.3	31	9.1
8-15	5	1.8	11	3.2
More than 15	4	1.5	2	0.6
TOTALS	274	100.0	342	100.0

As Exhibit II-5 shows, in 1980, nearly seventy-seven percent of the work orders that were filled out completely indicated that work was finished on the same day that the tenant made the request, and only ten percent indicated that work was completed the next day. In most maintenance departments, this distribution would be considered very unusual because of the way that work orders are assigned. Ordinarily, the maintenance crews go out during the morning and afternoon. In the afternoon, the crews respond to work orders initiated in the morning (or previously, if there is a backlog). The work orders initiated during the afternoon are not fulfilled until the following day. With radio contact to crews in the field, it is conceivable that sixty-four percent of all work orders could be completed the same day. But to complete seventy-seven percent the same day would be very unlikely unless tenants initiated all work orders during the morning or unless the maintenance staff were waiting around with nothing to do and could respond to afternoon requests as they came in. There is no reason to think that either of these explanations applied to HACL in 1980. With twelve percent of all work orders providing insufficient information to determine response time, it is probably reasonable to assume either that the information indicating same-day responses for seventy-seven percent of the work orders is incorrect or that the response times for the incomplete twelve percent were significantly longer than the reported average.

In sum, it appears that the response time under contract maintenance has been quite good, certainly as good as that provided by the in-house staff. Moreover, HACL's maintenance records are now substantially better and more complete than they were previously. The poor quality of the 1980 data suggests that the actual response time of the in-house staff may have been worse than reported, which would make the maintenance contractor significantly better than HACL's previous system.

TENANTS' OPINIONS OF CONTRACT MAINTENANCE

A majority of respondents in a random sample of seventy-six tenants, interviewed in five of HACL's projects, reported no difference in their satisfaction with the current and previous maintenance services. Most respondents also said that the condition of the buildings and grounds was no different under the two systems. Compared with those who said maintenance services and conditions had improved, significantly more respondents claimed that maintenance conditions were worse now or that they were less satisfied now than they were when the in-house staff was responsible for maintenance.

Tenants' opinions of maintenance at HACL must be read in light of considerations beyond the mere adequacy of maintenance services. Many tenants at HACL were very sympathetic to the old maintenance staff, whose termination remains a live issue. These tenants have an interest in saying that maintenance now is worse, regardless of actual conditions. (Indeed, one of the tenants interviewed was a former HACL maintenance worker, who said he was less satisfied with maintenance now because he was out of work.) Also, at HACL, as at many housing agencies, maintenance workers are the agency's representatives who are closest to the tenants in many respects, particularly if there are no full-time project managers or social workers at the projects. HACL's contractor is interested only in providing maintenance, whereas the in-house maintenance workers spent more time with the tenants. The loss of this personal contact on nonmaintenance matters may have caused tenants to think less of the actual maintenance services.

Two critical questions were asked of tenants who had lived in HACL's housing at least since 1980:

- Comparing maintenance now with the in-house staff, would you say that you are more satisfied now, were more satisfied then, or is there any difference?

- Comparing the appearance and condition of the buildings and apartments in this project now with when the in-house staff was here, would you say you are more satisfied now, were more satisfied then, or is there any difference?

Responses to these questions are indicated in Exhibit II-6.

EXHIBIT II-6
TENANTS' OPINIONS OF MAINTENANCE SERVICES AND CONDITIONS

	Comparison of Maintenance Services		Comparison of Building and Unit Condition	
Responses	Responses	Percent	Responses	Percent
Better Now	2	3	10	13
Same	54	71	45	59
Worse Now	20	26	21	28
TOTALS	76	100	76	100

Interviewed tenants represented a broad cross-section of the tenant population. They gave a wide range of reasons for their responses but there were some common themes. Eleven of the twenty that said they were less satisfied with maintenance now stated that their response was based on the perception that the in-house maintenance men were faster or more experienced. Of the twenty-one who were less satisfied with the condition of buildings and apartments now, eleven stated that their projects were cleaner under the previous maintenance system.

Contract maintenance may lead to serious problems if more than a quarter of the tenants believe that it is worse than in-

house maintenance. Consequently, the responses of those who said the current system was worse must be examined more closely. The responses regarding cleanliness indicated a desire for a maintenance worker to be on-site full-time, which may suggest a dissatisfaction with HACL's centralized maintenance, rather than with the maintenance contractor.

Although it is difficult to determine with any precision whether maintenance is now better or worse, interpretive data are available. As the analysis of work orders indicated, the response time of the contractor is faster. The twenty tenants who said they were less satisfied with current maintenance were asked other questions regarding maintenance services. Fifteen of the twenty interviewees said that the last time they requested service, a maintenance worker arrived by the next day. Seventeen of the twenty said that the maintenance worker fixed their problem on the first visit. And eighteen said the speed and quality of the response was typical under contract maintenance. If these tenants are dissatisfied with the maintenance, it must be for reasons other than speed and quality, because their own responses indicate a maintenance service with which most housing managers would be quite happy.

Overall, interviews with tenants indicate that the maintenance provided by the contractor is good, and that most tenants are as satisfied with maintenance services and with the condition of their apartments now as they were when in-house staff provided the maintenance. Nonetheless, a significant proportion of those interviewed thought maintenance and conditions were worse under the contractor than before. These opinions may, however, reflect attitudes that go beyond the actual quality of maintenance services.

III. IMPLEMENTING CONTRACT MAINTENANCE AT OTHER AGENCIES

Contract maintenance has proven to be quite effective and economical at HACL. In some ways HACL was an ideal place to implement contract maintenance because its executive director was so skilled in the maintenance field, and its in-house maintenance staff was, according to the director, so expensive that the agency had little to lose by the experiment. In other ways, it would be difficult to find an agency less likely to hire a maintenance contractor because union sentiments are strong in the community. Three of HACL's five board members represented unions at the time of the switch. Even in late 1984, after three very successful years under contract maintenance, the chairman of the board said that he did not think the practice was worth the trouble it caused, and that he would not do it again, if he had the choice.

Before deciding to engage a maintenance contractor, agency officials should carefully consider all the ramifications that such a decision entails. At a minimum, officials should compare the current cost of maintenance with what the same services would cost if provided by a maintenance contractor. Next, an objective appraisal of the performance of the in-house maintenance staff should be made; if the performance is good, even a less costly maintenance contractor may not actually prove to be a good bargain. Finally, officials should consider the value of other benefits that a maintenance contractor could provide. Among these are improved management control and a ready source of technical assistance. If these considerations indicate that contract maintenance may be a good choice, the agency should carefully examine other costs and potential problems that might result from contracting. Only if the agency determines that it has the managerial ability to contract out its maintenance and

that all of the costs are acceptable, should it proceed to phase-out its in-house staff. Additionally, PHAs with unions should anticipate and should also take measures to be adequately prepared to address possible litigation that may arise from contracting out maintenance. As noted, HACL was required to address a suit entered by its former union, but its actions were subsequently upheld by the relevant adjudicative body.

This chapter is divided into two sections. The first outlines the basic considerations that a public housing agency must examine before undertaking contract maintenance. The second section examines the factors other than the maintenance contract's cost that an agency should consider before making its decision. You may also wish to refer to another HUD publication, Public Housing Authority Experience with Private Management: A Sourcebook (HUD-758-PDR, December 1983), for further guidance.

WHETHER TO ENGAGE A CONTRACTOR

In appraising the desirability of engaging a maintenance contractor, a public housing agency should first evaluate its own in-house maintenance operations and determine what improvements it hopes to attain by hiring a contractor. The three principal benefits realized by HACL include:

- better maintenance;
- better control over maintenance operations; and
- reduced maintenance costs.

In Lawrence County, the decision to employ contract maintenance was prompted by a desire to reduce maintenance costs and improve maintenance responsiveness.

Cost Comparison

Although HACL was able to reduce its maintenance costs substantially as a result of hiring a maintenance contractor, the agency probably would not have changed its maintenance system had it not been in such severe financial straits. Because of the way the performance funding subsidy is perceived to operate, agencies do not have great incentive to save money in their maintenance operations, unless, as was the case at HACL, they are in danger of going bankrupt. To figure the cost savings to be realized by switching to contract maintenance, a public housing agency should follow a four-step process.

First, the agency should appraise its current maintenance costs. This should include a detailed breakout of all the costs of maintenance-related functions that could be fulfilled by a contractor. At a minimum, these costs include the salaries and benefits of all current employees who would lose their jobs. There may be other costs, as well. At HACL, for example, the contractor provides maintenance vehicles and thus relieves HACL from purchasing and maintaining trucks.

Second, after itemizing the current costs of maintenance, officials should draft a document defining the scope of work for all items that are to be contracted. HACL, for example, wanted all items covered so the director noted each specifically, including all routine maintenance, lawn work, emergency maintenance, custodial work, and preventive maintenance. To ensure an adequate work force, agency officials probably would want to specify a minimum number of regular workers and custodians that the contractor should provide.

Third, when a suitable scope of work is ready, the agency should obtain an estimate of what it would cost to have a contractor perform the work. Initially, the agency should make a rough estimate based on probable wages, staff levels, and overhead margins. If this seems to indicate that adequate cost

savings might result, the agency should issue an invitation to bid and should obtain actual cost estimates from interested parties.

Fourth, the agency should compare the bids with its own costs for performing the services. It is important to ensure that the bids match the scope of work the agency has requested, and that the activities included in the cost of in-house maintenance services match those that were included in the invitation to bid. When similar scopes of work and costs are narrowly identified, the difference between the lowest bid and the actual in-house maintenance costs provides a reasonable estimate of the savings that may be realized.

Maintenance Quality and Speed

As time-consuming and costly as it is to determine the probable savings from contract maintenance, it is even more difficult to evaluate probable differences in quality. The best place to start is with an honest appraisal of the performance of the in-house maintenance department. One quick measure is to compare the department's speed with generally accepted standards for performing maintenance tasks. For example, are vacant units turned over in seven or fewer days? Are routine work orders handled within two days? Are emergencies resolved the day they are reported? In measuring these response times, the agency should be certain that its service orders are completed properly. For example, the vacancy of a unit should not be attributed to maintenance if it actually resulted from delays by the housing management staff.

Next, a qualitative set of indicators should be examined. For example, how does the maintenance-related appearance of the agency's properties compare to that of surrounding neighborhoods and other low- and moderate-income apartment complexes in the

community? Management staff should be familiar with tenant complaints about maintenance (and determine whether they are justified) and should have their own opinions about the quality and level of effort put forth by the maintenance staff.

