



CITY OF RICHMOND  
CITY AUDITOR

**DATE:** March 13, 2018

**TO:** Selena Cuffee-Glenn  
Chief Administrative Officer

**FROM:** Louis Lassiter  
City Auditor

**SUBJECT:** Citywide Facilities Audit

The City Auditor's Office has completed the Citywide Facilities audit and the final report is attached.

We would like to thank the staff in the Departments of Public Works, Public Utilities and Parks and Recreation for their cooperation and assistance during this audit.

Attachment

cc: The Richmond Audit Committee  
The Richmond City Council  
Mr. Robert Steidel, DCAO, Operations  
Ms. Debbie Jackson, DCAO, Human Services  
Mr. Bobby Vincent, Director, DPW  
Mr. Christopher Frelke, Director, Parks and Recreation  
Ms. Rosemary Green, Interim Director, DPU

# Citywide Facilities Maintenance

---



---

## City of Richmond, VA City Auditor's Office March 13, 2018



Executive Summary	i
Background	1
Department of Public Works	2
Department of Public Utilities	17
Department of Parks and Recreation	24
Contract Collaboration	30
Objective, Scope and Methodology	Appendix A
Management Responses	Appendix B

March 2018

# Highlights

Audit Report to the Audit Committee,  
City Council, Administration

## Why We Did This Audit

The Office of the City Auditor conducted this audit as part of the FY18 audit plan approved by the Audit Committee.

The audit focused on reviewing preventive and corrective work order and safety records for operational efficiency and compliance. Our objective was to determine if a process existed and was appropriately executed to prioritize, adequately repair, maintain and replace facilities when needed.

## What We Recommend

- The CAO should have the departments work together to obtain contracts for fire extinguishers, boiler work, and any other areas in which the three divisions perform similar tasks.
- The departments need to improve in the areas of fire alarm, extinguisher and sprinkler inspections.
- The CAO needs to assess the DPW Division's pay ranges and make necessary adjustments to ensure the city is competitive with surrounding localities.
- DPW needs to develop a plan to address staffing needs and present for funding.
- **Other recommendations include internal control and other operational enhancements (see appendix B)**

## Citywide Facilities Maintenance Audit

**Background** - Facilities Maintenance provides services to the City's buildings to keep them in safe and efficient working condition. Facilities Maintenance is performed by the departments of Public Works, Public Utilities, and Park and Recreation.

**Commendations** - DPU uses monitoring software for all HVAC system components at the Operations Center that creates alerts if a piece of equipment malfunctions. DPW also has made significant improvements since the 2011 facilities audit:

- The work order system is now used to track equipment, buildings and general duties for completed work orders and preventive maintenance.
- Preventive maintenance work orders are automatically generated.
- Profiles were created to track the age and life expectancy of the equipment.
- Employee labor hours are tracked and tied to specific work orders.

**Contract Collaboration** - Although they use the same vendor for fire extinguisher inspections, parts, and replacements, the departments have not entered into a citywide contract and paid varying prices for the inspections charged for similar work.

**Dept. of Public Works** - During FY16 and FY17, the Division faced staffing challenges. A consultant evaluated operations and indicated that the Division was not adequately staffed. In addition to staffing, the Division had a 20% turnover rate in FY17. Auditors also noted the pay ranges for some trade positions are lower than surrounding localities. Other testing showed:

- Quality assurance reviews on the completed work orders were not conducted. 19% did not capture the actions taken, 20% did not have any associated costs and 9% did not contain labor hours. The equipment inventory in the work order system was incomplete.
- 48% of the work orders were for preventive maintenance. However, according to industry standards preventive maintenance should be 70-80%.
- Fire extinguishers' inspections were overdue and boilers' annual maintenance documentation could not be provided. Also, building assessments and HVAC preventive maintenance schedules are still set up in the system for retired buildings.
- Monthly/yearly maintenance for a sample of ten generators were conducted as required.

## Dept. of Public Utilities

- Fire alarm and sprinkler inspections were not conducted in FY16.
- 84% of the equipment in the system were scheduled for preventive maintenance. Of a sample of 56 PM schedules, only 40 PMs were performed. Auditors could not conclude if preventive maintenance was performed for the equipment excluded from the system.
- Average of five days to close corrective work orders and 210 days to close preventive maintenance work orders. Materials costs were not included in any of completed work orders. Auditors could not conclude the Unit's workload and staff productivity due to limited documentation and data captured in the work order system.

**Parks and Recreation** - Annual fire extinguisher inspections were not conducted in FY16 and evidence of a fire sprinkler system inspection was only provided for one of the three locations reviewed. The work order system is not being used to its fullest capability. The inventory stock room needs to be built and the building components and equipment need to be set up. Other testing showed:

- Workload and staff productivity data was corrupted due to a virus however this issue has been corrected.
- We could not conclude if all the buildings are captured in the system as auditors received inconsistent listings. Also, the age/square footage of the buildings are unknown. The Unit does not have a complete listing of equipment.

Management concurred with 25 of 25 recommendations. We appreciate the cooperation received from management and staff while conducting this audit.



## BACKGROUND

Facilities maintenance is the process of providing maintenance services and upkeep to the City's buildings and equipment in order to keep them in the safest and most efficient working condition.

Maintenance involves tasks such as:

- servicing the HVAC units and boilers,
- changing light bulbs,
- fixing leaks,
- replacing tiles (ceiling and floor),
- maintaining the plumbing (restrooms), and
- keeping equipment operational.

