METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

INTERNAL AUDIT SECTION

Professional Audit, Advisory, and Consulting Services

AUDIT REPORT

Performance Audit of Building and Grounds Maintenance and Construction Management

Date Issued: June 20, 2006

Office Location and Phone Number

222 3rd Avenue North, Suite 401
Nashville, Tennessee 37201

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METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

OFFICE OF INTERNAL AUDIT

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OFFICE OF INTERNAL AUDIT

Section I Report of the Internal Audit Section

BILL PURCELL
MAYOR

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

DEPARTMENT OF FINANCE
INTERNAL AUDIT SECTION

222 3RD AVENUE NORTH, SUITE 401
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June 20, 2006

David Manning, Director of Finance
225 Polk Avenue
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Nashville, TN 37203

Report of Internal Audit Section

Dear Mr. Manning:

We have recently completed a performance audit of Building and Grounds Maintenance and Construction Management. *Government Auditing Standards* issued by the Comptroller General of the United States define performance audits as follows:

> Performance audits entail an objective and systematic examination of evidence to provide an independent assessment of the performance and management of a program against objective criteria as well as assessments that provide a prospective focus or that synthesize information on best practices or cross-cutting issues. Performance audits provide information to improve program operations and facilitate decision-making by parties with responsibility to oversee or initiate corrective action, and improve public accountability.

A performance audit is different than a financial statement audit, which is limited to auditing financial statements and controls, without reviewing operations and performance. In performing this audit, we retained Matrix Consulting Group to work under our direction. Their final report dated June 20, 2006, *Performance Audit of Building and Grounds Maintenance and Construction Management*, accompanies this report and is hereby submitted to you.

Metro Nashville uses a fragmented approach for delivery of buildings and grounds maintenance. Fourteen different departments deliver buildings and grounds maintenance services. The profile of the services delivered by these departments is located in chapter two the Matrix Consulting Group report.

This has several negative and costly consequences for Metro. Based on a representative sample of Metro buildings, electrical cost per factored square foot are 70% higher than its peers, custodial cost 45% higher, and building maintenance cost 267% higher.

Objectives, Scope, and Methodology

The primary objectives of this performance audit were as follows:

- Develop a profile of the Buildings and Grounds Maintenance and Construction Management program.
- Develop an in-depth understanding of the key issues impacting the buildings and grounds maintenance and construction management.
- Assess 'customer satisfaction' with delivery of buildings and grounds maintenance services.
- A comparison of Metro's building and grounds maintenance and construction management practices to industry norms and benchmarks, and to select peer local governments.
- An assessment of the organizational placement within Metro of all building and grounds maintenance and construction management services.
- Evaluate the effectiveness of the building and grounds maintenance and construction management practices.

The audit utilized data and practices in place during the time of the audit and compared to peer cities that were either consolidated city-county governments, located in Tennessee or were recognized as progressive and well managed.

The methodology employed throughout this audit was one of objectively reviewing various forms of documentation, including staffing, workload, best management practices and comparative survey information to assess the organization, operations and staffing of buildings and grounds maintenance and construction management services. Interviews were conducted with key staff from Building Operations Support Services Division, the Real Property Services Division, and each of the other departments that deliver buildings and grounds maintenance services to obtain an understanding of potential issues with performance and operations.

We performed the audit procedures in accordance with generally accepted government auditing standards.

Findings and Recommendations

The Matrix Consulting Group report addresses the Building and Grounds Maintenance and Construction Management and the resulting findings and recommendations in detail. The following is an overview of some of the more significant findings and recommendations included in their report.

- Fourteen different departments deliver buildings and grounds maintenance services. This results in a variation in staff resources and the square footage maintained per building technician ranges from 19,300 to 133,300. The benchmark utilized by Matrix is 60,000 factored square feet per building technician. The consolidation of these resources within the Building Operations Support Services Division should enable the division to assume responsibility for the maintenance of the four additional buildings that have recently been or will be added to the portfolio. The addition of these 990,577 square feet would typically require the addition of 16 to 17 additional technicians. With consolidation, the division can use the existing underutilized technicians in these other departments to maintain this additional square footage. This represents an annual cost avoidance of $830,000 in salaries and fringe benefits. In addition, the Building Operations Support Services Division budgeted $149,000 in FY 2005 for plumbing, heating, ventilating, and air conditioning service. Upon the consolidation and the adjustment of the mix of managerial, supervisory, skilled,

semi-skilled and unskilled positions assigned to buildings and grounds maintenance, these expenditures should be eliminated.

- Metro does not operate energy efficient buildings. The electrical consumption for Metro buildings kilowatt-hour per factored gross foot is 70% higher than the median for its peers. This is not insignificant given the annual cost of electricity for the Building Operations Support Services Division exceeds $1.8 million. The electrical cost per factored square foot is 25% higher than its peers. The Matrix Consulting Group believes that the Building Operations Support Services Division can reduce its electrical costs for existing buildings by $450,000 annually through prudent investments in energy conservation and enhanced energy management.

Additional detailed findings and recommendations can be found in the Matrix Consulting Group report in chapters 6 through 9 accompanying this report. A summary of additional findings and recommendations and the related fiscal impact can be found in Chapter 1 of the Matrix report.

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Management's response to the audit recommendations is attached to this report.

We appreciate the cooperation and help provided by all staff of the fourteen departments where Matrix conducted interviews and obtained data.

This report is intended for the information of the management of the Metropolitan Government of Nashville and Davidson County. This restriction is not intended to limit the distribution of this report, which is a matter of public record.

Internal Audit Section

Signature on File

Don Dodson
Internal Audit Director

Copy: Mayor Bill Purcell
Karl F. Dean, Director of Law
David L. Manning, Director of Finance
Eugene Nolan, Associate Director of Finance
Talia Lomax-O'dneal, Deputy Finance Director
Metropolitan Council Audit Committee
Richard V. Norment, Assistant to the Comptroller
KPMG, Independent Public Accountant

OFFICE OF INTERNAL AUDIT

Section II Management's Response

Management Response to Audit Report……..See Attached

METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

BILL PURCELL
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METRO CITY HALL
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June 20, 2006

Mr. Don Dodson
Internal Audit Director
Metropolitan Government of Nashville and
Davidson County
222 3rd Avenue North, Suite 401
Nashville, TN 37201

Dear Mr. Dodson:

I have reviewed Internal Audit's performance audit report of *Building and Grounds Maintenance and Construction Management*, and I am in basic agreement with the related recommendations. Efficient management of construction and maintenance of building assets that have a value exceeding one billion dollars is essential in order to provide a safe, pleasant environment for the public and employees.

The Department of Finance will work to implement the recommendations for Real Property Services and we will assist the Department of General Services as they work with the appropriate Metro departments to implement the other recommendations presented by Matrix Consulting Group.

Sincerely,

David L. Manning
Director of Finance

Copy: Mayor Bill Purcell
Nancy Whittemore, General Services
Ken Maynard, Real Property Services
Karl F. Dean, Department of Law
Metropolitan Council Audit Committee
Richard V. Norment, Assistant to the Comptroller
KPMG, Independent Public Accountant

Performance Audit of
Building and Grounds Maintenance and Construction Management

METROPOLITAN NASHVILLE AND DAVIDSON COUNTY, TENNESSEE

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June 20, 2006

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1. INTRODUCTION AND EXECUTIVE SUMMARY

1. INTRODUCTION AND EXECUTIVE SUMMARY

The report, which follows, presents the results of the performance audit of the buildings and grounds maintenance and construction management conducted by the Matrix Consulting Group for the Metropolitan Nashville and Davidson County (Metro).

This first chapter introduces the analysis - outlining principal objectives and how the analysis was conducted - and presents an Executive Summary.

1. PROJECT SCOPE OF WORK

The analysis by the Matrix Consulting Group of buildings and grounds maintenance and construction management involved the following steps.

- **Developed an in-depth understanding of the key issues impacting the buildings and grounds maintenance and construction management.** To evaluate buildings and grounds maintenance and construction management, Matrix Consulting Group conducted interviews with staff of the General Services Department and the Real Property Services Division. Interviews focused on goals and objectives with regard to the delivery of buildings and grounds maintenance and construction management services, key operating issues with the current system, specific concerns, review of current buildings and grounds maintenance and construction management processes, authority distribution and overall program approach.

- **Developed a Profile of the Buildings And Grounds Maintenance And Construction Management program.** The Matrix Consulting Group conducted interviews with the staff of the fourteen different departments that deliver buildings and grounds maintenance services, custodial maintenance services, and security services and the Real Property Services Division to document current organization of services, the structure and functions of the these programs, budgets, review of workload data, etc.

- **Assessed 'customer satisfaction' with delivery of buildings and grounds maintenance services.** The project team utilized a customer satisfaction survey to assess managers' perceptions of the adequacy of buildings and grounds maintenance services delivered by the Building Operations Support Services Division.

- **A comparison of Metro's building and grounds maintenance and construction management practices to industry norms and benchmarks, and to select peer local governments**. The 'best management practices' included comparisons of quantitative and qualitative practices and comparisons to other local governments.

- **An assessment of the organizational placement within Metro of all building and grounds maintenance and construction management services**. This included interviews with key staff to develop an understanding of the current organizational model, comparisons to 'best management practices' and the comparative survey.

- **Evaluated the effectiveness of the building and grounds maintenance and construction management practices.** Based on interviews, data collection, 'best management practices' and the comparative survey, the project team assessed the effectiveness of building and grounds maintenance and construction management practices. This included a review of the adequacy of preventive maintenance, efficiency, etc.

The section, which follows, provides a discussion of the project methodologies.

2. PROJECT METHODOLOGIES

The processes utilized in developing this study are described in the points below:

- Interviews were conducted with key staff from Building Operations Support Services Division**,** the Real Property Services Division, and each of the other departments that deliver buildings and grounds maintenance services. The purpose of these interviews was to develop an understanding of potential issues with performance and operations of the buildings and grounds maintenance and construction management services.

- Through interviews, data collection and discussion with key staff, the consulting team documented the organization, operation, management systems, and staffing of buildings and grounds maintenance and construction management services

- The consulting team utilized data, including workload, best management practices and comparative survey information to assess the organization, operations and staffing of buildings and grounds maintenance and construction management services.

The following section provides the proposed five-point agenda for enhancing the cost-effectiveness of Metro buildings and grounds maintenance.

3. FIVE-POINT AGENDA FOR CHANGE

The assessment of buildings and grounds maintenance and construction management identified a number of recommendations for improvement that the Matrix Consulting Group believes should provide the basis for change in the coming years. These recommendations fall into 5 major improvement areas including:

- Consolidation of buildings and grounds maintenance for all of the departments of Metro in the Building Operations Support Services Division of the General Services Department, excluding Metro Nashville Public Schools and the General Hospital, to reduce building and custodial maintenance costs;

- Enhancing the capacity of the Building Operations Support Services Division to manage buildings and grounds maintenance and deliver responsive services for its customers;

- Development and installation of a comprehensive preventive maintenance for buildings;

- Enhancing energy conservation management to reduce the costs of utilities for Metro buildings; and

- Enhancing the working relationship between the Building Operations Support Services Division and the Real Property Services Division.

Each of these major points in the improvement agenda is briefly summarized below.

(1) Consolidation of Buildings and Grounds Maintenance in the Building Operations Support Services Division

Metro Nashville uses a fragmented approach for delivery of buildings and grounds maintenance. Fourteen different departments deliver buildings and grounds maintenance services. This has several negative and costly consequences for Metro.

- Based upon a sample of Metro buildings (17 buildings and 847,000 square feet), Metro's costs for building maintenance and operation are significantly higher than its peers. For example:

    - The electrical consumption for Metro buildings kilowatt-hour per factored gross foot is 70% higher than the median for its peers. This is not

insignificant given the annual cost of electricity for the Building Operations Support Services Division exceeds $1.8 million. The electrical cost per factored square foot is 25% higher than its peers.

- The custodial cost for Metro buildings is 45% higher per factored square foot than the median for its peers. This is not insignificant given the annual cost of contract custodial services that amounts to $1.6 million.

- The building maintenance cost per factored square foot for Metro buildings is 267% higher than the median for its peers.

- Metro is not consistently preventively maintaining its building assets (heating, ventilating, air conditioning systems, electrical systems, plumbing systems, etc.). From a cost of service perspective, corrective repairs, due to their inherent inefficiencies, typically cost two to four times more than planned or preventive maintenance.

- There is significant variation in staff resource levels among the fourteen departments after equalizing for the square footage maintained by these departments. This ranges from a low of 19,300 square feet per building technician for the State Fair to 133,300 per building technician for the Building Operations Support Services Division. The benchmark utilized by the Matrix Consulting Group is 60,000 factored square feet per building technician. The range in Metro suggests significant variation in the efficient use of staff and an inability for some of these units such as Building Operations Support Services Division to preventively maintain building assets.

- There is a lack of management accountability for managing the maintenance of building assets that have a value of $1,024,677,917 (based upon the 2005 CAFR).

Metro should consolidate responsibility for buildings and grounds maintenance, custodial maintenance, and security services within the Building Operations Support Services Division.

The consolidation of these resources within the Building Operations Support Services Division should enable the Division to assume responsibility for the maintenance of the additional Metro buildings that have recently been added to its portfolio or will be added shortly without the addition of staff. These include the Justice

A.A. Birch building (235,000 square feet), Metro Southeast (454,000 square feet), Metro Office building (68,962 square feet), and historic courthouse (232,615 square feet). These four buildings have added or will add 990,577 square feet to the portfolio of buildings maintained by the Building Operations Support Services Division. This would typically require the addition of sixteen to seventeen additional technicians. With consolidation, the Division can make use of existing underutilized technicians in these other departments and address the needs of these four buildings. This represents an annual cost avoidance of $830,000 annually in salaries and fringe benefits. In addition, the Building Operations Support Services Division budgeted $149,000 in FY 2005 for plumbing, heating, ventilating, and air conditioning service. Upon the consolidation and the adjustment of the mix of managerial, supervisory, skilled, semi-skilled and unskilled positions assigned to buildings and grounds maintenance, these expenditures should be eliminated.

(2) Enhancing The Capacity Of The Building Operations Support Services Division To Manage Buildings And Grounds Maintenance And Deliver Responsive Services For Its Customers

The effective management of the maintenance of building assets by Building Operations Support Services Division is critical to this consolidation. A number of the practices and the mix of staffing of the Division must be enhanced if this consolidation is to be successful.

- The Division should utilize a zone approach to the delivery of building maintenance including the decentralization of this staff to four different satellite yards. The Division is currently working in five zones but should organize its staff into ten zones with a Building Maintenance Supervisor for each zone. The major strength of a zone approach is that the team is accountable for all building maintenance in that zone. Customers who work with Building Operations Support

Services Division would soon learn the names of their zone team. This enhances customer service and accountability.

- The Building Operations Support Services Division should acquire licenses for one of the two existing commercial-off-the-shelf (COTS) computerized maintenance management system already in use in Metro – the Hansen or the Azteca Cityworks enterprise asset management information system. This is essential to the successful management of building assets.

- The Building Operations Support Services Division should conduct an asset inventory of all building systems and components.

- The Building Operations Support Services Division should conduct condition assessments of Metro's facilities on a five to seven year cycle to identify renovation and rehabilitation requirements and deficient conditions.

- The Building Operations Support Services Division should develop service level agreements with its major customers.

- Some positions within the Building Operations Support Services Division should be reallocated to building maintenance.

- Upon consolidation within the Building Operations Support Services Division, the mix of managerial, supervisory, skilled, semi-skilled and unskilled positions assigned to buildings and grounds maintenance. Metro has an insufficient number of skilled trades technicians to effectively maintain its building assets, and more semi-skilled and unskilled technicians than required.

The Building Operations Support Services Division faces a number of challenges to efficiently and effectively use the resources resulting from consolidation, and more importantly, to redirect resources and invest in maintenance and preservation of the City's building assets.

(3) Development And Installation Of A Comprehensive Preventive Maintenance For Buildings

Metro taxpayers have a significant investment in building assets. Preserving these assets prolongs their useful life and reduces the long-term maintenance and rehabilitation costs. This is the primary objective of preventive maintenance.

Metro is not consistently preventively maintaining this infrastructure on a routine ongoing basis. The Building Operations Support Services Division needs to pursue a coordinated and comprehensive effort to ensure the efficient and effective preventive maintenance of those assets.

The Building Operations Support Services Division should establish and install a preventive maintenance program for Metro building assets (heating, ventilating, air conditioning systems, electrical systems, plumbing systems, etc.).

(4) Enhancing Energy Conservation Management To Reduce The Costs Of Utilities For Metro Buildings

Metro does not operate energy efficient buildings. The electrical consumption for Metro buildings kilowatt-hour per factored gross foot is 70% higher than the median for its peers. This is not insignificant given the annual cost of electricity for the Building Operations Support Services Division exceeds $1.8 million. The electrical cost per factored square foot is 25% higher than its peers.

There are local examples of the cost savings that can be generated through prudent investments in energy conservation. The State of Tennessee in 2004 upgraded two of the State's largest office buildings and cut energy expenses by more than half. This upgrade involved a large-scale energy-efficient retrofit at the Andrew Jackson and Rachel Jackson state office buildings in Nashville. The projected savings: $800,000 annually, a savings of 55 percent of the buildings' normal energy costs. The capital investment to achieve these savings amounted to $4 million, but the project will pay for itself in less than five years through energy savings. The Jackson buildings encompass more than 620,000 square feet. The reductions in energy use were achieved through a

number of measures:

- A lighting retrofit that included energy-efficient lamps and ballasts as well as a control system to limit the use of lighting when the buildings are unoccupied;
- A centralized control station for heating and cooling;
- More effective use of outside air to supplement heating and cooling;
- Steam and chilled water piping and ventilation ductwork changes;
- Variable-frequency drives on pumps, and certain air-handling units; and
- Quick-acting doors on the garage level, preventing winter heat loss.

The Matrix Consulting Group believes that the Building Operations Support Services Division can reduce its electrical costs for existing buildings by $450,000 annually through prudent investments in energy conservation and enhanced energy management.

(5) Enhancing The Working Relationship Between The Building Operations Support Services Division And The Real Property Services Division

The delivery of new or renovated buildings that can be cost effectively maintained requires a partnership between those responsible for designing and managing the construction of the building (the Real Property Services Division), and those responsible for maintaining the building when it is placed in service (the Building Operations Support Services Division). Maximizing the input of the buildings owner and building maintenance representatives in the design and construction processes inevitably leads to buildings that cost less to maintain. The effectiveness of this partnership requires additional effort by the Building Operations Support Services Division and the Real Property Services Division. The challenge with the effectiveness of this existing working relationship cannot be attributed exclusively to just one of these

two divisions. Both of these divisions need to increase their efforts to enhance the effectiveness of this relationship.

The effectiveness of this partnership needs to be enhanced through a number of measures.

- The Real Property Services Division and the Building Operations Support Services Division should develop a service level agreement that establishes parameters for an effective working relationship.
- The Real Property Services Division should enhance its capital project management practices.
- The Real Property Services Division should develop a formal written commissioning policy for buildings.
- The Real Property Services Division should develop a formal building equipment standardization policy.

The effectiveness of the working relationship between Real Property Services Division and the Building Operations Support Services Division is the foundation for buildings that cost less to maintain. The Matrix Consulting Group, in conducting inspections of Metro buildings that have recently been completed or are shortly nearing completion, identified a number of conditions that will impede the efficiency of building maintenance.

4. EXECUTIVE SUMMARY

The Matrix Consulting Group has prepared a summary of the findings, recommendations contained in the attached report. This summary is presented below.

Index	Findings	Recommendations	Cost/ (Savings)
6.1	• Metro Nashville utilizes a fragmented approach to organizing buildings and grounds maintenance services: fourteen different departments are involved in the delivery of buildings and grounds maintenance services.. • Metro is a high cost provider of building maintenance services: • Metro is not consistently preventively maintaining its building systems and assets; • There is significant variation in staff resource levels among the fourteen departments even after equalizing for the square footage maintained by each of these departments; and • There is a lack of accountability for managing the maintenance of building assets that have a value of $1,024,677,917 based upon the 2005 CAFR..	Consolidate the responsibility for buildings and grounds maintenance, custodial maintenance, and security management in the Building Operations Support Services Division, General Services Department. This should exclude the General Hospital and the Metro Nashville Public Schools.	$171,400
6.2	In reviewing the project assignments for the Real Property Services Division, there appear to be a number of projects that would be better classified as general maintenance projects and not as major maintenance projects.	• The Building Operations Support Services Division should assume responsibility for minor renovation projects including roof renovations. • The General Services Department and the Real Property Services Division should develop a formal written policy that defines the size and scope of the capital projects that each will be responsible for. • The Building Operations Support Services Division, General Services Department, upon consolidation of buildings and grounds maintenance services, should assess the skills of the staff reassigned to the Division and allocate one of these positions as project manager for minor renovations including roof renovations.	$0

Index	Findings	Recommendations	Cost/ (Savings)
7.1	In addition to the forty-three staff allocated to the Building Operations Support Services Division, twelve other departments (excluding the General Hospital and Metro Nashville Public Schools) also have staff responsible for providing building and grounds maintenance, custodial maintenance, security services and clerical support.	The staff and the service and supply funding in these twelve other departments that are allocated to buildings and grounds maintenance, custodial maintenance, and security services should be transferred to the Building Operations Support Services Division. This should exclude that proportion of staff allocated to event set-up and takedown at the Farmers Market, Municipal Auditorium, Convention Center, and State Fair.	$0
7.2	• The span of control for Metro building and grounds maintenance managerial and supervisory positions is one manager or supervisor to six skilled, semi-skilled, and unskilled workers. The span of control should approximate one to eight - ten workers • Metro allocates 40 building and grounds maintenance positions or 42% as unskilled or semi-skilled. This is 40% greater than best management practices. • Metro only allocates three positions as Plumbers or 3% of the total authorized buildings and grounds maintenance staffing. • Metro only allocates four Electrician positions or 4% of the total authorized buildings and grounds maintenance staffing. • Metro does not allocate any Locksmiths to building maintenance. • Metro allocates nine positions as Building Maintenance Mechanic, Convention Center Lead Mechanic, and Building Maintenance Lead Mechanic.	Adjust the mix of managerial, supervisory, skilled, semi-skilled and unskilled positions assigned to buildings and grounds maintenance in the Building Operations Support Services Division upon consolidation. • Eliminate five managerial positions. • Increase the number of supervisory positions from eight authorized positions to ten authorized positions. • Reduce the number of semi-skilled and unskilled positions from forty positions to twenty-eight positions. • Increase the number of Electricians from four positions to ten positions. • Increase the number of Locksmiths from no positions to two positions. • Increase the number of Plumbers from three positions to ten positions. • Increase the number of Building Maintenance Mechanic, Convention Center Lead Mechanic, and Building Maintenance Lead Mechanic positions from nine positions to ten positions. Upon consolidation, the Human Resources Department should conduct a classification study to allocate the incumbents in buildings and grounds maintenance to the appropriate classifications given the revised plan of organization and the duties performed by the incumbents.	$215,000

Index	Findings	Recommendations	Cost/ (Savings)
7.3	The Building Operations Support Services Division is responsible for providing building and grounds maintenance services to eight-four facilities located throughout Metro. Division employees are located in one facility and provide services from this location for all of these eight-four facilities. With the consolidation of building and grounds maintenance, the Division will be responsible for over 5.3 million square feet of buildings located throughout Metro Nashville. Additionally, the authorized number of positions for the Division will increase from 43 positions to 217.94 positions – a five-fold increase.	The Building Operations Support Services Division should utilize a zone approach to the delivery of building and grounds maintenance including the decentralization of this staff to four different satellite yards. The Division should organize its staff into ten zones with a Building Maintenance Supervisor for each zone.	$150,000 in one-time capital costs
7.4	• The median building maintenance cost per factored gross square foot for over fifty peer private and public agencies was $1.32, compared to $3.42 for Metro. Metro's building maintenance cost per factored gross square foot was 2.6 times higher than the median. • High-performing, lower cost building maintenance organizations typically allocate between 65% and 85% of staff hours to preventive maintenance and 20% to 35% to reactive maintenance. • The Building Operations Support Services Division allocates approximately 24% of staff hours to preventive maintenance activities.	The Building Operations Support Services Division should establish a preventive maintenance program.	$0
7.5	The Building Operations Support Services Division lacks a computerized maintenance management system to maintain a detailed inventory of assets, manage building maintenance and repair workload, plan and schedule work, schedule reliability-centered maintenance, manage periodic condition assessments, maintain a history of repair and maintenance of building equipment, etc.	The Building Operations Support Services Division should acquire licenses for one of the two existing commercial-off-the-shelf (COTS) computerized maintenance management system already in use in Metro – the Hansen or the Azteca Cityworks enterprise asset management information system.	$63,750 in one-time costs

Index	Findings	Recommendations	Cost/ (Savings)
7.6	• During the past year, the Building Operations Support Services Division created a Microsoft Excel spreadsheet to collect information about the facilities for which it has maintenance responsibility. Division staff has been populating the database. It is one of the few Metro departments that have created a comprehensive facility asset inventory. The database contains sixty pieces of information about each building and is about 25% complete. The database focuses on information about how various services (grounds, custodial, fire inspection, trash) are provided to the building. • The spreadsheet does not capture an inventory of building systems and components (electrical, HVAC, mechanical, plumbing).	The Building Operations Support Services Division should conduct an asset inventory of all building systems and components.	$0
7.7	The Building Operations Support Services Division has created a Microsoft Excel spreadsheet about the facilities for which it is responsible for maintaining. While this database presents information about how services are provided in each facility, it does not provide up-to-date information about a facility's assets or information about the condition of these assets. The Division does not conduct ongoing condition assessments of buildings to identify deferred building renovation and rehabilitation that should be addressed through capital improvement projects.	The Building Operations Support Services Division should conduct condition assessments of Metro's facilities on a five to seven year cycle to identify the backlog of renovation and rehabilitation requirements and deficient conditions.	$0

Index	Findings	Recommendations	Cost/ (Savings)
7.8	• The electrical consumption per kilowatt hour per factored square foot is 70% higher for Metro than the median for over fifty peer private and public agencies. Metro buildings require approximately 35-kilowatt hours per factored gross square foot versus 20.5-kilowatt hours for the median. • Electrical cost per factored gross square foot in Metro is slightly higher than the median for over fifty peer private and public agencies. Metro's electrical cost per factored gross square foot is $1.51 compared to the median of $1.21. • In Metro, the total utility cost per factored gross square foot, is approximately $2.25 compared to the median of $1.56 for over fifty peer private and public agencies. Overall, Metro's energy consumption is much higher than the median of the benchmarked agencies. This is not insignificant: utility costs typically comprise 32% of total building maintenance costs.	Metro should authorize an Energy Manager position for the Building Operating Support Services Division. The Building Operations Support Services Division should develop and implement a Metro-wide energy management program.	$100,700
7.9	• Metro does not use an internal service fund and charge-back system to support the Building Operations Support Services Division. • The concept of internal charge-back in facility projects is used as a Metro funding mechanism for internal services. For example, RPS uses a project cost system to fund costs for design and construction of buildings.	The Building Operations Support Services Division should be established as an internal service fund	$0
7.10	The Building Operations Support Services Division has not developed agreements with its customers to spell out the type and level of service required and any performance related penalties or incentives.	The Building Operations Support Services Division should develop service level agreements with its major customers.	$0

Index	Findings	Recommendations	Cost/ (Savings)
7.11	Some of the positions allocated to the Building Operations Support Services Division are not utilized effectively.	Some positions should be reallocated to building maintenance.	$(73,400)
8.1	The management of design and construction management and building maintenance are organizationally divided in Metro. The Real Property Services Division, Finance Department, is responsible for building design and construction, while the Building Operations Support Services Division, General Services Department, is responsible for the maintenance of buildings once they have been placed into service. Interviews with personnel in both divisions, a review of documentation and observations of buildings that have recently been constructed indicate there is not a positive working relationship between the divisions.	The Real Property Services Division and the Building Operations Support Services Division should develop a service level agreement that establishes parameters for a productive working relationship	$0
8.2	The review of the capital project management practices utilized by the Real Property Services Division to manage building capital projects has identified a number of issues associated with how well the Division applies core capital project management principals.	The Real Property Services Division should enhance its capital project management practices.	$0
8.3	The Real Property Services Division has not developed a formal written commissioning process to ensure that all building systems are installed, functionally tested, and capable of being operated and maintained to perform in conformity with the design intent and the owner's needs..	The Real Property Services Division and the Building Operations Support Services Division should develop a formal written commissioning policy for buildings.	$0

Index	Findings	Recommendations	Cost/ (Savings)
8.4	Equipment standardization has been demonstrated to improve on-going reliability of buildings through its direct impact on reliability. Effective equipment standardization programs have been shown to reduce the frequency and number of functional failures that could be attributed to human errors such as improper lubrication, improper maintenance due to training or procedural inadequacies, or the installation of improper parts, just to name a few.	The Real Property Services Division should develop a formal building equipment standardization policy.	$0
9.1	MGT of America conducted an audit of the Metro Nashville Public School in 2001. The study made 24 recommendations regarding facility planning, construction, maintenance and custodial services. Of the 24 recommendations, 12 or 50% have been implemented, 3 or 13% have been partially implemented and 9 or 37% have not been implemented.	The Finance Department should meet with the Metro Nashville Public School and discuss their plans for implementation of those recommendations that remain partially implemented or unimplemented.	$0

2. PROFILE OF SERVICES

2. PROFILE OF SERVICES

This chapter provides a descriptive profile of the Building and Grounds Maintenance and the Construction Management functions of Metro Nashville and Davidson County. The purpose of the descriptive profile is to document the project teams understanding of the organization, allocation of staff by function, and principal assigned responsibilities of staff. Data contained in the profile was developed based upon the work conducted by the consulting team including:

- Interviews with key internal staff, including department and/or division managers, as well as key external staff.
- Collection of various data describing organization and staffing, workload and service levels as well as costs.
- Documentation of key practices as that relates to work planning and scheduling, policies and procedures, as well as work processes.

The descriptive profile does not attempt to recapitulate all organizational and operational facets of the operations under review. The structure of this descriptive profile is presented below.

- An overview of each of the three functions performed.
- Organizational charts of each of the areas and key functions showing all staff positions by function and shift, as appropriate, and reporting relationships.
- Summary descriptions of key roles and responsibilities of staff for each of the departments. The responsibility descriptions provided in the descriptive profile also summarize the team's understanding of the major programs and service activities to which staff throughout the Divisions are currently assigned. It should be clearly noted that responsibility descriptions are not intended to be at the "job description" level of detail. Rather, the descriptions are intended to provide the basic nature of each unit and assigned positions including staffing levels and work schedules, program targets and service descriptions.

- Where necessary to better describe allocations and scheduling, additional charts are provided (e.g., scheduling, workload data, etc.)

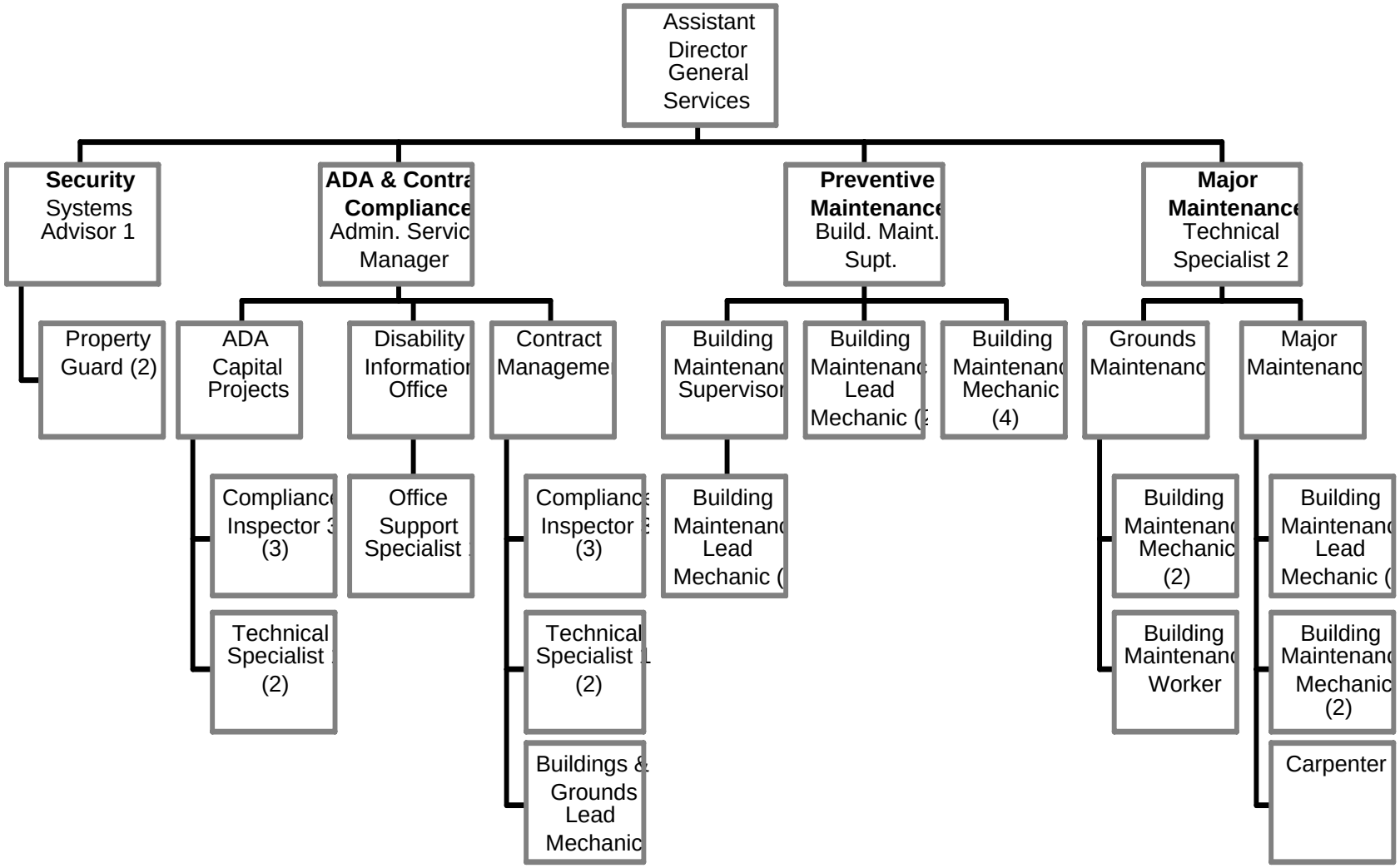
The sections, which follow, present our current understanding of the key elements of each of the departments reviewed.

1. BUILDING OPERATIONS SUPPORT SERVICES DIVISION OF THE GENERAL SERVICES DEPARTMENT.

The Building Operations Support Services Division, a division within the General Services Department, provides security and building maintenance services to many, but not all, Metro buildings and manages Metro's American Disability Act compliance function. The Division has a number of contracts in place for specialized maintenance support, environmental (janitorial) services and the key card building access system. The Division's budget totaled $6,885,800 in FY 2005. A summary of the BOSS budget for FY 2005 is contained in the table below. As the table indicates, over half of the budget for the division consists of utilities.

Budget Category	Amount	% of Total
Salaries and Wages	$1,009,200	14.7%
Fringe Benefits	$320,300	4.7%
Utilities	$3,582,100	52.0%
Janitorial Services	$1,108,800	16.1%
Services – Landscaping, Electrical, Janitorial, HVAC, Plumbing, security	$455,600	6.6%
Supplies	$311,200	4.5%
Fleet	$37,000	0.5%
Other – fees, Licenses, Equipment	$61,600	0.9%
Capital	$0	0.0%
TOTAL	**$6,885,800**	**100.0%**

The Division is authorized a total of 43 positions; the plan of organization for the Division is presented on the following page. Important points to note concerning the plan of organization for the Division following the plan of organization.


Assistant Director General Services
Security Systems Advisor 1
Property Guard (2)
ADA & Contra Compliance Admin. Servic Manager
ADA Capital Projects
Compliance Inspector 3 (3)
Technical Specialist (2)
Disability Information Office
Office Support Specialist
Contract Manageme
Compliance Inspector (3)
Technical Specialist (2)
Buildings & Grounds Lead Mechanic
Preventive Maintenance Build. Maint. Supt.
Building Maintenanc Supervisor
Building Maintenanc Lead Mechanic (
Building Maintenanc Mechanic (4)
Major Maintenance Technical Specialist 2
Grounds Maintenanc
Building Maintenanc Mechanic (2)
Building Maintenanc Worker
Major Maintenanc
Building Maintenanc Lead Mechanic (
Building Maintenanc Mechanic (2)
Carpenter

- The Security Section is staffed by three positions. This staff is responsible for Key Card access systems and a security guard contract with Wackenhut. These responsibilities are defined below.

  - Key Card Control – The Division is currently operating two key card control systems. The Division staff takes pictures, issues cards for employees and vendors, and maintains the database and bills Metro departments for replacement cards. The Division and the Police Department jointly administer the primary system, provided by a contract with Johnson Controls. It is operational in 35 Metro buildings and serves approximately 10,000 Metro employees. Cost for the annual maintenance contract with Johnson Controls is approximately $182,000. When the Adult Court vacated its facilities that are now being renovated, Real Property Services acquired a separate key card control system from Southeastern Sound for the court's three temporary buildings at Metro Center. The Division administers the court's key card system for approximately 800 employees. Plans call for the installation of a Johnson Controls system in the new court buildings. The Juvenile Court has a separate Johnson Controls key card system that the court administers. BOSS is preparing a request for proposal for Metro wide key card system for release in 2006.

  - Physical Security – The Division employs two security guards who provide security at Metro's remote downtown parking lot and around several downtown Metro buildings. The guards are on duty from 7 a.m. to 11:30 p.m. on weekdays. BOSS also contracts with Wackenhut for 51 security guards stationed at nine locations, primarily in the downtown area. The annual Wackenhut contract is for approximately $1.9 million. Metro currently has six different guard contractors. Parks and Recreation, Schools, Public Works, Juvenile Court and Adult Courts have separate contracts. Metro has issued a request for proposal to consolidate guard services under a single contract.

- The maintenance of buildings by the Division is accomplished by two major groups – Preventive Maintenance and Major Maintenance –authorized a total of 22 positions. These two groups are responsible for the maintenance of 84 buildings and the grounds surrounding these buildings. Major Maintenance takes on repair and construction projects while the Preventive Maintenance group is responsible for preventive maintenance. However, work that might tie a crew up for more than three days is generally contracted out. The staff assigned to Major Maintenance act as roving crews. Preventive Maintenance staff is assigned to specific buildings. The responsibility of these two groups is provided below.

  - The Preventive Maintenance group was established in July 2005. A manager and eleven positions are assigned to this group; one of these

positions – a Building Maintenance Lead Mechanic – is vacant. These personnel are assigned by zone county-wide that includes major Metro buildings in the downtown area. The manager of the group reviews work order information captured by a web-based customer service request system that was implemented in June 2005. Personnel in this group are also responsible for preventive maintenance in their assigned building. The preventive maintenance work is completed largely for HVAC systems, and not other systems such as electrical and plumbing. Personnel are largely self-directed in identifying their daily work assignments.

- The Major Maintenance group includes a manager, six staff allocated to building maintenance and three staff allocated to grounds maintenance. The building personnel work in 2-person crews and typically will not undertake jobs that will take more than three days to complete. The group utilizes contractors on call to accomplish larger projects. Typical Major Maintenance projects include electrical work up to the electrical box, water and sewer repairs of existing lines, roof repairs, door and window replacement, sidewalk and curb repairs.

• The ADA Compliance Division is authorized fourteen positions and is divided into three units – Contract Management, American Disability Act (ADA) Capital Projects and Disability Information. The function of each group is described below.

- Contract Management – The Division assesses contracted services for compliance with ADA. This group is responsible for administering and monitoring the contractors and their work.

- ADA Infrastructure Projects – This group is responsible for the implementation of Metro's transition plan that was agreed upon with DOJ. It works Metro wide and is currently monitoring more than 300 projects. It works with all Metro agencies, including Metro Schools on the design of new facilities and the renovation of existing facilities to ensure that they meet Metro's ADA goals.

  Access – This division is not only involved in construction, but they also monitor for compliance with technology, communications, and transportation.

- Disability Information Office – This group is responsible for distributing Disability Information.

The first exhibit presented at the end of this chapter presents the roles and responsibilities of the staff assigned to this Division.

The Division is in the process of developing a web-based maintenance management system that will be in place this calendar year. Implementation has been affected by the development of processes, procedures, data collection forms and systems and the need to acquaint employees with the systems. The first step in developing this system was the creation of a database containing information about 84 Metro buildings. This Excel database contains sixty pieces of information about each building. A second step in gathering information about maintenance needs and activities was the creation of a work order database. The web-based system was rolled out in June 2005. The initial phase was designed to collect service requests from clients in each of the buildings served by the Division. The managers of the Division are using the system to assign work to the Major Maintenance and Preventive Maintenance sections.