Even if the speed and quality of maintenance are poor, contract maintenance may not be better. It may be that the in-house system is good, but that certain workers or managers perform poorly. Or it may be that the system is badly designed, and that a similarly designed system of contract maintenance also would prove deficient. It is useful to note that HACL first tried changing its maintenance structure from centralized to project-based and back again before opting for a contractor. Frequently, maintenance improvements can be effected just by providing training or making small alterations to procedures.

A public housing agency cannot be certain that a contractor would be better than its own staff. Any invitation to bid should require a bidder to list similar jobs it has performed, along with references from each job. By checking these references, the agency may gain some quality assurances.

Management Controls

It is unlikely that any agency would opt for contract maintenance solely to improve its control over maintenance. However, this was one area in which HACL realized significant improvements, both in the completeness of maintenance and inventory records and the responsiveness of maintenance workers to executive direction. If an agency's work orders are incomplete or misfiled, or if priorities are neglected for extended periods of time, responsiveness might improve under contract maintenance.

Costs of Contract Management

Even if a contractor will help an agency save money on labor costs, adequate performance must be ensured through management oversight, as with any conventional maintenance organization. In its invitation to bid, HACL specified that it could terminate the contract unilaterally on sixty days' notice. But even with such a clause, an agency must designate someone to routinely monitor contractor performance. At HACL, performance has been good, but this has required agency personnel to review travel reports, approve overtime expenses, monitor performance, and investigate tenant complaints, which is essentially not different from conventional maintenance operations.

Additionally, when a maintenance contract first is executed, it is necessary for the agency to introduce the contractor to the agency's operating system. The configuration of the building systems (especially the water and sewer system) and procedures that are particular to the agency (such as the care of boilers in various buildings) must be communicated to the contractor through close work during the early days of the contract. At HACL, these costs were minimized because of the high degree of skill the executive director had in maintenance matters. Other PHAs will need representatives with similar skills in maintenance management for contract maintenance to be cost-effective. Agencies should plan for adequate time to "shake down" operations, even under the best of circumstances. One example of this point at HACL was the time required to reach operating consensus on what constitutes an after-hours "emergency."

OTHER COSTS OF CONTRACTING FOR MAINTENANCE

Even when a public housing agency has determined that it may save money, improve maintenance speed and quality, and enhance

its management of maintenance, it still has some distance to cover before deciding to engage a contractor. There are a series of additional potential costs that should be considered, including the costs of procuring a contractor, the human and financial costs of terminating in-house staff, the political and public relations costs, the costs of termination benefits, the costs of managing a contract, and legal costs. Each of these is considered briefly below.

Procurement Costs

It is very easy to overlook the costs involved in determining the benefits of contracting and managing the procurement of the contract. It may be a costly and time-consuming project for someone to ascertain the cost of the current maintenance effort, to quantify maintenance performance, to define the scope of work for a contractor, to solicit bids, and to evaluate the differences between various proposals and the in-house operation. However, someone must perform these tasks, and they add to the cost of engaging a contractor.

Human Costs

One of the unfortunate consequences of HACL's switch to contract maintenance was that the in-house workers lost their jobs in a time and place of high unemployment. Some of them still had not found work three years later. In a medium-sized agency like HACL, close friendships develop between maintenance workers and other staff members, as well as between maintenance workers and tenants, and eliminating jobs may cause lasting bad feelings. Others presumably could minimize this hardship by providing that the contractor could hire some or all of the agency's maintenance workers. HACL did not do this, because various legal actions were pending and because the agency feared its experiment might be sabotaged by workers who had an interest in its failure.

Termination Costs

The costs of guaranteed benefits to laid-off workers could prohibit a switch to contract maintenance. For example, one small public housing agency in Pennsylvania, which was self-insured for unemployment compensation, considered engaging HACL's contractor. However, after the agency found that because its unemployment insurance cost would be so high, it would realize no savings from contract maintenance for several years.

Political and Public Relations Costs

Probably the most severe cost at HACL was in public relations. Residents of Lawrence County, who are not favorably inclined toward "union busters," strongly supported the laid-off maintenance workers who picketed HACL for months and harassed the contractor's employees as they tried to do their jobs. In late 1984, more than three years after the contractor was first engaged, stories of alleged improprieties in HACL's maintenance operations remained front page news in local papers. Most other public housing agencies probably would not face such strong support for unions and therefore probably would not have to pay such high costs in community support. HACL's contractor, for example, also provides maintenance services to the PHA in Danville, Virginia, where unionism is very weak. The president of this firm said that there are virtually no problems with public support in Danville.

Legal Costs

Since engaging a maintenance contractor, HACL has been sued twice by the maintenance workers' union, and has undergone many audits to determine whether there have been irregularities in management or financing in connection with the change in

maintenance systems. HACL has prevailed in each of these actions but has had to abosrb the costs of defending itself in court. A hidden legal cost at HACL was the time spent by the executive director, long before any action was taken to implement contract maintenance, to understand the prevailing local and state laws regarding contracting for the private provision of public services. HACL prevailed in the legal challenges because the executive director had followed proper contracting procedures. Other agency officials contemplating eliminating their in-house maintenance departments would be well advised to learn the laws governing employee relations in their states and localities. Had HACL lost these lawsuits, its costs in retroactive salaries and other probable damages (over and above the much higher cost of labor under the IBEW contract) might have been a devastating blow.

APPENDIX A
BID SOLICITATION AND SCOPE OF WORK

GENERAL INSTRUCTIONS

1. QUALIFICATION OF BIDDER

Offers will be considered only from responsible organizations or individuals now or recently engaged in the performance of maintenance service contracts. In order to determine his qualifications each bidder is requested to furnish a narrative statement listing comparable contracts which he has performed, the general history of his operating organization, and his complete experience. Each bidder is required to furnish a statement of his financial resources, show that he has the ability to maintain a staff of regular employees adequate to insure continuous performance of the work, and demonstrate that his equipment and/or plant capacity for the work contemplated is sufficient, adequate, and suitable.

Competency in performing comparable maintenance service contracts, demonstration of acceptable financial resources, personnel staffing, plant equipment, and supply sources will be considered in determining the offer to be accepted.

2. PROPOSAL SUBMISSION

All bids must be submitted on forms furnished by the Housing Authority and shall be subject to all requirements of the Specifications. Bid forms and contract documents are to be submitted in duplicate each separately bound and organized as follows:

A. Form of Proposal
B. Statement of Bidder's Construction Experience
C. Financial Information Form
D. Organization and Operating Plan
E. Key Personnel Resume
F. Statement of Wage and Fringe Benefits

Bid documents shall be sealed in an envelope which shall be clearly labeled with the words "Bid Documents," and shall show the name of the contract, name of the bidder, and the date and time of opening.

Information requested herein must be furnished completely in compliance with instructions. The information requested and the manner of submission are essential to permit prompt evaluation of all proposals on a fair and uniform basis. Accordingly, the Housing Authority reserves the right to declare as non-responsive, and reject any proposal in which material information requested is not furnished or where indirect or incomplete answers or incomplete information is provided.

3. CONDITIONS

This request does not commit the Housing Authority to pay any cost incurred in the preparation or submission of any proposal. Further, no costs may be incurred in anticipation of a contract with the exception that any such costs incurred at the bidder's risk may later be charged to any resulting contract to the extent that they would have been allowable if incurred after the date of the contract and only to the extent and subject to conditions

identified by the Contracting Officer in writing prior to the performance of any precontract work. The Contracting Officer is the sole authority to legally commit the Housing Authority to expenditure of public funds for this procurement.

This request for proposal in no way obligates the Housing Authority to award a contract.

The Housing Authority reserves the right to make an award, after receipt of proposals, without further discussion. Therefore, it is emphasized that all proposals should be submitted initially on the most favorable terms from a price and technical standpoint that the bidder can submit to the Housing Authority pursuant hereto.

4. FINANCIAL STATEMENT

GSA Form 527, Contractor's Qualifications and Financial ~~Information~~, must be completed which shall include your company's last fiscal year financial statement and any up-dating statements. This statement will be confidential and may be placed in a separate envelope properly identified. Only the statement of the lowest bidders will be reviewed.

5. ORGANIZATION AND OPERATING PLAN

Your operating plan should discuss in detail your exact approach to performing the work requirements of the proposed contract. In addition, if you do not propose to subcontract specialized functions such as window cleaning, insect and rodent control, trash removal, etc., please discuss your expertise and experience in such specialized functions.

Include in your operational plan a narrative description of the following managerial, administrative, or procedural factors:

A. Authority and responsibility of the supervisor of the function.
B. Authority and responsibilities of subordinate supervisory personnel.
C. Managerial control devices proposed including usage and cost control for labor, materials, and equipment.
D. Daily assignment of work.
E. Scheduling, assignment, and production control methods.
F. Explain your staffing concepts which permit flexibility to meet shifting or peak workloads and emergencies.
G. Discuss plans for use of second and third shift operations and state your company policy on shift differential pay.
H. Discuss plans and policy regarding utilization and control of overtime including level of authorization.
I. Production and performance standards: Define your production standards. For example, how many square feet of floor space is assigned per man-day of work for each cleaning function? How many square feet of wall per man-day for painting?
J. Quality control responsibility and detailed inspection procedures.
K. Training plans for supervisory and production personnel.
L. Status reporting--contractor management to Housing Authority.

A separate phase-in plan should be submitted which describes in detail your plan for effecting a smooth work start-up, including such items as recruitment, indentification and clearance of personnel, training, orientation, arrangement for receipt of material and equipment. The phase-in operation must be scheduled within ten working days prior to the starting date of the contract.

6. DIRECT COSTS

The minimum productive man-hour base includes all work to be done. The minimum productive man-hour base for this contract is 20,800 man-hours per contract year. Failure to propose at least this man-hour base will be cause for rejecting an offer as non-responsive. Alternate proposals below the minimum man-hour base will not be considered for award. "Productive man-hours" does not include man-hours for vacation, holidays, sick leave, supervision, or other non-productive hours. Contractor must furnish bi-weekly payroll reports.

If you propose working supervisors in the productive labor category, 20 percent of their man-hours shall be included in supervision and 80 percent in productive labor. Failure to make this adjustment could result in your proposal being declared non-responsive if our adjustment causes your productive labor base to fall below the minimum base as stated above.

The minimum productive man-hour base is not intended to restrict the bidder's approach to successful performance of the contract with maximum economy, but merely to describe a reasonable level of effort believed to be required, based upon Housing Authority experience. The bidder may propose more man-hours than the minimum base if such is needed to support his plan of operation.

7. KEY PERSONNEL

The Housing Authority will evaluate the quality and pertinence of the background and experience of the key personnel you propose to assign to manage the work of this contract. Resumes will be submitted in the format provided in the Key Personnel Resume Form.