In the City of Richmond, facilities maintenance is performed by three different departments: Department of Public Works (DPW), Department of Parks and Recreation (PRCF), and Department of Public Utilities (DPU). Each department has its own staff, policies and procedures, and work order systems.

In facilities, there are two types of jobs performed:

- ***Preventive Maintenance (PM)*** – This is planned and scheduled work to routinely inspect and service equipment and buildings in order to reduce the number of reactive repairs by identifying and mitigating maintenance issues before they arise.
  - The City conducts two types of preventive maintenance:
    1. Routine equipment maintenance – These preventive tasks (e.g. changing filters, belts and oiling machines) are performed to keep the equipment in good working condition, avoid break downs, and potentially extend the useful life of the equipment.
    2. Building Assessments – Walkthroughs of the locations are performed to assess the condition of the facilities, identify maintenance issues, and generate work

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

orders to address identified issues. Building components such as lighting, fire systems, bathroom fixtures, and ceiling and floor tiles are inspected during the assessments.

- ***Corrective/Reactive Work*** - Corrective work orders are requested by department personnel when repairs are needed due to requests for services by City Departments.

### **Management Responsibility**

---

City management is responsible for ensuring resources are managed properly and used in compliance with laws and regulations; programs are achieving their objectives; and services are being provided efficiently, effectively, and economically.

### **Conclusion**

---

The Facilities Management Divisions have a significant responsibility for ensuring that City assets operate as intended over their useful lives and City facilities are safe and reliable. During this audit, the auditors worked with both management and facility staff that were knowledgeable about their jobs and committed to providing quality maintenance services. Several resource constraints and improvement opportunities were identified, which if addressed, would allow each Division to manage its operations more efficiently and effectively.

## **Department of Public Works**

The Facilities Management Division within DPW (DPW-FM) is divided into three Units (Capital Improvement Maintenance, Buildings Operations, and HVAC/Plumbing/Electrical Trades). This audit only addresses HVAC/Plumbing/Electrical Trades (Unit).

The DPW Facilities Maintenance staff are responsible for inspecting and maintaining approximately 1,300 pieces of equipment, and 73 buildings, totaling approximately 2.5 million square feet. The Trades Unit is overseen by an Operations Manager and consists of a Superintendent of Facilities, two Trade Supervisors, and 18 Maintenance Technician/Trades. Two

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

of the technician/trade positions were vacant during the audit scope. In FY16, the Division was allocated \$11.8 million. DPW contracts out the repairs listed below.

- annual HVAC maintenance,
- chiller PMs,
- generator PMs,
- all maintenance related to the Justice Center,
- elevators, and
- fire extinguishers inspections.

The maintenance work is tracked in FacilityDude, the Department's Computer Maintenance Management System (CMMS). Work orders are created for both preventive maintenance and corrective repairs as noted below.

- **Reactive/Corrective Repairs** - Requests are called in or emailed and set up as work orders. Work orders are assigned a priority level (Emergency, High, Medium, or Low) upon creation. Emergencies are assigned immediately to the appropriate staff and non-emergencies are sent to a supervisor for assignment. The technician performs the tasks needed to complete the work order, enters all relevant information, and then closes it out in the system. Every issue sent to Facilities is required to have a work order created and closed.
- **Preventive Maintenance (PM)** – Buildings and equipment are set up in FacilityDude when placed in service. Once placed in service, the PM schedules are established and work orders are automatically generated.

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

### **Overall Conclusion for the Unit**

---

Facilities has made significant improvements since the 2011 audit, despite enduring staffing constraints. The Division has transitioned to a more proactive maintenance approach. Routine maintenance is planned and scheduled to:

- inspect and service equipment and buildings in an effort to keep the equipment in good working condition,
- minimize the risk of breakdowns,
- potentially extend the useful life of the equipment, and
- identify and mitigate maintenance issues.

In order for the Division to continue to improve its operations, the staffing constraints need to be addressed.

### **Noted Improvements**

---

During the 2011 Facilities audit, the auditors noted many deficiencies within the Division's processes and procedures. Since that audit, DPW Facilities has made improvements to their system, functions, and policies and procedures.

Some specific examples of improvements from the 2011 audit are described below.

- I. During the 2011 audit, the Department had a system but did not use it to its full potential. Currently, they are using their system to track work orders done for equipment, buildings, and general duties.
- II. Work orders are generated automatically for preventive maintenance, whereas during the 2011 audit, management was mostly reacting to incidents.
- III. Equipment profiles were created to track the age and life expectancy.
- IV. Preventive maintenance schedules have been established and set up for equipment.
- V. Auditors were easily able to determine the work order status.

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

- VI. An issue identified in the 2011 report was the tracking of labor. DPW is now using FacilityDude as a way of tracking employee labor hours. Though the process is not perfect yet, they are moving towards employee accountability.

Facilities Management acknowledges and agrees that this is a continuous work in progress. For example, they installed a generator monitoring system to improve and safeguard the City's emergency back-up generators and ensure reliability at forty-two locations.

