

**INTERNAL AUDIT REPORT**

**REVIEW OF PHYSICAL FACILITIES  
MAINTENANCE AND REPAIRS**



**FAIRFAX COUNTY, VIRGINIA  
INTERNAL AUDIT OFFICE  
M E M O R A N D U M**

**TO:** Anthony H. Griffin  
County Executive

**DATE:** March 22, 2001

**FROM:** Ronald A. Coen, Director  
Internal Audit Office

**SUBJECT:** Report on the *"Review of Physical Facilities Maintenance and Repairs"*.

This is a report on the *"Review of Physical Facilities Maintenance and Repairs"*. It was performed as part of our FY 2000 Audit Plan.

The findings and recommendations of this audit were discussed with the Facilities Management Division. We have reached agreement on all of the recommendations and I will follow up periodically until implementation is complete. Their responses are incorporated into the report and the full response is attached.

RAC:dh

## TABLE OF CONTENTS

	<b><u>PAGE</u></b>
Introduction	1
Purpose and Scope	2
Executive Summary	4
Comments and Recommendations	5
<b>Attachment A: Capital Construction Fund: Requested Vs Funded FY90 to FY00</b>	
<b>Attachment B: Summary of Expenditures FY97-FY00</b>	
<b>Attachment C: List of Sources</b>	

## Introduction

The Facilities Management Division (FMD) provides many types of building services to County owned and leased facilities. These building services include the maintenance, repairs, and renovation of the facilities and associated equipment. This service helps provide County agencies, employees and citizens with a safe environment that is conducive to the accomplishment of their missions. Over the past fifteen years, Fairfax County has experienced a rapid population growth of approximately 45 percent with an associated increase in demand for services. This growth has required the addition of new facilities with an increase in the scope and volume of maintenance requirements. The Facilities Management Division is now responsible for the maintenance of an estimated 178 County facilities, containing an estimated area of 6.6 million square feet and an estimated value in excess of 1.3 billion dollars.

FMD provides maintenance, repairs, and renovations through two separate branches. These branches are: (1) the Planning, Engineering and Energy branch and (2) the Operations and Maintenance branch.

### (1) Planning Engineering and Energy Branch (PE&E)

In FY 2000, the Planning Energy and Engineering branch had an adopted operating budget of \$3,230,000 with 13 regular staff positions consisting of engineers, engineering technicians, and an assistant supervisor. The PE&E branch provides maintenance, repairs, and renovation services through contracts with the private sector. These are routine maintenance, repair, and renovation services that are not provided in house for various reasons such as a lack of resources or expertise. Major repair and renovation services are funded in Fund 303, County Construction, and include the following projects:

<u>Project #</u>	<u>Project Name</u>
3099	Miscellaneous Building Repairs
9132	Roof Repairs and Waterproofing
9133	Carpet Replacement
9136	Parking Lot Resurfacing
9151	HVAC/ Electrical Systems
9431	Emergency Generator Replacement

The Planning, Energy and Engineering branch provides contract administration over contracted maintenance, repair, and renovation work.

### (2) Operations and Maintenance Branch (O&M)

The Operations and Maintenance branch is responsible for the preventive maintenance and repair work that is performed in house by County staff. In FY 2000, the Operations and Maintenance branch had an adopted operating budget of \$ 5, 845,218 with 121 regular staff positions which consists of electricians, plumbers, painters, carpenters and other trades.

The Operations and Maintenance branch performs a variety of preventive maintenance procedures and repairs, and they respond to service calls as a result of requests from various County facilities. These assignments are largely determined through the distribution of work orders to the Operations and Maintenance staff generated from the information input into the Facilities Management Division's database.

## Purpose and Scope

We scheduled this audit of Physical Facilities Maintenance and Repairs in our Fiscal Year 2000 Audit Plan. Due to the size and various maintenance functions within the County, we limited our review to the Facilities Management Division (FMD). The purpose of this audit was to examine and evaluate how FMD schedules, performs, monitors and reviews maintenance activities for County facilities.