Key Personnel should include, but is not limited to: Personnel with ample plumbing, electrical, carpentry, and chemical extermination experience.

After the bidder has submitted the resumes of the Key Personnel to be located at the work site, and if he is the successful bidder, he will maintain the same personnel in supervisory positions for the period of the contract unless by mutual agreement the parties agree with a replacement.

SCOPE OF THE WORK

A. BUILDINGS TO BE MAINTAINED

Project No.	Project Name	Address	Family	Elderly
PA 26- 2	Harbor Heights	Booker Dr., Altman Road New Castle, Pa.	76	
PA 26- 3	Walnut Ridge	Pershing St., Loop St., Massachusetts Dr., Ellwood	100	
PA 26- 4	Grant Street	Grant St., Green St., Halco Drive, New Castle, Pa.	100	
PA 26- 5A	Brinton Hill	McGrath Ave., Hazen St., New Castle, Pa.	50	
PA 26- 5B	Sciota Street	Engine House Way, W. Reynolds, S. Jefferson, Steinbrink Place, Sciota St., New Castle, Pa.	52	
PA 26- 5C	Big Run	Sciota St., S. Jefferson St., Big Run St., New Castle, PA.	22	
PA 26- 6	Skyview Towers	219 North Beaver Street, New Castle, Pa.		120
PA 26- 7	Lincoln Terrace	Lincoln Ave., Cuba St., Wick Ave., New Castle, Pa.	050	
PA 26- 8	Crescent Place	630 Crescent Avenue, Ellwood City, Pa.		50
PA 26- 9	Neshannock Village	Neshannock Ave., New Castle, Pa.	120	
PA 26-10	Lawrence Manor	211 West Moody Avenue, New Castle, Pa.		150
PA 26-12	McGrath Manor	814 W. Washington Street New Castle, Pa.		100
TOTAL NUMBER OF UNITS: 990			570	420

B. AREAS TO BE SERVICED

1. Family Units

a. All family units, interior and exterior, including vacancies.
b. All offices including halls, walks, restrooms, reception and waiting areas, desks, chairs, windows, etc.

c. All community rooms including kitchen, storage, and meeting areas including tables, chairs, carts, shelves, ledges, windows, etc.

d. All grounds and common areas.

2. Elderly Buildings

a. All elderly units including vacancies

b. All hallways, stairways, fire towers, laundry rooms, landings, boiler rooms, compactor rooms.

c. All grounds and common areas.

d. All offices, restrooms, windows.

e. All community rooms including kitchen, storage, meeting areas including tables, chairs, carts, shelves, ledges, etc.

C. WORKING HOURS

The Contractor shall provide a maintenance foreman on site on a full-time basis. This person shall work a forty (40) hour week and be on 24-hour emergency call, 7 days a week, 52 weeks a year. The maintenance employees will work a forty (40) hour week and be on 24-hour emergency call, 7 days a week, 52 weeks a year. The call-in crew will be rotated on an equitable basis. See the General Instructions, Part 6, Direct Costs, for the minimum hours required.

Contract work shall be conducted within the buildings and grounds during the normal working hours of 8 a.m. and 12 noon, and from 12:30 p.m. to 4:30 p.m., Monday through Friday. The only exceptions to the normal working hours are due to Emergency Service, Section G, and Compactor Service Maintenance, Section H.

Since Ellwood City has 150 units, the Contractor will provide a minimum of one man at this location daily for a full shift to service the area and do preventative maintenance. His instructions shall be given from his foreman, the Authority's Project Manager, or the Executive Director.

D. GENERAL DUTIES

The Contractor shall perform all general maintenance work not previously sub-contracted. This work shall include, but is not limited to, the day-to-day maintenance of grounds, structures, and appurtenances thereto for the projects listed. The Contractor is responsible for:

a. Painting, plumbing, electrical, carpentry, roof repair, insect control, catch basins in the projects, general labor, the unloading of supplies, and any other duties that may be assigned.

b. Rapid servicing of all work orders initiated by the residents or project managers through the Inventory Department. No work order

concerning mechanicals shall be over 24 hours old before repair begins. Occasionally the project manager may assign a field work order. The paper work will be completed at the central office for recording purposes.

c. Rapid repair of the vacant units which have been assigned by the Housing Authority's Occupancy Supervisor. Contractor to deliver on the following schedule:

1 Bedroom -- 1½ Days
2 Bedrooms -- 1½ Days
3 Bedrooms -- 2 Days
4 Bedrooms -- 2½ Days
5 Bedrooms -- 3 Days

Vacancies shall be repaired with speed and quality. The Contractor shall follow a procedure to include the following:

1. Initial inspection by Authority employee and Contractor's maintenance foreman.

2. Clean out unit and secure.

3. Make necessary repairs.

4. Wall preparation and painting.

5. Final Clean-up and "make ready."

6. Final inspection.

The Contractor should have a Clean-Out Crew, a Maintenance Crew, and a Make-Ready Crew for the rapid completion of vacant units.

d. The Contractor's foreman and the Housing Authority's Occupancy Supervisor, and/or the Project Manager will inspect the completed units and comment prior to tenant possession. The Project Manager will make a complete report of the inspection and co-ordinate needed repairs with the maintenance foreman.

The materials necessary for completion will be issued or delivered daily. The Contractor shall provide sufficient employees to perform the services on a timely basis. After a timely period, the Housing Authority shall require a minimum of one maintenance man per 100 units. This minimum is to be supplemented with additional personnel when required for seasonal need or heavy work loads.

E. PREVENTATIVE MAINTENANCE

The Contractor shall prepare a month-by-month Preventative Maintenance Schedule. Each monthly schedule shall specify the maintenance worthy items such as apartment furnaces, office systems HVAC, building interiors, building exteriors and roofs, grounds and ground equipment, compactors, central hot

water heating systems, and central domestic hot water systems. For each maintenance worthy item the contractor shall attach to his proposal the number and description of tasks that will be accomplished daily, weekly, monthly, semi-annually, or annually to be performed during the inspection. This schedule may be revised by the Housing Authority within thirty days after the maintenance contract has been awarded and shall include all twelve months of the initial year's service. The Housing Authority will issue work orders to conform with an approved Preventative Maintenance Schedule. The present preventative maintenance worthy items are included as Appendix A. This schedule is made a part of the Specifications and may be changed by agreement of both parties.

The Housing Authority will provide or give the needed assistance to the Contractor to compile a complete equipment inventory classified by project. This inventory shall include the name of the equipment, manufacturer number, serial number, model number, capacity or description, and location. The Housing Authority shall provide the Contractor reasonable means of access to the equipment being serviced. The Contractor shall be permitted to stop and start all equipment necessary to perform the services.

The preventative maintenance shall include, but not be limited to, the following:

Structural

Roofs, gutters, down spouts, doors, windows, siding, sidewalks, parking lots, railings, etc. All minor adjustments will be performed during the examination. All needed repairs shall be scheduled by the Contractor's foreman, and any repair normally performed by sub-contract shall be reported to the Housing Authority.

Plumbing and Heating

Cleaning, lubrication, adjustment, calibration, and filter replacement of furnaces, hot water heaters, gas and electric stoves, boilers, hot water domestic heaters, and compactors. Plumbing systems shall be checked for proper functioning and water leaks.

Electrical

Examine, clean, adjust, and calibrate all temperature control devices; Inspect and test wiring for malfunctions; observe and report overloaded wall plugs.

Policing and Cleaning of Grounds

It shall be understood that the common public areas shall be kept clean at all times according to Appendix A, Preventative Maintenance Schedule--Grounds. In general, common public areas must have trash, cans, bottles, paper, etc. picked up twice a week. In the family projects, some public streets are wholly in the project area. Where this occurs, it is the intent of the specifications that these streets be policed as if they were owned by the Housing Authority. Failure to police the area as scheduled shall not be tolerated. Upon 24-hour notice of such

failure, the Housing Authority shall have the work performed by others and shall deduct this cost from the Contractor's monthly payment. The Contractor will make a daily walk through all project common areas between 8:00 a.m. and 8:30 a.m.

Lawn Care

All areas shall have the following lawn maintenance work completed between June 1, through October 15, 1985, June 1, through October 15, 1986, and June 1, through October 15, 1987, and shall include the playground area in Lincoln Terrace, Project PA 26-7.

Cutting Grass

Cut grass promptly when the height reached three (3) inches.

Provide a total of 25 cuttings per project per season. The Housing Authority representatives must witness and certify each cutting at each project.

Trimming

All areas that cannot be cut with a mower shall be cut with a trimming tool. These areas shall be around trees, poles, fences, etc. Trimming shall be done after each mowing.

Edging of Walks

Once a year, May, 1985, May, 1986, and May, 1987, grass along all curbs and walks shall be edged with a cutting tool. Grass along curbs and within paved areas shall be removed.

Leaf Clean-up

In October and November of each year, all leaves shall be bagged and removed from each project site. Semi-annually, all leaves shall be removed from the gutters, roofs, and scuppers in all projects.

Shrubs and Flower Beds

Prune trees and shrubs as required; spray trees and shrubs with approved insecticide; mulch flower beds to a minimum of three (3) inches; weed flower beds; prepare top soil and apply three (3) inches of mulch to flower beds; apply nutrients as required.

Snow Removal

All parking lots and common walk areas must be kept free of snow accumulation.

F. VACANT UNITS

The Housing Authority currently has a vacancy rate of approximately 8.5 percent. The standard allowable vacancy rate insuring the solvency of the Housing Authority is four percent. The Housing Authority shall permit the Contractor four months from the date of the contract to bring the Authority's vacancy rate to four percent. A housing unit that has been totally repaired by the Contractor, passed inspection by the Housing Authority's Occupancy Supervisor and Project Manager, and is ready for the rental market will no longer be considered a vacancy.

The Contractor will request the location and size of unit to be worked on from the Occupancy Supervisor or authorized Authority representative. This person has knowledge of the waiting list and is KEY to filling of vacancies.

The Contractor and the Authority's authorized representative shall determine those vacant units needing interior painting or wall washing prior to their being assigned to a new resident. The Contractor shall paint and repair all walls in a workmanlike manner without damage to the trim, windows, or floors. All other repairs shall automatically be accomplished before a completion inspection is made. The Contractor is expected to secure all vacant units for protection from vandalism from the time of his first knowledge of the vacancy reported either from his men or from the Authority staff.