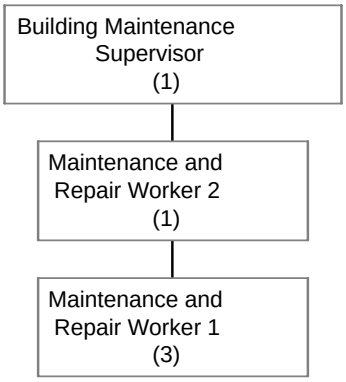
The Division recently instituted an interim step to get a better handle on maintenance activities by having its employees fill out daily time sheets. The Excel based time sheet records the following information: building, project number or description of work, day of the week, and regular or overtime hours expended.

The Division is responsible for the maintenance of 2.4 million square feet of buildings. The workload of the Division and service levels provided by the Division are presented in the second exhibit at the end of this chapter.

2. FARMERS MARKET

The Farmer's Market is responsible for providing a venue for local vendors of produce, foods, and other items to the citizens of Metro Nashville. This operation is set up as an enterprise fund within Metro.

The Farmer's Market has five fulltime equivalents assigned to building and grounds maintenance functions for its facilities and properties. Presented below is the table of organization for the individuals involved in the maintenance functions.



The table, which follows, presents the roles and responsibilities of the staff assigned to building and grounds maintenance.

Staffing By Classification		Roles and Responsibilities
Building and Maintenance Supervisor	1.0	• The Operations Manager is responsible for managing and directing the activities of staff, setting priorities and ensuring that all grounds and facility repairs are conducted. Oversees or performs the changing of filters, belts, and minor repairs to equipment (lawnmowers, vacuum).
Maintenance and Repair Worker 2	1.0	• The Maintenance and Repair Worker 2 is a working supervisor. This position is responsible for all grounds maintenance and facility repairs.
Maintenance and Repair Worker 1	3.0	• The three Maintenance and Repair Worker 1's handle all housekeeping, grounds maintenance and landscaping (including grass and hedge cutting), and minor facility maintenance (light bulb changing, outlet changing, painting, etc.)

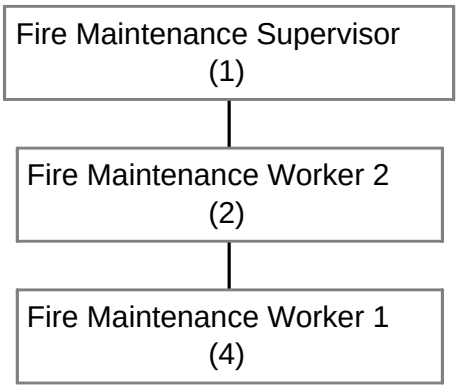
Contracts through Metro are utilized to cover repairs to heating, plumbing and HVAC systems. HVAC preventive maintenance is contracted out with the exception of filter changes that are done in house on a monthly basis.

The Farmer's Market is responsible for the maintenance of 40,000 square feet of air conditioned buildings, and 60,000 square feet of sheds. The workload of the

Farmer's Market and the service levels provided are presented in the third exhibit at the end of this chapter.

3. FIRE DEPARTMENT

The Fire Department has responsibility for grounds and building maintenance functions for all buildings it occupies. This amounts to a total of 42 buildings including 37 fire stations. The Fire Department allocates seven positions to building and grounds maintenance services. The plan of organization for this function is provided below.



The Deputy Chief is primarily responsible for the oversight and budgetary functions related to the maintenance activities. All custodial and grounds maintenance functions are performed by fire station personnel.

The roles and responsibilities of these staff are portrayed in the table below.

Staffing By Classification		Roles and Responsibilities
Fire Maintenance Supervisor	1.0	• Primary supervisor. Determines work priority, assignments, and schedules. Assists with duties as needed. On call 24/7 to address/assign employees for emergency situations.
Fire Maintenance Worker 2	2.0	• Performs mainly electrical work. Duties include both building electrical work and electrical work on fire apparatus. Apparatus work takes approximately 50% of his time. Trained electrician.

Staffing By Classification		Roles and Responsibilities
Fire Maintenance Worker 1	4.0	• Performs general maintenance activities including electrical, plumbing, HVAC, overhead doors, and metal fabrication. Employees have HVAC Type I certification. Some of the Fire Maintenance Worker I's have specialized skills including 1 Plumber and 1 Metal Fabricator. • Plumber also works on nozzles and hose repair.

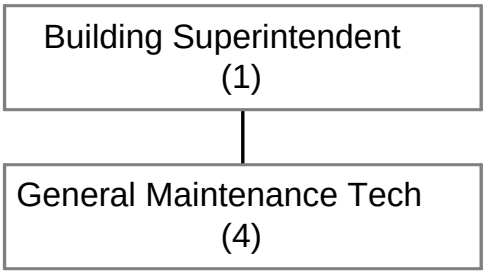
Contracts through Metro are utilized to cover repairs related to major plumbing, HVAC, and roof replacement.

The Fire Department is responsible for the maintenance of 429,999 square feet of buildings. The workload of the Fire Department and the service levels provided are presented in the fourth exhibit at the end of this chapter.

4. PUBLIC HEALTH DEPARTMENT

The Public Health Department is responsible for providing clinical health services to the residents of Metro Nashville and Davidson County.

The Public Health Department has five full-time equivalent staff assigned to building maintenance of its facilities and properties, and eleven custodial staff. Presented below is the table of organization for the Building Maintenance Division.



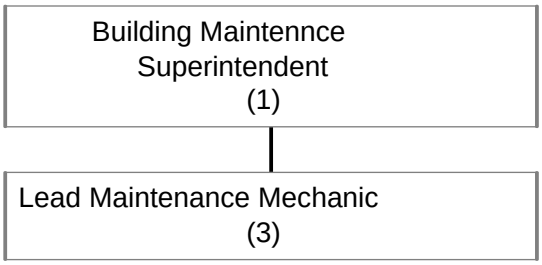
The table, which follows, presents the roles and responsibilities of personnel assigned to building and grounds maintenance.

Staffing By Classification		Roles and Responsibilities
Building Superintendent	1.0	• The Building Supervisor is responsible for managing and directing the activities of staff, coordinating courier services
General Maintenance Technician	4.0	• One General Maintenance Technician is assigned to two outlying facilities (East Center and the Woodbine Center). This position is responsible for all grounds maintenance and facility repairs. • The remaining three General Maintenance Technicians are assigned to six facilities, including one parking garage. • All staff are responsible for responding to work order requests, prioritizing work needs (e.g., emergency versus non-emergency) and coordinating preventive maintenance activities. • Maintenance staff also provide special event support (e.g., flu vaccination clinics, etc.), as well as serve as backup / additional couriers when needed.
Custodial Supervisor	1.0	• Supervise janitorial workers. One assigned to Main branch and one assigned to branches.
Custodial Worker 1 and 2	10.0	• Perform general janitorial cleaning services to assigned facility. Duties include sweeping, vacuuming, dusting, bathroom cleaning, etc. Some employees are responsible for more than one facility.

The Public Health Department is responsible for the maintenance of 247,247 square feet of buildings; this includes a parking garage consisting of 57,920 square feet. The workload of the Public Health Department and the service levels provided are presented in the fifth exhibit at the end of this chapter.

5. CONVENTION CENTER

The Convention Center is responsible for maintaining and operating the Convention Center located in downtown Nashville. The Convention Center has four full-time equivalent staff assigned to building maintenance functions for its facility. Presented below is the table of organization for the maintenance functions for the Convention Center.



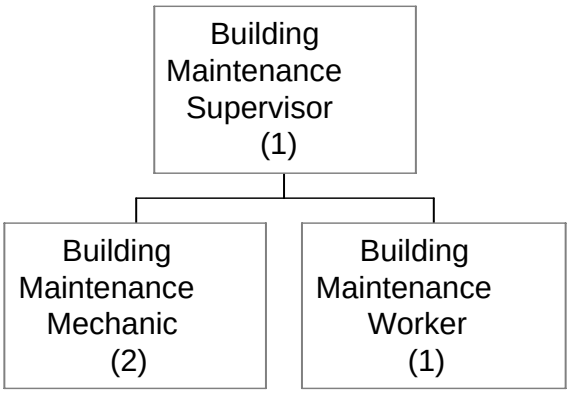
The table, which follows, presents the roles and responsibilities of personnel assigned to building maintenance.

Staffing By Classification		Roles and Responsibilities
Building Maintenance Superintendent	1.0	• Building and Safety Administrator oversees maintenance personnel including assigning and monitoring of work activities.
Lead Maintenance Mechanic	3.0	• All staff are responsible for responding to work order requests, prioritizing work needs (e.g., emergency versus non-emergency) and coordinating preventive maintenance activities. Perform maintenance activities including greasing/oiling pumps, light bulb replacements, general carpentry and electrical repairs, and plumbing repairs. Staff includes one certified electrician. • Maintenance staff also provides special event support (e.g., set up, tear down, electrical service).

The Convention Center is responsible for the maintenance of 450,000 square feet of buildings. The workload of the Nashville Convention Center and the service levels provided are presented in the sixth exhibit at the end of this chapter.

6. MUNICIPAL AUDITORIUM.

The Municipal Auditorium provides a venue for entertainment, trade show, and meeting space for the Nashville area. Presented below is the table of organization for the building maintenance functions for the Municipal Auditorium.



The Municipal Auditorium is authorized four employees for the maintenance of its building and its grounds. The table, which follows, presents the roles and responsibilities of personnel assigned to building and grounds maintenance.

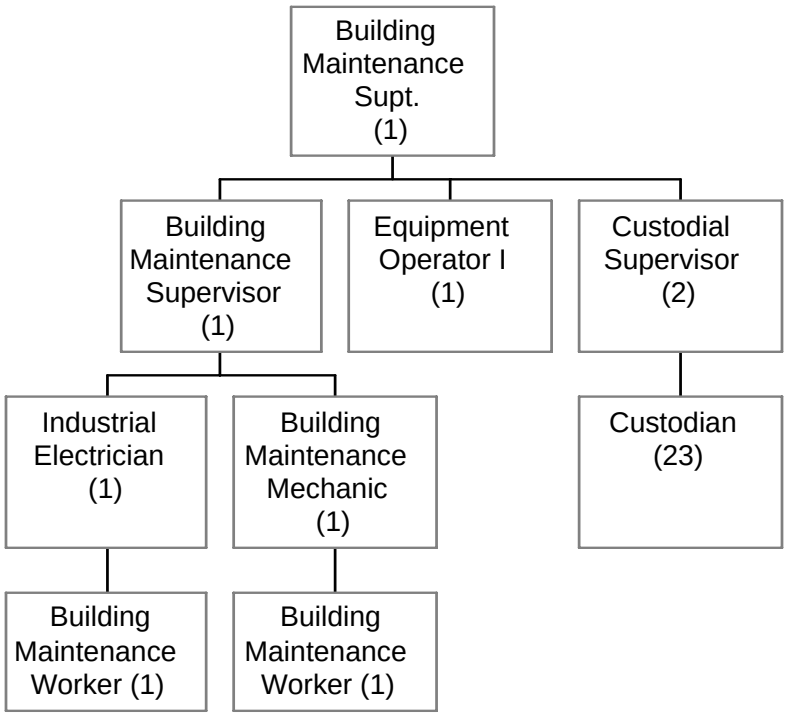
Staffing By Classification		Roles and Responsibilities
Building Maintenance Supervisor	1.0	• The Building Maintenance Supervisor is responsible for overall planning and budgeting of maintenance and event support.
Building Maintenance Mechanic	2.0	• Responsible for HVAC maintenance and repair including conducting preventive maintenance (air filters, valves, belts). Assist with general building maintenance activities and grounds maintenance activities as needed.
Building Maintenance Worker	1.0	• All staff are responsible for responding to maintenance requests (e.g., plumbing, electrical, concrete patching, bulb changing). Operate equipment including forklift, pick up and scrubber. Perform landscaping and mowing around facility. • Maintenance staff also provides special event support (e.g., stage/chair/table set up and tear down, electrical service, ice laying/painting, score board setup).

Employees are generally assigned to work from 8:00 a.m. to 4:30 p.m. or 8:30 a.m. to 5:00 p.m. However, staff shifts are flexed to provide staffing coverage for special events.

The Municipal Auditorium is responsible for the maintenance of 63,000 square feet of buildings. The workload of the Municipal Auditorium and the service levels provided are presented in the seventh exhibit at the end of this chapter.

7. METRO PUBLIC LIBRARY.

The Metro Public Library operates twenty-four facilities from which it provides library services. Presented below is the table of organization for the building and grounds maintenance functions for the Metro Public Library.



The Metro Public Library is authorized thirty-two staff for the maintenance of the buildings and grounds for its twenty-four facilities. The table, which follows, presents the roles and responsibilities of personnel assigned to building and grounds maintenance.

Staffing By Classification		Roles and Responsibilities
Building Maintenance Superintendent	1.0	• Plant Operations and Maintenance Manager is responsible for overall building and grounds maintenance functions. Supervises individuals in each of the functional areas.
Building Maintenance Supervisor	1.0	• Supervises maintenance personnel. Working position that assists with maintenance activities.
Building Maintenance Mechanic	1.0	• Responsible for HVAC repair and works on chillers. Assist with general building maintenance activities as needed.
Industrial Electrician	1.0	• Performs electrical repairs, installation, and minor remodeling jobs. Changes bulbs and ballasts as needed. Certified industrial electrician.
Building Maintenance Worker	2.0	• Assist electrician and HVAC Tech in performing assigned duties. One helper typically assigned to each function. Assist with event set up and tear down.
Equipment Operator I (Grounds Supervisor)	1.0	• Performs mowing, weeding, trimming, and shrub maintenance. Supervises work crews provided by Sheriff's Department that assist with grounds maintenance.
Custodial Supervisor	2.0	• Supervise janitorial workers. One assigned to Main branch and one assigned to branches.
Custodian 1 and 2	23.0	• Perform general janitorial cleaning services to assigned facility. Duties include sweeping, vacuuming, dusting, bathroom cleaning, etc. Some employees are responsible for more than one facility. Assist with event set up and tear down.

The Metro Public Library is responsible for the maintenance of 528,601 square feet of buildings. The workload of the Metro Public Library and the service levels provided are presented in the eighth exhibit at the end of this chapter.

8. PARKS AND RECREATION DEPARTMENT.

The Parks and Recreation Department maintains and repairs a park system that includes 102 parks, 10,200 acres, 90 playgrounds, a museum, a sportsplex, nature center, and seven golf courses. The Parks Department maintains 89 buildings including

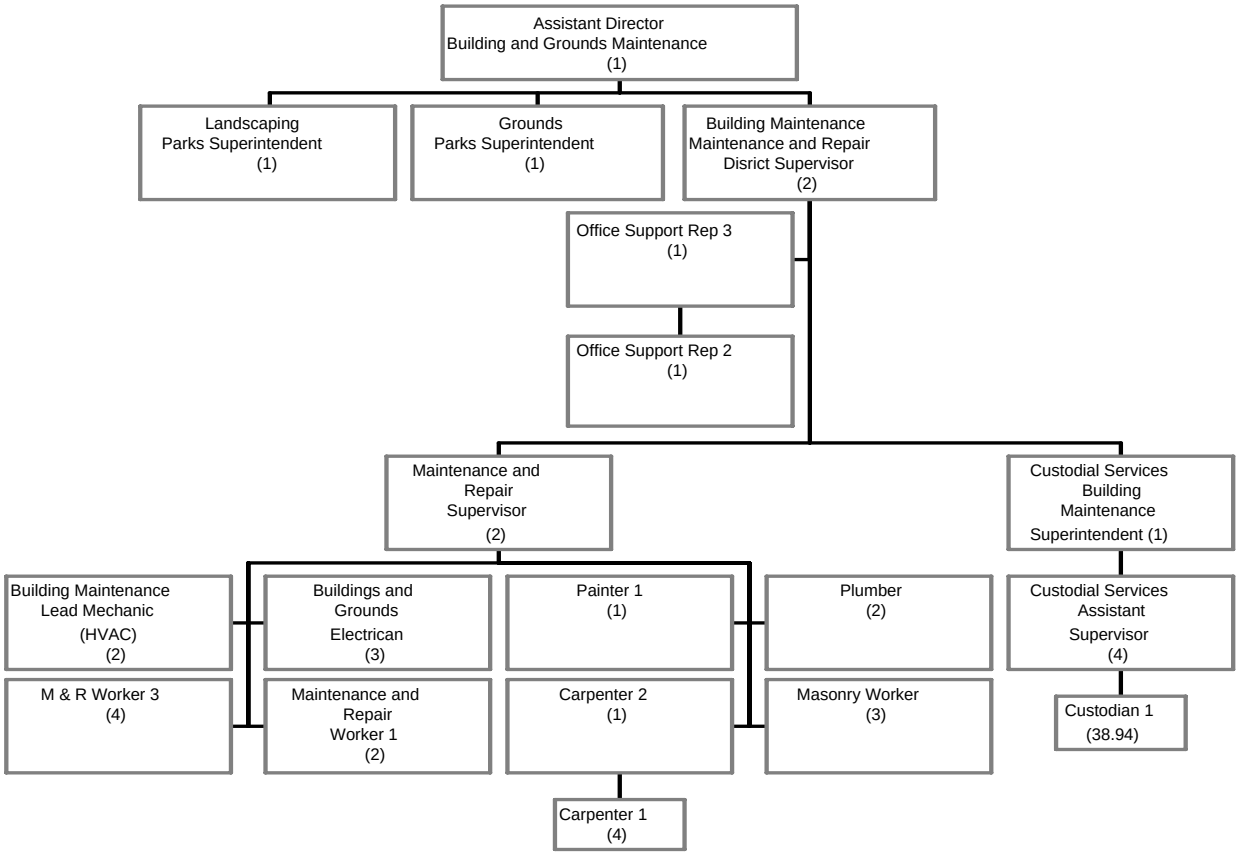
office buildings, community centers and concession stands/restrooms. These buildings comprise 777,637 square feet. The eighteen facilities that meet or exceed 15,000 square feet of space are presented in the table below.

Facility	Square Footage
Cleveland Community	15,000
Morgan Center	15,250
Fred Douglas Center	15,429
Centennial Rec. Bldg (with Storeroom & Beautification)	15,704
McGavock Center	15,795
Madison Community Center	15,800
Centennial Arts/Activity	15,928
Shelby Community Center	15,928
Easley Center at E.S. Rose	17,676
Whites Creek Center	18,000
Hartman Center	22,460
Z. Alexander Looby Ctr.	24,307
Hadley Tennis Dome (air supported)	24,960
Napier Center	25,254
Parthenon - Centennial park	28,500
Centennial Indoor Tennis	32,600
Centennial Maintenance Office / Shops	35,830
Centennial Sportsplex (with 2nd hockey rink)	131,550

These 18 facilities contain 485,637 square feet of space or 62% of all of the space maintained by the Parks and Recreation Department.

A total of 74.94 full-time equivalent staff are assigned to building and custodial maintenance. The custodial personnel are assigned to some of these buildings. The custodians may do some light maintenance work on occasion; typically the custodians are prime sources of service requests sent to Maintenance for investigation and correction.

An organizational chart for the building and custodial maintenance program is attached below.



The table, which follows, presents the roles and responsibilities of personnel assigned to building and grounds maintenance.

Staffing By Classification		Roles and Responsibilities
Maintenance and Repair District Supervisor	2.0	• Supervise crews in assigned areas of the community. • One Supervisor supervises electricians, HVAC, plumbers and the lead mechanics. • The other supervisor supervises the carpenters, painters, and masonry workers.
Office Support Rep 3 Office Support Rep 2	1.0 1.0	• Answers phones, generates reports, enters work orders, pays invoices. • Assists with purchasing research. • Office Rep 2 serves as Office Manager.
Maintenance and Repair Supervisor	2.0	• Supervises and assigns work to Trades personnel responsible for building maintenance. • One supervises masonry workers and maintenance and repair workers; the other supervisor supervises painters and carpenters.

Staffing By Classification		Roles and Responsibilities
Carpenter 2 Carpenter 1	1.0 4.0	• Performs general carpentry work including renovations, building of new structures, and repairs.
Building Maintenance Lead Mechanic	2.0	• Performs routine, minor, and preventive maintenance activities on heating and air conditioning systems.
Buildings and Grounds Electrician	3.0	• Performs routine electrical repairs and maintenance. Involved in wiring new construction and remodels.
Plumber	3.0	• Performs basic plumbing functions in all park facilities including maintenance, repair, and replacement of faucets, toilets, etc.
Painter 1 Maintenance and Repair Worker 1	1.0 2.0	• General painting work to maintain or repair existing facilities. Paints new construction as applicable.
Masonry Worker	3.0	• General masonry work throughout facilities and parks.
Maintenance and Repair Worker 1, 2 and 3	6.0	• Assist other trades with assigned duties . • Load and haul supplies and materials. • Operate equipment. • Drive trucks.
Building Maintenance Superintendent	1.0	• Supervises the custodial staff. • Supervises the four Custodian Assistant Services Supervisors
Custodian Assistant Services Supervisor	4.0	• Supervise janitorial workers.
Custodian 1	38.94	• Perform general janitorial cleaning services to assigned facility. Duties include sweeping, vacuuming, dusting, bathroom cleaning, etc. Some employees are responsible for more than one facility. Assist with event set up and tear down.

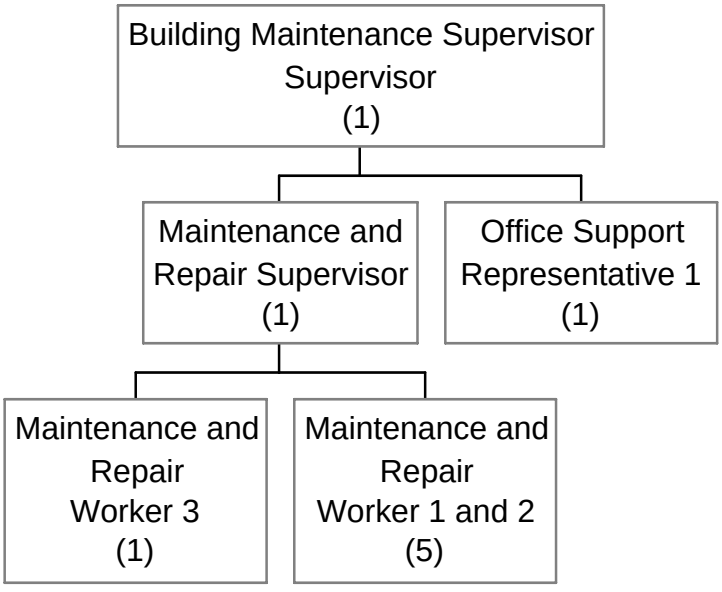
The department has not implemented a preventive maintenance program. There is an expectation that the Parks Master Plan, currently being implemented, will upgrade the building infrastructure, reduce the level of corrective maintenance, and enable implementation of a preventive maintenance program.

The workload of the department and the service levels provided are presented in the ninth exhibit at the end of this chapter.

9. STATE FAIR.

The State Fair is composed of 117 acres located three miles south of downtown Nashville. Overseen by the Board of Fair Commissioners, the State Fairgrounds is operated as an enterprise fund. The Fair is host to the annual ten-day State Fair, monthly flea markets, and various trade shows, special events, corporate events, and exhibitions. The sections, which follow, provide a summary of the building and grounds maintenance services provided by the Tennessee State Fair.

The State Fair has eight fulltime employees assigned to building and grounds maintenance functions for its facilities and property. Presented below is the table of organization for the Maintenance Function.



The table, which follows, presents the roles and responsibilities of personnel assigned to building and grounds maintenance.

Staffing By Classification		Roles and Responsibilities
Building Maintenance Supervisor	1.0	• The Building Maintenance Supervisor directly supervises the M & R Supervisor and the Office Assistant and is responsible for managing and directing the activities of staff. This is a working position.
Maintenance and Repair Supervisor	1.0	• Serves as a working crew leader.
Office Support Specialist 1	1.0	• This position performs all clerical functions related to the maintenance functions and assists with maintenance duties (such as cleaning Women's restroom) during periods of high facility usage.
Maintenance and Repair Worker III	1.0	• This position is primarily responsible for the electrical duties in addition to the duties performed by the Maintenance and Repair Worker 1's and 2's.
Maintenance and Repair Worker 1 and 2	5.0	• All staff are responsible for general maintenance functions including grounds maintenance, grass cutting, minor building repair and upkeep, building cleaning, event set up and tear down, plumbing, repair, painting, air conditioning, and trash collection.

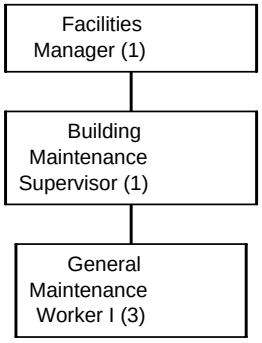
The State Fair is responsible for the maintenance of 214,200 square feet of buildings. This includes 156,000 square feet of exhibit buildings; 50,400 square feet of exhibit barns; and a 7,800 square foot arena. The workload of the State Fair and the service levels provided are presented in the tenth exhibit at the end of this chapter.

10. METRO ACTION COMMISSION.

The Metro Action Commission provides community support and assistance to residents in need, including utility assistance, training, head start program for children ages three to four, etc.

The Metro Action Commission has four fulltime equivalents assigned to building and grounds maintenance functions for its facilities and properties, as well as one

Facilities Manager. Presented below is the table of organization for the Facilities Management Division.



The Metro Action Commission has four staff assigned to building maintenance, and fourteen staff to custodial maintenance. Grounds maintenance is provided by the General Services Department. The table, which follows, presents the roles and responsibilities of personnel assigned to building and custodial maintenance.

Staffing By Classification		Roles and Responsibilities
Facilities Manager	1.0	• Responsible for the repair and maintenance of all facilities.
Building Maintenance Supervisor	1.0	Serves as a working crew leader.
General Maintenance Worker I	3.0	There is one Maintenance Worker I that is assigned to only preventive maintenance activities for each building. The Division has developed a PM schedule for each facility that outlines the required PM activities by month for each facility. • There are two Maintenance Worker Is that are assigned to work orders / request for services and special projects. • It should be noted that the Department of General Services Administration provides ground maintenance services to all Metro Action Commission properties.
Custodian Leader	1.0	• Supervises the janitorial workers.
Custodian	13.0	• Perform janitorial services to assigned facility. Duties include sweeping, vacuuming, dusting, bathroom cleaning, etc. Some employees are responsible for more than one facility.

The Metropolitan Action Commission is responsible for the maintenance of 143,229 square feet of buildings. The workload of the Metropolitan Action Commission and the service levels provided are presented in the eleventh exhibit at the end of this chapter.

11. WATER SERVICES.

The Water Services Department provides water and wastewater utility services. The Water Services Department is an enterprise fund organization, and maintains 2,800 miles of water mains, 2,900 miles of sewer mains, treatment plants and a variety of other facilities such as pumping stations and lift stations.

The Water Services Department provides service from 280 facilities with an asset value of $880,590,000. The facility information in the tables below was abstracted from the Metro Water Services Insurance Evaluation reports for 2004 and "Facts in Brief." Inactive and out of service facilities have been excluded from the tables. Three buildings at the central plant provide basic office space similar to other Metro office buildings. It should be noted that the Water Services Department was unable to provide facility square footage data for their wastewater facilities.

Water Utility Facilities			
Water Facility Type	**Number**	**Insured Value**	**Square Footage**
Buildings (Plant & Office)	20	$197,000,000	351,522
Reservoirs	47	$120,000,000	N/A
Pumping Stations	57	$25,000,000	N/A
Wastewater Utility Facilities			
Wastewater Facility Type	**Number**	**Insured Value**	**Square Footage**
Buildings (Plant & Office)	56	$441,055,000	N/A
Pumping Stations	100	$97,535,000	N/A

Central Plant Facilities		
Central Plant Building Facility Type	**Function**	**Size (Sq. Ft.)**
Administration	Administrative offices, laboratory	40,000
Customer Serviced	Customer counter, call center	35,200
System Services	Office Building	27,000
Central Stores	Warehouse	26,000
Total		128,200

The department has approximately 700 employees assigned to an Administration Division and five operating divisions. The Divisions are listed in the table below.

Division	Responsibilities	Personnel
Administration	Administration, finance, personnel	42
Operations	Plants, reservoirs, pump stations, lab	252
System Services	Water and sewer Lines	168
Customer Service	Billing, meter reading, turn-ons, shut-offs	107
Engineering	Design, construction	66
Storm Water	Separate from sewer except in downtown	71

Building and grounds maintenance services are decentralized in each of the divisions. In addition, the department makes few distinctions between building maintenance activities and the maintenance of its specialized water and sewer equipment in these buildings. The department has a large number of skilled trades personnel (Carpenters, plumbers, mechanics, electricians, HVAC, masons) who are primarily involved in maintaining specialized water and sewer equipment and do building maintenance on an as needed basis. Each division is responsible for maintaining its own buildings.

The Water Services Department has a large budget for facility and equipment maintenance. The bulk of departmental maintenance work is focused on the equipment in its plants, pump stations and reservoirs, not the buildings themselves. Water Services utilizes a number of vendors for building maintenance, however. The table below

indicates the type and value of maintenance contract invoices paid during the past two fiscal years: 2004 and 205. Most of the contracts are time and materials contracts. Some are with original equipment manufacturers (OEM) whose equipment is installed in the plants. This does not include capital expenditures.

Type of Maintenance	FY 2004	FY 2005
Mechanical	$3,478,267	$4,354,588
HVAC	$3,217,828	$3,455,942
Electrical	$1,021,742	$1,262,570
Buildings	$ 431,503	$ 492,389
Total	$8,149,240	$9,565,489

The Water Services Department uses the Computerized Maintenance Management System (CMMS) work order software from Hansen Information Technologies to track and document preventive and corrective maintenance, but not for building maintenance. The system has been used to create a comprehensive database of Water Services equipment assets and is routinely updated during preventive and corrective maintenance and when new equipment is installed. Although the CMMS could be used to document an inventory of departmental buildings and track building maintenance work orders it is not being used for that purpose.

The Water Services Department utilizes contractors and in-house staff to maintain the department's buildings as part of other related duties For example, the department has a number of skilled trades personnel (a carpenter, electricians, or plumbers) whose primary duties are maintaining and repairing the equipment in the departments buildings. However, as needed these personnel perform routine building maintenance.

The Water Services Department has reduced the number of authorized custodian positions in recent years. The department currently has three authorized Custodian positions, and relies on contractors for much of its custodial needs. Most of the janitorial work in the water and sewer plants has been contracted out to Randstedt Temporary Staffing. The department spent $169,000 in FY 2005 on custodial contract services.

The table, which follows, presents the roles and responsibilities of personnel assigned to building and custodial maintenance.

Position	Number	Description of Responsibilities
Custodian 2	3	• Perform general janitorial cleaning services to assigned facility. Duties include sweeping, vacuuming, dusting, bathroom cleaning, etc. Some employees are responsible for more than one facility.

12. GENERAL HOSPITAL

The General Hospital is a publicly supported, academically affiliated, community-based hospital. The hospital is city-owned and is governed by the Metropolitan Nashville Hospital Authority. All maintenance, janitorial, laundry and security services are provided by hospital staff with limited support from contractors. The staff provides 24-hour, 7-day a week service at the following facilities:

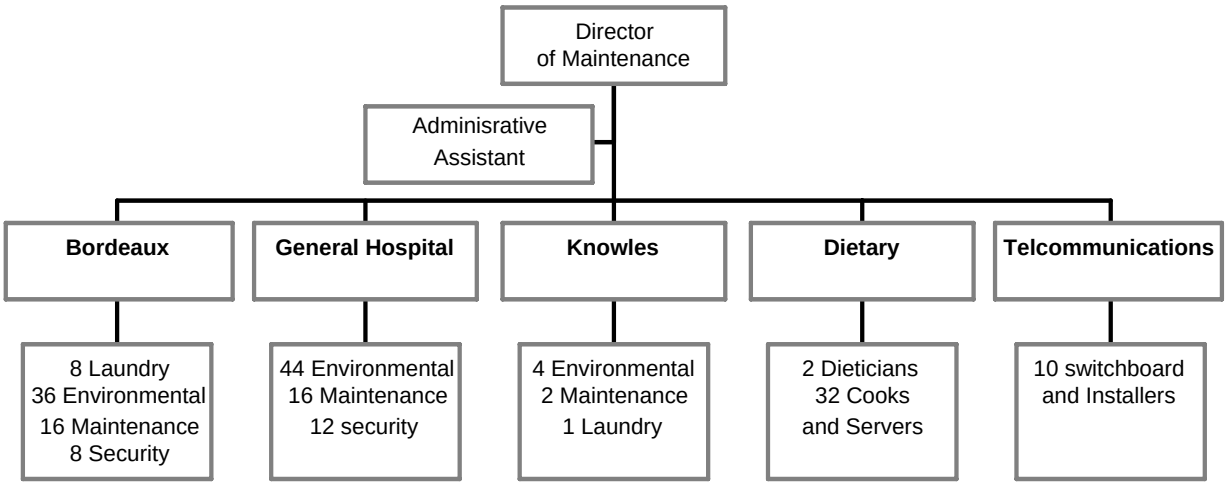
- Nashville General Hospital – A 157 bed full service hospital housed in a 13 story, 377,00 square foot building. The Hospital Authority has a 30-year lease for the building from Meharry College. The Hospital Authority renovated the building in 1997. The Hospital provides a full range of in- and out-patient services including a prison ward for the Metro and the State.

- Bordeaux Intensive Care Facility – A 480 bed long-term care facility housed in two, 4-story towers. The site also includes an administration building and several maintenance and storage buildings. The buildings total approximately 380,000 square feet of space. Patients are housed in two, 4-story buildings.

- Knowles Assisted Living Facility – A 100 bed, short-term care, single story building covering approximately 67,000 square feet of space.

The General Hospital is located on a small site not requiring any landscape or grounds maintenance staff, while the Bordeaux and Knowles facilities share a 120-acre campus.

The facility maintenance operation is staffed by a total of 193 employees including 34 maintenance staff, 84 environmental (custodial) staff, 20 security staff, 9 laundry staff, 34 dietary staff and 10 telecommunications staff. The number of authorized staff has decreased by approximately 20 positions during the past several years. An organizational chart for this operation appears below.



The table, which follows, presents the roles and responsibilities of staff assigned to building maintenance by the General Hospital.

Staffing By Classification		Roles and Responsibilities
Director	1.0	• The Director is responsible for managing and directing the activities of staff, setting priorities and ensuring that all grounds and facility repairs are conducted. • In addition to the maintenance functions, the Director also manages environmental services (janitorial) laundry, security and key card services at the four hospital facilities. • Negotiates and manages contracts with maintenance vendors with Metro Procurement. • Coordinates building assessments and construction projects with Metro's Real Property Services.
Administrative Assistant	1.0	• Splits time between the Maintenance and Dietary Divisions of the Hospital. • Performs general administrative support • Responsible for giving employees access to facilities via the Kronos Key Card system database.
Maintenance Manager	3.0	• A maintenance manager is assigned to each facility. • The manager is responsible for all scheduling and monitoring preventive and corrective maintenance at their assigned facilities. • The maintenance manager supervises the maintenance personnel assigned to their building.
Lead Mechanic	2.0	• Lead Maintenance Mechanics are assigned to the two larger facilities – the General Hospital and the Bordeaux buildings. • The lead mechanic is a working supervisor. • This position is responsible for all grounds maintenance, preventive maintenance in the buildings and facility repairs.
Mechanics	29.0	• The three General Maintenance Technicians handle all housekeeping, grounds maintenance and landscaping (including grass and hedge cutting), and minor facility maintenance (light bulb changing, outlet changing, painting, etc.) • All maintenance personnel have the same position title. Multiple job titles and job descriptions were eliminated several years ago in order to streamline operations and breakdown barriers to the efficient use of personnel. • All personnel are cross trained to provide a range of services - HVAC, electrical, mechanical, carpentry, paint, etc.

Contracts are not utilized extensively for building maintenance. The amount of contract expenditures has been reduced in recent years from approximately $3 million annually to $700,000 annually. Some of the key contracts in place are listed below:

- Elevators and escalators;
- Fire alarm systems – Bi-annual inspection;
- Fire sprinklers – Annual flow tests;
- Generators – Bi-annual inspections;
- Bio-medical equipment – Test and repair;
- Laboratory and radiology equipment – Test and repair; and
- HVAC – System calibration and maintenance. Management expects to internalize the work during the coming year.

The General Hospital is responsible for the maintenance of 824,000 square feet of buildings including 377,000 square feet of the General Hospital, 380,000 square feet at Bordeaux (two buildings), and 67,000 square feet at Knowles. The General Hospital is also responsible for the grounds maintenance of 120 acres. The workload of the General Hospital and the service levels provided are presented in the twelfth exhibit at the end of this chapter.

13. POLICE DEPARTMENT

The Building Operations Support Services Division, General Services Department provides building and grounds maintenance services for the Police Department's headquarters and precinct stations. However, four additional facilities are maintained by the Police Department. These facilities are listed in the table below.

Occupants	Facility Address	Buildings	Sq. Feet	Acreage
Domestic Violence, Crime Stoppers, Night Bikes	60 Peabody Street	1	20,280.	.3
Vehicle Impound Lot	1201 Freightliner Drive	1	6,228	21
Special Operations, Property, Archives	940 East Trinity Lane	1	122,548	0
Training Academy, Aviation	2715 Tucker Road	10	40,311	71
Total		**13**	**189,367**	**92**

The following table presents the Police Department's building maintenance and custodial staff assigned to each of these facilities.

Facility	Maintenance/Custodial Staff
Domestic Violence - 60 Peabody	1
Vehicle Impound Lot – 1201 Freightliner Drive	1
Special Operations, Property, Archives - 940 E. Trinity	1
Training Academy, Aviation - 2715 Tucker	3
Total	**6**

If the Police Department's building maintenance staff are unable to correct a problem with one of these buildings, this staff usually seeks the assistance of the Building Operations Support Services Division. If the Building Operating Support Services Division is unable to perform the work, the Police Department utilizes contractors.

The following section provides a brief overview of each facility:

- Domestic Violence. The Domestic Violence Unit is currently housed in a former MTA building. The unit will be moving to a new facility in February 2006. The new facility is a lease building that is being built-out under the direction of Real Property Services. Night Bikes (Motorcycle units) uses a small portion of the building as a roll-call room and office.

- Vehicle Impound Lot. The impound lot contains an office building housing the staff of the lot and 21 acres for storing approximately 1,600 vehicles. Four of the acres are contaminated and unusable. The Building Operating Support Services Division took over maintenance of the facility in the summer of 2005.

- Special Operations, Property and Evidence, Archives. Specials Operations shares space with Metro Archives and Property and Evidence. The Police

Department is currently working with Real Property Services to build out additional space at the site for Special Operations.

- Training Academy and Aviation. In addition to the resident staff of the academy, the facility routinely trains 40 to 60 police personnel from Metro and other agencies on a daily basis. The training academy has a number of older buildings (houses, chapel, warehouse) that have been adapted to various uses. The main building houses the academy staff, classrooms for recruit and in-service training and a gym. The main building, built in the mid-1970's, poses a number of on-going HVAC and plumbing problems. In addition to the buildings most of the acreage is composed of grass fields that need to be mowed throughout much of the year. An estimated two-thirds of the maintenance staff time is allocated to maintenance of the grounds. One of the maintenance personnel resides in a house on the site and Is available for evening and weekend work assignments.

The table, which follows, presents the roles and responsibilities of staff assigned to building, custodial, and grounds maintenance by the Police Department.

Staffing By Classification		Roles and Responsibilities
Building Maintenance Leader	4.0	• Reports to the Police Officer in charge of the facility • Performs all janitorial functions at the facility. • Performs minor preventive and corrective maintenance activities. • Investigates building problems and infrastructure failures. • Refers major maintenance problems to BOSS. • Maintenance staff at the Training Academy provides landscape maintenance services.
Building Maintenance Mechanic	1.0	
Building Maintenance Worker	1.0	

The managers of the Police Department responsible for managing buildings and grounds maintenance for these four facilities do not utilize a computerized maintenance management system to track the activities of their maintenance staff.

The Police Department is responsible for the maintenance of 189,367 square feet of buildings; 65% of this space consists of the Special Operations, Property, Archives building – an old factory/warehouse building. The front portion of the building

(approximately 10 percent of the entire square footage) is devoted to administrative offices, while the remainder of the building is an open warehouse used for storage.

The Police Department is also responsible for the grounds maintenance of 71 acres at the Training Academy and 21 acres at the Vehicle Impound Lot.

14. PUBLIC WORKS DEPARTMENT

The Public Works Department primarily utilizes 10 buildings in Nashville. A recent study commissioned by Public Works valued these buildings at $6.25 million. These buildings are presented in the table below. In addition, the Department has two convenience centers, a wash rack building and three salt bin buildings.