Our review included the Planning, Engineering & Energy branch and the Operations and Maintenance branch. This covers most of the maintenance functions within the Facilities Management Division.

Our specific goal was to document current practices and procedures used to carry out maintenance at the County facilities under FMD jurisdiction and compare them to procedures that we have identified as necessary ( *see Attachment C* ) for an organized and efficient maintenance process. We interviewed FMD management and staff, interviewed staff at three County facilities, toured six County facilities to observe actual maintenance, reviewed maintenance and repair policies, reviewed Operations & Maintenance branch and Planning, Engineering & Energy branch operations, and evaluated the Maintenance and Procurement (MP2) computer application.

The elements of a good maintenance management process are discussed in detail in the balance of this report but to briefly summarize, they are as follows:

1. **Identification of facilities and assets** - A detailed inventory, by location, of each item needing maintenance including the characteristics affecting the type of maintenance work performed.
2. **Maintenance task description** - each maintenance task or job required for the facilities listed in the inventory of assets should be documented.
3. **Maintenance task standards** - Documentation showing frequency of maintenance, a quality standard to which assets are maintained, method of maintenance, and what labor, materials, and time is usually needed to complete each task.
4. **Annual maintenance plan** - Using data from the first three elements above identifies maintenance needs and calculates financial resources necessary to accomplish the plan.
5. **Work schedules** - Bi-weekly or monthly schedules that identify and prioritize work from the annual plan, plus maintenance tasks from other sources such as a Board or department's request.
6. **Work orders** - A system of documentation that authorizes, assigns, and reports on all routine and emergency maintenance work.
7. **Management reports** - Reports and special analysis generated and provided to management on a regular periodic basis which compares planned tasks versus actual tasks and estimated resources versus actual resources.

8. ***Standard operating procedures*** - Documented policies and procedures for performing maintenance in all branches.
9. ***Periodic inspections*** - Managers or supervisors should conduct regularly scheduled inspections of all facilities to observe needed maintenance and inspect work completed.
10. ***Preventive maintenance schedule*** - More emphasis should be put on routine maintenance tasks aimed at preventing potential problems and repairs.

The overall goal of these maintenance process elements is to plan, organize, direct, monitor, and review maintenance work in a way that promotes efficiency and organization.

Our audit was conducted in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to afford a reasonable basis for our judgments and conclusions regarding the program, activity, or function under audit. An audit also includes assessments of applicable internal controls and compliance with requirements of laws and regulations when necessary to satisfy the audit objectives.

## Executive Summary

The Facilities Management Division is challenged with the task of managing a backlog of maintenance, repair and replacement projects with limited resources that must be carefully allocated.

To close this gap, they need enhancements to the Divisions' information data base system (MP2), budget methodology, records and reporting, and administrative practices concerning needed maintenance repair and replacement projects.

Specifically, the Facilities Management Division needs to:

- Fully utilize the MP 2 automated maintenance and repair system in order to maintain a database of vital building components for County facilities.
- Establish a new full time MP2 systems administrator position reporting directly to the Director of FMD.
- Prepare a Comprehensive Annual Maintenance Plan, which identifies and schedules maintenance, repairs, and major renovations of County facilities.
- Prepare periodic management reports that compare budget to actual costs by facility for major renovations budgeted in Fund 303.
- Update the policies and procedures contained in the Division's Maintenance Management Manual to reflect current operations and provide the necessary information that identifies, plans, organizes, directs, monitors, and evaluates maintenance work throughout the County.

These enhancements to the Division's information system, budgeting, records, reporting and administrative procedures should provide the benefit of increase savings over the long term through better allocation of resources.

## Comments and Recommendations

### **1. The Facilities Management Division is not completely utilizing the MP2 maintenance software system to capture and manage many key building components.**

The MP2 automated system is not fully implemented to include an inventory of building components including carpet, roofs, parking lots and HVAC / electrical. Based on interviews and a review of the MP2 implementation schedule, it appears that this information should have been captured.