G. EMERGENCY SERVICE

The Contractor shall provide prompt emergency service between scheduled shifts, including overtime, as necessary to keep equipment and components in proper, safe operation. Such service response time shall be within two hours of the first call. An emergency is defined as any item affecting light, and/or water at any time, and heat only during the winter months. All overtime calls must receive prior approval from an Administrative official before work begins. The Authority reserves the unilateral right to reject overtime work that could have been performed during the regular working shift.

The Housing Authority shall pay the rate for emergency overtime only if the repair call is authorized prior to the beginning of work by the Executive Director, the Inventory Clerk, or a Board Member in the absense of the Executive Director. No other overtime will be authorized under this agreement.

H. COMPACTOR SERVICE MAINTENANCE

The Contractor shall provide the following services regarding maintenance of the compactors:

1. Care of the four compactors and removal of debris shall be considered a normal contract work item and shall require work to be scheduled

for Saturday or Sunday by the Contractor as part of the normal work week at no additional cost.

2. Empty compactor, remove trash from the floor, and place in provided containers. In Lawrence County, the containered trash is taken to the dumpster located at the site.

3. Clean, sweep, hose, and wet mop compactor room.

4. Clear any obstruction from the shute and compactor when malfunction occurs, as trained, so compactor functions properly.

5. Clean the compactor electric eye mechanism and restore into operation.

6. Clean trash rooms of each floor of paper boxes and items not put in the shute.

7. Clean shute with clearing ring, flush and wash shute. Fill compactor's disinfectant reservoir with disinfectant as ordered by the Contractor and/or supplied by the Housing Authority.

8. Report any malfunctions or mechanism failures immediately to the Administrative/Maintenance Office.

9. Service to the compactors shall be scheduled with the hauler. Compacted and related trash shall be set out to be picked up once or twice a week. When, or if, the hauler's schedule changes, trash set out will be coordinated by the Contractor's maintenance foreman. The Contractor's maintenance foreman shall not alter the method or number of trash pick-ups to suit his schedule.

10. Return of containers shall be handled by returning containers to the room on the same day.

11. Clean dock area of all trash and papers and sweep. Clean containers periodically.

I. EMERGENCY GENERATOR TESTING

Every month the emergency generators shall be run twenty minutes. Monthly, a battery check shall be made for water and filled if needed, as trained. Also check the oil, as trained by the Housing Authority. The servicing mechanic shall date the schedule located on the generator and list the starting and stopping time or meter reading and initial the entry.

J. SITE LIGHTING

Defective outside bulbs on buildings and outside pole lighting shall be replaced by the Contractor.

K. ELEVATOR SERVICE

The Contractor shall change lights and clean elevators at the same intervals as the lobby floors, or when deemed necessary by management.

Elevators shall be cleaned, swept, or mopped daily.

L. EQUIPMENT AND SUPPLIES

The Housing Authority shall maintain an adequate inventory of applicable supplies, spare parts, replacement equipment, vehicles, large electrical equipment such as rigid sewer augers, power saws, drills, key machines, exterminating equipment, and all other materials necessary to perform the maintenance function. The Housing Authority expects to have the Contractor furnish vehicles. At least seven service trucks must be made available. The Contractor will be reimbursed the current rate of mileage as approved by the local and county governing bodies. The Contractor must have mileage tickets turned in daily to the Authority to be checked by Authority personnel.

The Contractor shall provide his employees with all the necessary hand tools to accomplish the duties of this Contract.

The Contractor's employees shall not be permitted to use Authority-owned equipment on personal property or for personal reasons. The Housing Authority shall not approve any request by any employee of the Contractor to use the Authority's equipment for anything other than Authority business. Any person found in violation of this requirement shall be disciplined accordingly.

M. SAFETY

The Contractor shall use all necessary barriers, signs, safety devices, lights, and covers necessary to protect all pedestrians and property in and out of the Contractor's scope.

N. FIRE DOORS

After checking the hall lights in the fire towers, close all fire doors and remove all blockage. Check lights and doors daily.

O. CONTRACTOR'S REPORTING FORMS

After award of the contract, the Housing Authority and the Contractor shall design the necessary reporting and inspection forms to control the Contractor's work performance and quality of maintenance in all sections of the contract.

The Contractor shall submit monthly job status reports of all work accomplished during each month of contract performance in each work area and for each task order, if any. The report format will be as requested by the Authority. The reports shall be submitted to the Executive Director

by the tenth working day of the month following the end of the report period. Reports shall be in narrative form, brief, and informational in content. Photographs and illustrations may be included, if appropriate. The reports shall include, but not be limited to, the following:

1. Description of overall progress.

2. Current problems which may impede performance and proposed corrective action.

3. Work performed in the previous work period.

   A. Preventative work to be performed during the next month reporting period.

4. The number of personnel in each labor category as of the last day of the reporting period. This report should also include the number of terminations, hires, and transfers by labor category.

5. Actual straight and overtime man-hours worked during the month.

6. An accident experience report.

7. If work has been sub-contracted, state what was so accomplished.

8. Payroll report for the previous month.

P. INSPECTION

The Contractor shall conduct quality control inspections as required and may be required to accompany the Housing Authority's inspector or HUD personnel during requested periodical inspections of the normal maintenance cycle, or, in case of problem areas, of unfinished contract work.

All complaints registered verbally, or in writing, by authorized Housing Authority personnel shall be corrected the next working day. If the complaint is major in nature, the entire cycle of work shall be completed the next working day. Certain Housing Authority contact personnel shall be designated for quality control and shall have the authority to determine the performance of the Contractor.

Q. PERSONNEL

The Contractor shall furnish the manpower to perform all the required sections of the specifications. The Contractor shall be responsible for the entire scope of each employee's responsibility and liability of each employee in performance of their work functions.

1. The Contractor shall meet all wage and hour regulations. The bid shall include a Statement of Wage and Fringe Benefits paid by the Contractor for each class employee at the time of bidding. Proof

of the wage and fringe package paid by the Contractor will be presented to the Housing Authority within ten days after the close of each pay period.

2. The Contractor shall provide liability insurance for employees' actions and damage to Housing Authority and tenant property as well as injury due to contract performance in accordance with the General Conditions.

3. All persons that work on this contract shall be employees of the Contractor not the Housing Authority.

4. No person who has pending litigation against the Housing Authority may be employed by the Contractor.

5. The Contractor's employees shall not sub-contract or work for the Housing Authority's tenants during or after normal working hours.

6. If a Contractor's employee has violated a Housing Authority or probationary rule of the Contractor, he may be terminated immediately.

7. When the Contractor's employees are not working or functioning as part of this contract, they shall not be on the premises.

8. Employees shall be dressed in neat, clean uniforms which shall clearly identify them as the Contractor's employees. All personnel will be dressed alike with the exception of the usual difference in the attire of the sexes. The uniform shall have the Contractor's name affixed thereon in a permanent manner. Employees shall be required to dress neatly commensurate with the tasks being performed. The Contractor shall furnish all necessary special work clothing or foot wear for his employees.

9. All employees assigned by the Contractor to the performance of work under this contract shall be physically able to do their assigned work and shall be free from communicable diseases. Each one shall be given a physical examination without cost to the Housing Authority and a physician's certificate giving notice as to the results shall be furnished to the Executive Director before the employee is assigned to duty. In some special circumstances, the Executive Director may in his judgment permit a contract employee to enter on duty and work for as long as three days before obtaining the physician's certification. Notwithstanding the furnishing of this certificate, however, the Contractor shall not be relieved from the obligation imposed upon him by the first sentence of this paragraph.

10. Employees of the Contractor shall be issued keys. If keys are lost by the Contractor, the cost of changing locks or duplication of keys shall be at the expense of the Contractor. The Contractor shall orientate all employees regarding policies and restrictions of the Housing Authority before being hired for contract work.

11. Frequently the Housing Authority receives outside grants to train low-income and disadvantaged individuals. The participants are funded

through outside agencies and none of their wages or fringe benefits are the responsibility of the Housing Authority or the Contractor. The Contractor shall permit the use of these individuals for grass cutting, groundskeeping, painting, vacant unit clean-up, and general laborer duties as part of the maintenance services agreement. In the event these grants are not received, the Housing Authority will consider these work items as part of the contract specifications.

R. INSURANCE AND LIABILITY

The Contractor shall carry all liability, workmen's compensation, and any type of insurance necessary to hold the Housing Authority free of liability for action of the Contractor's employees due to performance, equipment, material, or contract scope.

S. RODENT AND INSECT CONTROL

Initial Service--The premises shall be thoroughly inspected to identify infested areas, and areas of potential infestation. Intensive control measures shall be taken to control and eliminate all existing problems during the first month of service.

The Contractor shall submit a report of his findings and the corrective actions taken by him, to the Executive Director within five days following the end of the first month of the contract. The report shall indicate the interior and exterior conditions found and the nature and scope of the remedial actions taken by him.

Follow-up Service--During the life of the contract, as a minimum requirement, further inspections of the premises shall be made monthly. Appropriate treatments shall be applied as indicated and as necessary to control insect and rodent infestations.

Safety Precautions--In order to protect buildings' occupants and safeguard property, the Contractor shall adhere to the following:

1. Interior premises shall be treated with pesticides only when they are vacant.

2. Applicators shall be provided with protective clothing and gear by the Contractor. This clothing and gear shall be worn during the application of all pesticides.

3. Applicator or Contractor shall be State approved to use pesticides.

T. CONTRACT PAYMENT

The contract price shall be broken down into monthly payments. The Contractor shall invoice for each completed month by the fifth of the following month. The Housing Authority shall make payment by the tenth of the following month. Performance of work may be deducted from the monthly payments based

on factual information as stated above. If the work is immediately corrected, a deduction from the billing will not occur.

U. CONTRACTOR'S RESPONSIBILITY FOR DAMAGES

The Contractor shall be responsible for all damages to persons or property that occur as a result of his fault or negligence as well as that resulting from acts of his employees, agents, and sub-contractors and he shall save and keep harmless the Housing Authority against any or all loss, cost, damage, claims, expenses, or liability in connection with the performance of this contract.

V. CONTRACTOR'S RESPONSIBILITY FOR EMPLOYEES AND PLANT

The Contractor shall be responsible for the safety of his employees, plant, and material, and for any injury or damage done to or by them. He shall protect the Housing Authority from all claims for damages to any and all persons and/or property resulting from the fault or negligence of any of his employees. While in the public buildings covered by this contract in connection with the performance of the contract, employees of the Contractor shall be subject to the same regulations of conduct as those governing employees of the Housing Authority. It is part of the Contractor's responsibility in the maintenance of the buildings, to assist in the protection of Authority property. This includes assisting the prevention of thefts. The Contractor shall alert each of his employees to exercise a reasonable vigilance in implementing this policy and to notify the Administrative/Maintenance Office when an unauthorized or suspicious person is seen on the premises.