Occupants	Facility	Size (Sq Ft)
Engineering Services	720 South 5th Street	9,600
Special Services	740 South 5th Street	27,092
Modular Unit	740 South 5th Street	2,463
Administration	750 South 5th Street	8,169
Warehouse	740 South 5th Street	13,771
Traffic Control Warehouse	33 Peabody Street	2,539
Traffic Control Office	415 4th Avenue, North	1,274
Service Center East	930 Dr. Richard Adams	4,939
Service Center West	3800 Charlotte Pike	5,048
Hazmat Building	943A Dr Richard Adams	1,772
Total		**76,667**

A Maintenance and Repair Worker 1 is allocated for the maintenance and repair of the four Public Works buildings. In addition, the Public Works Department is authorized a Carpenter and an Electrician on its staff who will sometimes do maintenance work in the buildings. If the local facility person is unable to correct a maintenance problem, the Building Operating Support Services Division is contacted for an evaluation of the problem and the provision of service. If the Building Operating Support Services Division is unable to perform the work, a contract is initiated with one of Metro's approved vendors for the service.

The following table lists the roles and responsibilities of the position assigned by the Public Works Department to building and custodial maintenance.

Function	Staffing By Classification		Roles and Responsibilities
Building Maintenance and Custodial Services	Maintenance and Repair Worker 1	1.0	• Reports to the Public Works official in charge of the buildings. • Performs all janitorial functions at the buildings. • Performs minor preventive and corrective maintenance activities. • Investigates building problems and infrastructure failures. • Refers major maintenance problems to BOSS for evaluation and resolution.

The Public Works Department has developed an Access Database for tracking its service work orders. It is not currently used to track building maintenance activities.

The Public Works Department is responsible for the maintenance of 76,667 square feet of buildings; 21% of this space consists of warehouses.

15. REAL PROPERTY SERVICES

The Real Property Services Division was established in 2001 to develop a capital improvement master plan for Metro's real estate holdings and to establish standards for the design and construction of facilities. It is responsible for the development of Metro's capital improvement plan for buildings as well as the design and construction management of new buildings, the renovation of existing buildings, the design of building interiors, the relocation of Metro staff and equipment among buildings, and the real estate activities (buy, sell, lease) of Metro. The Division provides services to fifty-four departments, but does not usually provide support for the Parks and Recreation Department, Metro Transit, Metropolitan Nashville Public Schools and Nashville Electrical Services.

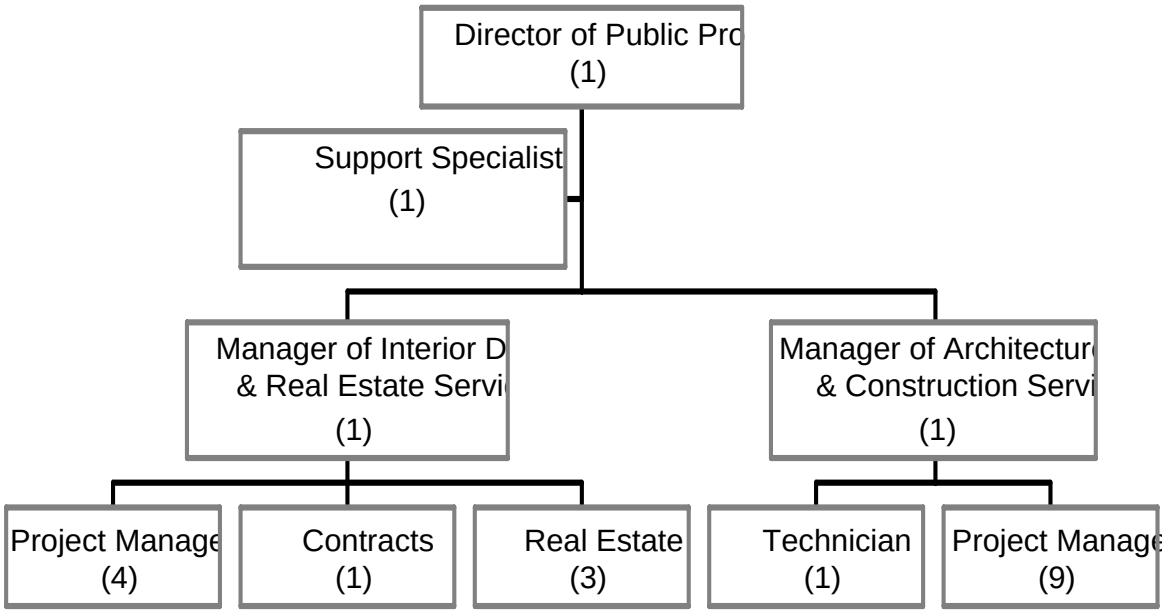
Real Property Services is a fee-funded agency. It operates without support from the General Fund. Fees are based on the type of project and the size (dollar value) of the project. Fees are calculated on a logarithmic scale such that as the scope of the project increases the fee rate is adjusted downward. For example, the log scale declines from .135 for a $10,000 project to .0482 for a $40 million project. The fee rate is also calculated differently depending on the type of project. The rates are different for new construction, renovations and interior design projects. The various rates for different types of construction interior design projects are listed in the table below.

Project Type	Fee Multiplier	$1 million Project Fee*
New Construction	$1.00	$62,780
Renovation/Addition	$1.25	$78,475
Historic	$1.33	$83,497
Hazardous Materials	$1.33	$83,497
Survey/Assessment	$0.20	$12,556
Interior only	$0.75	$47,085

* The log multiplier for a $1 million to $2 million project is .06278

The organization does not have a fee structure for real estate services. General overhead for the Division covers the costs for the real estate operations.

The Division is managed by the Director of Public Property and is authorized twenty-two positions. The following chart presents the plan of organization for the Division.



The Interior Design and the Architecture Design sections work closely together on projects. Although there are stand-alone projects (i.e., new construction, real estate, interior design and relocations), many projects require staff support from both of these sections. These two sections are described in the paragraphs below.

- Interior Design and Real Estate Services is authorized eight positions and is divided into three work groups. The staff manages 70 to 90 projects of varying levels of complexity annually.

  - Project Management – Four project managers are responsible for the interior design and construction of these interiors. In some instances they may do the actual design and in other instances they may prepare an RFP for the design and build out of an interior and then participate in the selection of the design and construction contractors and monitor/inspect their work. As project managers they are also responsible for developing interior specifications and procuring furnishings. Finally, project managers plan and manage the move of employees among facilities.

  - Real Estate – Three real estate professionals buy, sell and lease real estate for Metro agencies as well as for specific RPS projects.

- Contracts – The contracts person works with colleagues in Real Property Services and Metro Procurement on the preparation of bid documents. She also performs other technical duties for the organization.

- Architecture Design and Construction Services is authorized 9 positions. In addition, the section utilizes two full-time consultants as Project Managers. The group has two major organizational components – design/engineering and construction management. However, members of the group participate in the entire CIP planning process and the development of bid packages.

  - Design Engineering – Project personnel are responsible for site planning as well as building design. The group prepares requests for proposals, evaluates and selects contractors and then guides/monitors the work of the design contractors. Efforts continuously focus on improving the quality and detail contained in scopes of work.

  - Construction Management – Project managers oversee all new construction and renovation projects. The group prepares and evaluates bids and oversees the construction in conjunction with design contractors.

The thirteenth exhibit presented at the end of this chapter presents the roles and responsibilities of the staff assigned to this Division.

The development of the Capital Improvement Plan (CIP) by the Real Property Services Division for buildings is a multi-step process. The development of the Capital Improvement Plan by the Division consumes a considerable amount of staff time from February through May of each year. Critical steps in the process are presented below.

- Capital Request Budget Worksheet – This worksheet is completed by Real Property Services with input from the requesting Metro agency. The worksheet is designed to outline the scope of the project and to develop realistic cost estimates for:

Land acquisition	Site improvements
New Construction or Renovation	Roof
Demolition	Furnishings and Equipment
Heating/cooling	Plumbing
Electrical	Security
Energy Retrofit	Life-Safety Compliance
ADA Compliance	Other

The form collects additional information about the number of building occupants, parking spaces and the funding source for the project.

- Project Scope Agreement (PSA) – Briefly describes the project scope and contains a financial summary and timeline summary. It requires signoff by the RPS Project Manager, RPS Coordinator or Officer, Agency Head and Agency Representative. RPS updates the document whenever major changes in a project occur. In addition, the Agency Head is required to sign off on the project when it has been satisfactorily completed.

- Design Procurement Documents – Scope of work and other procurement documents are prepared in coordination with Metro Procurement. RPS has traditionally used design-bid-construct methodologies for projects. More recently it has engaged in design-build contracts to reduce design-construction conflicts and to speed up project completions. In design-bid-construction mode the design contractor will design the facility (Schematics, detailed drawings, construction documents) and participate in the preparation of construction procurement documents.

- Construction Procurement Documents – Preparation of a request for proposal, evaluation of proposals and selection of a contractor. Other Metro agencies including Codes, Zoning, Fire Marshal, Water and Sewer, Public Works and ADA usually participate in this process.

- Construction Documents – Preparation of detailed status and budget materials to track the project. On-going management includes a review of milestones, recovery plans as needed, periodic status meetings, site visits to inspect work and discussion with the design contractor concerning performance of the construction team.

During FY 2005, the Division actively managed slightly over 200 capital improvement projects. Projects vary widely in size and complexity from simple office reconfigurations or straightforward real estate easements to multi-million dollar new building requirements and real estate acquisitions. The current list of new construction and major renovation projects are valued in excess of $170 million.

The workload of the Real Property Services Division and the service levels provided are presented in the fourteenth exhibit at the end of this chapter.

Exhibit 1 (1)

Roles and Responsibilities
Building Operations Support Services Division

Function	Staffing By Classification		Roles and Responsibilities
Major Maintenance and Preventive Maintenance	Technical Specialist 2 Building Maintenance Superintendent	1.0 1.0	• Manages the Major Maintenance and Preventive Maintenance groups. • Assigns and monitors work • Ensures employees perform work in a correct and efficient manner. • Evaluates employee performance and productivity. • Ensures that proper safety standards are maintained. • Counsels with and corrects employees as needed. • Plans maintenance, landscaping, and repair projects for buildings and related facilities • Evaluates work orders and requests to determine the amount of manpower, equipment, and supplies needed. • Plans, assigns, and supervises the work of employees custodial and maintenance staff. • Studies and reviews field work and makes recommendations for improvements. • Conducts monthly and quarterly safety inspections of facilities, grounds, and all related equipment. • Ensures that work is completed properly and on schedule. • Coordinates activities with crew supervisors. • Performs administrative functions. • Conducts staff meetings and in-service training. • Investigates and resolves or makes recommendations to resolve problems and complaints. • Keeps accurate records and prepares detailed reports. • Assists in hiring personnel. • Answers inquiries from the public. • Requisitions equipment, materials, and supplies.

Exhibit 1 (2)

Function	Staffing By Classification		Roles and Responsibilities
Major Maintenance and Preventive Maintenance (Cont'd)	Building Maintenance Supervisor	1.0	• Preventive Maintenance supervisor and worker. • Supervises employees. • Assigns duties to employees. • Ensures employees perform work in a correct and efficient manner. • Evaluates employee performance. • Counsels with and corrects employees as needed. • Trains employees. • Plans, assigns, and supervises the work of employees in the maintenance and repair of public buildings and other structures. • Oversees highly skilled work in all areas of maintenance and/or operations including carpentry, plumbing, masonry, and electrical circuitry. • Supervises the erecting, repairing, and altering of partitions, stages, sub-floors, and other structures for special events. • Performs administrative duties. • Recommends new and revised regulations to achieve conformity of code regulations. • Makes budget recommendations for personnel, materials, and equipment. • Evaluates/writes work orders and work requests to determine manpower, equipment, and supply requirements. • Prepares various reports. • Answers complaints and questions about maintenance or repair work. • Maintains inventory.
	Carpenter	1.0	• Carpenter in Major Maintenance. • Performs skilled work on wood and related structures. • Replaces and repairs doors, frames, and locks. • Installs window glass and screens. • Builds and repairs furniture and cabinets. • Repairs or replaces roofs, floors, or walls. • Installs ceramic and other varieties of tile. • Constructs sub-floors, rafters, and wall frame for new and existing structures. • Installs insulation and wall coverings. • Reads and interprets blueprints. • Draws rough sketches of projects as needed. • May pour and set concrete to appropriate grade. • Assists in estimating materials and supplies. • May operate, tow, or transport equipment or commercial motor vehicles.

Exhibit 1 (3)

Function	Staffing By Classification		Roles and Responsibilities
Major Maintenance and Preventive Maintenance (Cont'd)	Building Maintenance Lead Mechanic	8.0	• Lead worker in either Major or Preventive maintenance. Leads and performs preventative maintenance on environmental systems. • Replaces or cleans filters. Checks freon levels and adds as needed. Cleans and/or repairs vents and ducts Maintains and/or replaces thermostats. • Repairs and maintains building fixtures, furniture, electrical, and plumbing systems. • Diagnoses failures in equipment and initiates necessary repairs. • Repairs and maintains toilets, sinks, water fountains, and drainage pipes. • Replaces or repairs electrical switches, fixtures, and related systems. Replaces parts in motorized or electrical machinery. Replaces or installs doors, locks, windows, and related hardware. • Repairs furniture and related items. • May apply paint or do touch-up work on furniture. • Ensures that all buildings safety features are operational. Inspects fire extinguishers as scheduled. Checks alarm and/or sprinkler systems. • Checks for and reports signs of vandalism, theft, or break-ins. • Performs routine administrative duties. • Requisitions supplies and equipment. • Assists in establishing repair priorities. • Trains new employees. • Keeps simple records and makes reports.

Exhibit 1 (4)

Function	Staffing By Classification		Roles and Responsibilities
Major Maintenance and Preventive Maintenance (Cont'd)	Building Maintenance Mechanic	5.0	• Maintenance mechanic in either Major or Preventive Maintenance. • Performs preventative maintenance on environmental systems. • Replaces or cleans filters. • Checks freon levels and adds as needed. • Cleans and/or repairs vents and ducts. • Maintains and/or replaces thermostats. • Repairs and maintains building fixtures, furniture, electrical and plumbing systems. • Repairs and maintains toilets, sinks, water fountains, and drainage pipes. • Replaces or repairs electrical switches, fixtures, and related systems. • Replaces parts in any motorized or electrical machinery. • Replaces or installs doors, locks, windows, and related hardware. • Repairs furniture and related items. • May apply paint or do touch-up work on furniture. • Ensures that all buildings safety features are operational. • Inspects fire extinguishers as scheduled. • Checks alarm and/or sprinkler systems. • Checks for and reports signs of vandalism, theft, or break-ins. • Keeps simple records.
	Building Maintenance Worker	2.0	• Performs routine maintenance and repair work on public buildings and grounds. • May on occasion, operate a truck or light equipment. • Repairs and maintains equipment and tools used. • Assists in the storage of stock and equipment. • May assist in the cleaning of the building.

Exhibit 2 (1)

Building Operations Support Services Division Workload and Services Table

Characteristic	Description
Hours of Operation/Scheduling	• Work hours are 7:00 a.m. until 3:30 Monday through Friday. • Each staff member works 40 hours during a 5-day workweek. • Staff members are called back on overtime during the normal workweek (Monday through Friday) for emergencies. • Staff members are assigned weekend and holiday standby coverage on a rotating basis.
Coverage Area	• Responsible for the provision of general repairs, preventive maintenance, scheduled maintenance and certain discretionary maintenance the buildings maintained by BOSS/General Services. • Maintenance personnel are organized into two major groups – Major Maintenance and Preventive Maintenance. • Major Maintenance personnel work Metro-wide and on more complicated assignments. • Preventive Maintenance personnel are assigned to particular buildings. If a preventive or other maintenance in one of their buildings is needed Major Maintenance personnel or contractors support them.
Preventive Maintenance	• BOSS implemented a preventive maintenance program in June 2005 • The program focuses primarily on HVAC maintenance and is based on a schedule of daily, weekly, monthly, quarterly and annual activities. Although schedules have been established, BOSS has not developed worksheets for employees to report on the results of their inspections. Schedules and a list of inspectional activities have been established for the following equipment: Fans, Filters, Heating and cooling coils, Ducts. Pipes, Centrifugal pumps, Valves, Heat exchangers, Air compressors, Transformers, Batteries, UPS Systems, Generators, Rotary chillers, Reciprocating chillers, Cooling towers, Boilers, and Centrifugal Chillers.

Exhibit 2 (2)

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Workload</td><td>
• Responsibilities
– .4 million square feet of buildings
– 21 maintenance personnel
– 114,285 feet per building maintainer
• Information about the kinds of activities maintenance personnel engage in and the amount of time expended on various activities is very limited.
• In June of 2005 BOSS introduced an automated service request system for clients in the buildings it serves. However BOSS does not currently capture information about preventive maintenance activities.
• It is a web based system through which General Service clients can request support.
• General Services has trained several clients in each building on how to use the system to report problems and request service. General Service supervisors review the requests daily and assign Major or Preventive Maintenance Personnel to investigate and resolve problems.
• The following table lists the number of service requests handled between June 21, 2005 when the request system went live and November 11, 2005. During this period Maintenance processed approximately 5.4 requests per scheduled work day:
<table>
<tr><th>Month</th><th>Requests</th></tr>
<tr><td>>=June 21</td><td>22</td></tr>
<tr><td>July</td><td>92</td></tr>
<tr><td>August</td><td>129</td></tr>
<tr><td>September</td><td>87</td></tr>
<tr><td>October</td><td>153</td></tr>
<tr><td><= November 11</td><td>81</td></tr>
<tr><td>Total</td><td>564</td></tr>
</table>
• The request system has a field for the collection of the number of hours worked on an assignment. However, this data is not collected consistently. For example, data about the number of hours expended is missing from 42% of the work orders. For those work orders from which data is available, maintenance personnel spend an average of 1.7 hours on each work order.
</td></tr>
</table>

Exhibit 2 (3)

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Workload (Cont'd)</td><td>
• The following table presents information about the type of work requested and tracked.
<table>
<tr><th>Type of Work</th><th>Requests</th></tr>
<tr><td>Flooring</td><td>1</td></tr>
<tr><td>New Construction</td><td>1</td></tr>
<tr><td>Security Card Reader</td><td>2</td></tr>
<tr><td>Paint</td><td>3</td></tr>
<tr><td>Structural</td><td>7</td></tr>
<tr><td>Supplies</td><td>7</td></tr>
<tr><td>Janitorial/environment</td><td>8</td></tr>
<tr><td>Grounds</td><td>17</td></tr>
<tr><td>Door</td><td>50</td></tr>
<tr><td>Plumbing</td><td>63</td></tr>
<tr><td>Electrical</td><td>98</td></tr>
<tr><td>Other</td><td>141</td></tr>
<tr><td>HVAC</td><td>166</td></tr>
<tr><td>Total</td><td>564</td></tr>
</table>
• Plumbing, electrical and HVAC requests accounted for 58% of the work orders. 25% of the work orders, listed as "other", provide no information about the type of work required or performed.
• The following table provides information about which BOSS group performed the work:
<table>
<tr><th>Business Unit</th><th>Requests</th></tr>
<tr><td>Grounds Maintenance</td><td>3</td></tr>
<tr><td>Environmental Services</td><td>6</td></tr>
<tr><td>Other</td><td>10</td></tr>
<tr><td>Blank</td><td>155</td></tr>
<tr><td>Preventive Maintenance</td><td>162</td></tr>
<tr><td>Major Maintenance</td><td>228</td></tr>
<tr><td>Total</td><td>564</td></tr>
</table>
• Preventive Maintenance (29%) and Major Maintenance (40%) accounted for the vast majority of the work. However, in 27% of the work orders the Business Unit field was blank.
</td></tr>
</table>

Exhibit 2 (4)

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Workload (Cont'd)</td><td>• BOSS used contractors on 42 (7%) of the 564 BOSS work orders. The following table lists the various vendors used by General Services from June 22 to November 11, 2005:

<table>
<tr><th>Contractor</th><th>Work Orders</th></tr>
<tr><td>Access Control Systems</td><td>2</td></tr>
<tr><td>Automatic</td><td>1</td></tr>
<tr><td>Carrier</td><td>1</td></tr>
<tr><td>Dillingham & Smith</td><td>10</td></tr>
<tr><td>Electrical</td><td>1</td></tr>
<tr><td>Green Company</td><td>1</td></tr>
<tr><td>Johnson Controls</td><td>2</td></tr>
<tr><td>Little Blessing</td><td>1</td></tr>
<tr><td>Middle TN Exterminator</td><td>4</td></tr>
<tr><td>Oasis Irrigation</td><td>1</td></tr>
<tr><td>Richard Steel</td><td>1</td></tr>
<tr><td>Rio Grande</td><td>1</td></tr>
<tr><td>Southeast Electrical</td><td>2</td></tr>
<tr><td>Southeast Sound</td><td>3</td></tr>
<tr><td>Stanley Sound</td><td>2</td></tr>
<tr><td>Star Distributor</td><td>1</td></tr>
<tr><td>Trane</td><td>1</td></tr>
<tr><td>Young Sales</td><td>1</td></tr>
<tr><td>Total</td><td>42</td></tr>
</table></td></tr>
</table>

Exhibit 3

Farmers Market Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are staggered to cover the facility from 7:30 a.m. till 5:30 Monday through Friday.
• Work hours vary depending upon the activities to be performed by the staff to support activities within the facilities.</td></tr>
<tr><td>Coverage Area</td><td>• Maintenance, repair and cleaning of Main Building which consists of vendor areas, office area, and storage.
• Landscaping and grounds keeping of the exterior grounds.</td></tr>
<tr><td>Workload</td><td>• The table, which follows, presents the facility square footage for which the Building Maintenance personnel are responsible:

<table><tr><th>Facility Name</th><th>Square Footage</th></tr><tr><td>Conditioned Space</td><td>40,000</td></tr><tr><td>Sheds (4 – 15,000 s.f. ea)</td><td>60,000</td></tr></table>
• Responsible for maintaining the following mechanical equipment:

<table><tr><th>Equipment</th></tr><tr><td>4 - 15 ton rooftop Heating and Air Units</td></tr><tr><td>4 – 15 ton split heat pump units</td></tr><tr><td>1 – 7.5 ton unit (for office space)</td></tr><tr><td>1 – 7.5 ton unit for mezzanine</td></tr><tr><td>1 – 7.5 ton split unit for basement</td></tr></table>
• The Farmer’s Market does not have a work order or facility maintenance program. The Farmer’s Market does not have a work order system or work tracking system. Therefore, data presenting the allocation and utilization of personnel was unavailable.</td></tr>
</table>

Exhibit 4 (1)

Fire Department Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are 7:00 a.m. till 4:30 Monday through Friday.
• Employees are on standby to cover after hours events.</td></tr>
<tr><td>Coverage Area</td><td>• Responsible for all routine maintenance of buildings including electrical, plumbing, and HVAC. As well as more specialized function unique to Fire Department, such as overhead door repair, nozzle work, and electrical repair of apparatus.</td></tr>
<tr><td>Workload</td><td>• The Fire Department utilized an Excel spreadsheet for tracking work orders. While repair tickets including the following information: location, type, priority, number of hours job required, cost, number of employees assigned, and parts utilized in the repair, not all this information is entered into the work order system – this is mainly used to track whether projects are completed.

• To date, the Department has been unable to provide the work order history information. After receipt, it will be reviewed and analyzed.

• The following preventive maintenance activities are performed by Fire Department Maintenance personnel: check overhead doors (1 time/year in Fall), air conditioning checks (once per year in April), and annual backflow valve inspection.

• The Fire Department maintenance personnel are responsible for maintaining the following facilities:

<table>
<tr><th>Building</th><th>Square Feet</th><th>Yr Built</th></tr>
<tr><td>Repair Shop</td><td>29,410</td><td>1930</td></tr>
<tr><td>Administration Bldg.</td><td>24,656</td><td>1976</td></tr>
<tr><td>Fire Academy</td><td>22,206</td><td>1987</td></tr>
<tr><td>E.M.S Center</td><td>11,938</td><td>1965</td></tr>
<tr><td>Fire Prevention</td><td>24,780</td><td>1963</td></tr>
<tr><td>Safety Section</td><td>9,900</td><td>1961</td></tr>
<tr><td>Engine 1</td><td>11,346</td><td>1978</td></tr>
</table>
</td></tr>
</table>

Exhibit 4 (2)

Characteristic: Workload (Cont'd)

Description:

Building	Square Feet	Yr Built
Engine 3	11,934	1962
Engine 4	8,740	1991
Engine 5 & 9 T 9,	16,464	1985
Engine 6	9,000	1976
Engine 7	11,346	1978
Engine 8	8,740	1989
Engine 10	9,176	1995
Engine 11	5,865	1966
Engine 12	9,844	1963
Engine 13	8,740	1990
Engine 14	2,100	1914
Engine 15	9,657	1962
Engine 16	2,124	1930
Engine 17	4,773	1974
Engine 18	8,740	1989
Engine 19	20,036	1964
Engine 20	7,308	1962
Engine 21	19,080	1963
Engine 22	11,844	1979
Engine 23	6,893	1964
Engine 24	7,076	1975
Engine 25	7,119	1974
Engine 26	8,740	1991
Engine 27	7,728	1975
Engine 28	11,346	1978
Engine 29.	11,346	1978
Engine 30	4,696	1978
Engine 31 & 38	4,912	1978
Engine 32	5,288	1978
Engine 33 & 35	7,007	1978
Engine 34	4,712	1978
Engine 36	5,859	1987
Engine 37	7,935	1978
Engine 39	9,595	2001
TOTAL	**429,999**	

Exhibit 5

Public Health Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are 8:00 a.m. till 4:30 Monday through Friday.</td></tr>
<tr><td>Coverage Area</td><td>• A Maintenance Technician covers two outlying facilities – namely the East Center and the Woodbine Center. This position covers all grounds maintenance and facility repairs.
• All other maintenance technicians are assigned to six facilities (as listed below) and perform maintenance, grounds, and special event support.</td></tr>
<tr><td>Workload</td><td>• The Public Health Department does not have a work order system or work tracking system. Therefore, data presenting the allocation and utilization of personnel was unavailable.
• The table, which follows, presents the facility square footage for which the Building Maintenance personnel are responsible:
<table>
<tr><th>Facility Name</th><th>Square Footage</th></tr>
<tr><td>Lentz Center</td><td>107,300</td></tr>
<tr><td>Lentz Center Parking Garage</td><td>57,920</td></tr>
<tr><td>East Center</td><td>13,800</td></tr>
<tr><td>Woodbine Center</td><td>14,620</td></tr>
<tr><td>Sup. Food Warehouse</td><td>15,000</td></tr>
<tr><td>Downtown Clinic</td><td>6,000</td></tr>
<tr><td>S.N.A.C.</td><td>6,900</td></tr>
<tr><td>Animal Control</td><td>20,707</td></tr>
<tr><td>Total</td><td>247,247</td></tr>
</table></td></tr>
</table>

Exhibit 6

Nashville Convention Center Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are typically from 7:00 a.m. till 4:30 Monday through Friday.
• Employee work schedules vary depending upon the scheduled events at the facility and the level of support needed from maintenance personnel.
• Work is scheduled utilizing Microsoft Outlook including all preventive maintenance activities. Hours spent on repair activities are monitored at a broad level – based upon scheduled activities and not necessarily actual time.</td></tr>
<tr><td>Coverage Area</td><td>• The staff provide maintenance and event support for the Convention Center as well as maintenance for space shared with the hotel.
• Costs associated with the maintenance and repair of the shared space is allocated, in accordance with an established formula, between the Convention Center and the hotel.</td></tr>
<tr><td>Workload</td><td>• The table, which follows, presents the facility square footage for which the Building Maintenance personnel are responsible:

<table><tr><th>Facility Name</th><th>Square Footage</th></tr><tr><td>Convention Center</td><td>405,000</td></tr><tr><td>Shared space (w/ hotel)</td><td>45,000</td></tr><tr><td>Total</td><td>450,000</td></tr></table>
• Convention center staff performs routine preventive maintenance activities for HVAC in house and schedule filters for changing once per year and examine belts during this service.
• Landscaping services, HVAC Automation and major repairs, and elevator/escalator services are contracted out.</td></tr>
</table>

Exhibit 7

Municipal Auditorium Workload and Services

Characteristic	Description
Hours of Operation/Scheduling	• Work schedules are generally set as either 8:00 a.m. to 4:30 p.m. or 8:30 a.m. to 5:00 p.m. These overlapping scheduled provide greater flexibility in covering the facility during general work hours. • Work hours are also flexed to provide coverage on nights and weekends for special events occurring at the facility.
Coverage Area	• The Municipal Auditorium consists of 63,0000 square feet of space that was built in 1962. • Maintenance staff covers the maintenance, cleaning, and event support functions. It was estimated that approximately 50% of the staff time was spent on duties related to event set up and servicing. • Major plumbing, electrical, and HVAC repairs are handled through contracts with outside vendors as established by Metro.
Workload	• The municipal auditorium does not utilize a work order system and also does not track employee hours by activity. Therefore, no data was available for calculating staff allocation and/ or utilization levels.

Exhibit 8 (1)

Metro Public Library Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours vary depending upon the location assigned to but generally cover the hours from 8:00 a.m. to 5:00 p.m. Monday through Saturday.
• Employee scheduling may be adjusted to address specific needs of facilities and/or events that are occurring.</td></tr>
<tr><td>Coverage Area</td><td>• Staff provide maintenance and custodial support to twenty-four facilities.
• Staff assist with minor landscaping work at some facilities.</td></tr>
<tr><td>Workload</td><td>• The table, which follows, presents the facility square footage for which the Building Maintenance personnel are responsible:
<table>
<tr><th>Facility</th><th>Square Footage</th></tr>
<tr><td>Antioch</td><td>6,854</td></tr>
<tr><td>Archives</td><td>7,153</td></tr>
<tr><td>Bellevue</td><td>5,213</td></tr>
<tr><td>Bordeaux</td><td>20,440</td></tr>
<tr><td>Donelson</td><td>6,054</td></tr>
<tr><td>East</td><td>5,280</td></tr>
<tr><td>Edgehill</td><td>4,451</td></tr>
<tr><td>Edmondson Pike</td><td>25,650</td></tr>
<tr><td>Goodletsville</td><td>4,146</td></tr>
<tr><td>Green Hills</td><td>26,000</td></tr>
<tr><td>Hadley Park</td><td>2,733</td></tr>
<tr><td>Hermitage</td><td>25,805</td></tr>
<tr><td>Inglewood</td><td>5,480</td></tr>
<tr><td>Looby</td><td>7,245</td></tr>
<tr><td>Madison</td><td>20,666</td></tr>
<tr><td>Main Library</td><td>300,000</td></tr>
<tr><td>North</td><td>5,207</td></tr>
<tr><td>OLD Hickory</td><td>5,694</td></tr>
<tr><td>Pruitt</td><td>12,200</td></tr>
<tr><td>Records Center</td><td>6,256</td></tr>
<tr><td>Richland Park</td><td>6,854</td></tr>
<tr><td>South East</td><td>12,114</td></tr>
<tr><td>Thompson Lane</td><td>5,501</td></tr>
<tr><td>Watkins Park</td><td>1,600</td></tr>
<tr><td>Total</td><td>528,601</td></tr>
</table></td></tr>
</table>

Exhibit 8 (2)

Characteristic	Description
Workload (Cont'd)	• No comprehensive work order system is utilized for the tracking and assigning of work. Therefore, no initial analysis of staff allocation and/or utilization could be conducted. An excel spreadsheet is utilized to track some work orders – mainly those that are non-emergency and can wait to be addressed.

Exhibit 9

Parks and Recreation Workload and Services

Characteristic	Description
Hours of Operation/Scheduling	• Work hours are 7:00 a.m. till 4:30 Monday through Friday. • Crews are assigned to specific regions for work activities.
Coverage Area	• Maintenance, repair and cleaning of park facilities. • Landscaping and grounds keeping of the exterior grounds of all facilities, parks, golf courses and some grounds work on other City facilities. • The Parks Department does not have an automated inventory of its buildings.
Workload	• The Parks Department is responsible for the oversight, maintenance and programming of over 10,200 acres of parklands, 110 buildings, 90 playgrounds, 102 parks, a museum, 26 community centers, 7 golf courses, a sports facility, and a nature center. • The Parks Department has a variety of buildings including office buildings, community centers and picnic shelters. There are 51 major buildings (office, community, nature, golf). These buildings total 185,566 square feet. • The Maintenance Department has a semi-automated work order system. The customer-facing portion of the system enables park employees to phone in service requests to an answering machine from which maintenance supervisors then create work orders for investigation and assignment. • Supervisors enter work order information into an ACCESS database and use the database to make assignments and track completion of the work. • Parks has been in discussion with EBS about adopting the work order and inventory systems contained in Metro's People Soft financial system as a replacement for the current work order system. The EBS system is being developed and tested in Metro's Fleet Operations Department. • Parks Department has identified through a previous analysis over $15.7 million in deferred maintenance work that needs to be conducted. • Parks Department has $260 million in projects identified as part of their master planning process. $92 million has been funded over a 3-year period.

Exhibit 10

State Fair Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are 8:00 a.m. till 4:30 Monday through Friday.
• Hours are frequently flexed (both starting times and assigned days of the weeks) in order to provide staffing for events occurring during those times.</td></tr>
<tr><td>Coverage Area</td><td>• Responsible for 117 acres of land containing eight buildings totaling over 156,000 square feet. of exhibit space, two barns with 50,400 square feet and a 7,800 square feet. arena.
• Metro Contracts are utilized for items such as roof repairs, electrical power panel repairs, and HVAC preventive maintenance (filters and greasing).</td></tr>
<tr><td>Workload</td><td>• The Tennessee State Fair does not have a work order system or work tracking system. Therefore, data presenting the allocation and utilization of personnel was unavailable.
• It is estimated by the Director that the staff spend their time as follows: 20% grounds maintenance, 30% building maintenance, 25% related to building rentals (setup/tear down for events), and 25% on support for the monthly flea market.
• Each building is inspected monthly to determine items need to be addressed or repaired.
• During summer months, grass is scheduled for cutting every two weeks. Mowing of most “hill” areas have been contacted out
• The table, which follows, presents the facility square footage for which the Building Maintenance personnel are responsible:
<table>
<tr><th>Facility</th><th>Square Footage</th></tr>
<tr><td>Exhibit Buildings (8)</td><td>156,000</td></tr>
<tr><td>Livestock Barns (2)</td><td>50,400</td></tr>
<tr><td>Arena</td><td>7,800</td></tr>
<tr><td>Total</td><td>214,200</td></tr>
</table>
</td></tr>
</table>

Exhibit 11 (1)

Metro Action Commission Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are 8:00 a.m. till 5:00 Monday through Friday.</td></tr>
<tr><td>Coverage Area</td><td>• Responsible for maintenance functions of the Metropolitan Action Commission facility at 1624 5th Avenue.</td></tr>
<tr><td>Workload</td><td>
• The Metro Action Commission's Facilities Management Division has created an excel database to document and track work orders handled by building maintenance staff. The database was not 100% complete (e.g., missing some months, such as February, March, etc.) With that said, the project team reviewed the information contained in the database.
• The table, which follows, presents the number of work orders received each month by the Facilities Management Division.
<table>
<tr><th>Month</th><th>Number of Work Orders Received</th><th>% of Work Orders</th></tr>
<tr><td>April</td><td>60</td><td>9%</td></tr>
<tr><td>May</td><td>96</td><td>15%</td></tr>
<tr><td>June</td><td>144</td><td>22%</td></tr>
<tr><td>July</td><td>26</td><td>4%</td></tr>
<tr><td>August</td><td>93</td><td>14%</td></tr>
<tr><td>September</td><td>82</td><td>13%</td></tr>
<tr><td>October</td><td>100</td><td>15%</td></tr>
<tr><td>November</td><td>47</td><td>7%</td></tr>
<tr><td>Total</td><td>648</td><td>100%</td></tr>
</table>
As the table shows, in eight months, the Facilities Management Division received 648 work orders.
• The table, which follows, presents the distribution of work orders by crew size, where the data were available.
<table>
<tr><th>Crew Size</th><th>Number of Work Orders</th><th>% of Work Orders</th></tr>
<tr><td>One</td><td>427</td><td>83%</td></tr>
<tr><td>Two</td><td>76</td><td>15%</td></tr>
<tr><td>Three</td><td>11</td><td>2%</td></tr>
<tr><td>Total</td><td>514</td><td>100%</td></tr>
</table>
• The table, which follows, presents a summary of the hours tracked by Metro Action Commission's Facilities Maintenance Division:
</td></tr>
</table>

Exhibit 11 (2)

Characteristic

Description

Workload (Cont'd)

Month	Number of Hours	Number of Work Orders	Average Number of Hours per Work Order
April	46	102	2.21
May	73	241	3.31
June	101	241	2.38
July	18	29	1.60
August	69	119	1.72
September	57	149	2.62
October	79	170	2.15
November	18	56	3.08
Total	**461**	**1,106**	**2.40**

On average, each work order accounted for 2.4 hours of work. In addition to work hours, some data were available which indicate completion time of work orders (e.g., from the date the work order was submitted by the requestor to the date the work order was marked completed).

- The table, which follows, presents the average number of days it took to complete work orders.

Month	Average Number of Days to Complete Work Orders
April	4.63
May	4.00
June	5.91
July	9.06
August	6.67
September	3.35
October	2.76
November	2.06
Total	**4.80**

The average number of days to complete a work order ranged from a low of 2.06 days in November to a high of 9.06 days in July.

Exhibit 12 (1)

General Hospital Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours 24 hours a day and seven days a week.</td></tr>
<tr><td>Coverage Area</td><td>• Three facilities including Nashville General Hospital, Bordeaux Intensive Care Facility and Knowles Assisted Living Facility including the buildings and surrounding grounds.
• Functions include building maintenance and repair including all preventive maintenance activities.</td></tr>
<tr><td>Workload</td><td>• The following table presents information about the scope of the General Hospital buildings and grounds that need to be maintained:
<table>
<tr><th>Facility</th><th>Square Footage</th></tr>
<tr><td>General Hospital</td><td>377,000</td></tr>
<tr><td>Bordeaux (2 buildings)</td><td>380,000</td></tr>
<tr><td>Knowles</td><td>67,000</td></tr>
<tr><td>Grounds</td><td>120 acres</td></tr>
</table>
• General Hospital uses several methods to ensure that the buildings are maintained properly. First, Maintenance has established a comprehensive preventive maintenance program. The program is based on detailed listings of maintenance activities and the interval at which the maintenance is to be performed. Microsoft Outlook is used to publish monthly maintenance schedules. The system is paper based. Detailed preventive maintenance sheets are distributed to mechanics who conduct the inspections, take corrective actions or request more specialized or intensive follow up as needed. The completed maintenance sheets are stored in binders for review by supervisors. In addition, mechanics keep daily logs of their activities that record the type of work they complete during their rounds. Finally, supervisors review the mechanic's logs and their prevention checklists and routinely spot check facilities to note any deficiencies. The following table lists some of the preventive inspection checklists used by the Hospital:</td></tr>
</table>

Exhibit 12 (2)

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Workload (Cont'd)</td><td>
<table>
<tr><th>Function</th><th>Number</th><th>Frequency</th></tr>
<tr><td>Fire Drill Observer</td><td>19 items</td><td>1 per quarter per shift</td></tr>
<tr><td>Negative Pressure and Isolation Room</td><td>35 rooms</td><td>Every 8 hours</td></tr>
<tr><td>Patient Room PM</td><td>30 items</td><td>Monthly</td></tr>
<tr><td>Fire Doors PM</td><td>All doors in facility</td><td>Bi-monthly. Does monthly if 95% target is not achieved</td></tr>
<tr><td>Emergency Power System Test (Seven Generators)</td><td>14 items</td><td>Weekly – Run generator
Monthly – Run generator & 45 minute power transfer</td></tr>
<tr><td>Department (Office space)</td><td>21 items</td><td>Monthly</td></tr>
<tr><td>Employee log</td><td>14 items</td><td>Daily</td></tr>
<tr><td>Infection Control Construction Check List</td><td>4 items</td><td>All construction projects</td></tr>
<tr><td>Construction Check List</td><td>36 items</td><td>All construction projects</td></tr>
<tr><td>HVAC Preventive Maintenance</td><td>10 items</td><td></td></tr>
</table>
The General Hospital also operates a web based work order system. However, the system is used only to gather service requests from customers in the facilities operated by the hospital. The system was developed in conjunction with the Hospital's Information Technology Department. Hospital staff is able to submit service requests via this system. These requests are reviewed by managers and assigned to mechanics for resolution. Minor items have a 24-hour completion requirement while major problems must be resolved in eight hours. Actual data was not available for analysis.
</td></tr>
<tr><td>Warehouse and Parts inventory</td><td>The hospital does not maintain a parts inventory because most items can be easily purchased as needed in Nashville.</td></tr>
</table>

Exhibit 13 (1)

Roles and Responsibilities of the Real Property Services Division

Position	Number	Description of Responsibilities
Director of Public Property	1.0	• Directs the Office of Real Property Services. • Serves as an Assistant Director of Metro Finance • Manages Real Property Services
Manager of Interior Design and Real Estate Services	1.0	• Manages the Interior Design and Real Estate group. • Participates in all Capital Improvement Planning processes. • Conducts weekly review of projects with staff
Manager of Architectural Design and Construction Services	1.0	• Manages the Design Engineering and Construction Management group • Participates in all Capital Improvement Planning processes. • Conducts weekly review of projects with staff
Senior Project Manager	2.0	• 2 Senior Project Managers (One is assigned to Interior Design and one is assigned to Architectural Design and Construction) • Splits time between managing project officers and managing construction projects • Participates in the Capital Improvement Plan development process. • Oversees the work of the Project Managers and Project Officers. • Reviews all projects on a weekly basis. • Monitors construction budgets and approves invoices. • Monitors change orders. • Identifies and resolves major problems. • Participates in the construction procurement process by preparing and reviewing bid documents • Visits projects periodically to ensure that they are being build according to the design specifications and plans.