Ten criteria have been identified to be essential to the administration of an effective and efficient maintenance system. These criteria are:

- Identification of assets
- Maintenance task descriptions
- Maintenance task standards
- An annual maintenance plan
- Work schedules
- Work orders
- Management reports
- Standard operating procedures
- Periodic inspections
- Preventive maintenance schedules

The MP2 system has the features necessary to address and/or support each of the criteria listed after the data input is complete. The MP2 system, as designed, has been fully implemented by other jurisdictions to manage all maintenance worthy components.

If FMD properly implements and utilizes MP2, as designed, assets and facilities would be identified and maintenance histories and needs would be easily tracked. Information would be provided for the development of a comprehensive maintenance plan thus providing support for both staffing and budget recommendations.

There are multiple elements that contributed to MP2 not being fully implemented to capture and manage key building components. Implementation is a resource intensive process, and at the time of implementation, it appears that staffing levels were inadequate. In addition, the major building components were not maintained on the old system and the information could not be converted. This information required manual input and no one was assigned the responsibility for data input, therefore, the task was not completed. The Division of Information Technology presently has three support staff assigned to support server application functions and desktop applications in FMD. However, there is a need for a system administrator or business analyst to provide full time support for table maintenance, reports, training and testing for the MP2 system that would conform to the particular business needs of FMD.

Two other jurisdictions that were successfully using MP2 had an individual dedicated full time to the system. These individuals were not technical positions. Their responsibilities included archiving records, monitoring system activity, troubleshooting and addressing problems, training and setting up new users, formatting tables and reports, developing better methods, entering new scheduled tasks, consulting with management, system security, set up of filters and acting as first contact before technical support is contacted.

### **Recommendation**

In order to adequately capture and manage key building components and fully utilize the systems capabilities, FMD needs to:

- Form a team to ensure the system is fully implemented. Keep the team size reasonable, but include a representative from the Department of Information Technology, maintenance managers, and the system administrator.
- Establish a new system administrator that reports directly to the Director of the Facilities Management Division. This position should serve as the primary end user project leader for FMD and should coordinate system maintenance priorities with the Department of Information Technology.
- Complete input and/or transfer of inventory of building components into the database.
- Provide additional training to users to ensure effective and efficient use of the system's resources.

### **Department Response**

I will create a committee within FMD and include DIT to evaluate the MP-2 system and how it is utilized within the division. The committee will review how other jurisdictions are utilizing this system as suggested in your report. The committee will also review the staffing requirements for the best utilization of the system including the need for a system administrator as suggested in your report. The committee will be established in early January to begin work on this initiative. The goal of this effort is to develop an effective computer aided facilities management system that supports the planning, design, and operations and management functions of FMD.

## **2. The Facilities Maintenance Division's annual budget for maintenance, repairs, and renovation should be based on an annual plan and a comprehensive database similar to the plan used for the generator replacements.**

The main types of major County facility repairs and renovations outsourced by the Planning, Engineering and Energy branch are roof repairs, parking lot resurfacing, carpet replacements, HVAC/electrical, and generator replacement. These are all contracted services funded in Fund 303, County Construction. In-house maintenance comes from responses to departmental requests and scheduled preventive maintenance. Budgetary planning is especially important for outsourced maintenance due to the large scope and significant dollar amount of contractual obligations required. The Fund 303 budget is developed in response to several different factors.

It was determined that:

- Two categories have an inventory of elements to be maintained. There is an inventory listing of generators that indicates the County facility, the year built, replacement date, estimated replacement cost, and life expectancy guidelines. There is a warranty listing for roofs, but this has not been updated since July 1998 and it is not current and complete. At the time of our audit, FMD was in process of updating the list. There is an incomplete inventory of HVAC equipment, carpet and parking lots.
- The selection of maintenance projects at facilities and the allocation of maintenance resources is based primarily on the number of service requests from departments, results of an annual survey distributed by FMD soliciting information from departments, and input on the backlog report originating from the Operations and Maintenance branch as a result of inspections.