W. ACCESS TO AUTHORITY PREMISES

The Contractor shall not permit any individual to have access to the buildings or grounds herein until it has been determined that permitting such person or persons to have such access will not be contrary to the public interest and that the individual is authorized to be admitted in accordance with applicable orders, rules, regulations, and instructions. These prohibitions and requirements shall also be applicable to all individuals with regard to access, removal, and/or possession of classified data, materials, supplies, equipment, and all Authority-owned property at the locations designated in the contract.

X. TERM OF AGREEMENT

This requirement is for a three year period of time. This period is predicated upon the need for program continuity and is intended to provide stability through uninterrupted service.

Y. TERMINATION OF AGREEMENT

This agreement may be terminated by the Housing Authority by giving a sixty-day written notice by certified mail provided that such termination shall not affect any rights or obligations which shall have accrued to either party prior to the effective date of such termination.

In the event the Contractor does not have adequate personnel either in number or in skill to accomplish the work as needed, the Housing Authority reserves the right to hire outside personnel to accomplish such work and to deduct the wage rate for said personnel from the contract amount during the current month for the work.

The Contractor shall furnish prior to the signing of the contract a performance bond in the amount of the total contract for the entire period of the agreement.

FUNCTIONAL AREA:	Maintenance and Custodial
EFFECTIVE MANAGEMENT PRACTICE:	Preventive Maintenance Program
AGENCY:	Huntsville Housing Authority (Huntsville, Alabama)
SIZE:	Large

EXECUTIVE SUMMARY

This case study focuses on the preventive maintenance program of the Huntsville Housing Authority (HHA) in Huntsville, Alabama. An overview of the agency's operations appears on the following page.

HHA officials have found that by designating some of their routine maintenance staff to preventive maintenance activities, the agency is better able to maintain the appearance and condition of housing stock. HHA's preventive maintenance program has five essential elements: a dedicated preventive maintenance crew; housekeeping inspections; monthly exterior inspections; regular storm door and window maintenance; and other miscellaneous activities. This case study describes these preventive maintenance activities in detail and illustrates how they have helped to contain maintenance costs, reduce the number of work requests initiated by tenants, and improve the overall condition of HHA's physical stock.

Chapter III of this study addresses how other agencies might adopt similar practices. Discussed in that chapter is how other agencies could: designate a preventive maintenance team, including the equipment that would be needed; establish a maintenance schedule; and effectively monitor work performance.

HUNTSVILLE AT A GLANCE

CHARACTERISTICS	DATA
Total Stock:	1,755 units of LIPH in 11 projects (also 220 units of owned public housing and a small Section 8 program)
• Projects for Families:	8 projects
• Projects for Elderly Tenants:	3 projects
• Unit Sizes:	efficiency ..... 7 percent one-bedroom ..... 23 percent two-bedroom ..... 36 percent three-bedroom .... 25 percent four-bedroom ..... 7 percent five-bedroom ..... 2 percent
• Largest Project:	Northwoods (269 units)
• Smallest Project:	Council Court Addition (16 units)
• Oldest Project:	Council Court (1953)
• Newest Project:	Searcy Homes (1971)
Demographics:	
• One-Parent Households:	74 percent
• Minority Tenants:	90 percent
• Children Under 18:	50 percent
Operations:	
• Operating Expenditures:	$200.86 (PUM)
• Dwelling Rentals:	$ 82.42 (PUM)
• Operating Reserve:	98.8 percent of allowable level
• Staffing:	98 employees: 33 administrative; 57 maintenance; and 8 tenant and protective services.

I. HHA'S PREVENTIVE MAINTENANCE OPERATIONS

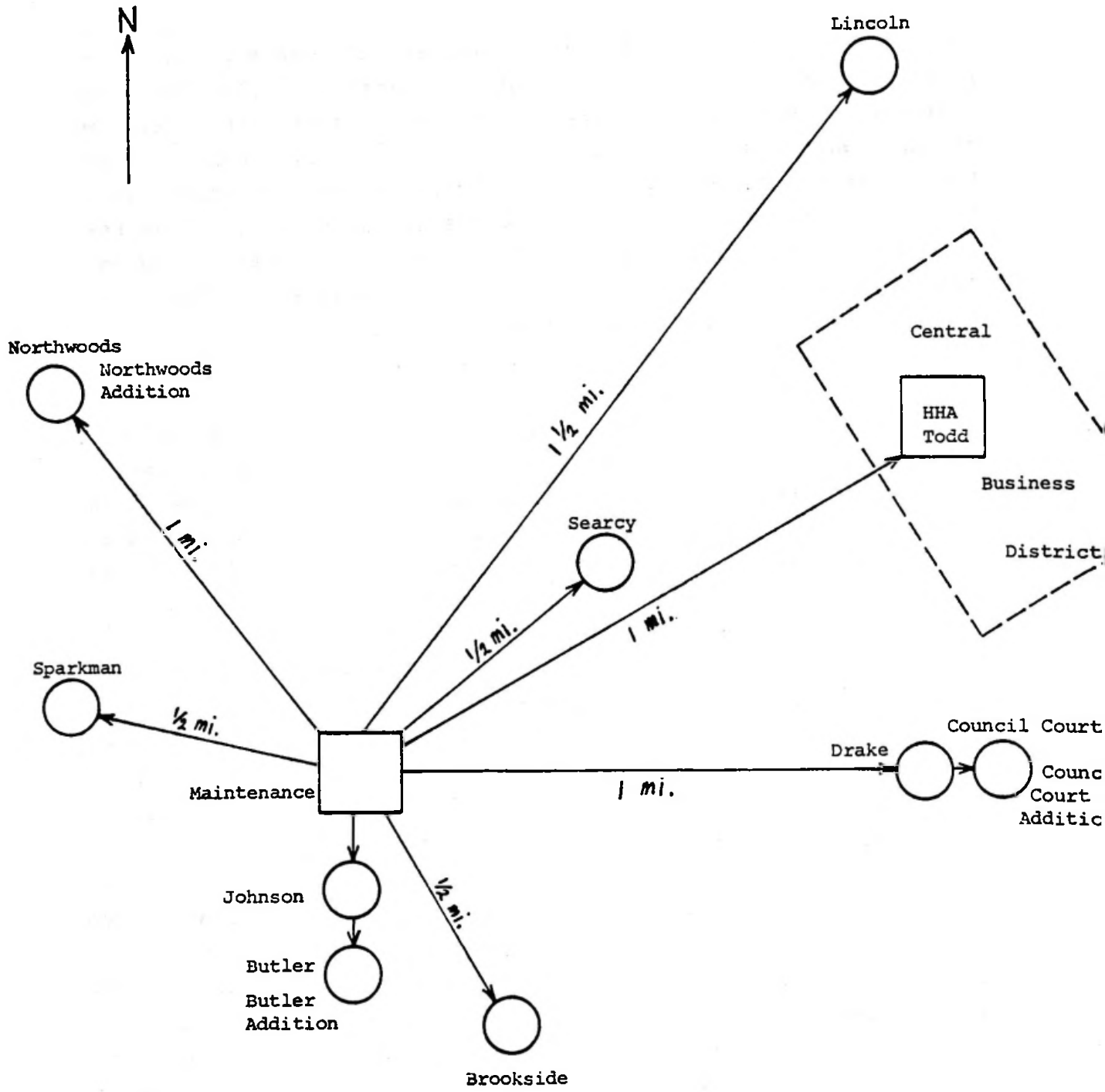
This chapter comprehensively examines the general organization of HHA's maintenance function, with particular focus on Huntsville's preventive maintenance program. After an overview of the agency's organization and staffing of maintenance operations, the discussion turns to a brief review of the procedures that HHA employs to perform such maintenance functions as responding to tenant requests for service and preparing vacant apartments for rental. The chapter ends with a description of the current preventive maintenance operation.

ORGANIZATION AND STAFFING

Huntsville's maintenance operation is fully centralized, with all maintenance staff working out of a large central facility. This central shop is located about a mile away from HHA's central administrative offices in a light-industrial area near several of the LIPH developments. The central shop is quite well suited to its function; Exhibit I-1 displays its geographic relationship to other sites.

The shop is large enough to accommodate all maintenance functions, provide office space for maintenance staff, and provide storage space for stoves and refrigerators in need of cleaning or repair and for all maintenance vehicles and equipment. Nearly all the maintenance-related employees use this shop as their base of operations. The only exceptions are the planning and engineering chief, who has an office in the central administrative building, and his special assistant, who has an office at a project site. All the other maintenance workers report to the central shop in the morning. Some receive assignments that take them to various HHA properties, while others report to work stations within the maintenance shop itself. HHA has about ten trucks which employees use to travel to work in the projects and to carry parts and equipment.

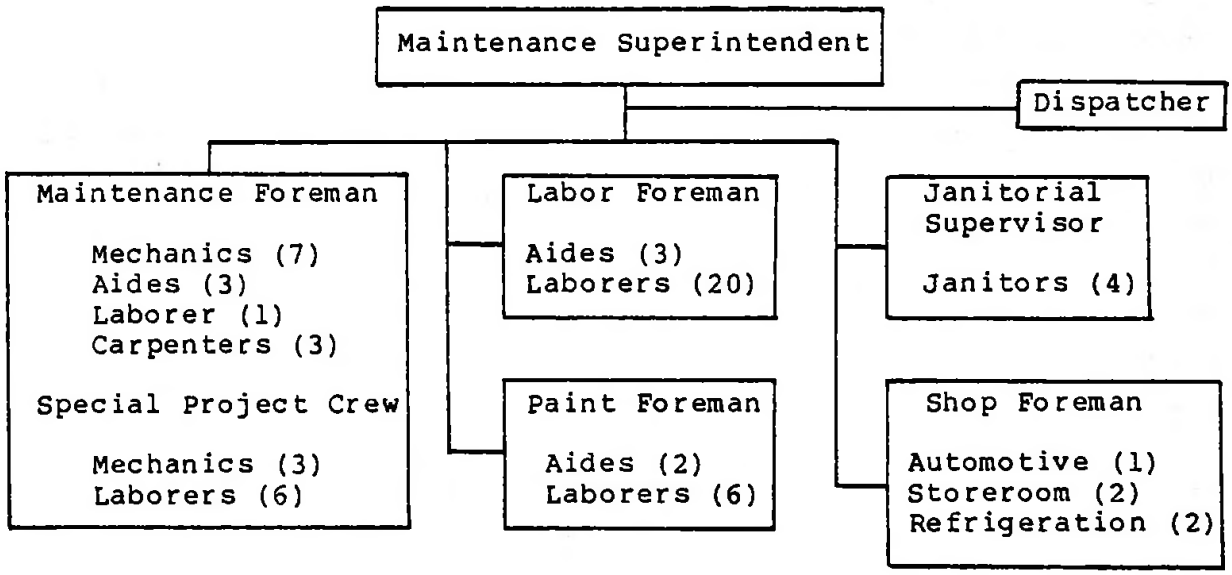
EXHIBIT I-1
GEOGRAPHIC CONFIGURATION OF HHA



The maintenance superintendent, who has served HHA in this capacity for many years, is in charge of all operations administered through the maintenance shop. Under the maintenance superintendent are five major divisions, including the maintenance, labor, paint, shop, and janitorial divisions. The janitorial division is managed by an individual titled supervisor, while the other divisions are headed by foremen. Exhibit I-2 provides an organizational chart for HHA's maintenance operations as of the end of August 1984.