Exhibit 13 (2)

Position	Number	Description of Responsibilities
Project Managers and Project Officers – Design and Construction	4.0	• Project Managers and Project Officers have similar duties. Pos tend to spend more time on site reviewing construction work. • Two of the Project Managers are contractors. • Oversees building assessments (i.e., Roofs). • Develops design guides (i.e., Fire Stations). • Conducts site and building fact finding. • Develops and maintains project schedules in MS Project • Evaluates and Implements alternate delivery methods – Design-bid-build – Design-build • Prepares bid packages including work scopes. • Conducts project inspections • Prepares preliminary site plans. • Approves invoices
Project Officer – Interior Design	3.0	• Manages smaller projects and supports the Project Manager on larger projects. • Uses AutoCAD to create designs. • Conducts space need assessments and prepares interior space plans. • Prepares interior space designs. • Prepares bid packages for the design and construction of building interiors. • Reviews bids and participates in the selection of contractors • Reviews and approves the work of design contractors. • Reviews and approves the work of interior construction contractors. • Participates in the specification and procurement of interior finishes (Modular furniture, paint, carpet, etc. • Prepares legislative for Metro Council approval to sell “Back Tax” and surplus properties on E-bid.
Project Officer – Design and Construction	4.0	• Manages smaller projects and supports the Project Manager on larger projects. • Visits construction sites and prepares weekly progress reports • Monitors change requests • Identifies and resolves major problems and escalates as necessary. • Participates in the construction procurement process by preparing and reviewing bid documents • Visits projects weekly to ensure that they are build according to the design specifications and plans.

Exhibit 13 (3)

Position	Number	Description of Responsibilities
Real Estate Manager and Real Estate Officers	3.0	• 1 team lead plus 2 real estate officers. • Acts as real estate agent for all Metro agencies • Gathers and evaluates real estate requirements from Metro agencies. • Coordinates with American Disability Act group in General Services. • Maintains list of approved appraisers with Metro Procurement. • Procures property appraisals. • Negotiates purchases, sales and leases. • Negotiates temporary construction access. easements. • Prepares real estate transaction packages (Lease, purchase, sell) for approval by the Metro Council.
Contracts and Operations Officer	1.0	• Assigned to Interior Design and Real Estate Services. • Supports Interior Design and Design Construction. • Maintains Capital Improvement Request (CIR). Access and Excel databases. • Updates the Real Property web site. • Prepares Invitations to Bid (IBBs) and Requests for Proposals (RFPs). • Maintains “Results Matter”, Real Property’s internal measurement system. • Attends monthly ADA Committee meeting. • Organization’s liaison to Metro Purchasing. • Coordinates office moves (people and furnishings). • Assists the Office Support Specialist as needed.
Project Technical Specialist II	1.0	• 1 assigned to Architectural Design and Construction Services
Office Support Specialist II	1.0	• Office support manager. • Coordinates training, payroll and human resource activities. • Tracks purchase orders in People Soft. • Sorts and distributes mail. • Orders and distributes supplies.

Exhibit 14

Real Property Services Workload and Services

<table>
<tr><th>Characteristic</th><th>Description</th></tr>
<tr><td>Hours of Operation/Scheduling</td><td>• Work hours are 8:00 a.m. till 5:00 Monday through Friday.</td></tr>
<tr><td>Coverage Area</td><td>• Oversees capital project implementation.
• Assists with scope and design on capital projects.</td></tr>
<tr><td>Workload</td><td>• During FY 2005 RPS actively managed slightly over 200. Projects vary widely in size and complexity, from simple office reconfigurations or straightforward real estate easements, to multi-million dollar new building requirements and real estate acquisitions. The current list of new construction and major renovation projects are valued in excess of $170 million.

Design and Construction Projects
Current Projects – November 2005

<table>
<tr><th>Project Type</th><th>Number</th><th>Budget</th><th>RPS Fee</th></tr>
<tr><td>New Construction</td><td>9</td><td>$94,392,152</td><td>$6,076,395</td></tr>
<tr><td>Renovation</td><td>18</td><td>$87,087,725</td><td>$4,402,337</td></tr>
<tr><td>Study</td><td>2</td><td>$519,106</td><td>$12,137</td></tr>
<tr><td>Demolition</td><td>2</td><td>$212,776</td><td>$21,115</td></tr>
<tr><td>Major Maintenance</td><td>1</td><td>$43,396</td><td>$4,604</td></tr>
<tr><td>Master Plan</td><td>1</td><td>$16,400</td><td>$0</td></tr>
<tr><td>Total</td><td>34</td><td>$182,271,555</td><td>$10,516,588</td></tr>
</table>
• Construction Postings: Construction postings represent the amounts of money actually Metro paid out to its contractors. The postings serve as a surrogate for the amount of work completed during the year. The postings for the past two fiscal years and for July – December 2005 are listed below.

– FY2004 - $26,132,404
– FY2005 - $76,298,908
– FY2006 - $38,803,981 (Through December 2005)

• Interior Design Projects: In October 2005 the Interior Design group was managing 91 projects of various content and scope. These include 38 furniture projects, 29 redesign projects, 20 renovation projects, and 4 new construction projects. The value of these projects ranged from a few thousand dollars for furniture purchases to multi-million dollar project like the renovation of the Old Court House.
• Real Estate Projects: During FY 2005 the Real Estate group was involved in 43 projects to acquire, lease or dispose of properties. These included 24 acquisitions, 10 leases, 4 easements, 3 dispositions, 1 donation, and 1 plat.</td></tr>
</table>

3. CUSTOMER SATISFACTION SURVEY

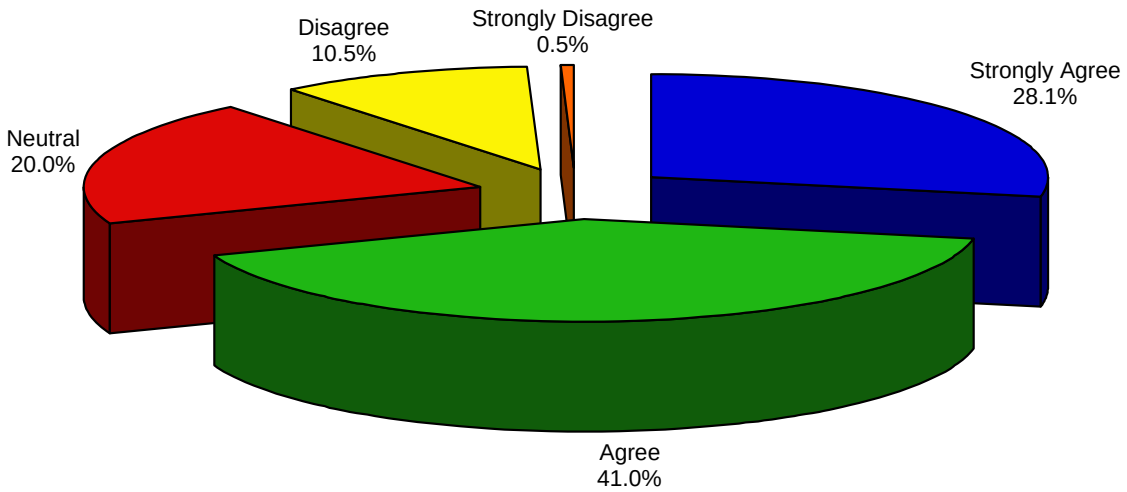
3. CUSTOMER SATISFACTION SURVEY

As part of the performance audit, the project team conducted a customer survey of the General Services Department. The project team developed an electronic survey instrument that was distributed to all customers of the General Services Administration Department. This included twenty-two Metro departments. The response rate for this survey was 50%.

1. OVERALL RESPONDENTS HAD POSITIVE PERCEPTIONS OF THE SERVICES PROVIDED BY THE GENERAL SERVICES DEPARTMENT.

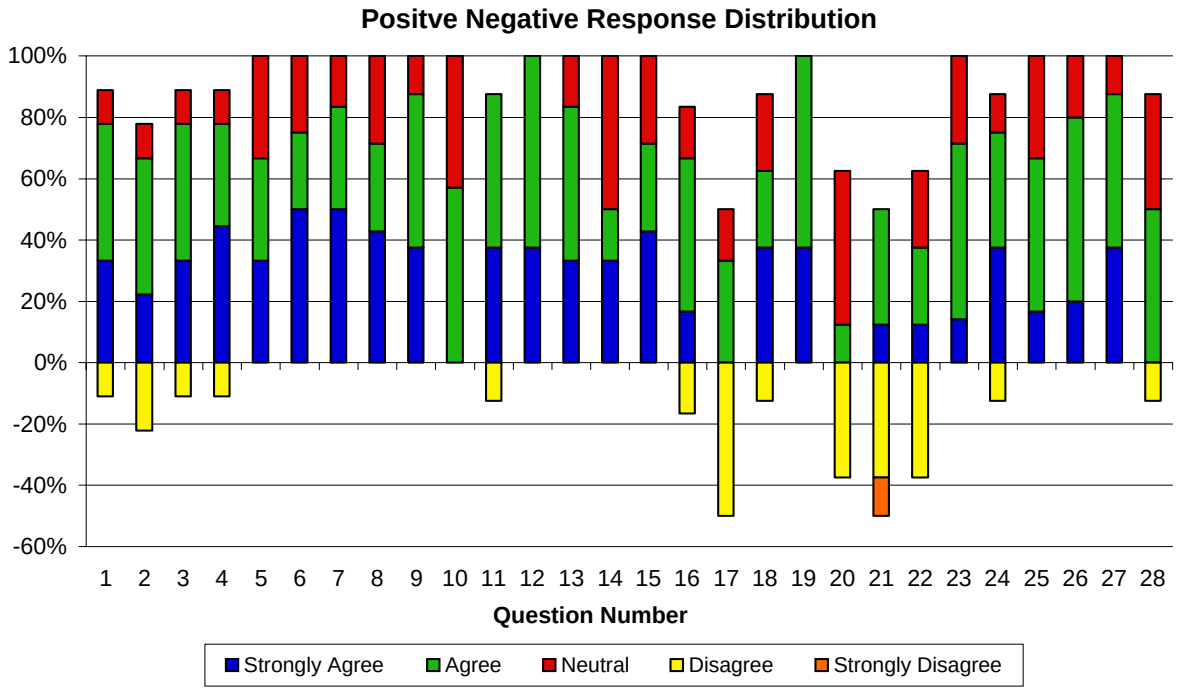
In reviewing the results to the quantitative responses in the first section of the customer survey, it is important to look at the pattern of responses for the entire group versus individual responses. The chart, below, summarizes the overall distribution of responses to statements to which employees were asked to select a response. It should be noted that the chart does not include responses where the employees selected "no opinion."

Overal Response Distribution



As shown in the above chart, overall 69% of survey participates responded positively to statements about the General Services Department. Approximately 11% of responses were 'disagree' or 'strongly disagree.'

To gain a more detailed sense of the responses from the statements of the customer survey (e.g., customer service, management, level of services, etc.) it is useful to look in greater detail at the topics that elicited the strongest positive and negative responses. The chart, found below, plots the number of responses that were positive and negative responses for each statement.

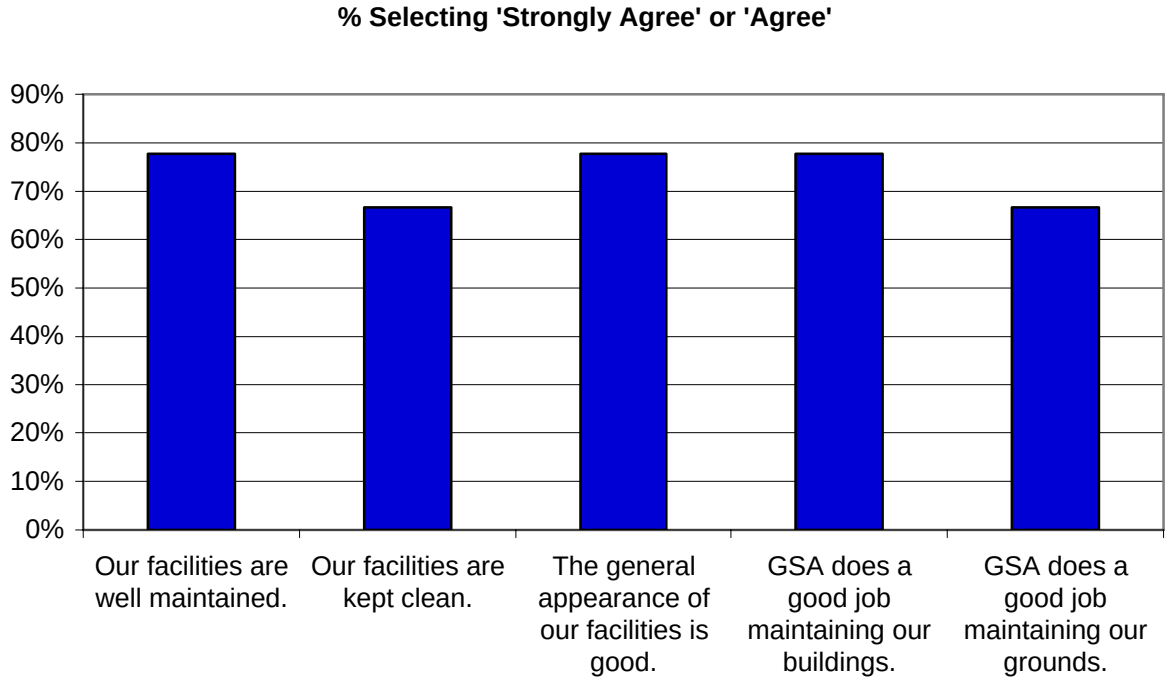


As noted, the chart above presents the positive – negative distribution of responses by statement. As the previous chart shows, the overall responses were mostly positive. The positive - negative response distribution chart shows that there were statements to which respondents had positive attitudes, as well as some statements to which respondents had negative perceptions.

The sections, which follow, provide a detailed discussion of the results of the customer survey for each of the topic areas as identified.

2. RESPONDENTS VIEWED THE OVERALL LEVEL OF SERVICE PROVIDED BY GENERAL SERVICES DEPARTMENT POSITIVELY.

The Matrix Consulting Group included statements in the customer survey, which addressed the overall level of customer service provide by the General Services Department. The chart, which follows, provides a comparison of the results.



The points, which follow present a summary of the information provided in the chart.

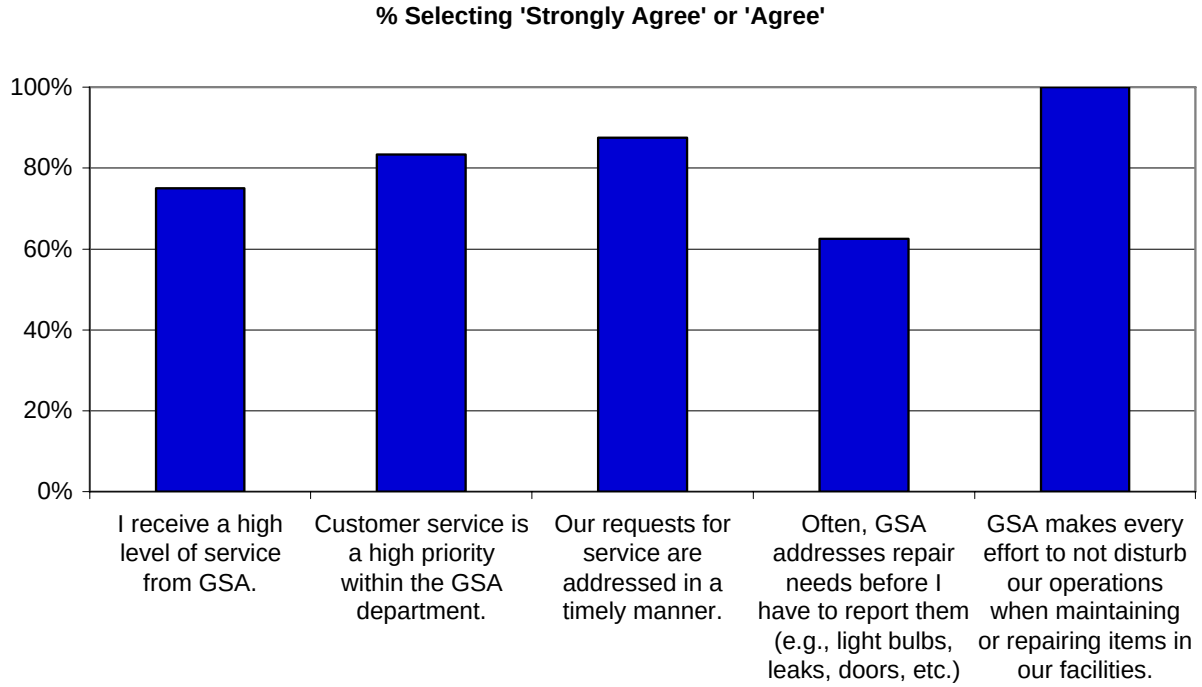
- In response to the statement, ‘our facilities are well maintained,’ 78% of respondents selected “strongly agree’ or ‘agree,’ and 11% selected ‘neutral’ and 11% selected ‘strongly disagree’ or ‘disagree.’
- Slightly fewer respondents, 68%, selected ‘strongly agree’ or ‘agree’ in response to the statement, ‘our facilities are kept clean; 22% of respondents selected ‘strongly disagree’ or ‘disagree.’

- When provided the statement, 'the general appearance of our facilities is good,' participates responded positively with 78% selecting 'strongly agree' or 'agree.'

- Additionally, 78% of respondents selected 'strongly agree' or 'agree' in response to the statement, 'GSA does a good job maintaining our buildings.'

- Respondents perceived ground maintenance slightly less positive than building maintenance with 67% of respondents selecting 'strongly agree' or 'agree' in response to the statement, 'General Services Department does a good job maintaining our grounds.'

The chart, which follows, provides a comparison of the survey results with respect to the level and quality of services provided by the General Services Department to its customers.



The points, which follow, provide a discussion of the information provided in the chart.

- Approximately 75% of survey participants responded positively to the statement, 'I receive a high level of service from the General Services Department,' with 50% of respondents selecting 'strongly agree' and 25% of respondents selecting 'agree. It should be noted that the remaining 25% of respondents selected

'neutral.'

- In response to the statement, ' customer service is a high priority within the General Services Department,' 83% of respondents selected 'strongly agree' or 'agree' and 17% selected 'neutral.'

- When provided the statement, 'our requests for service are addressed in a timely manner,' 88% of respondents selected 'strongly agree' or 'agree' and 12% selected 'disagree.'

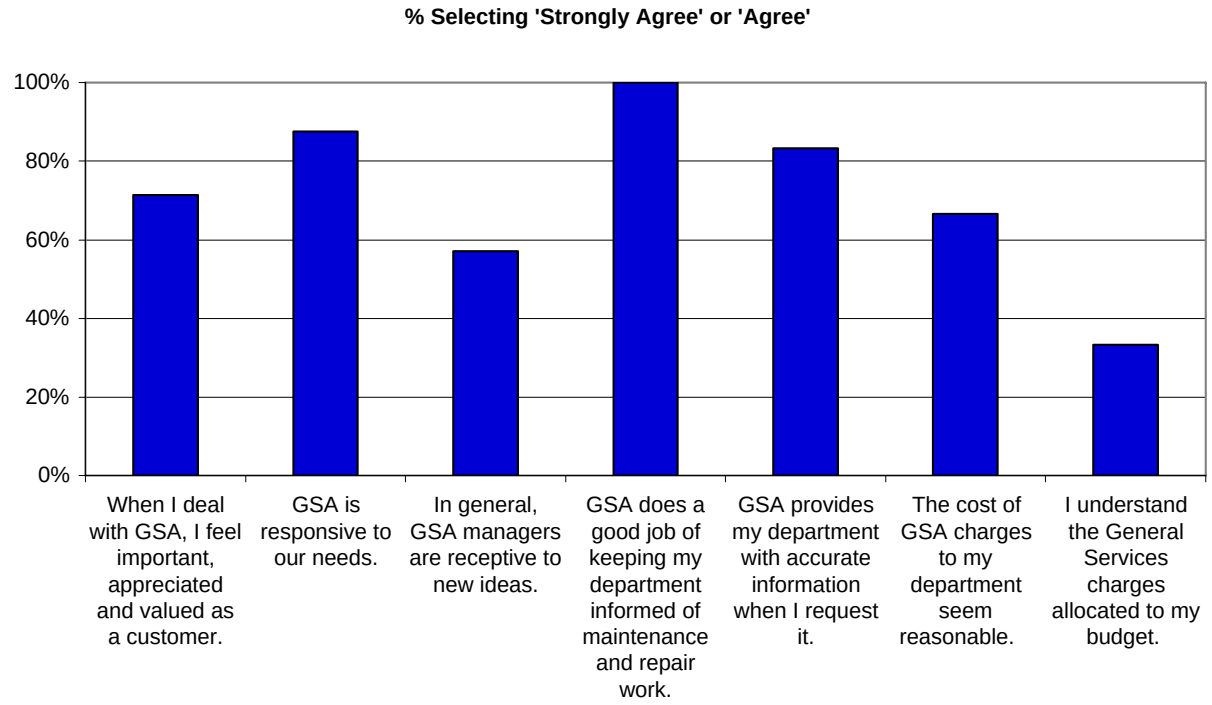
- In response to the statement, 'often, General Services Department addresses repair needs before I have to report them,' 63% of respondents selected 'strongly agree' or 'agree' and 25% of respondents selected 'neutral.'

- When provided the statement, 'the General Services Department makes every effort to not disturb our operations when maintaining or repairing items in our facility,' 100% of respondents selected 'strongly agree' or 'agree.'

Overall, the customers of the General Services Department viewed the level and quality of services provided by the Department positively. The majority of survey participates responded positively to each statement presented in this section.

3. RESPONDENTS VIEWED GENERAL SERVICES DEPARTMENT'S COMMUNICATION WITH AND RESPONSIVENESS TO CUSTOMER DEPARTMENTS POSITIVELY.

Survey participants were provided statements relating to communication that General Services Department provides to its customers, as well as the Department's responsiveness. The chart, which follows, presents a comparison of the results for each statement.



The points, below, present a summary of the information presented in the chart.

- In response to the statement, 'when I deal with the General Services Department, I feel important, appreciated and valued as a customer, 71% of respondents selected 'strongly agree' or 'agree' and 29% of respondents selected 'neutral.'

- Approximately 88% of respondents had positive perceptions with respect to the statement, 'the General Services Department is responsive to our needs.'

- When provided the statement, 'in general, the General Services Department managers are receptive to new ideas,' 57% of respondents selected 'strongly agree' or 'agree' and 43% selected 'neutral.'

- All respondents (100%) selected 'strongly agree' or 'agree' in response to the statement, 'the General Services Department does a good job of keeping my department informed of maintenance and repair work.'

- With respect to the statement, 'the General Services Department provides my department with accurate information when I request it,' 83% of respondents selected 'strongly agree' or 'agree.'

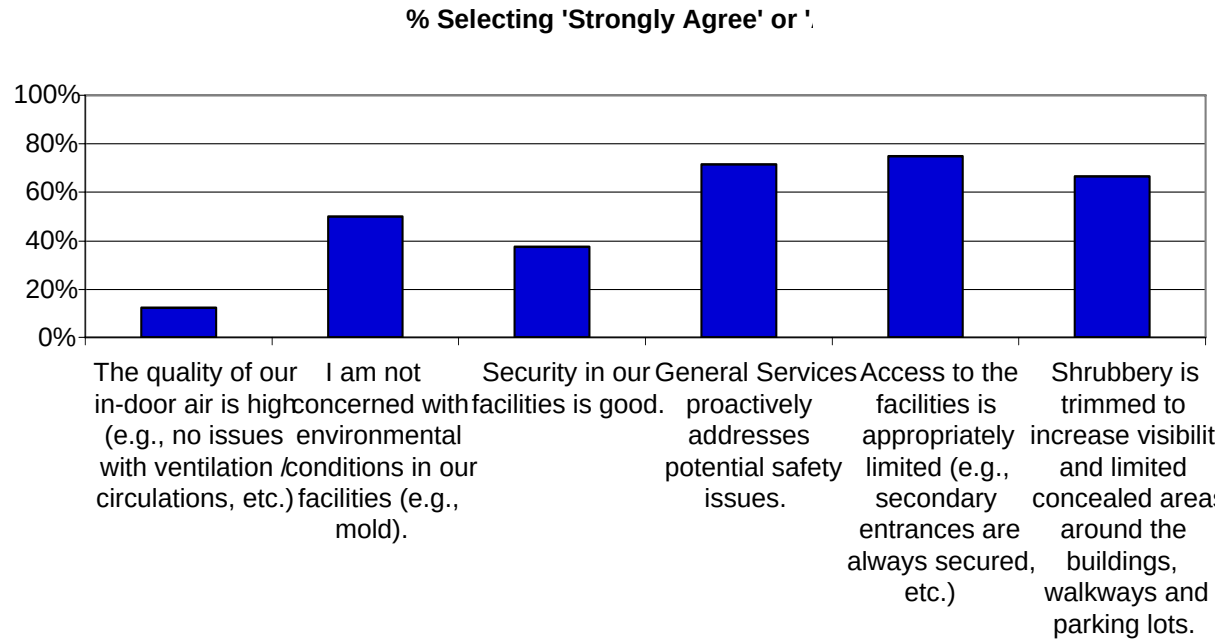
- In response to the statement, 'the cost of the General Services Department charges to my department seem reasonable,' 67% selected 'strongly agree' or 'agree and 17% selected 'neutral.'

- When provided the statement, 'I understand the the General Services Department charges allocated to my budget,' 33% selected 'agree,' 17% selected 'neutral' and 33% selected 'disagree.'

Overall, customers perceived that General Services Department communicates with them effectively.

4. RESPONDENTS EVALUATED STATEMENTS RELATING TO OVERALL FACILITY CONDITION AND ENVIRONMENT.

Respondents were asked to evaluate statements regarding the general condition of their facility, as well as the overall environment. The chart below presents the results of the survey.



The points, which follow, provide a summary of the results of this chart.

- In response to the statement, 'the quality of our indoor air is high,' 13% of respondents selected 'agree,' while 50% selected 'neutral' and 38% selected 'disagree.'

- Respondents were evenly divided with respect to the statement, 'I am not concerned with environmental conditions in our facilities.'

- While 38% of respondents disagreed with the statement, 'security in our facility is good,' 38% selected 'strongly agree' or 'agree' and 25% selected 'neutral.'

- Approximately 71% of respondents selected 'strongly agree' or 'agree' in response to the statement, 'General Services proactively addresses potential safety issues.'

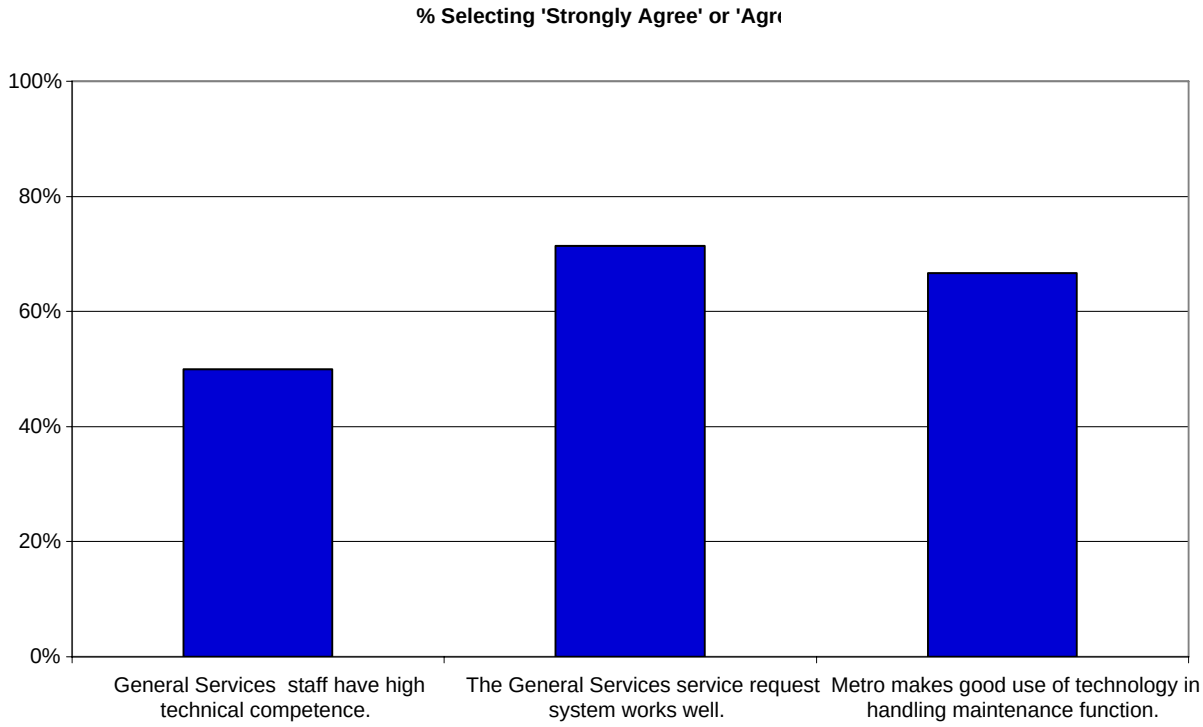
- When provided the statement, 'access to the facilities is appropriately limited,' 75% of respondents selected 'strongly agree' or 'agree.'

- Survey participants responded positively to the statement, 'shrubbery is trimmed to increase visibility and limit concealed areas around buildings, walkways, and parking lots,' with 67% of respondents selecting 'strongly agree' or 'agree.'

While respondents had mixed to negative perceptions with respect to security and in-door air quality, overall customers viewed the general conditions and services provided by General Services positively.

5. RESPONDENTS HAD POSITIVE PERCEPTIONS WITH RESPECT TO THE USE OF TECHNOLOGY BY AND THE STAFF COMPETENCY OF THE GENERAL SERVICES DEPARTMENT.

The survey included statements regarding the use of technology by the General Services Department, as well as the technical competency of staff to meet the needs of Metro's facilities. The chart, which follows, presents a comparison of the survey results.



The points, which follow, provide a summary of the results presented in the chart.

- In response to the statement, 'General Services staff have high technical competence,' 50% of respondents selected 'strongly agree' or 'agree' and 50% selected 'neutral.'

- When provided the statement, 'the General Services service request system works well,' 71% of respondents selected 'strongly agree' or 'agree.'

- Approximately 80% of respondents selected 'strongly agree' or 'agree' in response to the statement, 'Metro makes good use of technology in handling maintenance functions.'

Overall, customers had neutral to positive perceptions with respect to the use of technology and the technical competency of staff.

6. FOR THE MOST PART, RESPONDENTS UNDERSTOOD THE ROLES OF THE GENERAL SERVICES DEPARTMENT AND REAL PROPERTY SERVICES DIVISION.

Respondents were asked to evaluate statements regarding their understanding of the roles of the General Services Administration Department and the Real Property Services Division. Overall, survey participates responded positively to the statements regarding their understanding of the roles of the General Services Department and Real Property Services Division. However, approximately 13% of respondents selected 'disagree' in response to the statement, 'I understand the role of Real Property Services.'

7. SURVEY PARTICIPANTS WERE ASKED T0 RESPOND TO OPEN ENDED QUESTIONS.

The customer survey included two open-ended questions to which survey participants were asked to respond. The questions were: what are the key strengths of the General Services Department; and what are the key opportunities for improvement?

The points, which follow, provide samples of the key strengths identified by survey respondents.

- 'Onsite personnel. Our General Services staff person is an excellent employee that is always proactive in solving issues.'
- 'Upper level management responding to the needs of our Department.'
- 'General Services is always on top of any issues with the building.'
- 'Our maintenance man is great. He is proactive!'
- 'Communication, professionalism, empathy, a great spirit of cooperation and a sense of urgency.'

- 'The management and staff of the General Services Department has in recent years performed a remarkable job in their attempts to maintain the building and grounds.'

- 'General Services should receive high marks for their efforts.'

The points, which follow, present samples of the key opportunities for improvement provided by the survey participants.

- 'HVAC issues; because our facility is a twenty-four, seven days per week, three hundred and six-five days, consideration should be given to have a private vendor respond to our facility when needed. General Services experience in this area seems lacking.'

- 'I think we should clean out the parking garage more often.'

- 'The key opportunity for General Services is the opportunity to assume the role of Property Manager for the newly renovated Metro Office Building scheduled for completion next month.'

- 'It would be reasonable to expect that the cleaning contractor would periodically dust and polish the office furniture. I also believe it reasonable that they would be more diligent in emptying trash receptacles and restocking bathroom supplies (i.e. hand towels).'

- 'Explanation on how the total amount allocated for our department is figured.'

- 'Office staff complains of the evening parking lot guard not being visible at any time.'

Overall, the General Services Department customer viewed the level and quality of services provided by the Department positively.

4. COMPARATIVE SURVEY

4. COMPARATIVE SURVEY

As part of the performance audit of buildings and grounds maintenance and construction management of Metropolitan Nashville and Davidson County (Metro), the Matrix Consulting Group conducted a comparative survey.

The consulting team identified local governments with which to compare Metro Nashville. The table, below, identifies the local governments from which the project team collected information.

Local Government	Population
Jacksonville	840,000
Austin	718,000
Memphis	680,000
Louisville	699,000
Honolulu	899,600
Metro Nashville	595,000

These local governments were selected because (1) they are consolidated city-county governments (Louisville, and Jacksonville) (2) they are located in Tennessee, or (3) they are recognized as progressive and well managed.

The sections, which follow, provide an analysis of the results of the survey.

1. ALL OF THESE LOCAL GOVERNMENTS, WITH THE EXCEPTION OF METRO NASHVILLE, HAVE CONSOLIDATED THE MANAGEMENT OF BUILDING MAINTENANCE.

Information concerning the plan of organization each of these four local governments utilizes for the delivery of buildings and grounds maintenance is presented below.

- **Metro Louisville.** The Facilities Management Division, General Services Department, is responsible for the maintenance of 200 Metro-owned facilities with a combined square footage of over 2 million square feet. The responsibilities include maintenance of heating, ventilating, and air conditioning systems, roofing

systems, electrical systems, plumbing systems, custodial maintenance, landscaping maintenance, etc. This division also negotiates and manages property leasing, land acquisitions, and disposal of Metro property, and manages mail service for the Metro. The Division is authorized 164 staff.

- **Jacksonville.** The Public Buildings Division, Public Works Department, provides security, custodial and building and grounds maintenance services for all 420 public buildings. These buildings total over 6 million square feet. The maintenance includes maintenance of heating, ventilating, and air conditioning systems, roofing systems, electrical systems, plumbing systems, custodial maintenance, landscaping maintenance, etc. The Division is authorized 123 staff.

- **Austin.** The Building Services Division, Finance and Administrative Services Department, is responsible for the management of building operations and maintenance activities for all of the City's buildings. This includes custodial, heating, ventilating, and air conditioning systems, electrical systems, security services, plumbing systems, etc. The Division is authorized 132 staff.

- **Memphis.** The Property Maintenance Division, General Services Department, ensures that the 900+ publicly owned facilities that consist of more than 12 million square feet of space function properly. Continuous increases in new facility construction are straining the division's resources, resulting in a lower maintenance service level. The Division is focusing on preventative maintenance, timely minor repairs, and energy conservation technology to keep costs low, and utilizing construction inspections to ensure project completion and warranties are in place. The division provides customers with building maintenance and repair services; administers warranties for City facilities; comments and makes recommendations on all plans regarding construction and major repairs; and provides an aggressive preventive maintenance program. The division is authorized 85 staff. In addition, another division within the General Services Department, the Operation City hall Division, is authorized 16 positions for building maintenance and repair of City Hall.

- **Honolulu.** The Public Building and Electrical Maintenance Division, Facility Maintenance Department, plans, directs, coordinates, and administers the repair, maintenance, and renovation programs for public buildings and appurtenant structures; street, park, mall, outdoor and other city lighting and electrical facilities; and communication facilities under the jurisdiction of the department. The division also administers activities including property management; parking garage management; city employees' parking; motor pool; and security for City Hall, Kapolei Hale, the Honolulu Municipal Building and certain other facilities. The division is authorized 177 staff.

Each of these five local governments has consolidated the responsibility for maintenance of their public buildings. This stands in stark contrast to Metro Nashville; thirteen other departments, besides Building Operations Support Services Division, General Services Department, are responsible for building, grounds, and custodial maintenance.

2. THE RESPONSIBILITY FOR BUILDING DESIGN AND CONSTRUCTION MANAGEMENT IS NOT CONSISTENTLY ASSIGNED TO THE SAME DEPARTMENT RESPONSIBLE FOR BUILDING AND GROUNDS MAINTENANCE.

The comparative survey collected information regarding building capital projects design and construction management. The points, which follows, presents the comparative survey results for the capital projects management comparative data.

- **Metro Louisville.** One of the divisions in the General Services Department is a Project Management Division. This division is responsible for architect, space planning, design, and construction management services. The division is authorized 8 staff. The General Services Department is also responsible for building and grounds maintenance.

- **Jacksonville.** The Engineering Division, Public Works Department, includes an Architectural/Structural and Parks Design section. This section provides engineering and architectural design of buildings, bridges, structures, utilities, parks, dredges, landscapes and other assorted projects. Other miscellaneous services also include analysis, rehabilitation and renovation of existing facilities owned by the city. The Public Works Department includes the Public Building Division that provides security, custodial and building and grounds maintenance services.

- **Austin.** The Capital Project Delivery Division, Public Works Department, is responsible for implementation of infrastructure projects for City departments. The Building Services Division, Finance and Administrative Services Department, is responsible for the management of building operations and maintenance activities.

- **Memphis.** Building design and construction management services are provided by the City Engineering Department. The Building Design and Construction

Division provides engineering and architectural services in support of building projects of all City divisions. This division is authorized 11 staff.

- **Honolulu.** The Design and Construction Department is the central agency responsible for the planning, design and construction management of the City's Capitol Improvement Program. The department administers the planning, development and implementation of capitol improvements for all City agencies. The Public Building and Electrical Maintenance Division, Facility Maintenance Department, plans, directs, coordinates, and administers the repair, maintenance, and renovation programs for public buildings.

While there is clarity regarding the centralization of buildings and grounds maintenance, there is no such clarity for building design and construction management. In two local governments, Louisville and Jacksonville, these services are placed in the same department responsible for buildings and grounds maintenance. In the other three local governments, Austin, Memphis, and Honolulu, the responsibility for building design and construction management is placed in departments other than that department responsible for buildings and grounds maintenance.

5. BEST MANAGEMENT PRACTICES

5. BEST MANAGEMENT PRACTICES

This section of the report evaluates the practices and performance of the buildings and grounds maintenance and construction management practices of Metro Nashville against best management practices based upon a variety of methods, including (1) review of professional association best practices such as the International Facility Management Association; (2) interviews with staff; and (3) analysis of quantitative information on performance where available.

1. BUILDINGS AND GROUNDS MAINTENANCE.

The first exhibit following this chapter provides a comparison of 'best management practices' versus the actual practices of each of the fourteen departments that provide buildings and grounds maintenance services. The check mark symbol (√) indicates that the department meets the associated best management practice.

The following sections compare the practices utilized by the fourteen departments responsible for building maintenance against best management practices.

(1) There Is a Uniform Lack of Building Asset Inventory.

An essential best management practices for effective building maintenance is an inventory of building systems and components. An asset inventory needs to exist in some basic format in every organization that effectively manages the maintenance of these assets. Keeping asset inventory information - construction dates and current replacement value, features, roofing, boilers, furnaces, air handling systems, etc. - up-to-date, accessible and understandable is the challenge of asset inventory management.

Not one of the fourteen departments responsible for building maintenance for Metro buildings has developed such an inventory.

(2) Facility Condition Assessments Are Not Conducted.