This new system has the following features:

- The ability to communicate with the generators remotely with a Smartphone or computer.
- Receive alarm notifications via SMS text or email notification, 24/7.
- Visually observe the status of the generator devices.
- Supports the reliability that the device has activated and allows DPW to know fuel levels for 30 of the diesel fuel tanks electronically and remotely.
- During imminent weather conditions or extended power outages, DPW has the ability to start/stop the device remotely. In situations where there is a lengthy outage, they can monitor fuel levels to determine when refueling is needed.
- Allows the City to know when the generator contractor is actually performing a PM service to support their service PM report documentation for invoicing.

### **Workload and Staff Productivity**

---

During FY2016, a total of 19,997 work orders were created. Four thousand and four (4,004) work orders were for administrative, custodial, capital improvements tasks and duplicates. After removing these, 15,993 maintenance work orders remained. The table below is a breakdown of the work orders by type.

Work Order Type	Quantity
<b>Total Number of Work Orders</b>	19,997
<b>Administrative*</b>	3,166
<b>Duplicate/Voided</b>	217
<b>Custodial and Capital Improvements</b>	621
<b>Total Maintenance Work Orders</b>	<b>15,993</b>

---

**Richmond City Auditor's Report# 2018-06**

Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)

Facilities Maintenance

March 13, 2018

---

<b>Preventive</b>	7,634
<b>Corrective</b>	8,359
<b>Total</b>	<b>15,993</b>

\* Administrative tasks include daily startup procedures, meetings, training, and other misc. non-maintenance tasks.

Auditor Prepared

The auditors were unable to adequately conclude on the Unit's efficiency and staff productivity due to the staffing constraints and data issues, which are discussed subsequently in this report. Performance measures were not in place to evaluate the staff. Also, work orders were not required to be done within set timeframes as the Division was short staffed.

### **Staffing Resources**

---

The Department hired a facility engineering consultant to evaluate the Facilities Management Division to identify improvement opportunities. As part of this evaluation, a staffing analysis was completed. In a report dated September 2016, the consultant indicated that the Division was not adequately staffed and recommended additional staffing, in particular highly skilled staff, to improve City facilities operations. The consultant recommended a staffing level of 27 maintenance Full Time Equivalent (FTEs) to move the Division towards a comprehensive stewardship service level, which is characterized by:

- organized maintenance work;
- timely response to service calls;
- regular upgrades; and
- well-developed preventive maintenance program.

During Fiscal years 2016 and 2017, the Unit only had 20 authorized maintenance FTEs. In addition to lack of authorized FTEs, the Unit has been continuously afflicted with vacancies for the past few years as demonstrated below. The majority of the vacancies occurred for the Maintenance Technician III and the Air Conditioning Refrigeration & Heating Mechanic positions.

---

**Richmond City Auditor's Report# 2018-06**

Departments of Public Works (DPW), Public Utilities (DPU) and Parks &amp; Recreation (PRCF)

Facilities Maintenance

March 13, 2018

---

<i>Fiscal Year</i>	<i>Approved FTE Count<sup>1</sup></i>	<i>Vacancies</i>
2013	21	7
2014	21	3
2015	21	3
2016	20	2
2017	20	4

Source: Prepared by Audit Using Payroll Data from financial system

Based on discussions with management, the Unit has encountered difficulties in attracting, hiring, and retaining qualified staff as the City's salaries are not competitive with other localities and private industry. The auditors compared the City's salaries with surrounding localities for the positions below. Based on the below analysis, the City's salary range is lower than the surrounding localities.

Job Title	Salary Ranges		
	<i>Richmond</i>	<i>Chesterfield</i>	<i>Henrico</i>
<b>Electrician I<sup>2</sup></b>	\$32,492 - \$52,668	\$36,903 - \$63,017	\$35,588.01 - \$63,948.95
<b>Master Plumber<sup>3</sup></b>	\$30,815 - \$49,949	\$36,903 - \$63,017	\$37,296.33 - 67,018.67
<b>Air Conditioning, Refrigeration &amp; Heating Mechanic<sup>4</sup></b>	\$30,815 - \$49,949	\$32,298 - \$55,153	-

Source: Prepared by Auditor using job descriptions and pay plans for the localities.

These positions were used as they were easily matched to the job titles and duties in the other localities.

---

<sup>1</sup> FTE count includes Trades, Technicians, and supervisors.

<sup>2</sup> The City's position/duties is comparable to Chesterfield County and Henrico County's Electrician position/duties.

<sup>3</sup> The City's position/duties is comparable to Chesterfield County's Plumber position and Henrico County's Senior Plumber position/duties.

<sup>4</sup> The City's position is more comparable to Chesterfield County's HVAC Technician position based upon job duties and education and experience requirements.

## **Certifications and Training**

---

In addition to the staffing shortage noted above, funding has not been allocated to provide training to existing staff and assist them in obtaining and maintaining certifications. In the workplace, training is essential to stay up to date on current standards, processes, and best practices. According to Facilities Management staff, training is not allocated in the budget. Management stated that employees are sent to free training. Also, when vendors come in to install or work on machinery, facilities staff will observe and learn from the tech performing the work.

Employees are responsible for paying and keeping their certifications up to date. All staff with licenses must meet the required training for their respective licenses. DPW does not reimburse employees for their certification costs or training needed to retain their licenses. Paying for certifications could possibly help recruit and retain employees.

Adequate staffing plays a vital role in the efficiency and effectiveness of the Facilities Management Division. The above staffing constraints may result in:

- delays in completing repair requests and preventive maintenance,
- deferred maintenance,
- increased reliance on contractor services,
- higher costs to the City, and
- poor customer service.