EXHIBIT I-2

ORGANIZATIONAL CHART OF HHA'S MAINTENANCE OPERATIONS



The organizational chart shows some sixty-six positions within the maintenance department. The department hires seasonal temporary employees, whose number fluctuates widely during the year. The number peaks during the summer when the need for lawn care and landscaping is highest. Most of these temporary positions are included as "laborers" under the labor foreman. The overall number of HHA employees varies somewhat throughout this

case study because of the fluctuation in seasonal employees and the dates for which personnel reports were available. None of HHA's employees are represented by a labor union.

In addition to the five maintenance and janitorial crews, the organizational chart denotes the position of maintenance clerk/dispatcher. This individual is the hub of all maintenance activity, including receiving requests for service, maintaining radio contact with maintenance crews, and providing direction to those crews based on continuous contact with the maintenance superintendent.

Other Staff Who Contribute To Maintenance

Two types of employees located in HHA's housing management division also make important contributions to the maintenance function. These are the management coordinators and the housekeeping inspectors.

Management coordinators at HHA are principally responsible for tenant relations. Their main functions involve tenant orientation and the enforcement of behavioral rules, but they also play a key role in preparing vacant units for rental. When tenants provide notices of intent to vacate, the management coordinators notify the maintenance department so that the maintenance superintendent can include the work in the schedule for the upcoming month. When tenants leave, the coordinators perform inspections, which become the basis for orders to prepare units for rental. They also assist tenants moving in, and may notify the maintenance department of problems overlooked during preparation.

Two housekeeping inspectors at HHA regularly check the cleanliness of each apartment. If they find conditions in serious need of repair, they request service. Until recently, the housekeeping inspectors wrote work orders for any maintenance needs they noticed, thus directly contributing to preventive maintenance. Now, however, they report only conditions that urgently require correction. The change in

policy occurred because it was thought to duplicate the preventive maintenance policy, it discouraged tenants from calling in their own work orders (because they knew that several times each year the inspectors would come around to receive their requests), and because the housekeeping inspectors were inundating the maintenance department with apparently trivial work order requests.

ROUTINE MAINTENANCE PROCEDURES

Before proceeding with a review of HHA's preventive maintenance activity, this section provides an overview of how HHA handles other key aspects of maintenance, including procedures for assigning work, responding to work orders and preparing vacant units.

Assigning Work

The size and scope of Huntsville's operations allow considerable specialization not found in smaller agencies, but the manner of direction has much in common with that of smaller maintenance shops. The maintenance superintendent makes most staff assignments, and the lack of automation in the work order system keeps decisionmaking somewhat informal.

HHA's maintenance superintendent makes work assignments in conjunction with the four foremen. They monitor the amount of work chiefly by counting work orders and vacant units, then determining the amount of manpower available each day (in light of vacations and absences). Based on these inputs, they make the appropriate work assignments. Each individual assignment is reviewed on a daily basis to provide coordination between different work crews and to ensure that vacant units are prepared as soon as possible and that other urgent tasks are addressed. Work assignments are made the first thing each morning after everyone has reported to work. Staff members congregate in a large meeting room, where an assignments board notes everyone's work station for the day.

task, the next crew can begin. HHA's maintenance superintendent, in consultation with the four foremen, performs this coordinating task quite well. A unit is rarely vacant for more than a week.

As in all well-run agencies, vacant units are a major priority, because of the revenue loss they entail. In Huntsville, the maintenance superintendent submits a daily report to the executive director on the status of vacancies (see Exihibit I-4). The report provides a breakdown of vacant apartments based on whether they have been reported to maintenance: (1) less than seven days; (2) eight to fifteen days; (3) sixteen to thirty days; or (4) more than thirty days. The requirement of a daily report helps to make vacancies a priority of the maintenance department and forces the maintenance superintendent to keep on top of the vacancy workload. Whenever units are vacant for more than seven days, their preparation becomes a very high priority of HHA's maintenance department.

REVIEW OF HHA'S PREVENTIVE MAINTENANCE PROGRAM

Preventive maintenance is one of three principal categories of maintenance operations; the others are ordinary or recurring maintenance and extraordinary maintenance, replacements, betterments, and additions. Preventive maintenance is distinguished from the others because it entails actions taken to avoid or minimize the need for costly measures at some future time. It is performed before actual breakdown thereby preventing costly replacements and, in the case of operating equipment, lengthy shutdowns. Virtually all systems and infrastructure require some preventive maintenance treatment to ensure their long-term viability. The reader is referred to the HUD Low-Rent Housing Handbook, which identifies thirteen specific elements of preventive maintenance, and industry trade publications for further delineation of the typical elements included in a comprehensive preventive maintenance program.

EXHIBIT I-4
VACANCIES IN MAINTENANCE DAILY REPORT

DAILY REPORT DATE: 6/13/85
VACANCIES IN MAINTENANCE

TO: [redacted] Executive Director
The Housing Authority of the City of Huntsville, Alabama

ADDRESS	DATE IN	TODAYS CHANGES ADDED TO MAINT.	TODAYS CHANGES S/R TO MGMT.	COMMENTS
IN WORK LOAD MORE THAN 30 DAYS:				
IN WORK LOAD MORE THAN 15 DAYS				
IN WORK LOAD MORE THAN 7 DAYS:				
IN WORK LOAD 7 OR LESS DAYS:				
3 Bdrm. 402-A Dallas 6	6/7/85	Completed		Poor
3 Bdrm. 1406-A Graceland 6	6/7/85	Completed		Poor
2 Bdrm. 103-C Indiana 3	6/10/85			Poor
1 Bdrm. 613 Apt 3	6/10/85			Fair
1 Bdrm. 2706-A Klondike	6/13/85			Good
2 Bdrm. 125-B Mason	6/13/85			Fair

I certify that I have examined the maintenance work load for vacancies after 3:00 p.m. this date and the above represents the exact status found. Futher, each apartment has been checked for security and vandalism on this date.

HHA's Approach to Preventive Maintenance

The core of Huntsville's preventive maintenance system is the two-man crew that systematically goes from unit to unit making necessary repairs. For the problems that cannot be corrected on the spot, the crew writes work orders so the appropriate crews subsequently can make the repairs. To a large extent, the work of this crew would be unnecessary if tenants always reported conditions that required correction. Many tenants however, do not call to request service. Some tenants are reluctant to call because they caused the damage and do not want to pay for it, whereas others apparently prefer to have the apartment in less than perfect condition than to have repairs made. Consequently, the preventive maintenance crew always finds plenty of work that needs to be done.

Other components of HHA's program include: inspections conducted by housekeeping inspectors and regular maintenance crews; monthly inspections of the agency's fences and playgrounds by maintenance staff; and miscellaneous activities, including preventive maintenance performed at the maintenance shop and on auxiliary power units.

The following subsections respectively address the five elements of HHA's program.

The Preventive Maintenance Crew

The preventive maintenance crew is the essential element of HHA's preventive maintenance operation and is quite simple. Two maintenance workers, a mechanic and an aide, are assigned to spend every day going from project to project and unit to unit, checking all systems within each apartment, writing up work orders, and making repairs along the way. Using this approach, HHA annually allocates two staff-years to this activity, time which could be used for responding to service requests or preparing vacant units. In exchange, however, HHA receives the following benefits: most minor repairs are made in a programmed manner; no apartment goes longer than one year without correc-

tive maintenance; and possible reductions in vacant unit preparation time.

This practice began about ten years ago during slack times, when one particular worker went from door to door in a project asking if there was anything he could fix. Several years later, after the worker had left the agency, HHA hired two individuals to carry out this same function on a formal basis. Since 1980, the preventive maintenance mechanic has been the same person, and there has been one change in the aide who accompanies him. The maintenance management says these workers are "not the best at any one thing, but they are skilled in just about everything, and they're very quick, and they get along with the tenants."

The crew starts out the year with a list of all the apartments in each of the thirteen projects. Their work schedule is to proceed routinely through the list visiting each apartment during the course of the year. Occasionally though, they are diverted from preventive maintenance to fill in for workers with other responsibilities. Such diversions are out of the ordinary, however.

The preventive maintenance crew has a step van, which is bigger and more elaborately outfitted than the pickup trucks most other maintenance crews use. The reason for this is that the inventory on the van is big enough to accommodate routine repairs in any of HHA's buildings, whereas most maintenance crews only work in one area, and thus, only need parts appropriate for those buildings.

Procedures. The basic procedure the preventive maintenance co-workers follow each day is to pick up where they left off on their list of apartments and proceed according to the steps detailed in Exhibit I-5. Several aspects of these procedures are worth emphasizing. One is their efficiency. On entering the apartment, the crew very quickly goes through the entire unit to determine what may be wrong. Then, unless there are many jobs that need to be done, one crew member starts to make repairs, while the other does the clerical tasks of writing up inspection sheets and work orders. Frequently, the repair work

EXHIBIT I-5

PREVENTIVE MAINTENANCE PROCEDURES

STEP	ACTIVITY
1	Knock on the door and ask for admittance. ("Good morning, we're maintenance and we'd like to inspect your apartment.") If no one is home, crew members let themselves in and leave a note; if they are refused entry, they contact a housing management coordinator who eventually arranges admittance.
2	Upon entry, the crew members head in opposite directions, inspecting different parts of the apartment. At a minimum they check the following: o every light switch; o every faucet and tap; o the toilet and tank; o the commode seat; o the walls (both for cracks and holes and for nonregulation paint or wallpaper); o the mailbox; o the presence of every ceiling light globe; o whether double hung windows slide easily up and down; o every lock and door knob; o every bathroom fixture (for tight fit); o the presence and condition of storm doors and windows; and o the quality of housekeeping (particularly poor housekeeping is reported to housing management officials as a behavioral problem).
3	If the tenant is there, crew members ask whether there is anything they might have missed that requires maintenance.
4	One crew member then fills out an inspection sheet (See Appendix B for facsimile) that notes each element and whether it required attention, or, if everything is in good repair, that the apartment has been checked and no work was needed.
5	The same crew member then writes work orders for the deficiencies. Those that they can fix on the spot (most things) go on one work order. Those that require another crew (such as plastering or storm window work) go on a separate work order and those which require a part not on their truck go on another work order.