Following the inventory of building systems and components in each building, a condition assessment is needed to quantify the building components and to establish their current condition. This step includes both an objective process of fact-gathering and a subjective assessment of the current condition. The purpose of this condition assessment is to:

- Identify all existing backlog maintenance and deficient conditions in terms of Routine Maintenance, Deferred Maintenance and Capital Repair.
- To calculate the costs for these projects, utilizing R.S. Means Corporation's published construction and remodeling cost estimating data and format.
- To rank and prioritize all projects by severity and anticipated life cycle.
- To develop a full function database for maintaining all project data, modeling existing data to determine future funding requirements, and monitor ongoing code compliance/plant adaptation issues.

Not one of the fourteen departments responsible for building maintenance for Metro buildings has conducted such an assessment.

(3) Only the Building Operations Support Services Division and the Parks and Recreation Department Utilize Computerized Maintenance Management Systems for Buildings Maintenance.

In today's building maintenance arena the Computerized Maintenance Management System (CMMS) is one of the most important and powerful tools in the building maintenance shop's toolbox. The systems is an essential management tool in answering such questions as the following:

- **Are my Preventive Maintenance procedures working?** Evaluate total

employee hours, grouped by work type or class comparing the amount of Emergency/Breakdown repairs to the amount of preventive maintenance work accomplished. This should show a decline in Emergency/Breakdown repairs if the correct Preventive Maintenance tasks are performed at the correct frequency.

- **Are my Preventive Maintenance inspection frequencies accurate?** Evaluate the number of scheduled work orders grouped by work type or class comparing the amount of work that was identified as a result of performing preventive inspections. This should be approximately a 1 to 6 ratio (for every 6 times a preventive maintenance is performed a minimum of 1 corrective work order should be generated).

- **Where are my problems in reliability and where should my maintenance department focus their limited resources?** Evaluate the total cost for work type or class Emergency/Breakdown and Call-In. Sorting the work requests by equipment or equipment type or class, evaluate both open and closed work orders. This will identify by equipment number or class where all the costs are being accumulated.

- **Where is maintenance spending their energy?** Evaluate the total employee hours grouped by work type or class. Depending on the established work types this will identify the type of work that the maintenance organization is accomplishing. This is critical to ensure true maintenance work is being accomplished in support of production goals and targets.

- **What is our backlog of work?** Evaluate the ready backlog of work, there should be no less than 2 weeks and no more than 4 weeks of ready backlog (all parts/materials available waiting scheduling) and between 4 to 6 weeks in the total backlog.

- **How efficient is our maintenance workforce?** Review the actual hours on the work orders executed by each crew. Are the crew sizes appropriate to the tasks performed? Does the amount of work hours per work order compare favorably to industry guidelines?

- **How much money is our department spending on maintenance? (parts, material costs, contractor costs, and maintenance labor costs).** Look at the material cost, contractor cost, and labor cost grouped by work type or class, this will provide the total cost to the maintenance organization.

Of the fourteen departments responsible for building maintenance for Metro buildings, only two routinely utilize a computerized maintenance management system to manage building maintenance. The Building Operations Support Services Division has

only begun the process of developing a web-based maintenance management system; it will be in place this calendar year. Implementation has been affected by the development of processes, procedures, data collection forms and systems and the need to acquaint employees with the systems. The web-based system was rolled out in June 2005. The initial phase was designed to collect service requests from clients in each of the building served by the Division. The managers of the Division are using the system to assign work to the Major Maintenance and Preventive Maintenance sections.

The Parks and Recreation Department has a semi-automated work order system. The system enables departmental employees to phone in service requests to an answering machine from which maintenance supervisors then create work orders for investigation and assignment. Supervisors enter work order information into an Microsoft Access database and use the database to make assignments and track completion of the work. It is not utilized to schedule preventive maintenance; the department does not have a preventive maintenance program for its buildings.

None of the other twelve departments utilize a computerized maintenance management system to manage building maintenance.

(4) Only Four Departments Routinely Preventively Maintain Building Systems.

The American Public Works Association, in their Public Works Management Practices Manual, recommends the establishment of a preventive maintenance program for all building maintenance functions, and a component replacement schedule for all major components to enable the projection of budgets and reduce the need for deferred maintenance. Effective preventive maintenance and major component replacement is a planned approach designed to avoid equipment breakdowns and prevent minor

problems from escalating into major ones. By contrast, emergency and corrective maintenance occur when equipment fails, typically requiring more time and resources to correct problems. From a cost of service perspective, corrective repairs, due to their inherent inefficiencies, typically cost 2 to 4 times more than planned or preventive maintenance.

Of the fourteen departments with responsibility for maintenance of buildings and grounds, only four routinely preventively maintain building assets. These include the Building Operations Support Services Division, Convention Center, Metropolitan Action Commission, and the General Hospital. In some of these four departments, this preventive maintenance is limited to heating, ventilating, and air conditioning systems.

(5) None of the Fourteen Departments Are Routinely Providing Ongoing Training for Buildings and Grounds Maintenance Staff.

An effective buildings and grounds maintenance organization must ensure that staff have and maintain the skills needed to cope with changing technology to effectively carry out the maintenance program. Skill requirements are identified through periodic reviews of all the workload demands and evolving technology, and comparing skill requirements with the staff skill inventory to identify development needs. Skill inventories and requirements identification should address all facilities maintenance program phases, including shop crafts, administrative skills, preventive technology and inspection technologies, and the use of computers.

As an example, training plays a major role in reaching and maintaining skill levels required for an effective reliability-centered maintenance program. The following are examples of specific areas of training and possible sources for the training:

- Infrared Thermography (IRT) is complex and difficult to measure and analyze. Training is available through infrared imaging system manufacturers and vendors.

- Vibration monitoring and analysis training is available from equipment vendors. The Vibration Institute has published certification guidelines.

- Electrical preventive technology and inspection technology training is available from equipment manufacturers and consultants specializing in electrical testing techniques. This includes such training as motor current signature analysis, motor circuit analysis, complex phase impedance, and insulation resistance readings and analysis.

Of the fourteen departments with responsibility for maintenance of buildings and grounds, none routinely provide training to their buildings and grounds maintenance on an ongoing basis.

(6) None of the Fourteen Departments Have Developed Comprehensive Energy Management Plans.

Building operation and maintenance programs specifically designed to enhance operating efficiency of HVAC and lighting systems can save 5 to 20 percent of the energy bills without significant capital investment. The primary objective of an effective energy management plan is to eliminate or minimize energy waste while maintaining a comfortable and safe environment. There are a number of best management practices for energy management for building maintenance. Examples of these best practices are presented below.

- Incorporate objectives for energy efficient building operation into the Metro performance measurement system.

- Require an energy management plan with energy-efficient operation as a primary component.

- Use an energy accounting system to locate savings opportunities and to track and measure the success of energy-efficient strategies.

- Hire or appoint an Energy Manager.
- Train building maintenance staff in energy-efficient operating and maintenance activities.
- Require service contracts that support energy-efficient building operation.
- Documenting the sequence of operation and energy-efficient control strategies for the energy using systems is essential to understanding building control. The control documentation is critical for maintaining energy efficient operation and effectively troubleshooting operational problems.
- Equip building maintenance staff with state-of the-art diagnostic tools.
- Energy conservation initially focuses on short-term payback activities such as lighting retrofits (electronic ballasts, T12 to T8 lamps) and HVAC adjustments and variable air volume conversions, microprocessor-based building control systems, variable speed drives for motors, use of solar energy, etc.

Of the fourteen departments with responsibility for maintenance of buildings and grounds, none have developed comprehensive energy management plans and measures. As will be indicated in a subsequent chapter, the energy costs and consumption for Metro buildings is higher than its peers.

2. DESIGN AND CONSTRUCTION MANAGEMENT PRACTICES.

The project team also evaluated the design and construction management practices utilized by the Real Property Services Division. The following sections compare the practices utilized by the Division against best management practices.

There are a number of positive aspects to the approach used by the Real property Services Division in design and construction management of buildings. Examples of these positive aspects are presented below.

- Metro Nashville has prepared a five-year capital improvement program including renovation of existing buildings and construction of new buildings.

- The Real Property Services Division has prepared a number of master plans for departments to guide the development of new and renovated buildings including Metro Health, the Fire Department, the Head Start program, etc.

- The Real Property Services Division has outsourced the architectural design and construction management of almost all of its capital improvement projects.

- The Division has developed a master schedule for its capital projects that identify the schedule for projects by project manager for a twelve to thirteen month period.

- The Division generates monthly status reports for architectural design and construction and for interior design and real property acquisition.

- The Division uses a single project manager for the design and construction management of projects.

- "Field allowances" have been implemented to provide the project manager authority to approve change orders to a limited extent depending on the nature of the project.

There are also a number of opportunities for improvement in the design and construction management practices utilized by the Real Property Services Division. The primary opportunities for improvement are presented below.

- Project staffing requirements for projects are not routinely identified in capital improvement projects from the perspective of project managers and project officers in the Real Property Services Division.

- Staffing for projects assigned to the Real Property Services Division are not based upon cost of construction guidelines to identify the estimated workload demand for project managers and project officers in the Division.

- Workload demand for project managers and project officers in the Division is not "flattened" to fit the available staff resources.

- The master schedule and monthly status reports are not routinely shared with top and middle management in the General Services Department – the department that will likely be responsible for maintenance and repair of the building. In addition, the schedule and monthly status reports are published to the Division's web site.

- The Division does not utilize a project accounting system.

- The fees charged by the Real Property Services Division for project management of are not based upon actual costs incurred by the division. Fees are based on the type of project and the size (dollar value) of the project. Fees are calculated that as the construction value of the project increases, the fee is adjusted downward. For example, the fee declines from .135 for a $10,000 project to .0482 for a $40 million project. The fee also differs based upon the type of project: new construction, renovations and interior design projects. The rates for different types of projects are presented in the table below.

Project Type	Fee Multiplier	$1 million Project Fee*
New Construction	$1.00	$62,780
Renovation/Addition	$1.25	$78,475
Historic	$1.33	$83,497
Hazardous Materials	$1.33	$83,497
Survey/Assessment	$0.20	$12,556
Interior only	$0.75	$47,085

*The log multiplier for a $1 million to $2 million project is .06278

  The division does not have a fee structure for real estate services, and recovers the costs for these services through its overhead. Although fees are generated by projects, the division does not bill its actual costs for managing these projects.

- While the Division does prepare a project scoping agreement, it does not provide a breakdown of the costs of design, design administration, construction management, and construction inspection.

- The Enterprise Business Systems provides a financial tracking system that tracks specific project business units, but this report captures only limited amounts of information requiring maintenance of a more detailed financial record in Microsoft Excel spreadsheets. This generates redundant work and compromises internal control.

- The Division does not ensure that the Building Operations Support Services Division, General Services Department provides feedback for plans and specifications at 30%, 60%, and 90% completion. Either plans and specifications are not being provided to the staff of the Building Operating Support Services Division, General Services Department or the staff of the Division are not responding given other conflicting workload demands. In either case, inspection of buildings recently constructed by Metro by the project team identified a number of shortcomings that could have been detected by the review of these plans and specifications by the Building Operating Support Services Division, General Services Department.

The working relationship between the Building Operations Support Services Division and the Real Property Services is the most obvious opportunity for improvement. As will be noted in a subsequent chapter, this relationship needs to be formalized in a number of written policies and procedures.

Exhibit 16 (1)

Best Management Practice Assessment For Building Maintenance

Best Management Practice	Convention Center	Farmers' Market	Fire Dept.	GS Dept.	Health Dept.	MAC	Metro Public Library	Municipal Auditorium	Parks Dept.	Police Dept.	Public Works Dept.	Tenn. State Fair	Water Department
Building and Asset Inventory													
• Building components are periodically inspected for condition and maintenance needs.	√					√							√
• A comprehensive list of building systems and equipment with information, such as location, model type, warranty information, age and replacement parts is maintained													
• Regularly updates facility inventories to reflect changes in square footage, value, condition and maintenance practices.													
• Trained technicians and managers use written guidelines, standardized checklists, and / or automated systems to conduct assessments.													
Building Maintenance Management													
• Staff have available and utilize a computerized information system for maintaining building and asset inventories.				√									
• The department has a computerized parts inventory..											√		
• The department has a computerized work order system that tracks completion time, labor ad parts costs, and schedules preventive maintenance..				√					√		√		√
• The computerized work order system assists in the scheduling of routine and emergency work activities and tracks time required to perform all scheduled tasks.				√					√		√		√

Exhibit 16 (2)

Best Management Practice	Convention Center	Farmers' Market	Fire Dept.	GS Dept.	Health Dept.	MAC	Metro Public Library	Municipal Auditorium	Parks Dept.	Police Dept.	Public Works Dept.	Tenn. State Fair	Water Department
Preventive Maintenance Program													
• The department ahs developed an effective preventive maintenance program and routinely preventively maintains heating, ventilating, air conditioning, electrical , and plumbing systems.	√			√		√							
• The department has procedure manuals or checklists of tasks for employees to use when performing preventive maintenance.	√			√		√							
• The department's preventive maintenance program includes one-year schedules that prescribe weekly activities for specified equipment and components according to manufacturers' recommended frequency or other set intervals.						√							
Employee Skills Competence													
• The department requires that maintenance personnel receive periodic training on recognizing and diagnosing the cause of maintenance problems in buildings for which they are responsible.													
• Staff receives training in the areas of emergency conservation, new facility technologies, assessing building and component condition and analyzing the useful life of building components.													
• Managers receive additional training in the subjects of management skills, budget development, and communication and presentation techniques.				√									
• Maintenance employees have and maintain appropriate certifications for their specific trade or craft.													

Exhibit 16 (3)

Energy Management													
• An energy audit has been conducted of major facilities and adjustments made as a result.													
• The department has developed an energy management plan to control and management costs and utilization.													
• Collected energy data is analyzed to identify problem areas, unusual changes in uses, and project future usage and costs.													
• An energy accounting system is employed to identify savings opportunities and to track and measure the success of energy-efficient strategies.													
• One individual has been identified as Energy Manager (either as a sole responsibility or auxiliary duty) with responsibility for managing energy and promoting energy-efficient building operations.													
• Building operators have been formally trained in energy-efficient operations and maintenance activities.													
• Actual performance is tracked against expected performance for major equipment.													

6. ANALYSIS OF THE PLAN OF ORGANIZATION OF BUILDINGS AND GROUNDS MAINTENANCE

6. ANALYSIS OF THE PLAN OF ORGANIZATION OF BUILDINGS AND GROUNDS MAINTENANCE

This chapter presents the findings and recommendations for the overall organization and management of buildings and grounds maintenance for Metro Nashville.

1. ORGANIZATIONAL PRINCIPLES.

Organizational structure in local government is often unplanned resulting in a system that is often duplicative, highly fragmented, occasionally inefficient and very difficult to change. While not uncommon, incremental changes without an overall strategy can be detrimental to the organization's overall performance.

In evaluating the plan of organization and the management systems used for buildings and grounds maintenance in Metro Nashville, the Matrix Consulting Group utilized a number of principles for organizational structure. These principles are presented in the paragraphs below.

- **Building and Grounds maintenance should be organized on a 'form follows function' basis** with a clear, distinct and comprehensive sense of purpose or mission for each functional area. Functions are grouped consistent with their periodic interaction, common planning and scheduling systems, delivery of services which are linked in some way, resulting in functional cohesion.

- **The organizational structure should foster accountability.** Does the organizational structure foster accountability among management and supervisory staff? The organizational structure itself can facilitate or impede the performance of an organization.

- **The plan of organization should enhance communication and coordination.** The number of handoffs/exchanges required among different departments providing service to the public is minimized. The structure enhances shared knowledge and understanding among divisions and departments. The channels of communication are clear and consistent.

- **Staff resources should be utilized efficiently**. The plan of organization minimizes administrative overhead. Workload can be distributed/shared to maximize the productivity of staff through peaks and valleys and offer cross-functional capabilities (e.g., to balance workload of maintenance staff across the different lines.). Processes can be standardized to enhance the efficiency and customer responsiveness of services (e.g., the preventive maintenance process).

- **The potential of human capital should be enabled**. The plan of organization enhances career development opportunities, training and recruitment and retention.

- **The quality and responsiveness of services provided to customers should be improved**. The plan of organization enables staff to provide better service to the customers in terms of cycle times, user friendliness, performance management, quality control, and consistency of the application of policies and procedures. Customers are the hub – with the service provider organization designed around them.

- **The span of control for any manager or supervisor should not exceed the number which can be feasibly and effectively supervised**. The trend is to widen span of control. In the last decade, the introduction of information technology spurred the trend toward wider spans of control.

- **The number of layers of management should not result in a tall, narrow configuration**. Organizations with many layers are associated with centralized decision-making. Flatter organizations tend to have decentralized decision-making, as authority for making decisions is given to the front line employees.

The lack of an overall vision of organizational principles creates many of the inefficiencies that exist in local governments today. Reorganization efforts that ignore these broader principles could create new, unintended consequences for the future. The principles above were used as criteria to evaluate the present organizational structure leads to a number of conclusions. These conclusions are presented below.

2. BUILDINGS AND GROUNDS MAINTENANCE ORGANIZATIONAL STRUCTURE

Buildings and grounds maintenance management services should be organized to meet the needs of its customers. Traditionally, it was believed that the effectiveness

of buildings and grounds maintenance management was correlated to its proximity to its customers. The most obvious result was the decentralization of buildings and grounds maintenance management, each serving the seemingly unique needs of its own department.

Increasingly, however, it has been recognized that buildings and grounds maintenance management can be more effectively met through a consolidated approach. The move towards consolidation can be traced, in large measure, to the increasing complexity and cost of buildings and grounds maintenance management over the past twenty years. During this period, developments in such areas as automation, personnel management and professional development, regulation of environmental protection and occupational safety and health, and building technology have changed the definition of “effective” buildings and grounds maintenance management, making it prohibitively expensive for specialized, but usually small and poor, buildings and grounds maintenance management organizations to keep up. The use of predictive technology and reliability-centered management through such techniques as infrared thermography, vibration analysis, etc. are examples of technology that can only be cost effectively applied in consolidated buildings and grounds maintenance organizations.

A significant advantage of centralizing buildings and grounds maintenance management was that investment in automation, employee training, facilities, and the like are more likely to be adequately funded for one large organization than for several smaller ones. Another significant advantage is the ability it affords to standardize policies and procedures so as to promote consistent – and consistently sound –

operating and service delivery practices and avoid inequities in the distribution of resources that create uneven service levels and impair employee morale. A final advantage of consolidation is that it can improve the utilization of buildings and grounds maintenance resources and capabilities – such as maintenance personnel or building systems expertise – by permitting the application across organizational lines that might otherwise create barriers to such shared use.

The price of consolidation is the distancing – organizationally if not physically – of buildings and grounds maintenance management services from their customers. Sacrifices in this area should be acceptable, however, if they are offset by gains in others, and can be compensated by the use of a zone (or geographically decentralizing) approach to the plan of organization for the consolidated buildings and grounds maintenance.

Thus, the key question to be addressed in examining the organization of the buildings and grounds maintenance management functions in Metro Nashville is whether a consolidated organizational structure will yield improvements in service effectiveness and/or cost control, always keeping in mind that service considerations should take precedence over cost considerations because that is what buildings and grounds maintenance management is about.

Finding

Metro Nashville utilizes a fragmented approach to organizing buildings and grounds maintenance services. Fourteen different departments are involved in the delivery of buildings and grounds maintenance services. These fourteen departments are presented below.

- The Building Operations Support Services Division, General Services Department;
- The Convention Center;
- The Farmer's Market;
- The Fire Department;
- The Public Health Department;
- The Metropolitan Action Commission;
- The Public Library Department;
- The Municipal Auditorium;
- The Parks and Recreation Department;
- The Police Department;
- The Public Works Department;
- The State Fair;
- The Water Services Department; and
- The General Hospital.

With the exception of Building Operations Support Services Division, these departments provide services only for their department.

The results of this fragmentation are not positive for cost-effective building maintenance for Metro. The challenges that derive from this fragmentation include the following:

- Metro is a high cost provider of building maintenance services:
- Metro is not consistently preventively maintaining its building systems;

- There is significant variation in staff resource levels among the fourteen departments even after equalizing for the square footage maintained by each of these departments; and

- There is a lack of accountability for managing the maintenance of building maintenance assets that have a value of $1,024,677,917 based upon the 2005 CAFR.

Each of these challenges are addressed in the following sections.

(1) There Is Significant Variation in the Building Maintenance Staff Resource Levels among These Fourteen Departments That Provide Building Maintenance.

The table below presents the square footage that each of these departments is responsible for maintaining and the number of building maintenance staff (excluding custodial maintenance, clerical and managerial positions, but including supervisory positions). As the table indicates, the square footage per building maintenance staff varies considerably.

Organization	Square Feet	Staff	Square Feet/ Staff
Building Operational Support Services	2,400,000	18	133,333
Farmer's Market	100,000	5	20,000
Fire Department	429,999	7	61,428
General Hospital	824,000	31	26,580
Metro Action Commission	143,229	4	35,807
Municipal Auditorium	63,000	4	15,750
Convention Center	450,000	4	112,500
Parks and Recreation	485,637	27	17,986
Police	189,367	6	31,561
Public Health	247,247	5	49,450
Public Library	528,601	5	105,720
Public Works	76,667	1	76,667
State Fair	154,200	8	19,275
Average	**6,091,947**	**125**	**48,736**

Important points to note concerning the table are presented below.

- **Metro has authorized 125 staff for the maintenance of its buildings (excluding custodial maintenance, clerical and managerial positions, but**

including supervisory positions). However, only 14% of these positions are allocated to the Building Operational Support Services Division, yet that Division is responsible for the maintenance of 39% of the square footage in Metro buildings that require maintenance. Two other departments are authorized more staff for building maintenance than the Building Operations Support Services Division, yet maintain far less square footage: the Parks and Recreation Department and the General Hospital.

- **The number of square feet per building maintenance staff averaged 48,736 but ranged from a high of 133,333 for the Building Operations Support Services**. There were a number of departments whose level of building maintenance staffing appears to be more than suggested by benchmarks including the Farmer's Market, General Hospital, Municipal Auditorium, Parks and Recreation, and State Fair. On the other hand, there appear to be a number of departments whose level of building maintenance staffing appears to be substantially less than that suggested by benchmarks including the Building Operational Support Services Division, Convention Center, and Public Library.

- **The Water Services Department was excluded from the table**. The department has not been included on the table because the agency was (1) not able to provide the number of square feet in its buildings and (2) because it contracts out all of its building maintenance work.

- **Overall, there appears to be sufficient staff to provide effective building maintenance services**. Excluding the General Hospital, there are 94 staff assigned to building maintenance with responsibility for the maintenance of 5,267,947 square feet. This is equivalent to 56,042 square feet per building maintenance staff. This is within benchmarks for building maintenance staffing requirements.

Clearly there is an inconsistent approach to the allocation of staff among these fourteen departments.

(2) Metro Is Not Consistently Preventively Maintaining Its Building Systems

The Metro building maintenance assets have a value of $1,024,677,917 based upon the 2005 CAFR These assets are not consistently maintained by the fourteen departments that are responsible for building maintenance management as discussed in the previous chapter. These include the absence of:

- A building asset inventory;

- Periodic condition assessments of building components and the development of 5-year rehabilitation and replacement plans;
- Preventive maintenance of building assets with some exceptions;
- Computerized maintenance management systems with some exceptions;
- Periodic, ongoing training of building maintenance staff;
- Energy management plans.

The impact of the inconsistent approach is clearly evident on the costs of maintaining and operating Metro buildings.

(3) The Cost of Building Maintenance for Metro Is Higher Than Its Peers.

The project team benchmarked the building maintenance and operating costs for the Building Operations Support Services Division against fifty-two other public and private sector organizations. This Division was the only division that had sufficient data to utilize for this benchmarking.

The results indicate that costs to Metro Nashville for building maintenance and operations are significantly higher than its peers. Examples are presented below.

- The electrical consumption for Metro buildings kilowatt hour per factored gross foot is 70% higher than the median for its peers. This is not insignificant given the annual cost of electricity for the Building Operations Support Services Division exceeds $1.8 million. The electrical cost per factored square foot is 25% higher than its peers.
- The custodial cost for Metro buildings is 45% higher per factored square foot than the median for its peers. This is not insignificant given the annual cost of contract custodial services that amounts to $1.6 million.
- The building maintenance cost per factored square foot for Metro buildings are 267% higher than the median for its peers.

These results are not surprising for the Building Operations Support Services Division. It is clearly understaffed in comparison to benchmarks and unable to deliver an effective preventive maintenance program. The division is allocating a much higher proportion of its available work hours to reactive and corrective maintenance than suggested by best management practices. A sample suggests that the division is allocating 54% of its available work hours to reactive and corrective maintenance; benchmarks suggest that this should approximate 25% to 35%.

(4) There Is a Lack of Accountability for the Maintenance of the Metro Buildings.

There are fourteen different departments responsible for the maintenance of Metro buildings. This fragmentation inhibits the ability of Metro to develop effective management controls for the management of the maintenance of these building assets. This would include such controls as:

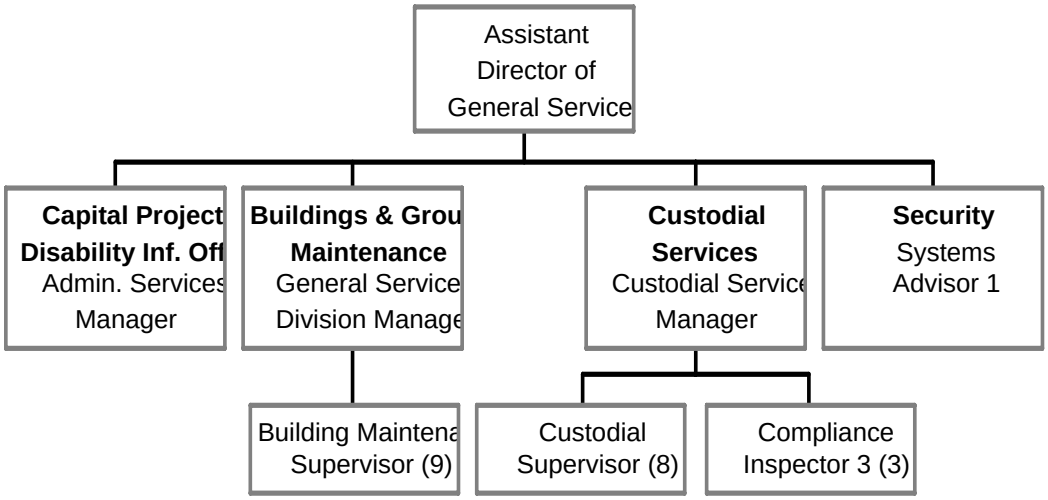
- Consistent written goals, objectives, and performance measures;
- Clear delineation of responsibility and authority;
- Formal written policies and procedures;
- Effective long-range planning processes;
- Ongoing performance reports that clearly indicate actual accomplishments versus the objectives and performance measures.

Establishing accountability for building maintenance is critical to enabling effective stewardship of building assets, ensuring high quality, responsible service delivery, ensuring the sound delivery of services to customers; and maximizing desired program outcomes.

Recommendation 6-1:

Consolidate the responsibility for buildings and grounds maintenance, custodial maintenance, and security management in the Building Operations Support Services Division, General Services Department. This should exclude the General Hospital and the Metro Nashville Public Schools.

The implementation of this recommendation should reorganize the Building Operational Support Services Division as shown below.



The proposed changes in the administrative plan of organization for the Division would result in:

- The addition of a General Services Division Manager position with responsibility for managing buildings and grounds maintenance for all Metro buildings with the exception of the General Hospital and the Metropolitan Nashville Public Schools;

- The addition of a Custodial Services Manager position with responsibility for managing custodial maintenance provided by contractors and in-house staff for all Metro buildings with the exception of the General Hospital and the Metropolitan Nashville Public Schools;

- Redefining the role of the Administrative Services Manager to management of capital projects, review and quality control of architectural plans and specifications developed by all agencies, and managing the Disability Information Office.

The following chapter addresses the management of the Building Operations Support Services Division and the implications of consolidation of the staff of these other departments on the plan of organization of the Building Operations Support Services Division in greater detail.

Implementation Strategies and Timeline

The Mayor should direct the Finance Director to meet with the twelve affected departments and discuss the consolidation of building and grounds maintenance, custodial maintenance, and security services	August 2006
The General Services Department should conduct work sessions with the twelve affected departments to discuss the consolidation of building and grounds maintenance, custodial maintenance, and security services.	September 2006
The Mayor should direct the Finance Director to prepare the necessary budget amendments for review and approval of the Mayor and the Metropolitan Council.	August 2006
The General Services Director should cause the budget amendments to be created.	October 2006
The Mayor should direct the General Services Director to begin implementation of the consolidated plan of organization.	November 2006

Fiscal Impact

Implementation of this recommendation would increase salary and fringe benefit expenditures by $100,700 at the control point for the additional position of General Services Division Manager, and $70,700 at the control point for the additional position of Custodial Services Manager.

3. PROJECT MANAGEMENT OF MAJOR MAINTENANCE CAPITAL IMPROVEMENT PROJECTS

The roles of the Real Property Services Division and the Building Operations Support Services Division in the accomplishment of maintenance and repair of buildings should be clearly defined.

The Real Property Services Division was established in 2001 to develop a capital

improvement master plan for Metro's real estate holdings and to establish standards for the design and construction of facilities. It is responsible for the development of Metro's capital improvement plan for buildings as well as the design and construction management of new buildings, the renovation of existing buildings, the design of building interiors, the relocation of Metro staff and equipment among buildings, and the real estate activities (buy, sell, lease) of Metro.

The Real Property Services Division has defined general maintenance projects and major maintenance projects (see the exhibit at the end of this chapter). General maintenance projects, according to the definition, should be directed to Metro's Department of General Services. Major maintenance projects, on the other hand, should be directed to Real Property Services. These projects according to the definition should amount to an anticipated cost that exceeds fifty-percent (50%) of the facility/structure's current market value. The definition states that normally, as a guideline, this type of work exceeds a cost threshold of $100,000, but is not limited to that threshold.

Finding

In reviewing the project assignments for the Real Property Services Division, there appear to be a number of projects that would be better classified as general maintenance projects and not as major maintenance projects. These projects include such projects as the following:

- Metro Action Commission Dudley window replacement;
- Lentz repair of toilets and related damage (at a cost of $48,000);
- Ross Head Start soffit replacement at a cost of $129,000);

- Metropolitan Action Commission Tom Joy roof (at a cost of $29,000);
- Auditorium – cleaning and resealing the dome (at accost of $313,600).
- Metropolitan Action Commission HVAC (at a cost of $64,000); and
- Roofing assessment (at a cost of $260,000) and roof renovations (at a cost of $763,000);
- DA drug task force renovation (at a cost of $15,371); and
- Health – downtown clinic repairs (at a cost of $6,727).

The Real Property Services Division has a number of significant, complex, and costly projects. These include such projects as the Justice A. A. Birch building, the Historic Courthouse renovation, the Public Square Garage/Plaza, the Old Metro office building, and the Howard office building among others. It should not utilize its scarce staff resources for these minor projects.

Recommendation 6-2:

The Building Operations Support Services Division, General Services Department should assume responsibility for minor renovation projects including roof renovations. The General Services Department and the Real Property Services Division should develop a formal written policy that defines the size and scope of the capital projects that each will be responsible for. The Building Operational Support Services Division, General Services Department, upon consolidation of buildings and grounds maintenance services, should assess the skills of the staff reassigned to the Division and allocate one of these positions as project manager for minor renovations including roof renovations.

Implementation Strategies and Timeline

The Finance Director, General Services Director, and the Assistant Finance Director should meet to discuss the allocation of responsibility for project management of minor renovation projects including roof renovations.	July 2006
The General Services Director, and the Assistant Finance Director for Real Property Services should jointly develop a formal written policy that defines the size and scope of capital projects that each will be responsible for.	August 2006
The Finance Director should review and approve the policy.	August 2006

The General Services Director, and the Assistant Finance Director for Real Property Services should communicate this policy to their staff and to the Office of Management and Budget.	September 2006
The General Services Director, and the Assistant Finance Director for Real Property Services should implement the decision including the reallocation of minor renovation projects from the Real Property Services Division to the Building Operations Support Services Division	September 2006

Fiscal Impact

The three Compliance Inspector 3's and two Technical Specialist 1's assigned to capital projects in the Building Operations Support Services Division, General Services Department have sufficient workload capacity to assume this additional responsibility.

Exhibit 17

Definition of Construction and Maintenance Projects

1. "**Construction Project"** includes any capital project, approved in the Capital Improvements Budget involving the new building, or erection, of any public building, structure, park, or parking facility, which is funded in compliance with federal and state law(s). **Requests for these type projects should be directed to Real Property Services.**

2. "**Renovation Project"** includes the reconstruction, repairing, or major improvement of any public building, structure, park or parking facility, whereby the anticipated cost of the renovation exceeds fifty-percent (50%) of the facility/structure's current market value. **Requests for these type projects should be directed to Real Property Services.**

3. "**General**-**Maintenance Project"** includes maintenance to buildings and structures, and all devices, equipment and safeguards required in order to maintain the facilities in good working order. This includes work done on an existing facility, whereby an existing element of the facility is replaced with like product(s). Normally, this type work is performed, in-house, by the owner's maintenance crew or its designated maintenance Metro agency. Normally, general maintenance projects and/or services do not require a construction permit from Metro Codes or the assistance of a design professional; such as, the services of an Architect/Engineer (AE) and/or Interior Designer (ID).

Traditionally, general maintenance is performed routinely to keep current facilities and equipment in an existing state; preserve or retain in a condition of good repair and/or efficiency. Appropriate personnel within the applicable Metro department's maintenance staff should handle requests for these type projects. If no in-house or assigned maintenance agency exists, this work should be directed to Metro's Department of General Services, whereby it may be outsourced to the appropriate Metro Maintenance Service Contractor. If neither of these options are available, direct questions and/or the project requirement(s) to Real Property Services.

4. "**Major-Maintenance Project"** includes work similar to work previously defined as General Maintenance, except Major Maintenance Project includes major modifications to the existing buildings and structures, including the structural integrity of the building, and all devices, equipment and safeguards, which require the professional services of an Architect/Engineer (AE) and/or Interior Designer (ID), where the anticipated cost of the maintenance project exceeds fifty-percent (50%) of the facility/structure's current market value. Normally, as a guideline, this type work exceeds a cost threshold of $100,000, but is not limited to that threshold. Also, this work requires detail drawings and a construction permit issued by Metro Codes Department. However, all project requirement(s) rest on its own merits and the cost thresholds may vary, accordingly. **Requests for these type projects should be directed to Real Property Services.**

7. ANALYSIS OF THE BUILDING OPERATING SUPPORT SERVICES DIVISION

7. ANALYSIS OF THE BUILDING OPERATING SUPPORT SERVICES DIVISION

This chapter of the report presents an analysis of the Building Operating Support Services Division. The consolidation of buildings and grounds maintenance require effective maintenance management systems – systems that are not present in Metro at this time. This chapter presents a number of recommendations that are designed to enhance the management systems utilized by the Building Operations Support Services Division.

As Metro's buildings age, Metro faces the growing challenge of maintaining its building assets at a level that enables its staff to meet the needs of its residents. Because routine and unexpected building maintenance demands are bound to arise, the Building Operations Support Services Division must proactively develop and implement management systems for dealing with these inevitabilities.

1. METRO BUILDING MAINTENANCE, GROUNDS MAINTENANCE, CUSTODIAL MAINTENANCE, AND SECURITY STAFF AND SERVICE AND SUPPLY FUNDING SHOULD BE REALLOCATED TO THE BUILDING OPERATIONS SUPPORT SERVICES DIVISION.

The Building Operations Support Services Division includes maintenance, security, and custodial contract and ADA compliance. The points, which follow, present a brief discussion of the services provided by the Division.

- **Preventive Maintenance** – The Preventive Maintenance group was established in July 2005. A Building Maintenance Superintendent and eleven maintenance staff are allocated to this group. This staff is assigned to the Central area that includes major Metro buildings in the downtown area. The Building Maintenance Superintendent reviews work order information captured by a web-based customer service request system that was also implemented in June 2005. The staff is responsible for preventive maintenance in their assigned buildings. The

preventive maintenance schedule of activities is confined largely to HVAC systems. Personnel are largely self-directed in identifying their daily work assignments.

- **Major Maintenance** – The Major Maintenance group includes a Technical Specialist 2, six building maintenance staff and three grounds maintenance staff. The building maintenance staff work in 2-person crews and typically will not undertake jobs that will take more than three days to complete. The group has contractors on call to do larger projects. Typical projects include electrical work up to the box, water and sewer repairs of existing lines, roof repairs, door and window replacement, sidewalk and curb repairs.

- **Security** - The Security Section is staffed by three positions. This staff is responsible for Key Card access systems and a security guard contract with Wackenhut.

The Division has forty-three staff assigned to building and grounds maintenance services including managers, ADA project managers, contract compliance staff, and three staff assigned to security management.

Finding

In addition to the forty-three staff allocated to the Building Operations Support Services Division, twelve other departments (excluding the General Hospital and Metro Nashville Public Schools) also have staff responsible for providing building and grounds maintenance, custodial maintenance, security services and clerical support. The table, which follows, provides the number of building and grounds maintenance, custodial maintenance, security services and clerical support staff in these other departments.

Organization	Building Maintenance Staff	Grounds Maintenance Staff	Custodial Maintenance Staff	Security Staff	Clerical Staff
Farmer's Market	5	0	0	0	0
Fire Department	7	0	0	0	0
Metro Action Commission	5	0	14	0	0
Municipal Auditorium	4	0	0	0	0
Convention Center	4	0	0	0	0
Parks and Recreation	29	0	43.94	0	2
Police	6	0	0	0	0
Public Health	5	0	11	1	0
Public Library	6	1	25	1	0
Public Works	1	0	0	0	0
State Fair	8	0	0	0	0
Water Services	0	0	3	2	0
Total	**80**	**1**	**96.94**	**4**	**2**

It should be noted that the table includes lead workers, supervisors, and superintendents.

In addition, these organizations allocate funding for service and supplies for buildings and grounds maintenance and for custodial maintenance. The table below presents the data that was obtained from these departments.

Department	FY 2006
Convention Center	$295,900
Farmer's Market	$31,000
Fire	$228,400
Public Health	$278,200
Public Library	$432,000
Metro Action Commission	$39,000
Municipal Auditorium	$28,600
Parks and Recreation	$2,513,000
Police	$26,000
Public Works	$229,940
State Fair	$109,100
Water Services	$9,565,489
Total	**$13,776,629**

Important points to note regarding the table are presented below.

- This expenditure data was provided by each of the departments. It has not been audited, and line-item detail was not provided in most instances.

- The expenditure data for Water Services includes mechanical, heating, ventilating and air-conditioning, electrical and buildings. 82% of these expenses are for mechanical and heating, ventilating and air-conditioning. However, these expenses include the treatment plants, and not just buildings and grounds. Water Services was unable, at the time of the interview with the project team, to differentiate between expenses for the treatment plant versus buildings and grounds.

- 59% of the expenses for Parks and Recreation consist of utilities – electric, water and gas.

- Public Works expenses include an estimated allocation for other repair and maintenance services. The department indicated that a minor proportion of these expenses were allocated to buildings and grounds. The project team estimated these expenses at 10% of the total for this line item.

The building and grounds maintenance staff at the Farmers Market, Municipal Auditorium, Convention Center, and State Fair allocate a proportion of their work hours to event setup and takedown. The capacity for event setup and takedown will need to remain in these four departments after consolidation of buildings and grounds maintenance, custodial maintenance, and security services in the Building Operations Support Services Division. The Matrix Consulting Group developed an estimate of the allocation of time to event setup and takedown based upon interviews with these four departments. The points, which follow, present a summary of this information.

- The Farmer's Market has five staff assigned to building and grounds maintenance, as well as event set-up and vendor support. Approximately 70% of staff hours are allocated to buildings and grounds maintenance activities.

- The Municipal Auditorium has four staff assigned to buildings and grounds maintenance functions. Staff also provides event-up and support. In addition to these four staff, there is an Event Set Up Leader. Approximately 70% of staff hours are allocated to buildings and grounds maintenance activities.

- The Convention Center has four staff that provide a variety of services to the Center, including building and grounds maintenance and event set-up Approximately 60% of staff hours are dedicated to buildings and grounds maintenance functions.

- The State Fair has nine staff that provides a variety of building and grounds maintenance, as well as assist with special events (e.g., flea markets, etc.). In addition, the State Fair has 150 full-time equivalent seasonal/part-time/temporary staff. The State Fair allocates approximately 50% of its staff hours to buildings and grounds maintenance functions.

Recommendation 7-1:

The staff and the service and supply funding in the twelve other departments that are allocated to buildings and grounds maintenance, custodial maintenance, and security services should be transferred to the Building Operations Support Services Division. This should exclude that proportion of staff allocated to event set-up and takedown at the Farmers Market, Municipal Auditorium, Convention Center, and State Fair.