In order to plan and manage outsourced maintenance for roof repairs, carpet replacement, parking lot resurfacing, HVAC/electrical repairs, the FMD Planning, Engineering, and Energy branch needs to develop a plan based on a comprehensive data base, similar to the plan used for the generator replacement. The plan should identify a complete inventory of facilities, planned maintenance tasks, and the necessary financial resources. The annual plan should support the budget and include the following detail information:

- Identification of all maintenance worthy assets, by facility, such as asphalt parking areas that require maintenance and the details of the type of maintenance required for each asset, such as asphalt to be sealed or treated.
- Inventory should include all data necessary to predict and plan maintenance, such as descriptions, grade, quality, useful life, age and condition, repair history, estimated replacement costs and maintenance cost history.
- A set of task descriptions or procedures of how maintenance work should be completed.
- Standards which indicate the frequency of maintenance, the quality of maintenance, method of work, and the resources required or expected.
- The results of regularly scheduled inspections.

Failure to adequately plan and schedule maintenance work can result in any or all of the following conditions:

- Improper allocation of maintenance resources with too little or too much effort expended on specific facilities.
- County facilities that don't receive needed maintenance in a timely manner.
- Maintenance performed in a reactive inconsistent manner with backlogs of work.

We selected a sample of nine County facilities with recent repairs and renovations in order to observe the general condition of the building, to inquire as to the reason for the repair/renovation, and assess the quality of FMD response to the work. We visited six of the facilities and conducted telephone interviews for three buildings.

In general, there was a considerable period of time between the time repair or replacement work was needed to the time it was performed. Some facilities had peripheral damage due to the delay in obtaining the repair. There were also complaints from facility staff and the public, about the condition of the buildings and the lack of repairs. We also found that FMD performed repair work on some facilities when there was a greater need for similar work at other facilities. Other facilities were experiencing a critical need for the same type of repairs and had been waiting several years for the repair.

PE&E indicated that they do not have the resources to maintain an inventory of maintainable assets. The generator inventory was possible because there are approximately 70 generators as opposed to HVAC equipment, which is estimated to be some 20,000 pieces of equipment. This kind of volume will require some form of automation like the MP2 system.

PE&E stated that the long periods of time to address many of these repairs is directly related to the lack of funding in the 1990's and the growth of a maintenance backlog. They indicated that the percent of funds approved to funds requested for outsourced maintenance steadily declined through the mid 1990's to a low of 11% in FY 1994 (Attachment A). A good comprehensive maintenance plan can clearly demonstrate the importance of these kind of cuts on the County's facilities.

The MP2 system has the features necessary to address and support the detailed information and records necessary to develop a comprehensive maintenance plan. However, the basic inventory of maintenance data was not loaded into the MP2 system as part of implementation. FMD is in process of loading the data. During the tight budgets of the 1990's, FMD's budget reductions contributed to the backlog of maintenance items.

### **Recommendation**

We recommend that the O&M branch and the PE&E branch jointly develop and implement a comprehensive annual plan in support of the budget request for each major maintenance categories funded in Fund 303, County Construction. We recommend that it include the following:

- FMD should prepare a complete detailed inventory of all facilities and maintenance worthy assets, starting with the major categories in FUND 303.
- Maintenance summaries should be prepared which summarize total amounts of similar types of maintenance to be done on all assets.
- A set of procedures describing each type of maintenance work should be prepared.
- Work standards should be developed for each type of maintenance.
- Using all of the above data, FMD should prepare an annual work plan.

- FMD should prepare its annual budget request to the Department of Management and Budget using resource requirements calculated in the annual work plan.
- Regular periodic reports and analysis should be generated comparing planned and actual maintenance.