## ***Recommendations***

- 1. The Director of Public Works needs to develop a plan to address Facilities Management's staffing needs and present for funding in the Department's budget request.***
- 2. The Director of Public Works needs to request funding for training and staff certifications in the Department's budget request.***
- 3. The Chief Administrative Officer needs to assess the Division's pay ranges and make necessary adjustments to ensure the City is competitive with surrounding localities.***

- 4. The Deputy Director of DPW Facilities Management needs to develop and implement performance measures to assess the Unit and staff productivity.***

#### **Work Order Attributes**

---

The auditors noted management does not conduct quality assurance reviews on the completed work orders. According to management, quality assurance reviews are not conducted due to staffing constraints. The observations noted in this section could be addressed with quality reviews. If addressed, the Division can better assess its productivity and costs.

#### ***Completion Dates***

The completion date is automatically generated by the system when the work order status is changed to complete. However, based upon discussion with the software vendor, it was noted the completion dates can be manually overwritten. The auditors analyzed all work orders initiated and completed in FY2016. The auditors found 22% of the work orders had manually keyed completion dates. According to Facilities management, staff may leave work orders open for months for further follow-up (i.e. ordering specialty parts). Also, work orders are not closed immediately; they are closed when staff have time to close them upon returning to their workstation. Therefore, the auditors could not test for timeliness of work order completion as dates were either manually keyed or not representative of the actual completion date.

#### ***Work Order Information***

Pursuant to DPW-FM standard operating procedure (SOP), employees must record all actions including labor, materials, contractor costs, and repair details in the work orders. The SOP further states that all parts and purchases must be entered into the transaction section of the work order and a detailed explanation must be noted if there is no associated costs. Based upon review of the work order data, it was noted that some of the work orders did not capture the required information. Testing revealed:

- Approximately nineteen percent (3,117) of the work orders did not capture the actions taken to complete the work orders. The auditors reviewed a sample of 75 of these work

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

orders and determined that actions should have been keyed. The action taken was actually keyed as the request description for 11 of the work orders and checklists were completed within the work orders for 14 of them. These were not noted as exceptions as management could identify what work was performed in the work orders. Approximately 28% of the total work orders without actions taken were completed and closed by a staff that is not under DPW supervision.

- Twenty percent (3,212) of the work orders did not have any associated costs. The auditors reviewed the actions taken for a sample of 1,249 work orders to determine if material costs should have been captured. Below is a summary of the testing results:
  - 190 work orders – Based upon the noted actions taken, it was unclear if materials were needed, therefore the auditors were unable to draw a conclusion.
  - 1,013 work orders – Materials and parts were not needed to complete work orders.
  - 46 work orders - Materials and parts were required for repairs.
- Nine percent (1,466) of the work orders did not contain labor hours. According to Division staff, labor costs were not required to be tabulated until after September 2015, which accounts for 230 of the work orders without labor costs. Without adequate labor hours represented in the work orders, the Division management will not be able to effectively measure productivity and evaluate employees for performance, as well as efficiently allocate resources as needed.

***Recommendation***

5. ***The Deputy Director of DPW Facilities Management needs to implement quality reviews to ensure that the required work order information is being captured by staff.***

## **Equipment**

---

DPW-FM has a total equipment population of 1,332 in FacilityDude. Of the 1,332 pieces of equipment, only 567 (43%) have a "placed in service" date and 471 (35%) have a life expectancy period keyed in the system. Without this information, the Division may be unable to adequately make budgeting decisions regarding equipment replacements and funding. Of the 471 with a life expectancy, 110 are past their useful life, based on the information keyed into the system. Per DPW-FM Management, in switching from their previous work order system, the equipment information was lost. All of the information had to be rekeyed. For the older equipment, some of the information was no longer available.

According to the Government Finance Officers Association's best practice "Asset Maintenance and Replacement," a complete inventory should be maintained by the department in order to properly assess their conditions and note the information of the asset such as location, maintenance history, replacement costs, book value, original useful life, etc.

### ***Incomplete Equipment Inventory***

DPW houses their equipment list in the FacilityDude system. During observations, the auditors noted the equipment inventory in FacilityDude was incomplete as the auditors found three generators, two hot water heaters, and one HVAC Unit missing from FacilityDude. The auditors could not determine the extent of the missing equipment. Also, during the audit scope, none of the Department's fire extinguishers were in FacilityDude. Instead they were maintained in a listing outside of FacilityDude. Recently, the Division started keying the fire extinguishers in the system, however the listing is still incomplete. The Division management noted that some items may have been missed as the system is still a work in progress. They are working to input equipment into the work order system as they are identified.

***Preventive Maintenance***

Industry standards suggests that 70-80% of maintenance work should be programmed (planned replacements/renovations or preventive maintenance)<sup>5</sup>. The Auditors noted that 48% of work orders initiated during the audit scope were for preventive maintenance and the other 52% were corrective work orders. The average age of the facilities maintained by DPW is 38 years and the majority have not undergone major renovations. The higher percentage of corrective work orders is most likely attributed to the City's aging facilities and equipment.