The Finance Department and the General Services Department should work with these twelve other departments to identify those service and supply budgeted expenditures that should be transferred to the Building Operations Support Services Division.

Only eight positions that were listed in the preceding table should not be transferred to the Building Operations Support Services Division. These positions – allocated to the Farmers Market, Municipal Auditorium, Convention Center, and State Fair – should remain with these four departments to assist in event set-up and takedown. These eight positions would include the following:

- A Building Maintenance Supervisor and Maintenance and Repair Worker 1 at the Farmers Market;

- A Building Maintenance Supervisor at the Municipal Auditorium;

- A Building Maintenance Superintendent at the Convention Center; and

- A Building Maintenance Supervisor, Maintenance and Repair Supervisor, and two Maintenance and Repair Workers at the State Fair.

The exhibit presented at the end of this chapter presents a breakdown of the positions that should be transferred to the Building Operations Support Services Division by department and class title.

Implementation Strategies and Timeline

The Assistant Director General Services should develop a transition plan for the consolidation of building and grounds maintenance, custodial maintenance, security services and clerical support staff in the Building Operations Support Services Division.	July 2006
The Assistant Director General Services should meet with the affected departments to discuss the transition plan	August 2006
The Assistant Director General Services should meet with and communicate the transition plan to affected employees	September 2006
The General Services Director should cause the budget amendments to be created to transfer building and grounds maintenance, custodial maintenance, security services and clerical support staff and services and supply budgeted expenditures to the Building Operations Support Services Division.	October 2006

Fiscal Impact

There will not be a fiscal impact; these positions and the service and supply budgeted expenditures will be transferred from these twelve departments to the Building Operations Support Services Division.

2. THE CLASSIFICATION STRUCTURE OF THE BUILDING OPERATIONS SUPPORT SERVICES DIVISION

The consolidation of positions into another organizational unit can often result in an imbalance of managerial, supervisory, skilled, semi-skilled and unskilled positions. This would result in an unwieldy classification structure that impedes the ability of the this organizational unit to function cost-effectively. The number of managers and supervisors could exceed that required in the newly consolidated organization, while the number of skilled positions could be less than that required to effectively maintain and repair building assets.

Finding

The points, presented below, present the classification structure of the buildings and grounds maintenance positions that would be transferred to the Building Operations Support Services Division from the twelve departments.

- Seventy-three building and grounds maintenance positions would be transferred to the Building Operations Support Services Division from the twelve departments.
- Three of these positions (or 4%) are management positions – classified as Building Maintenance Superintendent or Facilities Manager;
- Seven of the positions (or 10%) are supervisory positions – classified as Fire Maintenance Supervisor, Building Maintenance Supervisor, Maintenance and Repair District Supervisor, and Maintenance and Repair Supervisor;
- Twenty-four of the positions (or 33%) are skilled trades workers – classified as Lead Maintenance Mechanic, Building Maintenance Mechanic, Industrial Electrician, Carpenter, Buildings and Ground Electrician, Masonry Worker, and Plumber; and
- Thirty-nine of the positions (or 53%) are semi-skilled or unskilled – classified as Maintenance and Repair Worker, Fire Maintenance Worker, General Maintenance Technician, Building Maintenance Worker, Painter, Equipment Operator, and General Maintenance Worker.

The points, presented below, present the classification structure of the buildings and grounds maintenance positions within the Building Operations Support Services Division.

- Twenty-two positions are allocated to buildings and grounds maintenance in the Division;
- Two of these positions (or 10%) are management positions – classified as a Building Maintenance Superintendent and Technical Specialist 2;
- One of the positions (or 5%) is supervisory positions – classified as a Building Maintenance Supervisor;

- Eighteen of the positions (or 82%) are skilled trades worker positions – classified as Carpenter, Building Maintenance Mechanic, and Building Maintenance Lead Mechanic; and

- One of the positions (or 4%) is a semi-skilled or unskilled position – classified as a Building Maintenance Worker.

The table below summarizes the positions from these twelve departments and from the Building Operations Support Services Division.

Level of Classification	Number of Authorized Positions	% of Total
Management	5	5%
Supervisory	8	9%
Skilled Trades Worker	42	44%
Semi-Skilled or Unskilled Trades Worker	40	42%
TOTAL	**95**	**100%**

Important points to note concerning the data contained in the table are presented below.

- The span of control for these buildings and grounds maintenance managerial and supervisory positions is one manager or supervisor to six skilled, semi-skilled, and unskilled workers. This span of control is less than best practices; the span of control should approximate one to eight to ten skilled, semi-skilled, and unskilled workers. In addition, five managers, in addition to the recommended position of General Services Division Manager recommended in the previous chapter, are unnecessary.

- Metro allocates 40 buildings and grounds maintenance positions or 42% as unskilled or semi-skilled positions. This is 40% greater than best management practices would suggest as appropriate. Progressive building maintenance organizations typically allocate 30% of their total positions to semi-skilled or unskilled positions.

- Metro only allocates four Electrician positions or 4% of the total authorized buildings and grounds maintenance staffing of ninety-five positions. Progressive building maintenance organizations typically allocate 10% of their total positions as electricians.

- Metro does not allocate any Locksmiths to building maintenance. Metro does not even have a classification of Locksmith. Progressive building maintenance organizations typically allocate 5% of their total positions as locksmiths (if those organizations have responsibility for jails; it is typically half this allocation without that responsibility).

- Metro only allocates three buildings and grounds maintenance positions as Plumbers or 3%. Progressive building maintenance organizations typically allocate 10% of their total positions as plumbers.

- Metro allocates nine buildings and grounds maintenance positions as Building Maintenance Mechanic, Convention Center Lead Mechanic, and Building Maintenance Lead Mechanic or 9.5% of the total authorized buildings maintenance staffing of ninety-five positions. This is a little less than 10% of the total positions progressive building maintenance organizations typically allocate as heating, ventilating, and air conditioning technicians.

In addition, the classification of these positions varies significantly. Electricians are classified as Industrial Electricians and Buildings and Grounds Electricians. Heating, ventilating, and air conditioning technicians are classified as Building Maintenance Mechanic, Convention Center Lead Mechanic, and Building Maintenance Lead Mechanic; the lead positions are utilized even when the staff does not function as lead workers.

Recommendation 7-2:

Adjust the mix of managerial, supervisory, skilled, semi-skilled and unskilled positions assigned to buildings and grounds maintenance.

- **Eliminate the five managerial positions.**

- **Increase the number of supervisory positions from eight authorized positions to ten authorized positions.**

- **Reduce the number of semi-skilled and unskilled positions from forty positions to twenty-eight positions.**

- **Increase the number of Electricians from four positions to ten positions.**

- **Increase the number of Locksmiths from no positions to two positions.**

- **Increase the number of Plumbers from three positions to nine positions.**

- **Increase the number of Building Maintenance Mechanic, Convention Center Lead Mechanic, and Building Maintenance Lead Mechanic positions from nine positions to ten positions.**

Upon consolidation, the Human Resources Department should conduct a classification study to allocate the incumbents in buildings and grounds maintenance to the appropriate classifications given the revised plan of organization and the duties performed by the incumbents.

Implementation Strategies and Timeline

Through attrition, eliminate five managerial positions.	Through Attrition
Increase the number of supervisory positions from eight to ten.	September 2006
Through attrition, reduce the number of semi-skilled and unskilled positions from forty positions to twenty-eight positions.	Through attrition
Increase the number of Electricians from four positions to ten positions.	As semi-skilled and unskilled position become vacant
Increase the number of Locksmiths from none to two.	As semi-skilled and unskilled position become vacant
Increase the number of Plumbers from three positions to ten positions.	As semi-skilled and unskilled position become vacant
Increase the number of Building Maintenance Mechanic, Convention Center Lead Mechanic, and Building Maintenance Lead Mechanic positions from nine positions to ten positions.	As semi-skilled and unskilled position become vacant
The Human Resources Department should conduct a classification study of the incumbents assigned to buildings and grounds maintenance to allocate the incumbents to the appropriate classification given the revised plan of organization and duties performed.	October 2006

Fiscal Impact

The long-term impact, as positions are eliminated through attrition and upgraded to these skilled positions, would be an annual net increase of $215,000 in salary and fringe

benefits at the 6th step.

3. ZONE APPROACH TO DELIVERY OF BUILDING AND GROUNDS MAINTENANCE SERVICES

The project team has recommended the consolidation of buildings and grounds maintenance staff into one division – the Building Operations Support Services Division. This consolidation runs counter to the belief that the effectiveness of buildings and grounds maintenance management was correlated to its proximity to its customers. The challenge is to enhance the effectiveness of buildings and grounds maintenance while maintaining customer satisfaction and proximity to customers.

Finding

The Building Operations Support Services Division is responsible for providing building and grounds maintenance services to eight-four facilities located throughout Metro. Division employees are located in one facility and provide services from this location. With the consolidation of building and grounds maintenance, the Division will be responsible for over 5.3 million square feet of buildings located throughout Metro Nashville. Additionally, the authorized number of positions for the Division will increase from 43 positions to 217.94 positions – a five-fold increase.

Recommendation 7-3:

The Building Operations Support Services Division should utilize a zone approach to the delivery of building and grounds maintenance including the decentralization of this staff to four different satellite yards. The Division should organize its staff into ten zones with a Building Maintenance Supervisor for each zone.

The effectiveness of the consolidation of buildings and grounds maintenance into the Building Operations Support Services Division is dependent to a large extent on its seamless transition from the customer's perspective.

A model to keep these staff close the customer is zone maintenance. In zone maintenance, the building and maintenance staff would be divided into conveniently sized zones, usually approximating 500,000 square feet, with a team of multi-skilled maintenance craftsmen assigned to each zone. A Building Maintenance Supervisor would supervise each zone, and report the General Services Division Manager. Team size varies with the complexity, intensity of use, and size of buildings in the zone. There should be eight to ten skilled, semi-skilled and unskilled building and maintenance workers assigned to each zone.

The team is responsible for all buildings and grounds maintenance in their zone. All preventive and corrective maintenance work would be assigned to the team in their zone, but the Building Maintenance Supervisor may draw on support shops or contractual services to complete work beyond the capabilities of the team.

The major strength of zone maintenance is that the team is accountable for all maintenance in the work zone. Departmental managers and other customers who work with Building Operations Support Services Division would soon learn the names of their zone team. This enhances customer communication and service levels. The zones are usually based in a shop within the zone. These shops are not traditional shops, but locations where team workers organize and from which they are dispatched. The zone team controls maintenance and repair work done by support shops or by outside contractors. Such work is funded from the zone maintenance budget. The Building

Maintenance Supervisor is responsible for and should have the authority to manage maintenance in his or her zone buildings. Work orders would still be received and dispatched centrally.

The zone should be structured so that the team consists of one leader and six to fifteen multi-skilled workers at various proficiency levels. A typical ten-person zone team would have:

- 2 – 3 highly skilled journey mechanics, who could perform initial diagnosis and troubleshooting of building systems, include HVAC, electrical and plumbing systems;
- 3 – 4 less experienced building mechanics who would be capable of addressing traditional carpentry maintenance problems, such as window and door malfunctions, routine plumbing, electrical, and HVAC problems; and
- 3 – 5 staff capable of completing routine preventive maintenance work, such as filter changes, equipment lubrication, routine lighting programs, and painting, and would assist other building mechanics as necessary.

This structure provides a career job ladder from entrance level maintenance worker to highly skilled multi-disciplined technician without requiring formal supervisory responsibilities.

Implementation Strategies and Timeline

The Building Operations Support Services Division should deploy staff based on a zone approach.	September 2006
The Building Operations Support Services Division should create approximately ten zones.	September 2006
Each zone should be staffed with between eight to ten employees depending on complexity and needs of facilities.	September 2006
A Building Maintenance Supervisor should supervise each zone.	September 2006
The Building Operations Support Services Division should work with the Real Property Services Division to establish three additional satellite shops for the Building Operations Support Services Division	October 2006 through March 2007

Fiscal Impact

If the Real Property Services Division is able to identify existing buildings owned by Metro Nashville for the additional three satellite shops for the Building Operations Support Services Division, the one-time costs for remodeling these three satellite shops would approximate $150,000.

4. PREVENTIVE MAINTENANCE.

Many building-industry and facility-management groups, including the American Public Works Association, the Building Owners and Managers Association (BOMA) International, the Association of Physical Plant Administrators (now named the Association of Higher Education Facilities Officers), and the Association of School Business Officers agree on the benefits of well-planned preventive maintenance.

These professional associations cite preventive maintenance for its effects on improving equipment's operating efficiency, preventing premature replacement of components, and avoiding interruptions for building occupants. Preventive maintenance is widely thought to reduce long-term costs by maximizing the operating capacities of equipment, minimizing downtime, and avoiding breakdowns that would otherwise lead to higher repair costs later. Although we found no studies that quantified specific costs and benefits of a comprehensive preventive maintenance program for buildings, some studies demonstrate efficiencies of planned maintenance and others show the relationship between building maintenance and reducing building deterioration. Studies within individual companies show savings in energy costs and repair costs, as well as reductions in equipment breakdowns, due to preventive maintenance. For instance:

- The preventive maintenance tasks of cleaning coils and replacing dirty filters in a

heating, ventilation, and air-conditioning (HVAC) system have shown reduced energy costs for running an HVAC of 8% – 10%.

- In one company that adopted preventive maintenance, equipment breakdowns went from being a common occurrence to constituting approximately 1 percent of scheduled operating time over a ten-year period.

- Further, maintenance efficiencies allowed the company to reduce its maintenance workforce from 15 to 8 employees during that time.

- In another instance, by training maintenance workers in preventive maintenance, nine community colleges in California improved the efficiency of HVAC operations and saved an estimated 6 to 19 percent of their total annual energy bills, or $0.09 to $0.26 per square foot per year.

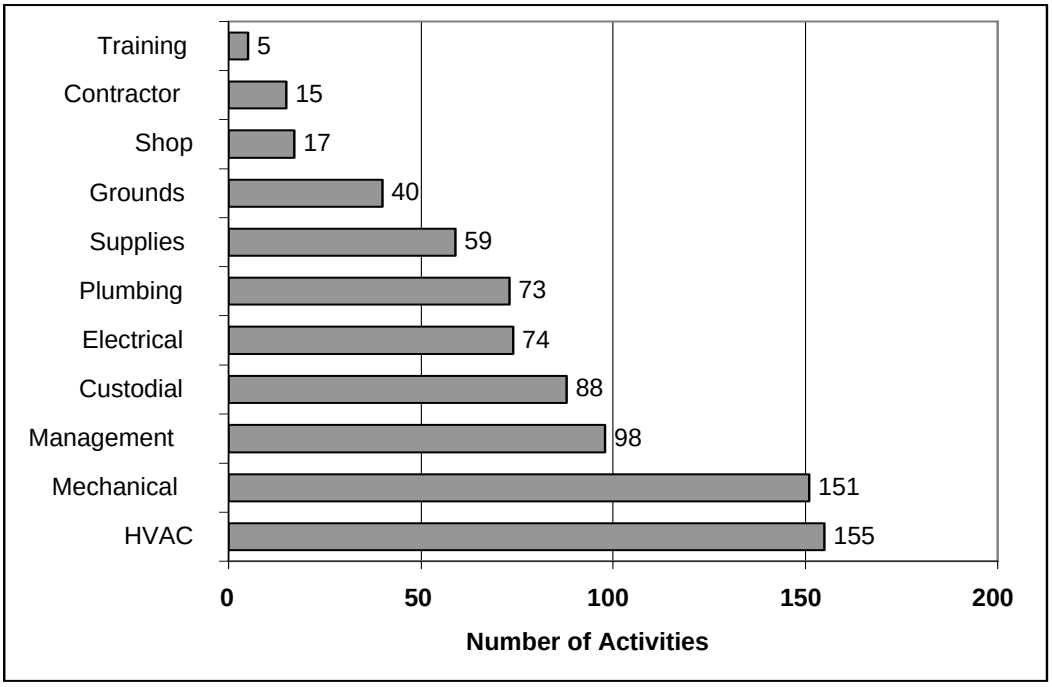
Finding

The project team analyzed data collected by the Building Operations Support Services Division to gain a better understanding of the activities performed by the Division. The analysis is based on a review of 2-weeks time sheets from twenty-three (23) Division employees. The times sheets were from various weeks in December 2005 and January 2006 and represent the work of supervisors, building mechanics and grounds workers. During this period the employees engaged in 775 activities and logged 1,762 hours of work.

The project team coded each activity in these time sheets into eleven (11) categories (management, HVAC, mechanical, plumbing, electrical, grounds, shop, custodial, contractor, supplies, and training) and 9 types of activities (management, corrective maintenance, preventive maintenance, grounds, custodial, supplies, shop, contractor, training).

The following chart summarizes the number of functional activities BOSS employees engaged in during the sample period. The sample contained 775 activities.

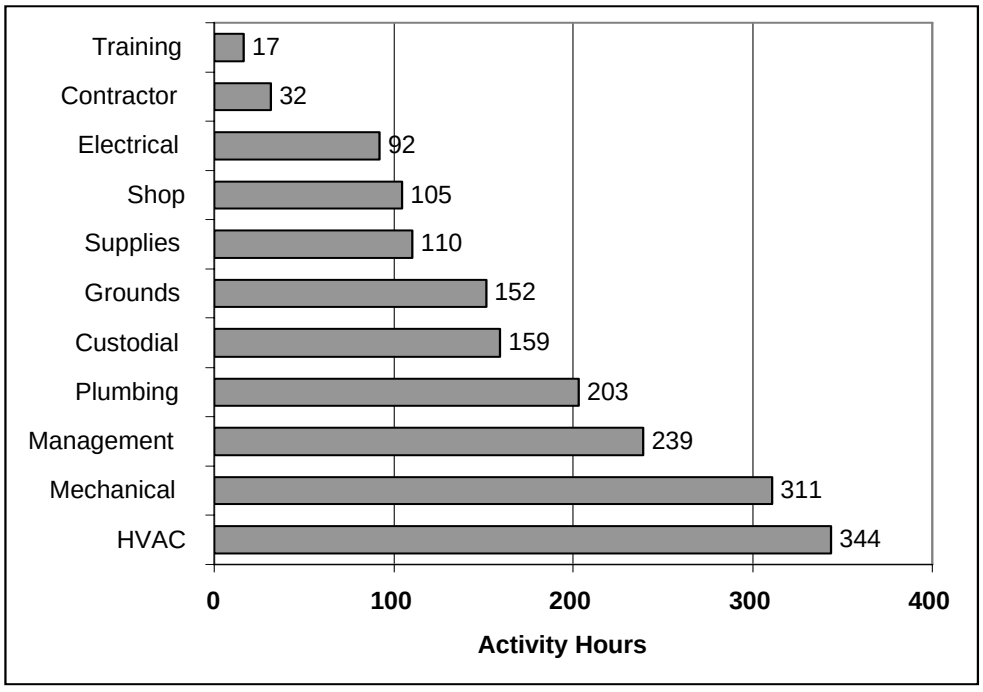
The most common activities involved HVAC and Mechanical maintenance in the buildings. They accounted for 39% of the activities. Both functions include corrective and preventive maintenance. Mechanical is a broad category because it encompasses a number of preventive assessments of conditions in the buildings in which personnel checked mechanical as well as electrical, HVAC and plumbing systems in making their daily rounds.



Management activities include attendance at meetings as well as supervisory, site inspection and administrative functions. It is the third highest category and accounted for 13% of the activities. The maintenance personnel engaged in a number of custodial duties, 11% of all functions. The electrical (10% of the total) and plumbing activities (9% of the total) include both corrective and preventive maintenance. Supplies (8% of the total) include the acquisition and distribution of supplies and materials to work sites. Grounds (5% of the total) includes outside maintenance at the building sites

while Shop (2% of the total) refers to work done at the Division's shop. Shop included work on the shop as well a work done at the shop that would be used at other buildings. Contractor (2% of the total) refers to meetings with contractors and inspection of their work. Training (1% of the total) accounted for the smallest number of functional activities. The current system of time recording does not account for any time involved in traveling to job sites.

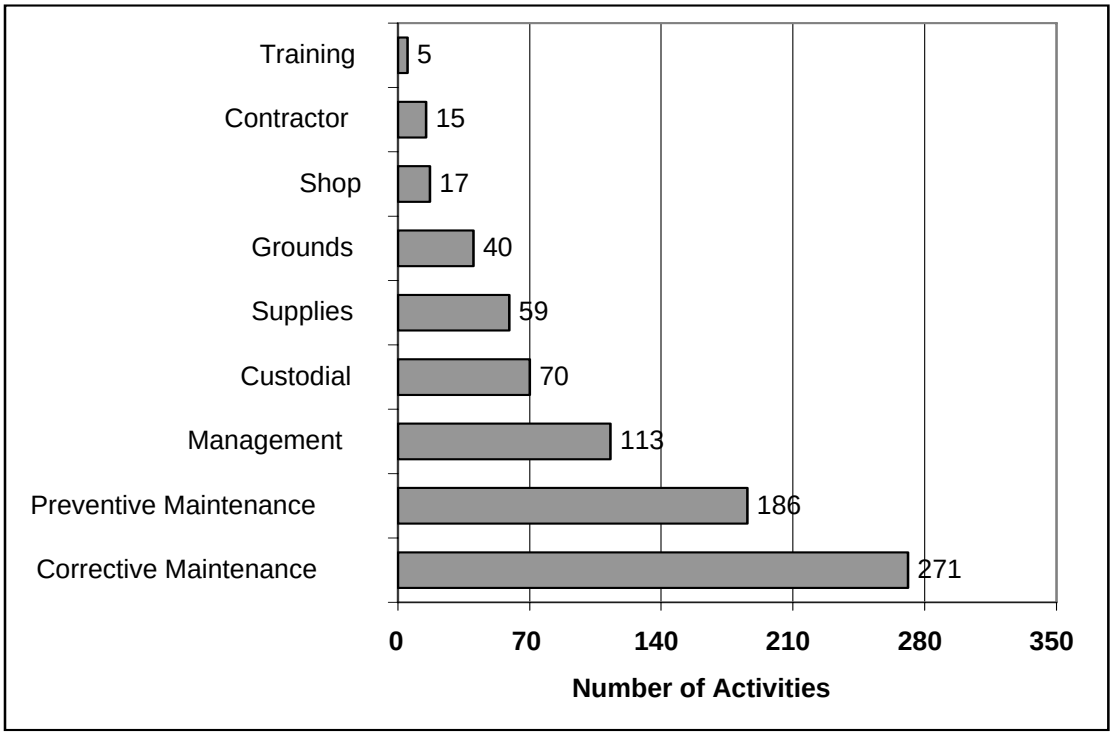
There is similarity between the number of functional activities performed and the hours spent on activities. The hours spent on each function appears in the table below. There were a total of 1,762-recorded hours. The top three functions (HVAC, Mechanical and Management) accounted for 52% of the total work hours for the sample period.



Plumbing and electrical maintenance activities accounted for 12% and 5% respectively of the recorded time. Custodial work in the buildings and grounds work each accounted for 9 % of the recorded time. The least amount of time was spent on

acquiring and delivering supplies (6% of the time), working in the shop (6%) contractor reviews (2%) and training (1% of the time).

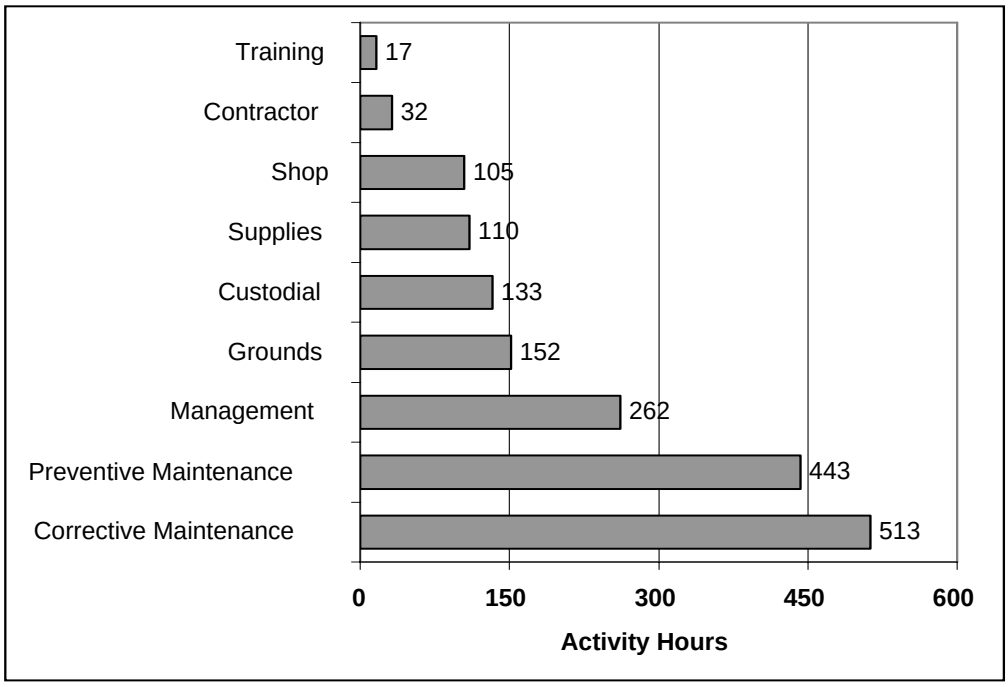
The following chart summarizes the types of activities that Division employees performed during the sample period. The most common activity was corrective maintenance. It accounted for 35% of the recorded workload. Preventive maintenance accounted for 24% of the activities.



Management activities accounted for 15% of the activity types. Custodial duties accounted for 9% of the work while the acquisition and distribution of supplies accounted for 8% of the activity. Grounds represents 5% of the total activities while shop represents 2% of the total. Contractor contacts and training accounted for 2% and 1% respectively of the work.

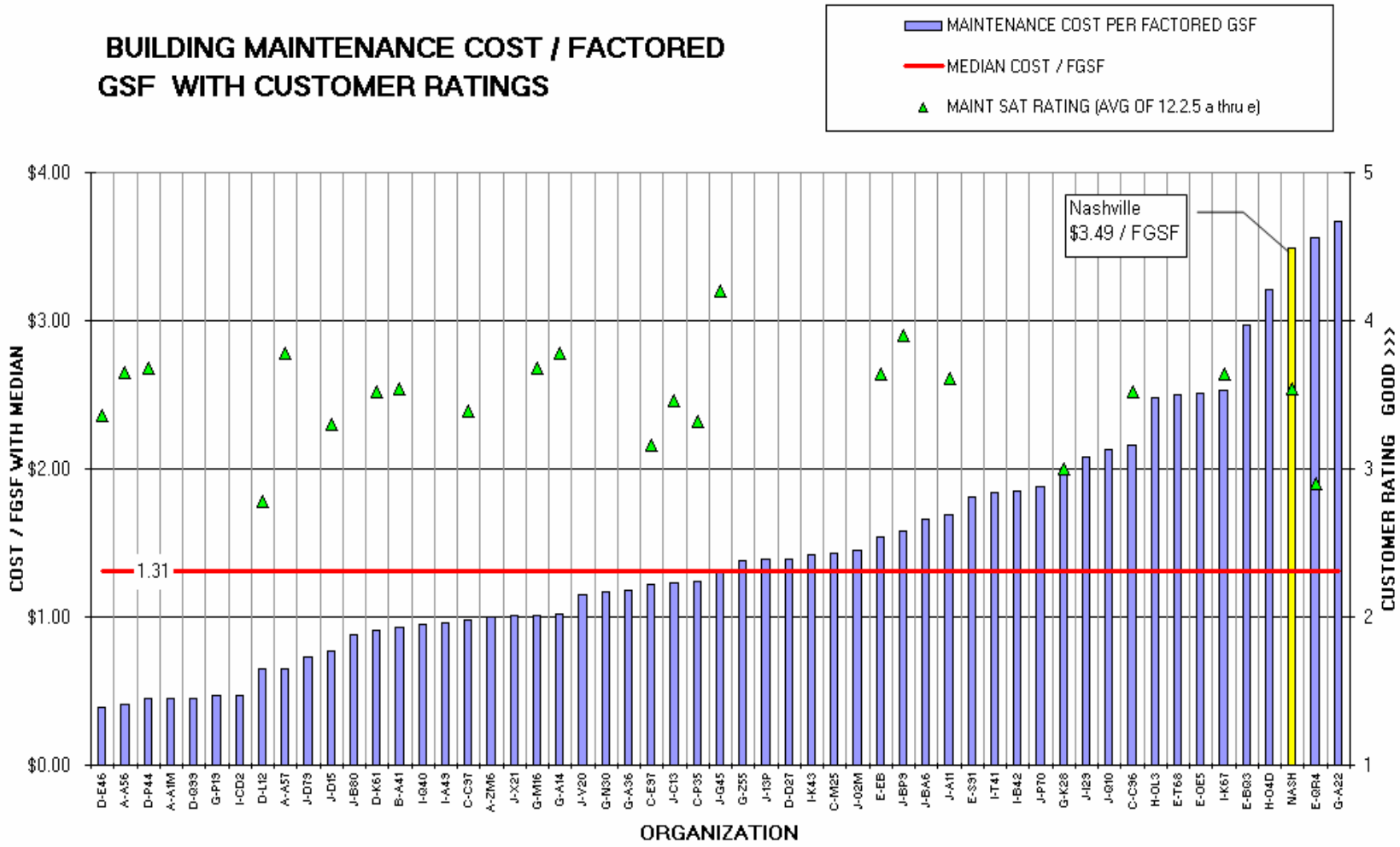
There is similarity between the number of activities performed and the hours

spent on each of the activities. The hours spent appears in the table below. Corrective and preventive maintenance accounted for 54% of the total work hours.



Management accounted for 15% of the activity time. Grounds and custodial activities accounted for 9% and 8% respectively of the recorded time. Supplies and shop activities each accounted for 6% of the recorded time. The least amount of time was spent on contractor reviews (2% of the time) and training (1% of the time).

Additionally, the project team collected data against which to benchmark Metro's performance. The charts, presented on the following pages, provide a comparison of Metro to building maintenance cost per factored gross square foot and the range of staff hours allocated to preventive maintenance and the resulting building maintenance costs.


BUILDING MAINTENANCE COST / FACTORED GSF WITH CUSTOMER RATINGS
MAINTENANCE COST PER FACTORED GSF
MEDIAN COST / FGSF
MAINT SAT RATING (AVG OF 12.2.5 a thru e)
Nashville
$3.49 / FGSF
1.31
$4.00
$3.00
$2.00
$1.00
$0.00
COST / FGSF WITH MEDIAN
5
4
3
2
1
CUSTOMER RATING GOOD >>>
D-E46 A-A56 D-P44 A-A1M D-B39 G-P19 I-CD2 D-L12 A-A57 J-D79 J-D15 J-B80 D-K61 B-A41 I-040 I-A49 C-C97 A-ZM6 J-X21 G-M16 G-A14 J-V20 G-N30 G-A36 C-E97 J-C13 C-P35 J-G45 G-255 J-13P D-D27 I-K43 C-M25 J-02M E-EB J-BP9 J-BA6 J-A11 E-S31 I-T41 I-B42 J-P10 G-K28 J-I23 J-010 C-C36 H-0L3 E-T68 E-0E5 I-K67 E-B03 H-04D NASH E-0R4 G-A22
ORGANIZATION

The points, below, present a brief discussion of the information contained in the charts on the previous pages.

- The project team collected comparative data from over fifty agencies. This data included costs for all building maintenance services provided by the benchmark agencies (e.g., corrective and preventive maintenance, internal and external contractual costs, etc.)

- The median building maintenance cost per factored gross square foot was $1.32, compared to $3.42 for Metro. Metro's building maintenance cost per factored gross square foot was 2.6 times higher than the median.

- The third chart presented the percentage of work attributed to preventive maintenance compared to the overall cost of maintenance services. High performing, lower costs organizations typically allocated between 65% and 85% of staff hours to preventive maintenance and 20% to 35% of staff hours to reactive maintenance. Based on a sampling of Metro for the Building Operations Support Services Division, Metro spends approximately 24% of staff hours were allocated to preventive maintenance activities. This is significantly lower than the normal allocation for high performing, low cost organizations.

Recommendation 7-4:

The Building Operations Support Services Division should establish a preventive maintenance program.

Implementation Strategies and Timeline

The Building Operations Support Services Division should identify the types of equipment that require preventive maintenance such as electrical systems, heating, ventilating and air conditioning systems, elevators, roofs, plumbing systems, fire protection systems, etc.	November 2006
Determine the maintenance activities necessary to maintain building systems	March 2007
Document the tasks that must be performed to preventively maintain these building systems ad develop checklists	March 2007
Develop and install a scheduling and performance system for preventive maintenance.	March 2007

Fiscal Impact

There are no additional costs of developing a preventive maintenance program.

5. COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM.

Automated work order systems are an indispensable aid to the efficient management of maintenance services. These systems enable maintenance organizations to not only mange individual pieces of work requested by tenants but also plan and schedule prevention and major maintenance work. An optimum system enables managers to collect comprehensive information about the activities of maintenance crews and identify ways in which work can be more efficiently managed.

In fact, two Metro departments have already acquired and installed commercial off-the-shelf computerized management systems. The Water Services Department is using an enterprise asset management system developed by Hansen. The Public Works Department is using an enterprise asset management system known as Cityworks that was developed by Azteca. Both of these systems are robust asset management information systems.

Finding

Five of the fourteen Metro maintenance organizations serving the Metro agencies have implemented either a commercial off-the-shelf computerized maintenance management system or systems based upon desktop software solutions. The sophistication and use of the systems varies widely across the organizations. These systems are briefly discussed below.

- The Public Works Department has an excellent work order management system that it developed for its core maintenance activities. The system, an Access database, tracks work order requests and the work done on the job, labor hours and labor costs and supplies used to complete the work. This system could be used to track both in-house and contracted building maintenance activities. However, like the system used by Water Services, it is only used to track work orders associated with the core activities of Public Works.

- The Building Operations Support Services Division has developed a web-based work order system that is used to gather and track customer service requests for maintenance work. This system uses a Microsoft Access database. This system is not being used to track preventive maintenance or corrective maintenance activities identified by the maintenance staff or work performed by contractors.

- The Parks and Recreation Department has developed a telephone-based system for gathering service requests from its maintenance customers. Information from the recorded messages are abstracted by maintenance supervisors and entered into a Microsoft Excel database for distribution to maintenance personnel. This system is not being used to track preventive maintenance or corrective maintenance by in-house staff or work performed by contractors.

- Metro Action Commission has developed a Microsoft Excel system on which staff are able to track request for service, employees performing tasks associated with the work orders, and number of hours spent on each work order.

The variety of the systems deployed by the agencies illustrates creative efforts to gather service requests from tenants and to use this information to manage the performance of maintenance activities. While the wok order systems development by the maintenance organizations has been commendable, there are a number of issues:

- Metro has not acquired a commercial-off-the-shelf computerized maintenance management system that serves all of the asset maintenance departments and eliminates redundant web and database development efforts.

- A comprehensive system that serves multiple needs by covering in-house maintenance (preventive inspections, preventive maintenance and corrective maintenance) as well as work done by contractors does not exist.

- Existing computerized maintenance management systems do not consistently gather detailed information about the work requested (Building, type of request, date) and work performed (Completion date) as well information about the resources (Crew size, labor hours and labor costs and supplies and materials) used to complete the work.

- Many of the computerized maintenance management systems do not contain a report writing capability that enable managers to analyze the performance of preventive and corrective maintenance and the use of time by maintenance crews.

Recommendation 7-5:

The Building Operations Support Services Division should acquire licenses for one of the two existing commercial-off-the-shelf (COTS) maintenance management system already in use in Metro – the Hansen or the Azteca Cityworks enterprise asset management information system.

Implementation Strategies and Timeline

The Building Operations Support Services Division should evaluate the two commercial-off-the-shelf systems already in use - Hansen or the Azteca Cityworks enterprise asset management information system – to assess which system would best meet its needs.	January 2007
The Building Operations Support Services Division should acquire the additional licenses necessary to support its activities.	March 2007
The Building Operations Support Services Division should contract for training from the software vendor for its staff in the use and application of the enterprise asset management information system	April 2007
The Building Operations Support Services Division should develop a training manual and a procedures manual for the use of the of the enterprise asset management information system.	April 2007

Fiscal Impact

The cost of additional licenses for the commercial-off-the-shelf computerized maintenance management system would approximate $50,000 depending on the vendor, number of licenses, level of support, and capability of the system. The cost for on-site training would approximate $1,750 per day, and an estimated three to five days training would be required or a total cost approximating $8,750. Initial technical assistance from the vendor for setting the system up and installing the system would cost approximately $5,000.

6. COMPREHENSIVE INVENTORY OF BUILDING ASSETS

The Governmental Accounting Standards Board Statement 34 requires state and local governments to begin reporting the value of their infrastructure assets. The accurate reporting of the value of these assets necessitates a comprehensive inventory

of assets. In addition, the American Public Works Association, in their Public Works Management Practices Manual, a guide to accreditation of public works departments, recommends the development of a comprehensive inventory including building assets.

Finding

During the past year, the Building Operations Support Services Division created a Microsoft Excel spreadsheet to collect information about the facilities for which it has maintenance responsibility. Division staff has been populating the database. It is one of the few Metro departments that have created a comprehensive facility asset inventory. The database contains sixty pieces of information about each building and is about 25% complete. The database focuses on information about how various services (grounds, custodial, fire inspection, trash) are provided to the building. The database does not capture an inventory of systems and assets (electrical, HVAC, mechanical, plumbing).

There are a number of reasons why this asset information is important in the cost-effective life cycle management of building assets.

- **A comprehensive asset inventory will provide better information for Metro Nashville to make informed resource allocation decisions**. Metro, with a comprehensive asset inventory for its building assets, can make sounder decisions regarding how tax dollars should be used, particularly as it concerns funding for renewal and rehabilitation of existing building assets versus the construction of new assets.

- **Metro's building assets are not being preventively maintained**. As noted previously, high performing, lower costs organizations typically allocate between 65% and 85% of staff hours to preventive maintenance and 20% to 35% of staff hours to reactive maintenance. Based on a sampling of Metro for the Building Operations Support Services Division, Metro spends approximately 24% of staff hours were allocated to preventive maintenance activities. This is significantly lower than the normal allocation for high performing, low cost organizations. The impact of this lack of preventive maintenance is evident in the costs of building maintenance and operations. The median building maintenance cost per factored gross square foot for peer agencies included in the survey was $1.32,

compared to $3.42 for Metro. Metro's building maintenance cost per factored gross square foot was 2.6 times higher than the median.

- **Governmental accounting standards are requiring enhanced and more consistent inventory information**. GASB 34 is a relatively new action that requires enhanced and more consistent information on infrastructure assets than has been required in the past. Local governments require better asset inventory data to meet these standards. The Department is in compliance with GASB 34, but more comprehensive asset information would enable the Department to more accurately depict the value of these assets.

- **Computerized maintenance management systems rely on comprehensive asset inventory data**. With the technological advances in recent years, tools are now available to create an effective asset management system. These systems no longer require large investments of resources or a lengthy education process. These tools can be made accessible to nearly all employees and the public. Automating the once manual system of managing assets does more than increase speed and efficiency of the process; it also ensures that the maintenance and repair of these assets are more effectively managed.

Recommendation 7-6:

The Building Operations Support Services Division should conduct an asset inventory of all building systems and components.

Implementation Strategies and Timeframe

The General Services Division Manager should develop a schedule and plan for collecting all the necessary data including a data collection instrument.	December 2006
Responsibility for coordinating the data collection activities should be allocated to the Building Maintenance for each zone.	December 2006
The Building Operations Support Services Division should conduct training of its staff on how to collect building system and component data	December 2006
The Building Operations Support Services Division should conduct a pilot test in each zone to assure that the staff of the Division understand the data collection plan and accurately collect the data.	February 2007
The Building Maintenance for each zone should complete the collection of building systems and components over a twelve-month period.	February 2008

Fiscal Impact

The significant impact will be on the utilization and allocation of staff resources of the Building Operations Support Services Division to collect his data. The Division should conduct a pilot program (i.e., collect the data from one zone) and determine the estimated impact and staff time. This should be evaluated to determine if contracting out for collection of data would be more cost effective.

7. PERIODIC ONGOING CONDITION ASSESSMENTS.

The American Public Works Association, in their Public Works Management Practices Manual, a guide to accreditation of public works departments, recommends the condition assessment of assets on an ongoing basis. The lack of ongoing condition assessments limits the Department's ability to identify major deficiencies early when timely repairs will be much less costly and risks to the public are less.

Findings

The Building Operations Support Services Division has created a Microsoft Excel spreadsheet about the facilities for which it is responsible for maintaining. While this database presents information about how services are provided in each facility, it does not provide up-to-date information about a facility's assets or information about the condition of these assets. The Division does not conduct ongoing condition assessments of buildings to identify deferred building renovation and rehabilitation that should be addressed through capital improvement projects.