FMD should continue full implementation of the MP 2 system. It has features necessary to address and/or support each of the above recommendations. (See recommendations on MP2)

### Department Response

FMD has included a request in the FY02 budget for funding a building condition assessment study. The study will provide base line data on the current condition of the County's building infrastructure. The data from this study will support the development of a multi-year maintenance plan similar to the generator program. The study will be initiated this winter using available funds within FMD. The long-term goal is to use this data for the development of a facilities maintenance/ renewal capital improvement program identifying the County's five-year plan for maintaining the County's facility assets. This plan would be submitted to the BOS each year along with the CIP. We are committed to providing high quality, timely, proactive maintenance services to our County customers and to developing a strong financial plan to accomplish this goal.

### **3. There is no regular periodic management reports produced by the Facilities Management Division or the Department of Management and Budget that compares budgeted amounts to actual costs by facility, for major buildings and grounds maintenance renovations.**

Every organization has individual budget preparation procedures, peculiar to itself, that are to be used to prepare maintenance budget estimates. There are no cut and dried methods of preparing the maintenance budget, mainly because of the various levels at which operations and maintenance is carried out in individual organizations. One acceptable method of identifying and handling maintenance costs, used by FMD, is to budget for major buildings and grounds maintenance costs by facility in Fund 303, County Construction. Fund 303 includes outsourced maintenance for roof repairs, carpeting, parking lot resurfacing, HVAC/ electrical, and generators.

Each year the FMD budget request, and the original approved budget amount, for each of the above categories of major buildings and grounds maintenance is tracked in FAMIS by a project number for each category. In addition, the budget amount by individual facility is included with the budget request and in the adopted budget documents. However, subsequent management reports only compare budget to actual cost by project category for each of the major buildings and grounds maintenance cost categories. The Facilities Management Division and the Department of Management and Budget do not receive or utilize regular periodic management reports comparing the current budget to actual costs and encumbrances by each facility as originally justified in the Adopted Budget. This type of information must be manually accumulated from FAMIS and CASPS in a fairly time consuming and laborious process. It currently is not done.

As part of the audit, we tried to compare the original approved budget, the final revised budget, and the actual costs for FY 1999 by facility. Neither the Facilities Management Division nor the Department of Management and Budget could provide us with a break down of the final budget by facility. FMD provided some manual schedules of actual costs by facility. We found these schedules were incomplete and not very useful. There are no regular periodic management reports produced by the Facilities Management Division or the Department of Management and Budget that compares budget to actual costs by facility.

Once the maintenance budget is formulated and approved, the execution phase is then divided into two categories: funds control and cost control.

- **Funds Control:** The status of various facility management accounts must be closely monitored to ensure that the budget is not over obligated. One method that is commonly used is a monthly review of the operating budget to analyze and compare it to the year-to-date actual expenses and encumbrances.
- **Cost Control:** Requires good tracking and record keeping, and with out it, the manager will not have good cost control. A good cost control system provides for tracking by budget item, work classification, and job function.

The Facilities Management Division and the Department of Management and Budget need periodic management reports comparing the maintenance budget and actual costs by facility for the outsourced major maintenance items included in the County Construction, Fund 303.

Effective maintenance planning and cost control becomes difficult with out detailed information on the budget and costs by facility. The risk of over or under budgeting increases as does the risk of over expending. Large unexpended amounts are carried over. Repair costs for the same facility have been used to justify budget requests for more than one budget year. FAMIS account codes and classification structure is currently not set up in a manner to track appropriations and costs for each of these individual facilities.

### **Recommendation**

We recommend that the Facilities Management Division, the Department of Management and Budget and the Department of Finance meet and establish accounting codes with in FAMIS to track the budget and costs for each facility for these major renovations/repairs.

### **Department Response**

As suggested in your report, FMD will coordinate with the Department of Finance and the Department of Management and Budget to develop necessary management reports and a more efficient data collection system to assure an accountable maintenance system.