The auditors reviewed 30 pieces of equipment to determine if PMs had been established and were in accordance with the manufacturers' recommendations. The auditors found planned maintenance had been established for the majority (27 of 30) of the tested equipment. Planned maintenance had not been set up for the remaining three pieces of the reviewed equipment, which included a gas furnace, fire station overhead door and a ductless HVAC unit. Per DPW Facilities Management staff, they are in the process of inputting equipment information along with PMs into the system. Facilities staff indicated this is a work in progress as they are continually adding equipment as it is identified and placed in service and setting up preventive maintenance schedules as staffing resources and funding allows.

Although preventive maintenance was set up for 90% (27/30) of the reviewed equipment, it was determined that:

- Corresponding work orders had not been generated and completed for six pieces of equipment.
- The established preventive maintenance was not in accordance with the manufacturers' recommendations or DPW-FM SOPs for two pieces of the equipment. Conclusions could not be expressed for ten pieces of equipment based upon the obtained information.

---

<sup>5</sup> Stanford, Herbert W. *Effective Building Maintenance: Protection of Capital Assets*. S.I.: Fairmont, 2011. Web.

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

In addition, the auditors tested the frequency of PMs to verify that they were being conducted in accordance with the established time intervals. A total of 39 PMs were set up in the system for the 27 pieces of equipment. Of the 39 PM schedules, the auditors noted that:

- 30 PMs were conducted in accordance within the established intervals.
- The auditors could not conclude if six were completed within the established intervals as the PM name may have been changed making it difficult to associate the work orders with the original PM.
- Three of the PMs were conducted less frequent than the established intervals.

### ***Recommendations***

- 6. The Deputy Director of DPW Facilities Management needs to ensure that all equipment are included in FacilityDude and preventive maintenance schedules are established and performed.***
- 7. The Deputy Director of DPW Facilities Management needs to ensure that staff are inputting equipment information, such as life expectancy and date placed in service, into the tracking system for all new equipment purchases.***

### **Contracted Work**

---

Facilities Management uses contractors to augment their staff. According to management, contractors are used to assist in completing their workload and for specialized expertise. The auditors tested some of the contracted work that posed a larger safety risk to City employees and citizens to ensure that contractors completed the required maintenance and inspections.

### ***Safety Inspections***

DPW hires an external vendor to inspect the fire suppression systems, including sprinklers and fire extinguishers. According to the National Fire Protection Association guidelines, fire extinguishers are to be inspected annually by certified personnel. Fire alarms and sprinklers should be tested on varying intervals throughout the year.

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

The auditors selected a sample of seven buildings that were high risk, high traffic areas and observed 90 fire extinguishers, which represent approximately 11% of the total population of extinguishers located at DPW maintained facilities. Twenty percent (18/90) of the observed extinguishers were out of date. It should be noted that in three of the buildings, all of the fire extinguishers were outdated by at least six months. Subsequent to informing management, auditors revisited one of the locations, and noted they had been inspected and updated.

The auditors also selected 11 sprinkler systems from the FacilityDude listing and obtained documentation to validate that the required inspections were completed. Inspection documentation was provided for eight of the reviewed sprinkler systems. According to management, two of the systems were set up in the work order system in error and will be removed. In addition, inspection documentation was not supplied for the remaining one; as such, the auditors could not verify if inspections occurred.

***Recommendation***

- 8. The Deputy Director of DPW Facilities Management needs to ensure the fire extinguishers are inspected in all Department of Public Works maintained buildings as required.***

***Boilers***

DPW-FM outsources their boiler work using the three quotes process and using other localities' contracts. All boilers identified in FacilityDude were covered by a maintenance contract or purchase order. The boilers are required to be serviced, inspected, and certified to the State of Virginia on an annual basis. The auditors noted a total of 34 boilers in the facilities maintained by DPW-FM. The auditors selected 10 boilers for testing to confirm that annual maintenance had been performed by the vendor. DPW-FM was only able to produce maintenance documentation for three units. Facilities management indicated the documentation was not maintained for the other boilers. As such, the auditors could not determine if the yearly maintenance was conducted for the remaining seven boilers.

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

In addition, the auditors requested the annual inspection and certificates for all of the boilers. The Division provided documentation demonstrating that inspections were completed for 28 of 34 boilers. DPW-FM stated that all boiler inspections had been performed by the City's insurance company but certificates could not be provided as the City had not paid the vendor at that time for the inspections. However, the auditors could not confirm this assertion.

***Generators***

DPW-FM contracts out their generator work for the City's facilities. Based on the contract, the vendor was required to perform monthly and yearly maintenance. The auditors randomly selected 10 of the 45 generators from the contract for testing. Based on testing, the contractor met the requirements and DPW tracked the work and maintained the documentation for 100% of tested generators.

***Buildings***

---

***Building Preventive Maintenance Schedule Completeness***

The auditors selected a sample of seven buildings (out of 73) to test for completeness of the PM schedules. The auditors queried the system for the following PMs:

- Building Assessment,
- Electrical PM,
- Plumbing PM, and
- HVAC/Heating PM.

Test results revealed that:

- one had a building assessment schedule,
- one had a plumbing PM schedule (set up after the audit scope),
- none of them had a complete electrical PM schedule, and
- two had a HVAC PM Schedule.

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

Four of the seven buildings tested were newer buildings. The buildings they replaced were in the system and the auditors were able to view their PM schedules. The auditors noted the old buildings had building assessments and HVAC PMs scheduled. In some instances, the old buildings' assessments are still set up to generate PM work orders on a regular basis and have not been modified. One of the old buildings had an electrical PM and none of them had a plumbing PM.