The Real Property Services Division has conducted condition assessments of some of the Metro building portfolio such as fire stations.

Recommendation 7-7:

The Building Operations Support Services Division should conduct condition assessments of Metro's facilities on a five to seven year cycle to identify the backlog of renovation and rehabilitation requirements and deficient conditions.

Information collected during periodic condition assessments are utilized:

- To calculate the costs for renovation and rehabilitation projects, utilizing R.S. Means Corporation's published construction and remodeling cost estimating data and format.
- To rank and prioritize all renovation and rehabilitation projects by severity and anticipated life cycle.
- To create and updated a database for maintaining project data, modeling existing data to determine future funding requirements, and monitor ongoing code compliance/plant adaptation issues.

Condition assessments are needed to identify the various types of backlog maintenance projects for Metro buildings and estimate the amount of funding needed on an ongoing basis to improve the life safety aspects of the building, reduce further deterioration of the building components, comply with current building and safety codes and ensure that the buildings operate as designed, both structurally and mechanically.

Implementation Strategies and Timeline

The Building Operations Support Services Division should conduct facility condition assessments of Metro facilities. On a five to seven year cycle	Beginning April 2007
The general Services Division Manager for the Building Operations Support Services Division should be responsible for developing a facility condition assessment plan that would include a data collection template and schedule.	January 2007
Zone supervisors should be responsible for implementing the plan in their zones.	Beginning April 2007

Fiscal Impacts

There are no significant additional costs associated with the development and implementation of the facility condition assessment, except for the impact on the

allocation of staff hours (and therefore the diversion of staff while conducting the facility conditions assessment).

8. ENERGY MANAGEMENT PROGRAM.

Effective energy management ensures that energy use and energy costs are kept as low as possible while standards of comfort and service are maintained or improved. Energy cost savings also provide a source of funds for investment in further energy efficiency opportunities or in Metro programs. This is not insignificant: utility costs typically comprise 32% of total building maintenance costs.

Findings

Benchmarks for energy management indicate that Metro has not developed an effective energy management plan. The charts, on the three pages that follow, clearly indicate that Metro buildings are inefficient in energy consumption compared to its peers.

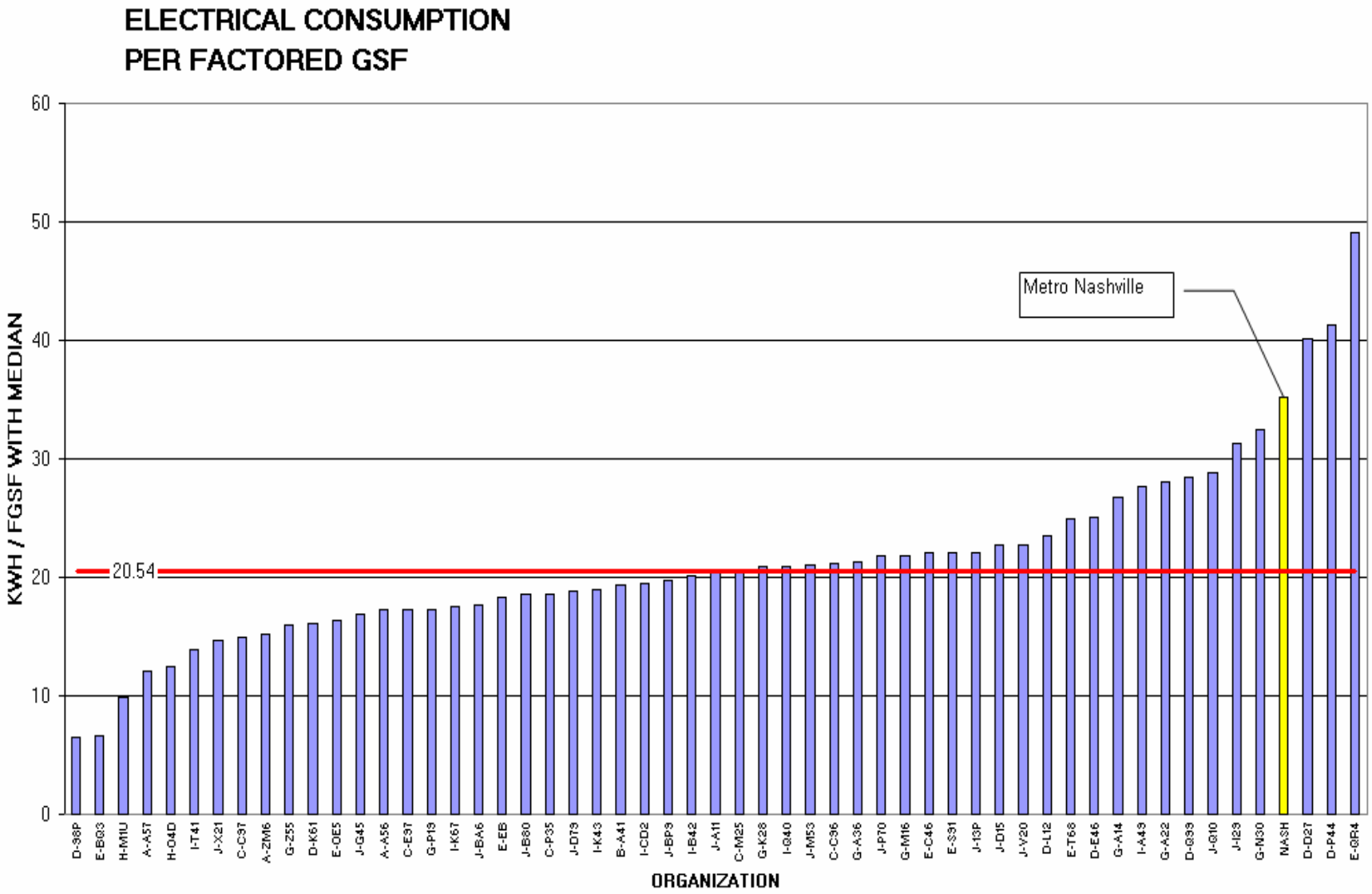
The points, which follow, provide a discussion of these charts.

- The first chart indicates that the electrical consumption per kilowatt hour per factored square foot is 70% higher for Metro than the median. Metro buildings require approximately 35-kilowatt hours per factored gross square foot versus 20.5-kilowatt hours for the median.

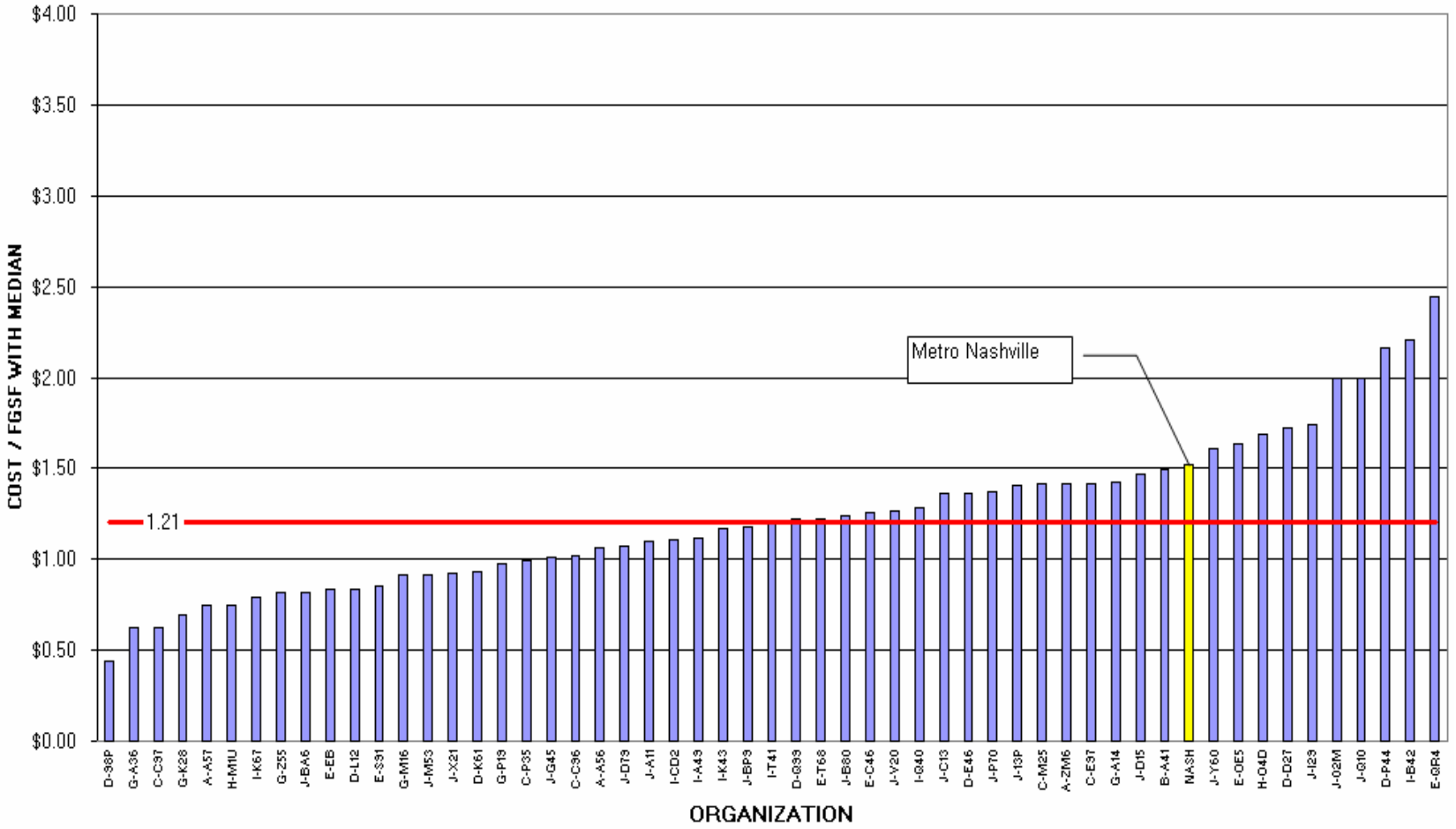
- Electrical cost per factored gross square foot in Metro is slightly higher than the median. Metro's electrical cost per factored gross square foot is $1.51 compared to the median of $1.21.

- In Metro, the total utility cost per factored gross square foot, is approximately $2.25 compared to the median of $1.56.

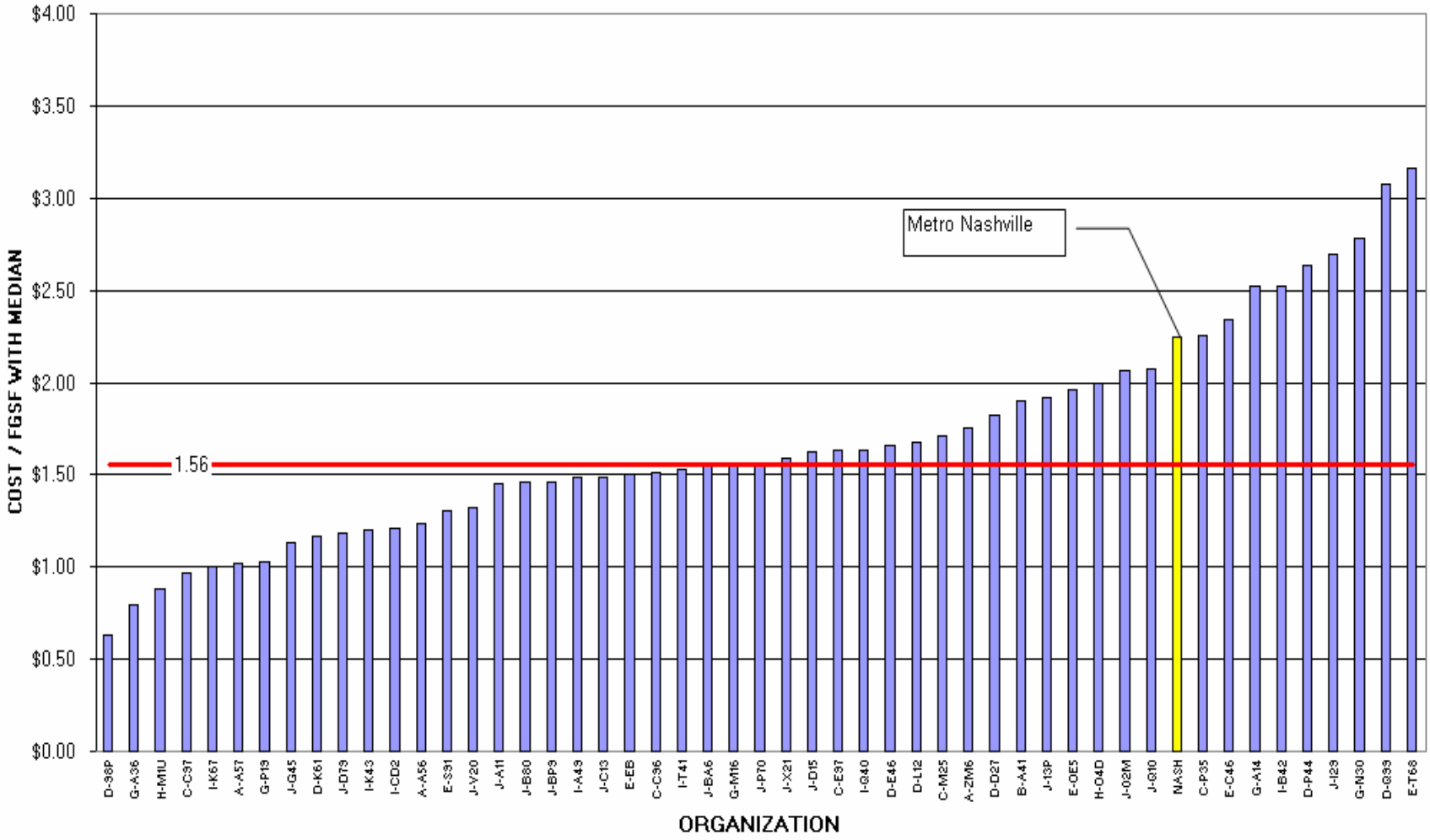
Overall, Metro's energy consumption is much higher than the median of the benchmarked agencies. This is not insignificant: utility costs typically comprise 32% of total building maintenance costs.


ELECTRICAL CONSUMPTION
PER FACTORED GSF
KWH / FGSF WITH MEDIAN
60
50
40
30
20
10
0
20.54
Metro Nashville
D-38P
E-B03
H-M1U
A-A57
H-O4D
I-T41
J-X21
C-C97
A-ZM6
G-Z55
D-K61
E-OE5
J-G45
A-A56
C-E97
G-P19
I-K67
J-BA6
E-EB
J-B80
C-P35
J-D79
I-K43
B-A41
I-CD2
J-BP9
I-B42
J-A11
C-M25
G-K28
I-040
J-M53
C-C96
G-A36
J-P70
G-M16
E-C46
E-331
J-I3P
J-D15
J-V20
D-L12
E-T68
D-E46
G-A14
I-A49
G-A22
D-039
J-010
J-I23
G-M30
NASH
D-D27
D-P44
E-0R4
ORGANIZATION

ELECTRICAL COST PER FACTORED GSF



TOTAL UTILITY COST PER FACTORED GSF



Recommendation 7-8:

Metro should authorize an Energy Manager position for the Building Operations Support Services Division. The Building Operations Support Services Division should develop and implement a Metro-wide energy management program.

The points, which follow, present the key elements that should be included in an energy management program.

- The Building Operations Support Services Division should develop and implement energy management goals and objectives. This should include the overall goals and objectives of the energy management program, such as eliminating inefficient energy usage, developing cost effective alternatives, promoting renewal energy resources, etc.

- The Building Operations Support Services Division should develop and implement energy management performance measures. This should include benchmark to document and measure the performance of the energy management program, such as cost of project, facility energy consumption, and energy costs, etc.

- The Building Operations Support Services Division should develop and implement an energy management plan. This should include energy initiatives to improve the efficiency of systems and equipment that use energy, reduce energy consumption and costs. Such program can include conversion to energy efficient lighting, automatic controls (e.g. sensors and timers), etc. This should also include providing staff state-of-the art diagnostic tools for predictive maintenance.

- Metro should authorize an Energy Manager position in fiscal year 2006-07. Key responsibilities of the position should include the following:

  – Develop program goals and objectives for Metro's Energy Management Program.

  – Receives, evaluates and processes data related to facility energy consumption and costs.

  – Assembles and reports energy management program goals and accomplishments.

  – Develops priority listing of replacement and / or retrofits projects.

  – Monitors energy costs at Metro buildings.

- Populate the "Energy Use Database" to tracks usage patterns for electric and natural gas use, graphs, and assigns costs to accounts, addresses and sites and analyzes utility bills and approves payments, after comparing to last 30-90-365 day usage.

- Manages energy retrofits and capital projects, including audits of Metro buildings for energy usage, developing energy initiatives to reduce energy consumption, receiving bids and managing the work performed, determining the feasibility of cost savings and performing payback analyses.

- Assists in resolving meter accessibility issues.

- Responsible for the overall management and direction of Metro's energy management program, including analyzing utility rate structures, performing life cycle costs analysis and feasibility studies, reviewing new construction designs and procuring energy commodities.

This position should report to the Assistant Director for General Services.

Implementation Strategies and Timeline

Metro should authorize an Energy Manager position.	July 2006
The Energy Manager should develop an energy management plan for consideration during the fiscal 2007-08 budget.	January 2007

Fiscal Impact

The annual salary and fringe benefit costs for the Energy Manager position would approximate $100,700 at the control point.

9. INTERNAL SERVICE FUND.

Internal service funds are established to account for any activity that provides goods or services to other funds, departments, or agencies of the primary government and its component units, or to other governments, on a cost-reimbursement basis. An internal service fund should be used only when the reporting government is the predominant participant in the activity. Otherwise, the activity should be reported as an enterprise fund.

Finding

Metro does not use an internal service fund and charge-back system to support the Building Operations Support Services Division. Buildings and grounds maintenance services are simply a line item in Metro's budget.

The concept of internal charge-back in facility projects is used as a Metro funding mechanism for internal services. Real Property Services uses a project cost system to fund its costs for managing design and construction projects. The amount charged to manage a project is related to total design and construction cost of the project. This amount is charged back to the organizational unit that will benefit from the project.

Recommendation 7-9:

The Building Operations Support Services Division should be established as an internal service fund.

Internal service funds and associated charge-backs are particularly appropriate financial mechanism for funding central service organizations that support multiple departments. The underlying principle of internal service funding for buildings and grounds maintenance is based on commercial real estate practices in which landlords agree to provide services to tenants and then recoup their costs by collecting rent as stipulated in a lease agreement. For most public sector buildings and grounds maintenance organizations, the closest equivalent to rent is a rate per square foot charged to internal tenants for occupied space.

The benefits of a charge-back system for buildings and grounds maintenance are listed below.

- Charge-back systems improve the consumption and provision of facility resources by:

– Creating a direct link between the behavior of facility users and the need for facility maintenance, on the one hand, and the costs for providing services and materials in a building, on the other hand. Facility users behave more cost effectively and treat their facilities with better care when they know that they have to pay for maintenance services directly.

– Encouraging facility users to hold operations and maintenance organization accountable for the quality, timeliness, and cost of the goods and services provided. Studies have consistently found that this accountability has a more profound impact on the cost-effectiveness of facility management than any other process improvement. Facility users demand cost effective, quality services from maintenance providers for when they have to pay for these services rather than receive them 'free'.

- Charge back systems promote equitable treatment of facility users because a facility user pays only for the resources (personnel, materials) used in the fulfillment of a work order. Charge-back systems eliminate the cross-subsidization of facility costs.

- Charge-back systems improve the timely completion of facility work orders.

- Charge-back systems allows for the amortization of facility capital costs over a several year period thus making it easier to accommodate peaks and valleys in asset replacement spending requirements.

Most buildings and grounds maintenance charge-back systems are organized around four types of service. This breakdown is presented below.

- Operating Costs Associated with the Space. Many facility departments charge a single rate for all user departments that is based on a square foot charge for services. There are exceptions and add-ons to the basic square foot fee. For example, there may be additional fees for high use and 24-hour facilities as well as for jails and hospitals that generally require a higher level of service and care. Parking garages and lightly occupied facilities may be charged a lower fee. Commercial practice operates much the same way, but surcharges are levied for anything other than normal business day/week operations. Space-associated operating costs typically include the following:

  – Energy

  – Utilities

  – Facility operation and maintenance

- Ongoing Services Rendered. setting a baseline standard of care and associated costs is very important because some departments may consistently require heavier service (i.e., jails, hospitals, nursing homes, 24-hour facilities). Maintenance departments need a good database of work order demands to adequately budget for and equitably charge-back fees for various types of facilities. Examples of ongoing service charges include:

  – Prevention inspection

  – Preventive maintenance

  – Corrective maintenance

  – Security service

  – Landscaping maintenance

  – Housekeeping service

  – Utility service

- Other Facility-Related, One-Time Costs. Expenses associated with rearranging facilities to support a change in the basic operation of the user department constitute a facility-related, one-time cost. Such costs are in contrast to ongoing services, which maintain the status quo. In most jurisdictions, one-time costs are usually tracked by work orders for specific jobs. The Interior Design Division of Real Property Services provides most of the services listed below. Interior Design does not have a charge-back system in place to recoup the costs for these services.

  – Office and facility moves

  – Furniture rearrangement

  – Interior space design

  – Above-building-standard alterations to prepare the space for occupancy including remodeling for an incumbent occupant.

  – Extra design service for above-standard alternations (i.e., architectural detailing, millwork shop drawings, installation drawings, and specification of systems furniture)

  - Master planning, master space programming, and development of space standards.

- Ancillary Services Provided by Facilities Departments. Many facilities departments experience demand for a wide range of odds and ends that consume substantial time and resources. These services are very commonly provided by municipal facility department but are almost never provided by commercial landlords for their tenants. If they are provided, extra charges are levied.

Public sector buildings and grounds maintenance organizations typically charge customer departments a fully burdened cost per square foot for service. The charge back is simply calculated by diving total service costs (direct and indirect) for the maintenance organization by the total number of square feet being maintained. Public sector buildings and grounds maintenance organizations with robust work order information systems that include labor and materials data are able to more accurately charge costs back to the agencies they serve. In other words, cost per square foot data is broken out by general facility type, such as general office space, clinical space, jails and detention centers, etc. This enables the buildings and grounds maintenance divisions and the user department to better understand the cost of maintaining different types space that can be used to prepare more accurate budget requests that better reflects the actual cost to provide maintenance services.

Implementation Strategies and Timeline

The Assistant Director for General Services should work with the Finance Department to develop a proposed approach to establishing the Building Operations Support Services Division as an internal service fund.	December 2006
The Finance Department should implement the internal service fund for buildings and grounds maintenance for fiscal year 2007-08.	July 2007

Fiscal Impact

The implementation of this recommendation should be expenditure neutral.

10. SERVICE LEVEL AGREEMENTS

A key component of successful customer service is the development of service level agreements. These agreements are essential to both the customer and the Building Operations Support Services Division because they spell out the type and level of service required as well as any performance related penalties or incentives. A clear understanding of what is required helps ensure that both the customer and the Division are satisfied and that the Division's customers are well served.

Finding

The Building Operations Support Services Division has not developed and adopted service agreements with its customers.

Recommendation 7-10:

The Building Operations Support Services Division should develop service level agreements with its major customers.

The purpose of service level agreements is to define the responsibilities for doing business with its customers. These service agreements document:

- The services to be provided;
- The funding resources required for acquisitions, maintenance, and repair;
- The terms and conditions under which the customer and BOSS will operate in order to properly support each Metro agencies facility needs and operations.
- The standard business practices including how compliance with the service agreement will be measured, problem (trouble) reporting protocol, how to request services, emergency service priorities, services provided after hours, etc.
- The services provided and not provided.
- The dispute resolution process.

The service level agreements will enhance communication among the Building Operations Support Services Division and its customers, as well as present service level expectations and costs associated with the level of service provided. A sample service level agreement is provided in the second exhibit following this chapter.

Implementation Strategies and Timeline

The Assistant Director for General Services should develop a model service level agreement	July 2006
The model service level agreement should be shared with the twelve departments whose buildings and grounds maintenance, custodial maintenance, and security services staff will be consolidated within the Building Operations Support Services Division.	August 2006
The Assistant Director for General Services should meet with the managers of these twelve departments, discuss the model service level agreement, and modify the agreement as appropriate.	October 2006.

Fiscal Impact

There are no significant fiscal impacts associated with this recommendation.

11. USE OF POSITIONS ALLOCATED TO THE BUILDING OPERATIONS SUPPORT SERVICES DIVISION

The Building Operations Support Services Division will be assuming responsibility for the maintenance of a number of new facilities. These include the following:

- Metro South East – 454,000 square feet – came on line in approximately December 2005;
- Metro Office Building – 68,962 square feet – came on line in approximately March 2006;
- A.A. Burch – 215,954 square feet – will come on line on approximately May 2006; and
- Metro Historic Courthouse – 232,615 square feet – will come on line in approximately August 2006.

This amounts to 971,531 square feet of office space that has recently come on line or will shortly be coming on line. The addition of this square footage should require the addition of sixteen (16) additional building maintenance staff - electricians, plumbers, building maintenance mechanics, etc. in addition to services and supplies.

Finding

Prior to the addition of staff for the additional square footage, the Building Operations Support Services Division should assess the allocation of its staff to determine whether opportunities exist to enhance the efficient and effective use of these staff. The review by the project team indicates there are a number of opportunities. These opportunities are presented below.

- **Two Building Maintenance Mechanics are utilized for grounds maintenance**. These two Building Maintenance Mechanic positions are part of a three-person crew: the third position is a Building Maintenance Worker. The Building Maintenance Mechanic classification is a skilled classification comparable to electrician or plumber. The Building Operations Support Services Division does not utilize the approach used by the Library Department. This department uses inmate labor for grounds maintenance supervised by an Equipment Operator I.

- **A Compliance Inspector 3 is assigned to supply and inventory control**. This is a long-term employee who was originally classified as a Building and Grounds Lead Electrician. The incumbent is now responsible for supplies and inventory control of warehouse and may do occasional building maintenance.

- **A Technician Specialist 1 position is assigned to special projects.** This position is assigned to specials projects. The position led the Division's effort to upgrade the life safety and fire inspections process, consolidate electrical bills, and works on the building intelligence report.

- **A Compliance Inspector 3 position is assigned to information technology**. This position is responsible for information technology including the building intelligence report, the web based work order system, and complaints. The position does not do field inspections for contract compliance.

- **A Technical Specialist 1 is assigned as the lead for janitorial services**. This

position functions as the lead for janitorial services, works special projects as needed, and compiled the square footage and acreage data for the business intelligence report. The position supervises five positions. With the proposed transfer of 96.94 custodial positions and the allocation of additional responsibilities for management of custodial contracts, the project team previously proposed the establishment of a Custodial Services Manager.

Recommendation 7-11:

The Building Operations Support Services Division should reallocate some of its positions to enhance the effectiveness and efficiency of its services and enhance its ability to manage the maintenance of the additional office space that has recently come on line or will shortly be coming on line.

- **The two Building Maintenance Mechanic positions assigned to grounds maintenance should be reassigned to building maintenance – the maintenance and repair of heating, ventilating and air conditioning systems – and the Building Maintenance Worker should be utilized to supervise inmate labor to maintain grounds for those buildings presently maintained by the Building Operations Support Services Division. The Building Operations Support Services Division should utilize the same approach as the Library Department for grounds maintenance. That department uses inmate labor for grounds maintenance supervised by an Equipment Operator I.**

- **The Compliance Inspector 3 assigned to supply and inventory control should be reclassified to Electrician and assigned to the maintenance and repair of electrical systems. With the proposed decentralization of the staff of the Building Operations Support Services Division from one facility to four facilities, the Division should transition to procurement cards and decentralized supply storage controlled by the Building Maintenance Supervisors.**

- **The Technical Specialist 1 assigned to special projects should be reclassified as an Electrician and assigned to the maintenance and repair of electrical systems.**

Implementation Strategies and Timeline

The Assistant Director for General Services should work with the Sheriff's Office to enable utilization of inmate labor for grounds maintenance and develop a formal written agreement regarding the use of inmate labor.	November 2006
The Sheriff's Office should provide training to the Building Maintenance Worker in the supervision of inmate labor.	January 2007

The Building Operations Support Services Division should begin using inmate labor for grounds maintenance.	April 2007.
The two Building Maintenance Mechanic positions assigned to grounds maintenance should be reassigned to building maintenance – the maintenance and repair of heating, ventilating and air conditioning systems	April 2007
The Technical Specialist 1 assigned to special projects should be reclassified as an Electrician and assigned to the maintenance and repair of electrical systems.	November 2006

Fiscal Impact

There implementation of these recommendations would reduce salary and benefit costs by $73,400 annually.

Exhibit 18 (1)

Positions to be Transferred to the Building Operations Support Services Division

Department	Building Maintenance Class Title	Number of Positions
Farmers Market	Maintenance and Repair Worker 2	1
	Maintenance and Repair Worker 1	2
Fire Department	Fire Maintenance Supervisor	1
	Fire Maintenance Worker 2	2
	Fire Maintenance Worker 1	4
Public Health	Building Superintendent	1
	General Maintenance Technician	4
Convention Center	Convention Center Lead Maintenance Mechanic	**3**
Municipal Auditorium	Building Maintenance Mechanic	**2**
	Building Maintenance Worker	1
Public Library	Building Maintenance Superintendent	1
	Building Maintenance Supervisor	1
	Industrial Electrician	1
	Building Maintenance Worker	2
	Building Maintenance Mechanic	**1**
Parks and Recreation	Maintenance and Repair District Supervisor	2
	Maintenance and Repair Supervisor	2
	Carpenter 1 & 2	5
	Building Maintenance Lead Mechanic	**2**
	Buildings and Grounds Electrician	3
	Plumber	3
	Painter 1	1
	Maintenance and Repair Worker 1, 2 & 3	8
	Masonry Worker	3
State Fair	Maintenance and Repair Worker 1, 2 & 3	4
Metro Action Commission	Facilities Manager	1
	Building Maintenance Supervisor	1
	General Maintenance Worker	3
Water Services		
Police	Building Maintenance Leader	4
	Building Maintenance Mechanic	**1**
	Building Maintenance Worker	1
Public Works	Maintenance and Repair Worker 1	1
Total Building Maintenance Positions		**72**

Exhibit 18 (2)

Department	Custodial Maintenance Class Title	Number of Positions
Public Health	Custodial Supervisor	1
	Custodial Worker 1 & 2	10
Public Library	Custodial Supervisor	2
	Custodian	23
Parks and Recreation	Building Maintenance Superintendent	1
	Custodial Assistant Services Supervisor	4
	Custodian 1	38.94
Metro Action Commission	Custodian Leader	1
	Custodian 1	13
Water Services	Custodian 2	3
Total Custodial Positions		**96.94**
Parks and Recreation	Office Support Rep 2 & 3	2
Total Clerical Positions		**2**

Exhibit 19 (1)

Service Level Agreement Between Building Operations Support Services Division And A Customer

INTRODUCTION

Building Operations Support Services Division (BOSS) understands that our customer occupants must reduce their operating costs in order to provide efficient services for _____. To that end, BOSS is committed to provide to lowest evaluated cost "facility management services" for its customers.

In order to accomplish the necessary facility cost reductions, the levels of service in which our customers have become accustomed will be aligned with general industry practices. BOSS will continue to provide a high level of service in areas where asset (building) preservation, life safety, and regulatory compliance are required. These costs will not be negotiable and be considered base service level agreement costs that all customers will pay for through a square foot charge.

In order to meet specific Department needs, a collaborative effort will be used to determine the maintenance, repair services and response time that are agreeable on non-critical assets. Each of these elements shall be modified or eliminated to reduce costs. Depending on the agreement, the customer may choose to manage a portion of the service themselves, in which case BOSS will adjust their charges for future expenditures to the customer.

Services which are required by BOSS such as department relocations, building modernizations, and capital improvements for Corporate purposes, will not be directly charged to its customers. However, these same services if requested by the customers and not required by BOSS, shall be paid for by the customer.

This Agreement provides a detailed description of Base and Additional Services which can be provided by BOSS. Each customer should review this document and become thoroughly familiar with the descriptions and costs for those services which are required or selected. The document will be a binding Owner/Tenant contract which will govern how BOSS and its customers will interact. It should be noted that this is intended to model the same type of commercial cost relationship that client occupants have in leased non-owned facilities.

This agreement shall be made with the Senior Executive for each major function.

Exhibit 19 (2)

GENERAL CONDITIONS
(This section describes the general conditions and requirements of the Service Level Agreement. It contains items that are common to all services and would typically be found in most owner tenant agreements.)

1.1 BOSS shall not place or cause to be placed any material or equipment, etc., at any location that would impede or impair the customer's access to or from the facility.

1.2 BOSS shall not interrupt the customer's operation at any time unless prior written approval is received from the customer.

1.3 The Customer shall not avail themselves to any of BOSS equipment or materials without BOSS approval.

1.4 The Customer shall schedule their work in accordance with the agreed to building and air conditioning schedules. The Customer shall notify BOSS of any circumstances that would require a change in the systems operations schedule and will charged accordingly to the using department .

1.5 BOSS shall re-lock all doors upon leaving.

1.6 BOSS shall dispose of all hazardous materials and provide services in accordance with Federal, State, County, and City statutes, rules and regulations, Department of Transportation, Environmental Protection Agency, and OSHA requirements.

1.7 Additional Services beyond this contract shall be provided by BOSS unless agreed to in writing prior to services being provided.

1.8 BOSS shall provide trained qualified personnel to perform the duties required in accordance with this agreement.

1.9 The financial responsibility for damage to _____ property shall be that of the party and charged to the department that caused the damage.

1.10 BOSS shall provide pagers for contact persons and supervisors. All supervisors shall be available by pager / mobile phone.

1.11 BOSS shall provide a list of its employees that will provide services on a daily basis.

Exhibit 19 (3)

1.12 All services provided by BOSS shall be in compliance with _____ Employee Safety Hand Book.

1.13 The existing condition of the property shall be documented and shall be expected to be kept in that same condition for the duration of this agreement.

1.14 BOSS shall control noise and dust resulting from performance of their services. Noise shall not exceed 60db during working hours.

1.15 BOSS shall coordinate all work to minimize interference's between trades and to maximize efficient service levels.

1.16 All workmanship shall conform to the methods and operations required by standards and accepted practices of the trade or trade involved.

SPECIFIC CONDITIONS
(This section explains the level of service that the customer can expect. It also breaks out "Base Services" from "Additional Services". All items noted in this section are noted in brief form on the Service Level Matrix in the next section.)

2.1 ***Base Service*** – Buildings and Grounds Maintenance Services are primarily focused on maintenance and preservation of _____ assets. These services are paid for and provided by BOSS if the service is one that repairs to retain an existing condition and does not provide a significant betterment to the property. These specific services are explained as follows:

2.1.1 Appliance Repair/Service-Maintenance and repair shall be provided for the cafeteria and break room related equipment such as ovens, refrigerator, ice machines and appliances.

2.1.2 Back Flow Prevention Devices- Periodic inspections and repair shall be provided for compliance with city codes.

2.1.3 Building Inspections - Inspections of the Facility shall be provided semi-annually and be used to help prevent major critical items from failure.

2.1.4 Building Life Safety Systems-All fire systems are maintained per the Life Safety Code.

Exhibit 19 (4)

2.1.5 Building Repairs/Service Response- 2 hour response time shall be provided for emergencies, a critical maintenance item shall have a 48 hour response time, and non- critical requested maintenance shall be completed based on a mutually agreed to response time.

2.1.6 Carpet Cleaning- The carpet shall be vacuumed a minimum of weekly and deep cleaned a minimum of annually.

2.1.7 Change Air Filters-The Air Filters are changed out on a set schedule for all buildings at a 1 month to 3 month interval unless special conditions warrant otherwise.

2.1.8 Concrete Repair Services-Repair shall be provided on concrete cracks due to weather, or remodels.

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2.1.9 Electric Power/HVAC/Lighting-Maintenance & repair shall be provided on all critical equipment such as electrical switch gear panels, transformers, motors, controls, chillers, ac units, cooling tower, fans, heating equipment, lighting controls, ballast, and lamps.

2.1.1 Elevators- Maintenance shall be provided on all elevators in compliance with City and State codes.

2.1.11 Environmental Compliance- Maintenance shall be provided to comply with environmental regulations as they relate to outside and inside air.

2.1.12 General Building Repairs- General repairs to keep the facilities presentable on floor surfaces, wall surfaces, ceiling and work space surfaces shall be provided by BOSS.

2.1.13 Landscaping-Exterior Landscaping shall be kept presentable.

2.1.14 Lot Sweeping- Exterior lot sweeping of parking lot shall be provided twice a year.

2.1.15 Maintain Building Air Temperature- the Building temperature shall be monitored each day and adjusted if it is out of the temperature range of 72-78°. *Requests to alter the temperature, when within the temperature range, shall be considered as additional services and billed accordingly.*

2.1.16 Maintain Building UPS-The UPS system is serviced on a semi-annual basis.

2.1.17 Maintain Generators-The generator shall be tested and serviced every 60 days.

Exhibit 19 (5)

2.1.18 Maintain Lights-BOSS shall change out defective lights on a negotiated schedule. If a ballast replacement is required, the customer shall be notified as the ballast change out shall occur on a scheduled basis. Safety related light change outs shall be considered an emergency and done within 2 hours of a request.

2.1.19 Roof -Roof maintenance shall be provided based on a five-year plan. It is reviewed annually and the five-year plan updated accordingly.

2.1.20 Repair/Service Hot/Cold Water Systems-Preventable maintenance shall be provided on these systems annually.

2.1.21 Repair/Service Restroom Fixtures-Repair and maintenance of traps, auto flushers, and Sloan valves shall be done annually.

2.1.22 Repair/Service Sewer Systems-Repair and maintenance of the sewer system shall be done annually.

2.1.23 Site Maintenance Repair-All site damage due to weather shall be repaired and maintained by BOSS.

2.2 ***Base Service*** - Facility Client Services provide the customer with the everyday tenant services. These services are where BOSS and the customer can collaborate and have the most opportunities to save _____ and their own department's money. These service levels typically can be altered and shifted upon mutual agreement. These specific services are explained as follows:

2.2.1 Conference Room Set ups- A standard conference room arrangement shall be provided only. *Customized conference room set ups shall be considered an additional service.* The existing conference room equipment shall be maintained.

2.2.2 Copiers- BOSS shall provide contract administration for copy machines and supplies. *Copier service will be maintained at an industry standard level of service. If cost cutting measures on this service are required, BOSS will initiate a collaborative effort with the customer.*

2.2.3 Custodial-BOSS shall provide service that protects assets and allows for a presentable environment. *Custodial Services beyond what has been mentioned shall be considered as additional services.*

Exhibit 19 (6)

2.2.4 Ergonomic Evaluations-BOSS shall evaluate new employees once, and the customer shall maintain their records of the findings should they move again. *Any additional ergonomic evaluations shall be considered as additional services.*

2.2.5 Furniture Modifications- BOSS shall perform furniture modifications on a funded basis only. *This means that if this is required by BOSS, BOSS will provide the funding. If the modifications are required by the department, the funding shall be provided by the department. Regardless of who pays for the modification, BOSS shall retain the accountability of asset protection for_____.*

2.2.6 Furniture Repairs- BOSS shall maintain existing furniture in a usable / safe condition. *Requests by the customers that exceed this shall be considered as "additional services".*

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2.2.7 Ice Services-BOSS shall provide the contract administration for ice. *Ice services will be maintained at an industry standard level of service. If cost cutting measures on this service are required, BOSS will initiate a collaborative effort with the customer.*

2.2.8 Move Services-BOSS shall provide employee office move relocation services when required by BOSS. *If the Department wishes to move, BOSS can provide the services but the move will be considered as an additional service. Regardless of who pays for the move or makes the move, BOSS shall retain the accountability of asset protection for_____.*

2.2.9 Pest Control- BOSS shall provide regularly scheduled pest control. *Additional requests for services shall be considered as "additional services".*

2.3 ***Additional Services*** - Facility Development Services are available to customers upon request and are considered as additional services. They include engineering, design, planning, and project management and construction services. These specific services are explained as follows:

2.3.1 As-built services shall be provided in critical areas necessary to keep facilities safe and efficient in accordance with BOSS standards.

2.3.2 Contract Management services shall be provided on all BOSS work. The Management and responsibilities shall be based on written specifications. Generally these contracts shall be based on developing long term reliable services / relationships.

Exhibit 19 (7)

2.3.3 Cost estimating / tracking services shall be provided all for BOSS work. Projects shall be estimated based on a full service basis. This includes planning, design, specifications, and bid, construction and inspection services. Projects shall be tracked to comply with costs and schedules.