EXHIBIT I-5 (continued)

STEP	ACTIVITY
6	Both crew members immediately undertake the repairs they can make on the spot.
7	Referring to an annually published list of prices for particular parts, the crew notes the amount and separately determines which items should be charged to the tenant.
8	Before departing, the crew gives the tenant one copy of the work order, noting any applicable tenant charges, or leaves the copy in a conspicuous location if the tenant is not home.

is completed at the same time as the paperwork. Where the work is beyond the preventive maintenance crew's capabilities (if it involves, for example, plastering or replacing a storm window), one member will write a work order for the appropriate crew. It should be noted that HHA presently does not have explicit standards to determine whether items should be repaired or replaced. One possible enhancement that other agencies may want to consider is establishing a simple set of standards that address key inspection items. After completing this cycle of activities, the crew checks the apartment off its list and goes to the next apartment to begin again.

On returning to HHA's central maintenance shop, the preventive maintenance crew turns in the paperwork from the trip to the dispatcher. This documentation includes a list of the units inspected, the inspection sheets from each unit, and the work orders that were written during that trip. The dispatcher files both the inspection sheet and the completed work orders in the apartment file, and treats the uncompleted work orders just as she would if she had written them herself. That is, she determines who should do the work and then files the work order accordingly--storm-door work for the storm-door crew, painting for the painting crew, and so forth.

Housekeeping Inspections

Another activity related to preventive maintenance is the performance of housekeeping inspections. HHA makes frequent checks on the cleanliness and safety of every apartment, partly to ensure that maintenance problems do not develop.

Inspection Team. Housekeeping inspections are a formal task of the housing management group in Huntsville. There are two housekeeping inspectors, a man and a woman, who work as a team, much as the preventive maintenance crew does. The team goes from project to project and unit to unit making inspections. Basically, they check housekeeping habits and rate the condition of each apartment on a scale from 1 to 4, with 4 being very poor. Apartments that receive very poor ratings are checked frequently thereafter, until the condition improves to an acceptable level. Only in extreme cases will failure to improve lead to initiation of eviction proceedings. These housekeeping inspectors, because they do not actually undertake corrective action, move faster than the preventive maintenance crew, and are able to cover each HHA apartment about three times per year.

All maintenance crews (including the preventive maintenance crew) also perform housekeeping inspections. The crews receive training in the procedures that the housekeeping inspectors use, and they inspect for housekeeping whenever they enter an apartment. On each work order a maintenance crew handles, a member of the crew writes the housekeeping rating of the apartment. When the work orders are turned in, the dispatcher records the housekeeping ratings made by the maintenance men. All apartments rated as very bad are included in a report to housing management staff and intensive efforts to improve the condition are undertaken. These efforts include biweekly visits by housekeeping inspectors until a favorable rating is achieved. If there is no improvement after several visits, eviction proceedings are initiated.

Monthly Exterior Inspections

All of HHA's developments have fences around substantial portions of the property, and all of the projects for families have playground equipment of some sort. Another part of preventive maintenance at HHA is the routine monthly inspection of these amenities. The executive director requires the maintenance department to file regular monthly reports about each project.

As with the preventive maintenance crew, two individuals have been designated to carry out these inspections each month. There has been little turnover in these positions. One of the maintenance workers on the vacant-unit crew is responsible for inspecting playgrounds. Sometime during each month, when he is on a site with playground equipment, he checks to see that everything is in proper working condition and writes a standard report. One of the permanent staff in the laborer group follows a similar procedure with regard to fences. Both staff members turn in their reports to the maintenance superintendent, who submits them to the executive director at the end of the month.

These inspections are not time consuming and probably not of overwhelming consequence. Nonetheless, they ensure that visible aspects of HHA property receive enough attention to prevent them from becoming hazards or eyesores.

Storm Door and Window Maintenance

There are preventive aspects of the work performed by the storm-door crew. The existence of a special crew to handle nothing but storm doors and windows results from the executive director's belief in the extreme importance of replacing or repairing missing or broken aluminum windows to improve the appearance of public housing. He lets the maintenance department know that it is a priority, and he calls the department to order the correction of any such problems he notices during his frequent drives through the developments.

Most of the work the storm-door crew performs is in

response to a tenant's request for services or to work orders for preparing vacant units. The preventive maintenance crew also passes work along to the storm-door crew. When they are between assignments or even when they are just driving to or from particular jobs, members of the storm-door crew are expected to notice work that needs doing and to act independently to make sure that all of HHA's storm doors and windows are in place and functioning properly.

Miscellaneous Preventive Maintenance Activities

Shop Preventive Maintenance. The shop at HHA has had preventive maintenance responsibilities for many years. All of the equipment used by the maintenance department--trucks, cars, mowers, backhoes, portable generators, air compressors, etc.--are subject to the shop's comprehensive preventive maintenance program. Every piece of equipment has its own individual card or jacket file. The card or file provides basic information and is used to record the equipment's service history. Preventive maintenance is performed in two separate but related operations. Phase one consists of four actions performed in sequence at regular intervals of one week or less. These four actions are inspection, lubrication, adjusting, and reporting. Phase two consists of similar but more in-depth actions performed at quarterly intervals. Such actions are: (1) completing detailed inspections; (2) making necessary repairs; and (3) reporting work in each history record. Machines are not taken out of the daily work schedule for phase one maintenance. In most cases, when serious problems are discovered during the phase one inspection, the problem can be scheduled for correction at a later date. Phase two actions are strictly scheduled; supervisors therefore can schedule the machines' usage to accomodate the program without detrimental effects on their work schedules.

Auxiliary Power Units. HHA has a diesel-powered generator in each of its three high-rise buildings to provide electrical power for the elevators and lights in case of an emergency. As

part of the overall preventive maintenance program, one specially trained mechanic (or a trained back-up) is required to perform a preventive maintenance check on each of the three generators once a week. This check includes starting the diesel-powered engine--checking its operation, fuel quantitites, belts, gauges, etc.--all to ensure that in case of an emergency, there will be no failure in the emergency power supply.

II. WHY HHA'S PREVENTIVE MAINTENANCE IS EFFECTIVE

Huntsville's preventive maintenance program is effective principally in ensuring that all of the agency's housing units are inspected regularly and repaired if necessary, regardless of tenants' inclination to request service. This routine preventive treatment has given HHA a good visual image and has kept the number of deficiencies in the apartments very low.

Among the benefits of a good preventive maintenance program are reduced future maintenance costs, enhanced image of the agency in the community, and safer and more sanitary housing. The conclusions presented in this chapter suggest that as a result of HHA's program, individual apartments and highly visible exterior components of the projects rarely fall below minimum standards of acceptability. The information supporting these conclusions also suggests that HHA realizes cost savings in its maintenance operations due to its preventive maintenance program. However, it is difficult to demonstrate that the savings have directly resulted from the program.

Financial Characteristics

Exhibit II-1 presents the amount of expenditures for routine maintenance from FY 1980 through 1985 both in absolute dollar amounts (not corrected for inflation) and as a percent of the year's total expenditures less nonroutine maintenance and capital expenditures.

During the past five fiscal years HHA's overall costs for routine maintenance have been very stable, running between thirty-one and thirty-four percent of the agency's operating expenses, not including nonroutine maintenance and capital expenditures. This continuity extends to the major cost components of routine maintenance, which are presented for illustration purposes only.

EXHIBIT II-1

HHA'S ROUTINE MAINTENANCE EXPENDITURES (FY 1980--FY 1984)

Fiscal Year	Operating Expenses* (In Thousands of Dollars)	Routine Maintenance (In Thousands of Dollars)	Percent of Total
1984	2,842.2	877.6	31%
1983	2,712.5	869.0	32%
1982	2,410.9	800.0	33%
1981	2,160.1	744.6	34%
1980	1,920.2	627.4	33%

* Total operating expenditures less nonroutine maintenance and capital expenditures.

As Exhibit II-2 indicates, the proportions of routine maintenance expenditures for labor, materials, and contracts also remained relatively constant during this period. Note an exception to this trend in FY 1981, when the costs for nonroutine maintenance were slightly higher. This was apparently

EXHIBIT II-2

COMPONENTS OF HHA'S ROUTINE MAINTENANCE COSTS (FY 1980--FY 1984)

	Fiscal Year				
Component	1984	1983	1982	1981	1980
Labor	68%	67%	69%	65%	68%
Materials	23%	24%	23%	27%	23%
Contract Costs	9%	9%	8%	8%	9%
TOTAL	100%	100%	100%	100%	100%

related to a change in the proportionate costs of labor and materials. But it is fair to say that over the period, labor has comprised about sixty-eight percent of the maintenance budget, materials about twenty-three percent; and contract costs about nine percent.

These budget figures reflect that there have been no dramatic changes in the way HHA performs its maintenance function. The agency has a well-organized maintenance department whose procedures and staffing patterns have worked well for many years. The budget figures indicate a department that is mature and settled.

Another noteworthy point is that overall maintenance costs have not declined significantly during the past five years. Although HHA's preventive maintenance practices have been in place for about ten years on an informal basis, the formal system described in this study has existed for about four years. During this time, routine maintenance costs have remained fairly constant, which suggests that the system may have helped to contain costs but that it has not resulted in savings substantial enough to show up in a summary analysis of maintenance costs.

Other Benefits

At HHA, the principal reasons for performing preventive maintenance are to present a good public appearance and to ensure that no apartments suffer from serious neglect over an extended period of time. During the data collection for this case study, HHA officials did not mention any concerns about the cost of providing maintenance. The efficiency of maintenance was mentioned only by the planning and engineering chief, who was performing a management analysis of the maintenance department for possible changes. Everyone interviewed, however, expressed their concern for the condition of the buildings, grounds, and apartments.

When asked directly why they pursued a preventive main-

tenance program, everyone connected with maintenance pointed out that tenants frequently fail to request service, particularly for damage that they have caused and may have to pay for. When these tenants live in a unit for several years, especially if they have young children, it tends to deteriorate. With preventive maintenance, every unit receives regular attention. Moreover, tenants see that the agency cares about the units, and that damage is soon detected and charged to them if they caused it. The program ensures that the units do not deteriorate for more than one year at a time, and it may encourage tenants to avoid damaging the units.