The auditors reviewed the building assessments in FacilityDude and noted that only 50% of the buildings had an assessment in the system. Below is a summary of the analysis.

- All fire stations had an assessment scheduled, except for one.
- Six of the nine City libraries had building assessments scheduled.
- City Hall does not have a building assessment scheduled.
- Four of the seven police stations had building assessments.

Building Assessments are an important aspect of proactively identifying issues before they arise. Inspecting the buildings regularly can reduce the need for reactive work orders and the department can better plan and prepare for their work.

### ***Recommendations***

- 9. The Deputy Director of DPW Facilities Management should ensure that all required inspections and maintenance work that is contracted out is completed and properly documented.***
- 10. The Deputy Director of DPW Facilities Management should ensure that all buildings have building assessments and plumbing, electrical, and HVAC Preventive Maintenance set up and are being conducted according to the schedule.***
- 11. The Deputy Director of DPW Facilities Management should ensure buildings and equipment are deactivated in FacilityDude when taken offline.***

## Department of Public Utilities

The Facilities Maintenance staff within the Department of Public Utilities (DPU) are responsible for inspecting and maintaining DPU buildings and equipment/components such as HVAC systems, plumbing, hot water heaters, lighting/electrical, and completing repairs as requested. Also, building assessments are conducted to inspect the condition of the buildings (e.g. ceiling, flooring, lighting, etc.) and identify and address any maintenance issues. The maintenance work is tracked in Mainsaver, which is the Department's work order system. Work orders are created for both preventive maintenance and corrective repairs as noted below.

- Reactive/Corrective Repairs - Requests are called in, faxed or emailed and set up as work orders by the Supervisor and forwarded to the Maintenance Technician. Upon completion, the work orders are returned to the Supervisor to close them out in the system.
- Preventive Maintenance (PM) – Preventive maintenance schedules are established and set up in Mainsaver when buildings and equipment are placed in service. Work orders are automatically generated based on the established maintenance schedule and includes the tools, materials, and tasks that are needed to complete the work.

During FY2016, DPU Facilities was responsible for maintaining 166 pieces of equipment and the Operations Center, which includes multiple buildings totaling approximately 139,000 square feet. The Division was also responsible for various renovations (e.g. painting and flooring) on multiple floors at the 730 building. Subsequent to the audit scope, the Division took over the 1801 Commerce Road location as well. The Division consisted of a Trades Supervisor, Maintenance Technicians (2), a Custodian, and a Hazardous Material Technician; and was allocated approximately \$1.5 million in the FY16 budget.

### **Overall Conclusion**

---

Limited data and documentation was captured and maintained to support the Unit's workload and staff productivity. As such, limited testing and data analytics were performed by the auditors. Also, key work order data (e.g. labor and material costs) and equipment information (e.g. in-

---

## **Richmond City Auditor's Report# 2018-06**

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

service dates and purchase price), which are needed by management to make informed decisions, were not always captured. In addition, work orders were not completed timely. Similar observations were noted in the Facilities Maintenance Limited Review, which was issued in September 2009.

### **What Works Well**

---

A monitoring software is in place for all HVAC system components on the Carrier system that are located within the DPU building. The supervisor or HVAC technician can monitor the status of the HVAC system components. The system creates alerts if a piece of equipment malfunctions or falls out of the predefined parameters set by the Department.

### **Unit Workload and Staff Productivity**

---

We were unable to conclude on the Unit's workload and staff productivity due to the limited documentation provided and data captured in the work order system. During FY2016, only 174 work orders were captured in Mainsaver. Below is a breakdown of the work order type.

Work Order Type	Quantity
Administrative*	38
Custodial	40
Preventive	48
Corrective	48

\* Administrative tasks completed by the Supervisor such as assigning work, completing paperwork and attending meetings.

Auditor prepared

Also, there was no evidence that staff conducted the bi-weekly building assessments. According to the Operations Manager, they were not keyed in the system. He also stated that most corrective work orders were missing as the staff members fixed the maintenance issues and did not create work order tickets. The Operations Manager further noted that the building assessments were not manually documented or keyed into the system and that the staff only create work orders for deficiencies noted during the walkthroughs. As a result, the auditors could not verify whether the assessments took place.

## Recommendations

**12. The DPU Facilities Management Operations Manager should ensure that building assessments are being conducted and documented in Mainsaver.**

**13. The DPU Facilities Management Operations Manager should ensure that Facilities staff are inputting work orders in Mainsaver.**

## Preventive Maintenance Schedules

---

DPU's Mainsaver system includes 166 pieces of equipment. The auditors noted 84% (139/166) of the equipment in Mainsaver had established preventive maintenance schedules. This means that DPU did not set up maintenance schedules for 16% (27) of the equipment. According to the Operations Manager, 14 of the 27 pieces of equipment (e.g. HVAC units and sprinkler system) should have preventive maintenance schedules. The auditors could not determine if preventive maintenance was performed for the equipment during the audit scope as work orders were not generated and tracked in Mainsaver.

The auditors noted DPU Facilities Maintenance established 56 PM schedules in Mainsaver. However, only 40 of the PMs were performed during FY16. It was noted that multiple pieces of equipment could be attached to a single PM. The Operations Manager was unaware that these had not been performed and indicated that they may have been simply overlooked.