2.3.4 Engineering and Design services shall be provided for BOSS required services. Customers may request design services but this will be considered as additional services beyond this base agreement.

2.3.5 New equipment support - When new equipment is ordered by the customer, it typically needs to be reviewed, designed and constructed to be accommodated into _____ Facilities. This additional service shall be provided upon request and at the expense of the customer.

2.3.6 Requested Betterment and Tenant Improvement - Design/Project Management services shall be provided at no cost to the customer if the work is required by BOSS. All work outside of BOSS requirements shall be paid for by the Customer.

2.3.7 Schedule Estimating/Tracking - This service shall be provided at no cost to the customer if the work is required by BOSS. All work outside of BOSS requirements shall be paid for by the Customer.

2.3.8 Requested relocation support -Design/Project Management services shall be provided at no cost to the customer if the work is required by BOSS. All work outside of BOSS requirements shall be paid for by the Customer

Exhibit 19 (8)

3.0 SERVICE LEVEL AGREEMENT MATRIX

(This section condenses the services mentioned in "Specific Services" into one matrix. This matrix covers each service and briefly covers what has been done in the past and what is expected in the future both from a service and financial perspective. The intent is to help the customer understand all changes to services and financial responsibilities per service. This matrix allows each customer to increase their service if they desire, but in doing so will be charged a higher monthly rate than the established market rate. Services beyond this agreed upon matrix shall be charged out as an additional service based on hourly rate noted herein.)

Building Systems (Life Safety)

Vent hood cleaning	Annual Cleaning and inspection
Fire Alarm	Repair Testing and documentation maintained
Fire extinguishers	Repair Testing and documentation maintained
Fire sprinkler	Repair Testing and documentation maintained
Halon	Repair Testing and documentation maintained
Fire Exit Signs	Repair Testing and documentation maintained
UPS service	Weekly, Monthly, Quarterly, Yearly Testing
Generator service	Weekly, Monthly, Quarterly, Yearly Testing

Operations and Maintenance

Air conditioning / Heating (Office)	Maintain at 73-78 degrees Change filters monthly or quarterly Service A/C Units Quarterly
Electrical systems	Provide reliable electrical power during business hours or as committed otherwise. Convenience Outlets Workstation Power UPS/Generator/ Back up
Plumbing Systems	Provide Safe potable water Restrooms Kitchen Backflow Prevention
Sewer	Maintenance and repair
Lighting	Provide adequate / safe lighting during business hours. Replace burnouts within 72 hours
Elevators	Regulatory Testing / Inspection and Maintenance
Pest Control	Monthly with callbacks at no charge

Additional Services

To be determined by needs of specific Department

8. ANALYSIS OF REAL PROPERTY SERVICES

8. ANALYSIS OF REAL PROPERTY SERVICES

This chapter of the report prevents an analysis of the Real Property Services Division. This chapter presents a number of recommendations that are designed to enhance the working relationship between the Real Property Services Division and the Building Operating Support Services Division.

1. SERVICE LEVEL AGREEMENT BETWEEN THE REAL PROPERTY SERVICES DIVISION AND THE BUILDING OPERATIONS SUPPORT SERVICES DIVISION

The delivery of new or renovated buildings that can be cost effectively maintained requires a partnership between the owner of the building, those responsible for designing and constructing the building, and those responsible for maintaining the building when it is placed in service. This partnership should begin when a client identifies a need and continues through the design, construction and commissioning of a building. Maximizing the input of the buildings owner and building maintenance representatives in the design and construction processes inevitably leads to buildings that cost less to maintain.

Finding

The management of design and construction management and building maintenance are organizationally divided in Metro. The Real Property Services Division, Finance Department, is responsible for building design and construction activities while the Building Operations Support Services Division, General Services Department, is responsible for the maintenance of buildings once they have been placed into service. Interviews with personnel in both divisions, a review of documentation and observations

of buildings that have recently been constructed indicate there is not a positive working relationship between the divisions. The challenges in the partnership between the Real Property Services Division and the Building Operations Support Services Division are presented in the paragraphs below.

- Consistently obtaining the input of the Building Operations Support Services Division at 30%, 60%, and 90% completion of plans, specifications and estimates for new or remodeled buildings.

- Consistently providing the Building Operations Support Services Division with project scoping agreements.

- Consistently providing the Building Operations Support Services Division with the Gantt charts developed by the Real Property Services Division and quarterly ongoing project status reports.

- Consistently inviting the Building Operations Support Services Division to the punch list inspection of new and renovated buildings.

- Consistently inviting the Building Operations Support Services Division to provide input regarding the type of building hardware proposed by Real Property Services Division (HVAC, electrical, plumbing). Decisions about building hardware (type, specifications) impacts on-going maintenance costs as well as replacement cycles.

- Consistently providing the Building Operations Support Services Division with the expected costs and schedules for design, construction management, and construction inspection milestones that are routinely provided to customers prior to commencement of design.

- Input from General Services is not obtained regarding life cycle costs for the medium and large capital improvement projects that might lead to a reduction in overall life-cycle costs.

- Consistently providing the Building Operations Support Services Division with as-built documents.

- Consistently providing the Building Operations Support Services Division with the opportunity to conduct facility project evaluations with the Real Property Services Division annually for a 1- to 5-year period after a major renovation or completion of a new facility. These evaluations are designed to gather information about the

facility operation and performance features that would enable planners to mitigate maintenance needs and costs in future design and construction projects.

- Consistently assigning a representative from the Building Operations Support Services Division to each Real Property Services Division project during the design process.

These are challenges not only for the Real Property Services Division, but also for the Building Operations Support Services Division to consistently participate in the design process and consistently provide feedback to the Real Property Services Division regarding the design of buildings.

Recommendation 8-1:

The Real Property Services Division and the Building Operations Support Services Division should develop a service level agreement that establishes parameters for an effective working relationship between the two divisions.

The elements of the service level agreement are presented below.

- The Real Property Services Division and the Building Operations Support Services Division should form a project team whenever a new project is scoped and initiated. The team should include, at a minimum, the Real Property Services Division project manager and representatives of the project owner and Building Operations Support Services Division. Team members should be expected to participate throughout the design and construction process.

- The Real Property Services Division project manager should advise all project team members of their participation and provide meeting and milestone schedules. Meeting notes and correspondence should be distributed to all team members to facilitate project tracking.

- Team members should be included in the design process and meetings and receive copies of meeting minutes. Attendance on an as-needed basis should be the responsibility of each team member unless specifically requested by the project manager. At a minimum, each team member shall attend meetings as necessary to remain informed of project development, and to insure that their interest and needs are adequate represented in the process.

- The project manager should schedule punch-list walkthroughs in accordance with the construction contract and ensure that team members are invited to and informed of the focus of all walk-throughs.

- The project manager should be responsible for compiling a list of discrepancies/deficiencies, as noted by the design contractor, Real Property Services Division inspectors, the building's owner and the representative from the Building Operations Support Services Division. These discrepancies should be reviewed by the project manager and included in the corrections punch-list.

- The contractor, upon the completion of the punch-list corrections, should prepare a written report containing an itemized explanation of corrections and the actions taken. The Real Property Services Division project manager should distribute the report to the project team.

- Upon final completion of construction, the Real Property Services Division project manager should collect all operation and maintenance manuals, training material, as-built drawings of record and warrantees. Copies of this information should be sent to General Services and to the building's owner. Metro should maintain a complete set of all operation and maintenance manuals, as-built drawings and Warranty documents in the permanent files of Real Property Services Division, Building Operations Support Services Division and at the building site.

- The Real Property Services Division project manager should schedule and coordinate the training and demonstrations needed to successfully hand the building over to the owner and to Building Operations Support Services Division for use and on-going maintenance.

Implementation Strategies and Timeline

The Assistant Finance Director for Real Property Services should develop a model service level agreement	July 2006
The Assistant Director for General Services should meet with the Assistant Finance Director for Real Property Services, discuss the model service level agreement, and modify the agreement as appropriate.	October 2006

Fiscal Impact

There are not any fiscal impacts associated with this recommendation.

2. CAPITAL PROJECT MANAGEMENT PRACTICES

The Matrix Consulting Group identified several project management principals that should be applied to each phase of the capital improvement project. These

standards include the following eight steps that comprise the core capital project management process:

- Preparation of a project budget;
- Definition of the project, including its scope, staff resources required, project costs, and project priority;
- Establishment of plans and schedules of each capital improvement project to determine what tasks are to be performed internally and by private contractors, as well as the start, end and milestone dates;
- Monitoring and reporting the progress against each element of the schedule for each project;
- Maintenance of the financial control systems necessary to ensure timely reports on current expenditures of funds for each line item of the project;
- Development of a system to alert top management to cost, schedule, legal and other difficulties and unusual circumstances encountered during the course of the project;
- Management of the staff and consulting resources involved in the project in order to adjust to changes in priorities and project mixes as well as to enable completion of the project on schedule and within budget; and
- Management and coordination of the interfaces needed to complete the project.

Underlying all of these principals is management accountability within the Real Property Services Division to ensure it is accomplished on schedule and within budget.

Finding

The review of the practices utilized by the Real Property Services Division to manage building capital projects has identified a number of issues associated with how well the Division applies these eight capital project management principals. These issues are presented in the following points.

- Staffing requirements for project managers and project officers have not been fully defined.

- Costs of construction guidelines are not utilized to determine the project managers and project officers staffing requirements for capital improvement projects.

- Staffing resources are not "leveled" to fit the design and construction management workload to the available staff resources.

- A time accounting system is not utilized to record the allocation of staff hours for the design and construction management by the staff of the Division.

- The monthly capital improvement program status reports generated do not provide important information regarding building capital projects.

- Capital projects are not fully scoped before commencement of design.

- The Building Operations Support Services Division is not reviewing plans and specifications at 30%, 60%, and 90% completion. There results, at times, problems with the maintainability of building assets and components as a result. For example, the access to heating, ventilating and air conditioning equipment at the Metro Office building is difficult. Only one elevator has been provided for at this three-story building. These examples are depicted in the first exhibit at the end of this chapter.

- Feedback mechanisms (e.g., final reports) have not been developed for quality assurance purposes.

- Mechanisms are not routinely employed to maintain effective communication with clients.

A number of steps need to be taken by the Division to improve the management of capital projects. These recommended steps are presented below.

Recommendation 8.2.1:

A design authorization form should be completed before commencement of building design.

The Real Property Services Division does complete a project scoping agreement prior to the initiation of a capital project.

The project scoping agreement should be expanded and additional information

included. Design of a project should not be initiated until the resources required (project management staff hours) for completing the project have been identified using the design authorization form. The design authorization form should include the components enumerated below.

- The project title including the phase of the project, if relevant.
- A general project description including a narrative summary description of the project, specific physical improvements, the location of the project, and the relationship to master plans.
- The capital project number (as noted in the five year capital improvement program).
- The financing and the cost including the source of funds, and the appropriation status.
- A budget covering the project management or design staffing, construction management staffing, appropriate consultants, property acquisition, utility relocation, etc., by major expenditure component.
- The responsibility for completing the various components of the capital project including the following:
  - Design by in-house staff or by consulting architect;
  - Construction inspection by in-house staff or by consulting architect;
  - Environmental assessment required;
  - Property acquisition required and, if so, the number of parcels and their locations and assessor parcel numbers;
  - Utility relocations that need to be relocated, problems with relocation and timing issues; and
  - Other key responsibilities that need to be assigned and/or accomplished.
- The extent of coordination necessary, listing the inter-agency coordination by division, department, or outside agency with whom coordination will be required in the design and construction of the capital project, the nature of the coordination, and the key contacts;

- The preliminary schedule for completing the design and construction of the capital project including the schedule for design, bid package preparation, advertise/award, property acquisition, environmental reports, and construction and including the dates of important events such as approval of the award of construction contract;

- A document control procedure and record-keeping system including contract documents;

- A change order procedure that includes a documented, systematic approach to the handling of construction change orders;

- Organizational structures, management skills, and staffing levels required throughout the design and construction phase, including the estimated staffing required in terms of person hours required for design and construction inspection utilizing the cost of construction guidelines;

- Quality control and quality assurance functions, procedures, and responsibilities for design and construction;

- Materials testing policies and procedures;

- Design and construction reporting requirements, including cost and schedule control procedures;

- Design considerations or issues related to the capital project such as complexities of the design;

- Community relation and public information requirements including public hearings or meetings and how the public will be informed and involved in the preliminary design and informed about the progress of the design and construction.

A design authorization form should be completed before commencement of design. It should be reviewed with the client department prior to the commencement of design.

Recommendation 8.2.2

Costs of construction guidelines should be developed and utilized to document project management and officer staffing requirements for the design and construction management of building capital improvement projects.

The use of cost of construction guidelines is commonplace in the architectural profession. These guidelines have been developed based upon the experience of architects in their profession. The following points should be noted concerning this cost of construction guideline

- Two different levels of complexity should be utilized: average and above average. An above average level of complexity should be based upon the need to deal with other agencies (e.g., TDOT), the design complexities of the project, or problems with planning and construction determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.

- These guidelines should be developed to fit the different types of construction jobs such as street construction, street reconstruction, traffic control, water and sewer, etc.

- These guidelines should be developed to "fit" the different types of work activities in each capital project. These include planning and scoping, design development, design survey, design administration, construction survey, construction inspection, construction management, and project closure.

- The guidelines should be expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). Using these guidelines, to determine the number of staff hours required, the Division would divide the cost of the work activity (e.g., design administration) based upon the cost of construction guidelines by the current hourly cost of a consulting architect. Use of the hourly cost for a consulting architect will level the playing field and ensure that the Division's staff are every bit as productive and held accountable as consulting architects.

- The guidelines identify resource requirements for each work activity associated with a project. These include design administration, construction management, etc.

- The managers within the Division should utilize these guidelines to determine the project management and project officer staffing requirements for each project in terms of person hours required for design administration and construction management utilizing the cost of construction guidelines.

Recommendation 8.2.3

The Building Operations Support Services Division should be provided with the opportunity for input and critique of plans and specifications at 30%, 60% ad 90% completion.

The Real Property Services Division should distribute the preliminary architectural plans and specifications to the Building Operations Support Services Division at 30%, 60% ad 90% completion for comment and critique. The Real Property Services Division should compile a list of discrepancies, as noted by the Building Operations Support Services Division to be reviewed and included in the plans and specifications for correction.

Once the architect has completed correction to the plans and specifications, the Real Property Services Division should send an itemized explanation of corrections taken, amended, or deleted in response to corrections noted by the Building Operations Support Services Division.

Recommendation 8.2.4:

Modify the Monthly Capital Project Status Report.

The Real Property Services Division uses project management software (Microsoft Excel and Microsoft Project. Monthly status reports are generated by project managers and project officers that identify the project accomplishments and expenditures and any budget or work problems.

The Real Property Services Division should modify these monthly status reports.

The monthly report should be expanded and the following information should be included in this status report.

- The capital project number (based upon the number assigned in the five year capital improvement program);

- The capital project name;

- The project manager or project officer assigned to the project (or the consulting engineer);

- A comparison of actual project costs to date versus planned including

  – Design budget;

  – Design expenditures to date separately identifying staff expenditures from consulting expenditures;

  – Construction management expenditures to date separately identifying contract administration, construction inspection, and consulting architect expenses;

  – Construction cost as budgeted; and

  – Current construction cost as estimated by the project manager responsible for construction management.

  These project costs should be based upon a fully loaded hourly rate that includes indirect costs.

- A comparison of actual project schedule to date versus planned including:

  – The date the design was scheduled to begin and actually begun;

  – The date the design was scheduled to finish and actually finished;

  – The date the Metropolitan Council was scheduled to award a contract for the construction versus the actual (or new estimated date);

  – The date the construction was scheduled to begin and actually begun; and

  – The date the construction was scheduled to finish and actually finished.

  – The current status of the capital project containing explanations such as 30% design complete.

  This should be a simple report. The report should be published monthly, on-line

on the Internet. After e-mail distribution of this status report, it should be the basis of a monthly meeting by the project managers, project officers, and the managers of the Real Property Services Division.

Recommendation 8.2.5:

The Real Property Services Division should utilize the Enterprise Business Systems project accounting software to track the costs associated with design administration and construction of building capital projects.

The Real Property Services Division should utilize the Enterprise Business Systems project accounting capacity to track the actual time expended for each project by its staff. The information required within the system should include:

- Project account number;
- Funds control including the budget for the project, source of funds, etc.;
- Purchase orders approved and pending including account numbers;
- Contracts, amendments, and change orders including the dates and the amounts;
- Key dates within the project such as award of contract by the Metropolitan Council;
- Invoice payments including the dates of the payments;
- Project closeout.

Access to the information contained within this system should be provided on Metro's Intranet.

Recommendation 8.2.6:

A final report should be prepared upon completion of a building capital project.

Without a formal analysis and distribution for review, the mistakes and weaknesses of one project will almost certainly be repeated on others. The final report

should focus on analyzing the good and bad aspects of the completed project, transmitting that information to the staff of the Real Property Services Division, and providing a convenient summary of the project.

At the completion of the project, the project manager or project officer assigned to the project should complete a final report including:

- Project name, project number, and a description of the project. Construction costs – planned versus actual with an identification of all of the change orders and the reasons for those change orders;
- The staff hours allocated to the project - planned versus actual;
- The schedule for completion of the project - planned versus actual including whether drawings, specifications, schedules, and cost estimates were prepared consistently according to schedule;
- The design costs for the project - planned and actual including cost per sheet;
- Construction management costs - planned versus actual;
- Whether as-built plans have been completed and a copy forwarded to the Building Operations Support Services Division;
- Whether the project at completion met the value expectations of the client including a customer satisfaction survey completed by the client that identifies such issues as construction cost versus value, responsiveness to the client, ease of maintenance, usability, and the like; and
- Comments and discussion regarding the project as necessary including unusual conditions encountered during the project such as contractor deficiency, quantity difference, scope change, etc.

This report should be circulated to the other project managers and project officers, the management of the Real Property Services Division, the Building Operations Support Services Division and the client department(s). After distribution of this status report, it should be the basis of a meeting with the client department(s) and the Building Operations Support Services Division.

Recommendation 8.2.7

A design report should be completed when the design is no more than 10% complete.

The project manager or project officer assigned to the building capital project should be responsible for preparing a design report (project evaluation and alternatives study). If a consulting architect is completing the design of the project, then the consulting architect would prepare this design report.

The design report should be prepared when the design is not more than 10% complete. The purpose of the design report is to serve as a preliminary design review to enable the project manager or project officer to review and approve the proposed design approach. More specifically, the design report should:

- Briefly identify the capital project and describe the project.
- Provide a background to the project including project history, whether the project has any outside support or opposition, and whether any commitments regarding the project have been made.
- Define the problem the capital project is intended to solve and the alternatives considered that could possibly solve all or a portion of the problem.
- Outline the detailed scope of the project and the reasoning behind the selection of the alternative utilized for the design and other architectural decisions.
- Outline in detail the design criteria used for the capital project and the rationale for those criteria.
- Set forth the detailed construction costs for the capital project based upon a detailed review of expected problems and the completion of 10% design, and the sources of funding.

Upon completion of the design report, the project manager assigned to the project should schedule a preliminary design review meeting. The project manager or project officer assigned to this project, the management of the Real Property Services

Division, and a representative of the Building Operations Support Services Division should attend this meeting.

At this meeting, the project manager should review the project, the alternative selected, why this alternative was selected, the design and construction cost estimate, special problems not resolved, the schedule, and staffing requirements (or consulting architects) needed to complete the design and construction management, etc.

Implementation Strategies and Timeline

The Assistant Finance Director for Real Property Services should develop formal policies and procedures regarding capital project management	October 2006
The Assistant Director for General Services should meet with the Assistant Finance Director for Real Property Services, to discuss the capital project management policies and procedures.	September 2006
The capital project policies and procedures should be published to the Real Property Services Division web site	November 2006

Fiscal Impact

There are not any fiscal impacts associated with this recommendation.

3. COMMISSIONING POLICY

A commissioning process is designed to ensure that all building systems are installed, functionally tested, and capable of being operated and maintained to perform in conformity with the design intent and the owner's needs.

Finding

The Real Property Services Division has not developed a formal written commissioning policy.

Recommendation 8.3

The Real Property Services Division should develop a formal written commissioning policy for buildings.

The commissioning policy should explicitly detail the role for General Services in the commissioning process.

- The Real Property Services Division project manager should prepare a detailed Commissioning Plan at the earliest possible point in the development process as projects are being specified and design bid documents are being prepared. The commissioning plan should be reviewed and agreed to by the owner's representative, Building Operations Support Services Division, the design contractor and construction contractor. The plan should specifically detail the roles for the commissioning participants, their task assignments and schedules. Should independent balancing or system adjustment be required when construction is complete, the Real Property Services Division project manager should make appropriate contractual arrangements to insure availability and scheduling of the corrective services.

- Design documents, prepared by Real Property Services Division or its Architecture and Engineering consultants should include planning for commissioning. The Building Operations Support Services Division should be provided an opportunity to completely review and present written comments on all design documents prior to their approval.

- The Real Property Services Division should schedule regular weekly meetings with the building's owner, the Building Operations Support Services Division during the commissioning process to verify plan progress, identify problems and resolve issues.

- General Services staff should be part of the project inspection process. They should attend the initial start-up of a project and perform periodic inspections of all projects. The Building Operations Support Services Division should complete written reports on all of its inspection activities and convey these reports to the Real Property Services Division project manager for review and discussion.

- Upon substantial completion of construction, Building Operations Support Services Division staff should inspect the building and convey observed deficiencies to the Real Property Services Division Project Manager. Real Property Services Division should review the Building Operations Support Services Division deficiency report, seek corrections or reconciled prior to certifying physical completion of the building.

- The Real Property Services Division should make arrangements during the commissioning process for the training of the Building Operations Support Services Division staff in the operation and maintenance of the building and the hand-over of all documentation pertinent to the operation of the building and its equipment.

A sample commissioning policy appears in the second exhibit following this chapter.

Implementation Strategies and Timeline

The Assistant Finance Director for Real Property Services should develop formal building commission policy	October 2006
The Assistant Director for General Services should meet with the Assistant Finance Director for Real Property Services, to discuss the building commissioning policy.	September 2006
The building commissioning policy should be published to the Real Property Services Division web site	November 2006

Fiscal Impact

There are not any fiscal impacts associated with this recommendation.

4. EQUIPMENT STANDARDIZATION

Equipment standardization has been demonstrated to improve on-going reliability of buildings through its direct impact on reliability. Effective equipment standardization programs have been shown to reduce the frequency and number of functional failures that could be attributed to human errors such as improper lubrication, improper maintenance due to training or procedural inadequacies, or the installation of improper parts, just to name a few. Experience has shown that equipment standardization is an often-overlooked topic when it comes to most reliability improvement projects and initiatives. Equipment standardization can provide Metro with several key benefits:

- Reduction in spare parts inventory and associated space and carrying costs;
- Reduction in training needs due to consolidation of equipment types and models;
- Reduction in need for specialty tooling;
- Less need for rigorous, multiple maintenance procedures;

- Increase in operating efficiency; and
- Reduction in the amount of maintenance errors, costs, and downtime.

Finding

The Real Property Services Division has not developed a formal written policy regarding equipment standardization.

Recommendation 8.4:

The Real Property Services Division should develop a formal building equipment standardization policy.

An example of a possible standardization policy could be: “The City’s standard for temperature and energy management control shall be Siemens. Building temperature, humidity and energy management controls shall be direct digital control (DDC) technology utilizing distributed microprocessor based apparatus. Each building shall be designed to operate in a "stand alone" mode but shall include the necessary features for communication with a remote operator's station. Connection to a remote operator's station must be included at the time of bid and construction. The inclusion of such shall have no bearing on the environment control system to be provided.

IMPLEMENTATION STRATEGIES AND TIMELINE

The Assistant Finance Director for Real Property Services should develop formal equipment standardization policy	October 2006
The Assistant Director for General Services should meet with the Assistant Finance Director for Real Property Services, to discuss the equipment standardization policy	September 2006
The equipment standardization policy should be published to the Real Property Services Division web site	November 2006

Fiscal Impact

There are not any fiscal impacts associated with this recommendation.

Exhibit 20 (1)

Examples of the Need for Review Of Plans and Specifications by the Building Operations Support Services Division

<table>
<tr><td>Metro Office Building
Construction Work in Progress.

This facility is located across the parking lot from the Howard Building that houses the basement mechanical plant providing support to this building.</td><td>  </td></tr>
<tr><td colspan="2">Mechanical Equipment Rooms on floors 2 and 3 have tight access for filter changes and other maintenance needs.</td></tr>
<tr><td>This photo shows the access door to the equipment room at the left, a pipe in the center and the air handling equipment on the right.

Maintenance will need to access the other side of the air handler for filter changes and it is a tight squeeze for a normal sized person between the pipe and the exhaust duct.</td><td>  </td></tr>
</table>

Exhibit 20 (2)

After you turn the corner, then you have to crawl under additional ductwork to reach the far side of the air handler for access to the filters. This photo is looking back and shows the side view of the exhaust duct in the first photo.	
If you enter the room and turn right, instead of trying to squeeze by the pipe, you can walk around the air handler until you are confronted with the chilled water lines. This was an even tighter squeeze than getting by the single vertical pipe. Whichever way you turn, you have to get by one of the obstacles to change the filters.	

Exhibit 20 (3)

The air handlers contain multiple filters. They are probably in the range of 20 X 20 inches. They are usually shipped in boxes containing 12 to 18 filters depending on thickness of the filter. Normal replacement procedure would be to have new and old filters in separate boxes but it is probably not going to be possible to get full boxes of filters past the obstructions. Maintenance staff will probably have to push a few filters at a time past one set of pipes or the other. There will also probably be a tendency to leave the old filters behind until they become a significant nuisance.	

Elevator Design

There is only one elevator for this three-story facility and a department requiring extensive public access is located on the third floor. It is unclear if one elevator is sufficient to meet the user requirements when the facility is fully occupied.

During the brief visit, the elevator was out of service due to overheating electrical equipment. A temporary cooling unit has been placed in the elevator equipment room to mitigate this problem.

Operation of this elevator is probably essential to meet ADA requirements and running the equipment at high temperatures will shorten the service life, reduce reliability, and increase maintenance costs.

Exhibit 21 (1)

Facility Commissioning Policy

1. Commissioning Definition

Building commissioning performed in new construction and existing buildings helps to ensure that systems and their connections are installed, functionally tested and capable of being operated and maintained to perform in conformity with design intent and the owner's needs. The process is commonly defined as one of testing system performance and correcting identified problems to ensure that a new building begins its life cycle at optimal productivity. Commissioning can also restore an existing building to optimal operation. Further, when commissioning is repeated periodically throughout the life of a building, it improves the likelihood that the building will maintain a high level of performance and operational sustainability.

2. Commissioning Benefits

The commissioning process involves functional performance testing and other diagnostic methods, documenting the results of testing as well as any resulting fixes, and reporting these results to the city. These activities help determine how well the building systems are performing individually and as an integrated whole. A thorough commissioning process will confirm that building systems and equipment are operating properly, allowing the city to realize the benefits of:

- Improved building system control;
- Increased energy efficiency;
- Improved building equipment performance;
- Improved indoor air quality, occupant comfort and productivity;
- Decreased potential for owner liability; and
- Reduced operation and maintenance costs.

3. Commissioning Protocol

A. Pre-design Project Planning Phase

Every city project shall include, at a minimum, commissioning of the building HVAC systems and commissioning of lighting controls that include daylight or occupancy sensing automatic controls, or automatic time switches. When the complexity of warrants, the city may decide that an independent commissioning consultant be used for a project.

B. Project Design Phase

The project manager will include in the architecture and engineering scope of work specific requirements to include commissioning tasks beginning as early as possible in the project design phase and in the construction bid documents as well as performance defined criteria for testing when construction is completed.

Exhibit 21 (2)

The plan will use and incorporate city maintenance and building staffs in final inspection and operations training efforts.

C. Construction Bid

Architecture and engineering will include requirements of the contractor in the bid documents that provide commissioning activities and tasks, including:

- Procedures for final inspections of the work that includes inspections by city maintenance and building management staffs.

- Full set-up, balancing, demonstration and testing of operation for all building systems, electrical, mechanical, fire protection, electronic, and doors and hardware components.

- Provide the city complete as-built record drawings (in electronic form) and operation and maintenance manuals and instructions.

- Provide the city with a complete set of operational training materials on all building systems.

D. Construction Phase

The project manager and the architecture and engineering consultant will meet with representatives of maintenance and building management at the beginning of construction to discuss the design features of major building components, their intended operation, and specific concerns for inspection and verification by city staff. The commissioning team will establish a plan and procedure for inspections during construction.

During construction city maintenance and building management staff will periodically inspection building components and systems to note deficiencies before these components are covered by construction elements.

City staff will perform a comprehensive inspection of all building systems and components as the building nears completion, noting deficiencies, for inclusion in the contractor's completion punch-list.

E. Commissioning Phase

A preplanned and established protocol fro commissioning activities should be prepared and agreed to by all parties prior to completion of construction. The plan should include a description of tasks, sequencing

Exhibit 21 (3)

and scheduling of those tasks, and specifications of individuals and agencies involved in the task.

The plan should include at a minimum:

- Equipment and systems to be tested, including the extent of sampling.
- Functions to be tested (i.e., calibration, economizer control, etc.)
- Conditions under which the tests should be performed (i.e., winter design conditions, full outside air, etc.).
- Measurable criteria for acceptance performance
- Inspection, verification and documentation of initial system components start-up.
- Verification and documentation of system testing, balancing and establishment of initial operational settings. The functional testing objectively verifies and documents that the building systems perform interactively in accordance with project documents and design intent.
- Verification of city receipt, and appropriate distribution, of project as-built record documents and operations and maintenance manuals.
- Establishment of warranty items response procedures and appropriate contacts.
- Establishment and initiation of ongoing building operation procedures and maintenance schedules.
- Installation of non-contact equipment and materials (furniture, phone/data lines, tenant equipment, etc.).
- Tenant move-n schedule and procedures.

During commissioning the project manager should schedule weekly meetings with the tenant, maintenance and building management staff to verify plan progress and resolve issues.

Exhibit 21 (4)

F. Commissioning Reports

The project managers should prepare a commissioning report identifying the following:

- Deficiencies found during the testing that have been corrected and the expected correction date for those that are still pending correction.

- Deferred test that could not be performed at the time of the report because of climatic conditions.

- Climatic conditions required for performance of deferred tests and the anticipated date of each deferred test.

The final commissioning report should provide a description of all test procedures and the results.

F. Small Project Commissioning

The commissioning of small projects should incorporate the same commissioning functions as those for larger projects except that the project will be planned and led by the owner's project manager.

9. METROPOLITAN NASHVILLE PUBLIC SCHOOLS

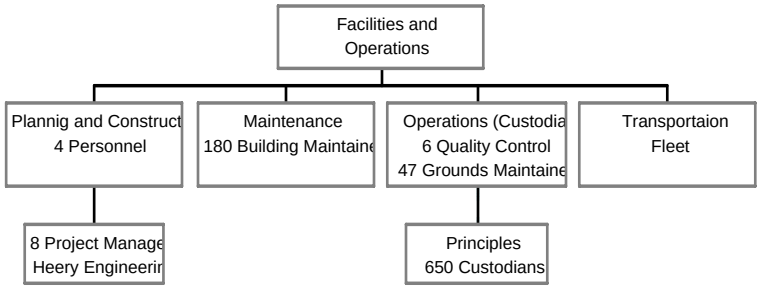
9. METROPOLITAN NASHVILLE PUBLIC SCHOOLS

This chapter presents an analysis of the extent to which the Metropolitan Nashville Public Schools (MNPS) has implemented the facility use and management recommendations contained in Chapter 11 of the performance audit of the Metropolitan Nashville Public Schools (MNPS) completed by MGT of America in January 2001.

The chapter opens with background information regarding the Facilities and Operations Division of the Metropolitan Nashville Public Schools.

1. BACKGROUND INFORMATION REGARDING THE FACILITIES AND OPERATIONS DIVISION.

The Metropolitan Nashville Public Schools (MNPS) operates approximately 150 buildings, 135 of which are elementary, middle or high schools. The Facilities and Operations Divisions is responsible for approximately 13 million square feet of buildings situated on 70 acres of land. The organizational structure of the Facilities and Operations Division is presented below.



The Facilities and Operations Division perform four major functions as depicted above. In this study we are interested only in the facility functions. The Planning and Construction group is responsible for the design and construction of school facilities. Almost all of the design and construction management is performed with contractors.

Several MNPS personnel, including an architect and two project managers, staff the group. In addition, six project managers and two administrative staff provided via a contract with Heery Engineering. The Planning and Construction group manages and average of eight major construction projects (new construction and remodels) annually.

The Maintenance Group is responsible for maintenance in all of the MNPS facilities. This work involves minor remodeling of facilities as well as preventive and corrective maintenance. The 180 budgeted personnel, mostly skilled trade workers (carpenters, electricians, painters, electricians), are responsible for 13 million square feet of buildings, an average of approximately 74,000 square feet per maintenance worker. Any work that requires a permit is contracted out to private vendors.

The Operations group is responsible for training the 650 custodial personnel assigned to the schools and for quality audit of the custodial work in the schools. The custodial staff are hired and managed by the 135 school principles. In addition, 47 grounds personnel take care of the sites on which school buildings are located and for outside maintenance work on the buildings.

2. IMPLEMENTATION BY THE METROPOLITAN NASHVILLE PUBLIC SCHOOLS OF THE RECOMMENDATIONS CONTAINED IN THE PERFORMANCE AUDIT.

MGT of America conduced an audit of the MNPS in 2001. The study made 24 recommendations regarding facility planning, construction, maintenance and custodial services.

Finding

The Matrix Consulting Group reviewed these recommendations with managers from the Facilities and Operations Division. Of the 24 recommendations, 12 or 50%

have been implemented, 3 or 13% have been partially implemented and 9 or 37% have not been implemented. The table below summarizes each recommendation from Chapter 11 of the MGT report and indicates the level of implementation by the MNPS.

Recommendations	Status, January 2006
11-1: Revise current responsibilities to ensure that all trades-related and heavy equipment work is the responsibility of the Plant Maintenance Department.	**Not implemented.** Heavy equipment work has not been transferred to Plant Maintenance. Operations does custodial work and grounds maintenance. Plant maintenance does internal building maintenance.
11-2: Direct principals to supervise custodians assigned to their school.	**Implemented**. All custodians, 650 budgeted positions, have been assigned to the schools. Grounds maintenance staff continue to report to Operations. There are 47 grounds personnel. Decentralization has not been effective for two reasons. (1) Many principles are not interested and knowledgeable about custodial work and (2) custodians in the elementary and middle schools do not have principle supervision during the summer months (60-day supervisory gap).
11-3: Establish a Site Selection Oversight Committee.	**Not implemented.** Process is informal and informational in nature. Metro Planning and Zoning and RPS Real Estate are involved as well as principles and community representatives. The Planning Commission, School Board and Metro Council must approve sites.
11-4: Develop a plan to implement multi-track, year-round program at five or 10 percent of the elementary schools in MNPS.	**Not implemented.** Instructional responsibility.
11-5: Expand involvement of stakeholders during the design phase and implement a formal post-occupancy evaluation system.	**Not implemented.** Informal input is solicited during the design phase fro principles and the community. Planning and Construction has design guidelines. School system averages eight major projects (new construction or remodel) annually.
11-6: Implement a professional development program for Plant Planning and Construction staff.	**Partially implemented.** Monies have not been allocated for professional development. Manager relies on vendors to present periodic training events.

Recommendations	Status, January 2006
11-7: Convert existing maintenance resources currently dedicated to construction, major maintenance, and alterations to recurring maintenance services.	**Not implemented.** Maintenance does smaller re-constructions projects because contracting is a lengthy process. As a consequence, preventive maintenance takes a back seat to new projects and emergency repairs.
11-8: Perform major painting projects utilizing contractor personnel and create a night shift dedicated preventive maintenance team.	**Not implemented.** Analysis proved contracting would not be cost effective. In addition, alternate shifts (evening, night, weekends) have been strongly opposed by the union and have not been implemented.
11-9: Implement a minimum of four area shops consisting of various trade's personnel. These shops will perform routine, non-emergency preventive maintenance on a planned and scheduled basis.	**Not implemented.** Regional shops would cut the time need tot travel throughout Metro's 533 square mile area to jobs. Maintenance has not been able to get space for regional shops in existing buildings.
11-10: Increase incrementally funding levels for the Plant Maintenance Department to a minimum goal of 75 cents per square foot.	**Implemented**. Funding has been increase to the $.75 level as recommended in 2001 but has not been increased to keep pace with inflation. Current deferred maintenance is estimated to be approximately $2.5 million.
11-11: Develop a mission statement and measurable goals that properly align customer's expectations with the function of in-house safe, healthy, well-maintained schools.	**Implemented**. Mission statement was revised to correspond with overall goals of the school. Some measurable goals were implemented for maintenance and custodial services.
11-12: Implement specific criteria for identifying maintenance priorities and response times.	**Partially Implemented**. Funds were increased to reduce the deferred maintenance backlog. However, the maintenance staff has remained largely unchanged; not all preventive maintenance can be accomplished. Maintenance continues to do minor remodeling projects that detracts from preventive maintenance.
11-13: Increase utilization of the ACT 1000 to incorporate the electronic receipt of school-based work requests, and confirmation to schools with an estimated completion date of the request.	**Not implemented.** ACT 1000 is not web based. Maintenance accepts phone, email and fax complaints that are entered into ACT. Maintenance processes 80,000 requests annually, many submitted by the custodial staff in the buildings.

Recommendations	Status, January 2006
11-14: Establish performance standards and a staggered shift policy.	**Partially implemented.** Performance standards have been established but the alternate shifts. Have not been implemented Failure to implemented alternate shifts means that maintenance occurs during regular school hours. This can be disruptive to education and slows the accomplishment of maintenance tasks.
11-15: Develop a vehicle needs analysis and associated vehicle support management plan.	**Implemented** Schools conducted further study and, as a consequence, have significantly reduced it vehicle replacement threshold to 10 years and/or 100,000 miles. In addition, moneys have been allocated to bring the fleet up to date.
11-16: Create a training program that is based on a needs analysis of the work being performed and the current skills of the work force.	**Not implemented**. Monies have not been allocated for training. Vendors provide some limited training.
11-17: Implement a customer satisfaction measurement process.	**Implemented**. Surveys are sent to principles at the close of significant maintenance and remodel projects.
11-18: Provide custodial staffing consistent with the current allocation formula of one custodian per 19,400 square feet.	**Implemented**. MNPS has 660 authorized building custodian positions to cover 13 million square feet of space. Custodial staff has been gradually increased to achieve the 19,400 square foot standard. The standard recommends 670 custodians.
11-19: Develop and implement a comprehensive custodial training program.	**Implemented**. New hire training - Custodial Operations provides a 1-day of video orientation training for new hires plus a 1-day training on custodial equipment. Head building custodians provide one week of practical training on building and equipment procedures. Annual in-service training – Custodial Operations provides a 1-day summer program.
11-20: Establish custodial standards and a quality control program to measure compliance and improvement opportunities.	**Implemented**. Custodial Operations has established standards and a quality control program. Cleaning standards were established (restrooms, classrooms, burnishing) and distributed to the principles and custodial staff. Six field foremen conduct monthly inspections of the approximately 150 school buildings.

Recommendations	Status, January 2006
11-21: Provide a minimum funding level for the cost of cleaning supplies (about $0.05 per square foot of space) and allocate to the schools accordingly.	**Implemented**. The supply budget is approximately $.05 per square foot. However, the budget has not been increased to keep pace with inflation since 2001.
11-22: Assess a building usage fee for outside agency activities on weeknights.	**Implemented**. The facility usage fee is $20.00 per hour when a custodian is retained for an event.
11-23: Create a function in the Plant Operations Department that is responsible for environmental health and safety and hire two environmental specialists.	**Implemented**. Two positions have been established in the Maintenance Division. The group responds to approximately 200 complaints annually.
11-24: Implement a comprehensive energy management program.	**Implemented**. MNPS has a multi-year contract with Siemens to conduct energy audits and recommend system upgrades. As a consequence, a number of lighting, boilers, chillers, cooling towers have been upgraded or replaced. The contact has a guaranteed savings clause. SCADA systems have been installed in approximately 80 buildings that can be monitored from a central point and on a laptop.

Recommendation 9-1:

The Finance Department should meet with the Metro Nashville Public Schools and discuss their plans for implementation of those recommendations that remain partially implemented or unimplemented.

IMPLEMENTATION STRATEGIES AND TIMELINE

The Finance Department should meet with the Metro Nashville Public Schools to discuss their plans for implementation of those recommendations that remain partially implemented or unimplemented	July 2006
The Metro Nashville Public Schools should indicate, in writing, to the Finance Department their plans for implementation for those recommendations that remain partially implemented or unimplemented.	July 2006

Fiscal Impact

There are not any fiscal impacts associated with this recommendation.