### **4. The Facilities Management Division needs to implement written standard operating policies and procedures that properly identifies, plans, organizes, directs, monitors and evaluates maintenance work through out the County.**

The Facilities Management Division's Comprehensive Maintenance Management Program Manual was last updated in 1985. At that time, the Facilities Management Division was under the Office of

General Services. The manual addresses objectives, work order priorities and types and preventive maintenance guide information. Some of the procedures, however, appear to be outdated and no longer conform to current operations. The manual does not address planning, organizing, directing and controlling procedures that could increase efficiency and organization for the maintenance of County facilities.

Written maintenance procedures should establish a framework for the consistent application of maintenance management that defines the resources, funding, personnel, and training for such administration. By developing documented standard operating procedures and guidelines, the maintenance procedures could serve, as a standard in evaluating performance and enhanced support for improving the analysis required in budget submissions to the Department of Management and Budget.

Dated and incomplete maintenance and repair procedures does not provide the guidance to staff to operate in a consistent and uniform manner. They do not provide a reference for planning, organizing, and administering maintenance and repair operations. In addition, the lack of updated and comprehensive procedures does not permit a consistent basis for measuring performance with in the department. Due to resource limitations, the Division's priorities, and staffing, the Facilities Management Division has not been able to completely update their operating manual to address all of the current maintenance, repair, and replacement issues to reflect current operations.

### **Recommendation**

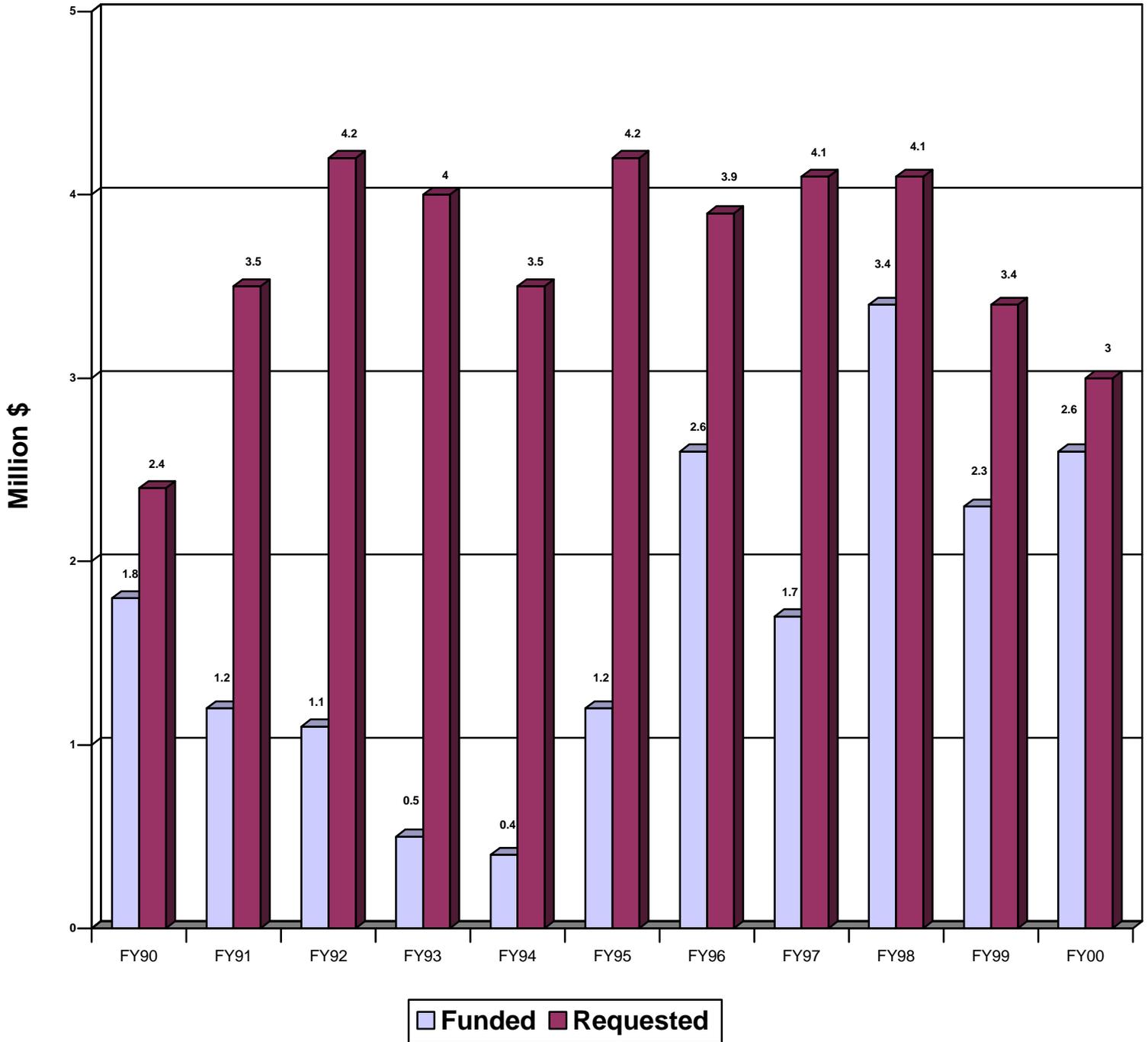
In order to properly plan and organize its maintenance responsibilities, the Facilities Management Division needs to upgrade their written policies and to reflect the current FMD operation. The procedures should at least include the following detail information:

- ***Scope of the manual*** - the objectives of the Facilities Management Division should be supported by an entire set of policies and procedures which define how the effort will be conducted, documented, and monitored.
- ***Lines of authority*** - the manual should reflect the current organization and reporting structure that defines the authority, responsibility, and resources of the organization.
- ***Document control*** - a description of documentation that defines how it is used, its purpose and its disposition. This should include documentation that assigns tasks, work schedules, management reports, and documentation for planning.

### **Department Response**

FMD will review the current manual and bring it up to our current maintenance practices and standards. Our goal will be to align the manual with other strategic work that is being undertaken by the core team and to address the scope of items outlined in your report.

### Capital Construction Fund: Requested vs Funded FY90 to FY00



## Attachment B

## SUMMARY OF EXPENDITURES FY97-FY00

	<u>FY97 Actual</u>	<u>FY98 Actual</u>	<u>FY99 Actual</u>	<u>FY00 Revised</u>
<b><i>Operating Expenditures</i></b>				
Operations and Maintenance	\$4,690,000	\$5,273,000	\$5,239,000	\$6,313,000
Planning Engineering Energy	<u>1,968,000</u>	<u>2,179,000</u>	<u>2,761,000</u>	<u>3,642,000</u>
Total O&M and PE&E Operating Expenses by FY	<u>\$6,658,000</u>	<u>\$7,452,000</u>	<u>\$8,000,000</u>	<u>\$9,955,000</u>

***Capital Construction Expenditures***

Misc. Building and Repairs	\$263,000	\$324,000	\$231,000	\$1,170,000
Roof Repairs	344,000	161,000	435,000	911,000
Carpet Replacement	342,000	680,000	487,000	850,000
Parking Lot Resurfacing	147,000	365,000	173,000	983,000
Generator Replacement	0	0	106,000	86,000
HVAC/ Electrical Systems	<u>616,000</u>	<u>736,000</u>	<u>452,000</u>	<u>1,222,000</u>
Total Fund 303 Maintenance Projects by FY	<u>\$1,712,000</u>	<u>\$2,266,000</u>	<u>\$1,884,000</u>	<u>\$5,222,000</u>

**Attachment C**

## List of Sources

### Professional Maintenance Standards

1. **Facility Manager's Operation and Maintenance Handbook**, Bernard T. Lewis
2. **Facility Maintenance, The Manager's Practical Guide and Handbook**, Don W. Brown
3. **Fairfax County Internal Audit of Maintenance Procedures of the Fairfax County Park Authority**, ( **Standards from US GAO Audit Report of National Park Maintenance** ).
4. **Internal Auditing Manual**, Chapter 24 - Facilities Management, James D. Willson & Steven J. Root