One factor that significantly contributes to the program's success is the regularity with which the preventive maintenance crew works. With 1,755 apartments to serve, a two-person crew working 260 days per year must visit an average of 6.75 apartments per day in order to complete one cycle in a year. Considering vacation time, holidays, absences, and days when the crew must be diverted to other jobs, it is clear that to complete the cycle on time the crew must perform preventive maintenance every day. Huntsville's records indicate that since 1980, the only units that have not been covered by the preventive maintenance crew were those that had undergone modernization within the given year.

ASSESSMENT OF EFFECTIVENESS

To provide further evidence as to whether HHA's preventive maintenance program was keeping units in better shape, several types of data were collected by the survey team. For a random sample of 140 HHA apartments, data were extracted from the inspection forms prepared during preventive maintenance visits for the years 1980 through 1984. A count was made of the number of items requiring correction during each visit to each apartment each year. This meant examining some 700 data points. Exhibit II-3 on the next page presents the results.

As the exhibit indicates, when inspections and regular

EXHIBIT II-3

AVERAGE NUMBER OF DEFICIENCES PER VISIT
(IN A RANDOM SAMPLE)

Year	Units for Families (N=40)	Units for Elderly Tenants (N=100)	Total Units (N=140)
1984	2.0	2.2	2.0
1983	2.0	2.9	2.4
1982	4.7	2.2	4.0
1981	3.3	1.3	2.7
1980	6.3	2.1	5.0

preventive maintenance were initiated in 1980, an average of more than six items needing correction were discovered in each family unit. During the most recent inspection, this figure was down to two items. That is to say, a trained inspector walking into the average family apartment today would find only two items that needed any corrective maintenance. Such items include leaky faucets, missing switch plates, and torn screens, as well as serious maintenance items. As one might expect, the apartments housing elderly tenants were in better shape initially and have remained about the same.

A further indication of HHA's preventive maintenance system's effectiveness concerns the number of apartments in very bad condition. Only twenty-three of the seven hundred randomly selected inspections noted in Exhibit II-3 revealed ten or more problems. Significantly, twenty of these inspections were in 1980. This is a strong indication that what HHA gains by its preventive maintenance program is the identification and repair of apartments that are in bad shape, making the overall condition of the stock better. It stands to reason that having its units in good shape (or at least fewer units in very bad shape) saves HHA money. This is especially true in terms of the amount

of work needed to prepare vacant apartments for rental. But these savings are apparently too small to be revealed in the summary analysis presented previously in Exhibit II-2. Further, it does not appear that HHA's preventive maintenance substantially reduces the amount of tenant requests for service. It would be logical to assume that where the apartments were in better shape, tenants would make fewer requests for service, thereby reducing HHA's costs for labor and parts. But as Exhibit II-3 denotes, all units seem to have about two problems per preventive maintenance visit. This is probably due to normal wear and tear. Moreover, other data on the number of requests for service in sixty-one HHA apartments indicated that the number of tenant-initiated service visits in 1984 correlated most closely with the number of maintenance visits in 1983, especially when the tenant was the same. In other words, tenants probably have a certain propensity to request service, and they will make a similar number of requests regardless of the objective condition of the apartment.

In sum, HHA's preventive maintenance program appears effective in keeping the apartments from dropping below minimum standards. It ensures that no unit will experience more than one year of deterioration before receiving maintenance. This practice at HHA may result in cost savings and a reduction in the amount of service requests, but the available evidence lacks sufficient detail to support or contradict such conclusions.

Another benefit of the preventive maintenance program--less tangible but quite important nonetheless--is that it allows the maintenance staff to respond to the majority of routine requests in a systematic manner. This permits the major portion of staff resources to be devoted toward emergencies and work that demands special skills. The likely result is a more efficient and effective use of maintenance personnel.

III. IMPLEMENTING HHA'S PREVENTIVE MAINTENANCE PROGRAM

HHA's preventive maintenance program, in addition to being quite effective at promoting proper maintenance of the projects, is very simple. In order to implement it, another public housing agency would only need to designate the maintenance workers who would perform preventive maintenance, to devise a work schedule, to equip the workers adequately for performing the task, and to provide routine monitoring to ensure that the activities are being carried out properly. These tasks are discussed below.

Designating a Preventive Maintenance Team

In setting up a program similar to that of HHA, an agency would need to divert labor power to the performance of preventive maintenance. This probably would be less of a burden than it might seem. A PHA that is performing annual inspections of its units anyway could simply ensure that anyone who makes these visits is experienced in maintenance and, preferably, be able to make repairs on the spot. In Huntsville, the preventive maintenance crew is composed of maintenance workers who are broadly skilled in most technical areas, which enables them to fix most items needing repair.

The issue of how many workers to assign to preventive maintenance requires some analysis. At HHA, two workers service more than 6.75 units per day. The needs of other agencies would depend on several factors, including the condition of the units; the relative proportion of units for families and elderly tenants; and the available manpower in light of absences, vacations, holidays, and the need to use the workers for other maintenance tasks. Although HHA maintains a two-person crew, there probably is no reason why a one-person crew could not be used elsewhere. A two-person crew, however, does provide the workers with some protection against tenants' allegations of

impropriety, especially in cases where the crew enters apartments when no one is home.

In Huntsville, only one crew does preventive maintenance. Although it would be possible to set up a system in which maintenance workers assigned to particular zones also performed preventive maintenance, HHA's system has some advantages. One is that having specific staff helps to routinize the function. That is, the job is more likely to be done if two individuals are responsible for it (and for little else) than it is if many individuals are responsible for it as well as for other tasks. A second major advantage is that a uniform standard of quality is applied to all of HHA's apartments. When workers at many different projects perform preventive maintenance, the likelihood of varying levels of quality increases.

Establishing a Schedule

The importance of having a set schedule cannot be overstated. In Huntsville, the schedule is very simple yet highly effective. In essence, two staff members are told that they have one year to inspect and repair all of HHA's units. Performance against that schedule can be monitored, and the crew can halt attempts to divert their efforts elsewhere if the preventive maintenance is behind schedule.

The need for a fixed schedule is greater when staff roles are less clearly defined. If a crew worked part-time on preventive maintenance and part-time on routine maintenance, a schedule would be absolutely necessary to ensure that the appropriate amount of time was spend on preventive maintenance. It is the nature of preventive maintenance, precisely because it is not done in response to immediately pressing demands, that it tends to be the task that is foregone when there are conflicting demands on time. In this regard, establishing a reasonable schedule in advance and making it known that meeting the deadlines is important helps to ensure that preventive maintenance is accomplished.

Huntsville's experience provides further lessons about scheduling and workflow. During 1982, each preventive maintenance visit was divided into two parts. In the first part, the crew went through the apartment and made the inspection. The findings were given to the dispatch clerk, who wrote work orders. The crew would then return to the unit to make the repairs noted on the work order. Although this procedure may have provided somewhat better control over work-order writing and possibly over the use of inventory, it was much slower and more cumbersome. HHA has returned to its original system of letting the crew devise its own schedule within general guidelines. The crew again writes its own work orders and completes them on the spot, if possible, as long as the work is being done properly and on time.

Preventive Maintenance Equipment

It is very helpful for a preventive maintenance crew to be highly mobile and equipped to make repairs anywhere. In Huntsville, the preventive maintenance crew has a well-equipped vehicle, which contains a rolling inventory that enables the crew to make most routine repairs in any of HHA's apartments. Thus, the crew avoids delays that would result from having to return frequently to the central maintenance shop or to write work orders for other maintenance staff to handle.

Beyond this minimum amount of equipment, however, implementing a system such as Huntsville's requires no elaborate investment in equipment or parts. Indeed, when HHA first implemented its program, it was just one maintenance man walking from door to door carrying his parts and tools with him.

Monitoring

Another important feature of HHA's preventive maintenance system is that it entails very few demands on the time of maintenance administrators. Because the roles and schedules are clear, there is no need for a supervisor to map out a daily work

plan for the crew. Given the relative freedom the preventive maintenance crew has in pursuing its work, however, there is a need to monitor performance to ensure that the work is being done properly.

This can be most simply accomplished by randomly selecting completed work orders, and verifying that the work was done by contacting the tenant and/or visually inspecting the repairs. This can be an assigned duty of the maintenance supervisor or an appropriate designee. Indeed, at Huntsville, the preventive maintenance crew does not just go off performing maintenance work with no control by the central office. Such a system might lead the crew to spend time in ways that are nonproductive. Any PHA that implements a system similar to HHA's should strongly consider having a foreman or other individual make routine spot checks of the work done by the preventive maintenance crew to ensure that it performs according to desired standards, as described above.

Another source of monitoring information is through other maintenance or custodial personnel who do on-site work. These individuals notice whether the preventive maintenance crew is performing properly, as well as whether tenants were pleased with the work. At HHA, each project has a maintenance mechanic with this specific responsibility. Also, at HHA the working foreman and the maintenance superintendent spend considerable parts of their days monitoring the performance of all crews and assisting in various maintenance projects. The preventive maintenance crew would not fail to perform responsibly for very long before someone would take note of the fact. Other agencies should take advantage of similar informal or ad hoc means of monitoring preventive maintenance crews to complement the formal and routine spot checking of work orders suggested above.

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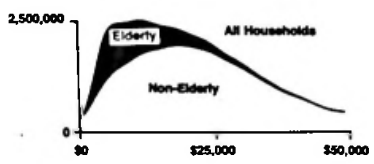

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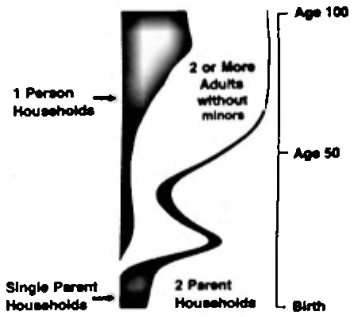

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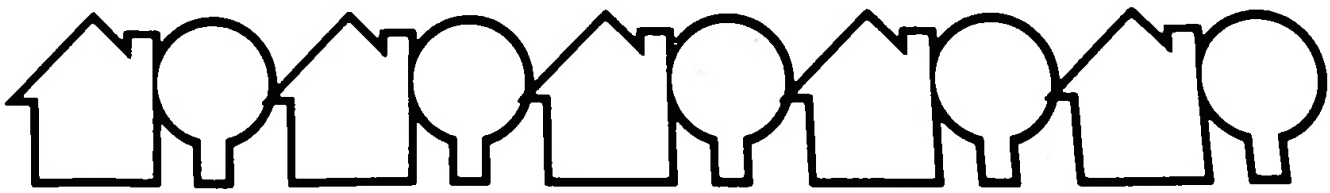

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