## Recommendation

**14. The DPU Facilities Management Operations Manager should ensure that all equipment/assets that have a required preventive maintenance schedule are set up in Mainsaver and performed.**

## Work Order Completion Timeframes

---

During FY16, DPU generated 174 work orders. After removing administrative and custodial work, 96 corrective/preventive work orders remained for the year. The auditors reviewed the time it

---

**Richmond City Auditor's Report# 2018-06***Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)**Facilities Maintenance**March 13, 2018*

---

took to complete the work orders and noted it took an average of five days to close corrective work orders and 210 days to close preventive maintenance work orders. As of March 28, 2017 (report run date), 15 work orders were still open from FY16 and one was closed without a completion date. Below is an aging of the work orders from origination to completion.

Completion Age Timeframe (in days)	No. of Work Orders
0-30	42
31-60	5
61-90	2
91-180	2
181-360	22
>360	7

Auditor prepared from Mainsaver data.

Below are examples of the larger delays noted.

Work Order No.	Description	No. of Days from Origination to Completion
P231439	Preventive maintenance for water heaters (check for leaks and gas operation)	263
P231201	Gas furnace (check filters, belts)	280
P231369	Heater – fan unit (check and clean motor, fan and bearings; check insulation and wiring; add oil)	405
P231372	VAC burner pumps (check electrical and gas connections; check exhaust and fan motor; check thermostat operation)	510

Auditor prepared from Mainsaver data.

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

The Operations Manager indicated that staff are forgetting to close the work orders in the system. However, the auditors looked at the hard copy documentation supplied by DPU and found that the dates in the system were reflective of the actual completion dates.

According to the Operations Manager, there are no preset established times for corrective work order completion as the technician needs time to troubleshoot and assess the issue at hand to determine what timeline is needed. For planned maintenance, a recommended timeline is provided for the job and work orders are being completed within those time frames. However, based upon analysis of the 48 completed PMs, it was noted that on average the PMs were completed 177 days after the established due dates.

***Recommendation***

***15. The DPU Facilities Management Operations Manager should ensure that the preventive maintenance work orders are completed timely within the established due dates. The reasoning for non-compliance with the established due dates should be documented.***

**Work Order Data**

---

DPU staff are responsible for documenting the materials used, labor hours, and tasks completed for each work order. This information is keyed in the work order system and the work orders are closed by the Supervisor. The auditors reviewed 81 of the work orders completed during the audit scope and noted:

- Labor costs were captured for 68 of the work orders.
- Tasks completed/actions taken were captured for 79 of the work orders.
- Material costs were not captured for any of the work orders, even though actions taken indicated that materials were used for some of the work.

Tracking labor and materials allows management to properly gauge how much time and money is required for each piece of equipment. These figures are also beneficial in the decision to fix or replace the equipment in the future.

The Operations Manager indicated that only the Supervisor and one additional staff member are setting up and keying work order information due to limited computer skills. They do not have an administrative employee for Mainsaver. This means that staff has to create, key, and update the system themselves in addition to their day-to-day duties.

### ***Recommendation***

***16. The DPU Facilities Management Operations Manager should ensure labor hours, material costs and actions taken are keyed into Mainsaver for all work orders.***

### **Equipment Data**

---

According to the Government Finance Officers Association's best practice "Asset Maintenance and Replacement," a complete inventory should be maintained by the department in order to properly assess their conditions and note the information of the asset such as location, maintenance history, replacement costs, book value, original useful life, etc. The Mainsaver software has the capability to log equipment information such as asset ID, entered date, purchase price, serial number, SOPs, deactivation date, labor and materials spent on the equipment, replacement cost, useful life, and safety documentation. However, the auditors noted that none of the 166 assets had an in-service date, purchase price, or replacement cost. Without the activation date, the useful life cannot be calculated making it harder to forecast replacement of the equipment. Also, without the purchase price and replacement costs, management cannot analyze the cost of working on the equipment versus replacing it.

One of the reporting functions of the system includes taking the purchase price and breaking down the expenditures related to a piece of equipment. The report provides:

---

**Richmond City Auditor's Report# 2018-06**

Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)

Facilities Maintenance

March 13, 2018

---

- percentages of material cost to total maintenance cost,
- total maintenance cost to asset cost, and
- other helpful percentages.

As stated above, labor hours and materials are missing from work orders in the system. Without this data, the calculations cannot be completed. These calculations can be a useful tool for budgeting and determining whether or not to continue servicing the equipment or to replace it, as well as planning maintenance for the assets.

### **Recommendation**

***17. The DPU Facilities Management Operations Manager should ensure that equipment data, such as purchase price, is keyed in the Mainsaver System.***

### **Safety Inspections**

---

Per the National Fire Protection Association guidelines, fire extinguishers are to be inspected annually by certified personnel. Fire alarms and sprinklers should be tested on varying intervals throughout the year. According to management, their fire extinguishers are visually inspected by staff and sent out for a formal inspection at least once a year and the fire alarms and sprinklers systems are tested by contractors annually.

Management indicated the fire alarm and sprinkler inspections were not conducted during FY16. Prior to the release of this report, the auditors were supplied inspection documentation demonstrating the inspections of the sprinkler systems have now been performed. According to the Operations Manager this was an oversight. The last inspections were conducted in June 2015. The auditors also looked at 25 of the 65 fire extinguishers and determined that inspections were up to date. Without fully functional fire protection equipment, buildings are more susceptible to damage if a fire were to break out. Inspecting these systems annually helps reduce the likelihood of system failure if a fire were to occur. As City employees use these facilities, the City's liability is heightened without properly functioning fire suppression systems.

***Recommendation***

- 18. *The DPU Facilities Management Operations Manager needs to ensure the fire alarms are inspected in all DPU maintained buildings as required.***

## Parks, Recreation and Community Facilities (PRCF)

The Facilities Division is divided into two units (Parks Maintenance and Facilities Maintenance). Parks Maintenance is responsible for maintaining the parks' grounds and playground equipment. Facilities Maintenance is responsible for maintaining the building structures and equipment. This audit only addressed Facilities Maintenance.

The Facilities Maintenance staff are responsible for inspecting, maintaining, repairing, and replacing the below elements in 47 buildings, 136 tennis courts, 50 playgrounds, 56 baseball/softball diamonds, 27 athletic fields, 9 pools, 75 sports courts, and 7 cemeteries.

- plumbing fixtures, ornamental fountains, and drinking fountains;
- building equipment;
- HVAC filters and belts;
- light fixtures and lamps;
- roof, drains and gutters;
- doors, benches and woodwork; and
- fences

Staff also perform touch up painting at their facilities; and winterization for buildings, fountains and backflow preventers. The Facilities Maintenance Unit is overseen by an Operations Manager and consists of Trades Supervisors (2), office support staff and maintenance/trade staff (15). Three of the maintenance/trade positions were vacant during the audit scope. The Division was allocated approximately \$2 million in the FY16 budget for facilities maintenance.

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

The maintenance work is tracked in MainTrac, which is the Department's work order system. Per the Operations Manager, work orders are created for both preventive maintenance and corrective repairs as noted below. However, the auditors were unable to verify this as the work order data was corrupted by a virus and auditors were not informed of the recovery of the data until the end of the audit.

- Reactive/Corrective Repairs - Requests are called in, faxed or emailed and set up as work orders and forwarded to the maintenance/trade staff. Upon completion, the work order information such as the labor hours, equipment, material, costs, and description of work is entered into the work order system.
- Preventive Maintenance (PM) – The PMs are manually created and set up on a monthly basis.

### **Overall Conclusion**

---

The auditors were unable to complete testing, perform data analytics, and conclude on the Unit's workload and staff productivity based upon the information provided. However, the auditors noted that the work order system's functionality is not being fully utilized.

### **Unit Workload and Staff Productivity**

---

The auditors were unable to conclude on the Division's workload and staff productivity. The MainTrac system contracted a virus in September 2016 that corrupted all of the work orders. The virus was not discovered before the backup data was overwritten with the corrupted files. A configuration issue existed in the backup process leading to the loss of the usable data.

The Department of Information Technology has since corrected the configuration problem within the backup system and are scanning with the latest anti-virus software. PRCF started keying work orders in the system again in January 2017. During fieldwork, the auditors were notified that data from the system, prior to the virus, was not recovered. Therefore, the auditors could not complete any testing or data analysis. Prior to report issuance, the auditors were notified that some of the

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

data was recovered. The PRFC noted that they were using MainTrac to track labor hours and material costs for each work order. They also stated they have two categories for work orders, emergency and general. Emergency work orders are to be completed within 24 hours while general work orders are to be completed within 10 days. The Operations Manager indicated they are reviewing work orders and occasionally walking through the buildings to check the work performed by staff. As the data was lost, the auditors could not verify these statements made by the Department.

### ***Buildings Listing and Assessments***

---

There are 47 buildings set up in MainTrac. It is unclear if all of the locations are captured in the system as the auditors received several inconsistent building listings. Also, the age and square footage of the buildings are unknown. Without a complete and accurate listing, buildings may not be maintained, or maintained properly, increasing the risk for the City as many locations are used by citizens such as parks, pools, and community centers.

Also, it was noted that building assessments were not completed. Building assessments should be conducted in order to inspect the condition of the building and identify and address any maintenance issues. Without the assessments, the buildings could become a hazard for citizens and employees that regularly use them. This risk could significantly increase the City's liability.

### **Recommendations**

***19. The PRCF Facilities Management Operations Manager should ensure that a comprehensive building/location listing exists and that all locations, and their respective information, are keyed in the MainTrac system.***

***20. The PRCF Facilities Management Operations Manager should ensure that building assessments are being conducted for Parks and Recreation Facilities and documented in the MainTrac system.***

---

## ***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

### ***Equipment Listing and Preventive Maintenance***

---

According to the Government Finance Officers Association's best practice "Asset Maintenance and Replacement," a complete inventory should be maintained by the department in order to properly assess their conditions and note the information of the asset such as location, maintenance history, replacement costs, book value, original useful life, etc.

The auditors noted PRCF did not have a complete listing of equipment even before the virus erased the data. This means management is unaware of the useful life, purchase price, purchase date, and status of equipment in the Department. The Operations Manager, indicated that when equipment needs to be maintained, they do what they can to make it function. When it is determined that equipment will need to be replaced based on work performed, the Operations Manager stated they meet with the PRCF Director to discuss budgeting for replacement.

PRCF management indicated that a comprehensive equipment list is in the works to be created. Department staff are in the process of documenting equipment as they conduct their work. This reactive approach presents a large risk for PRCF as they are not aware of the age of the equipment and cannot gauge its useful life. Without this information, they cannot properly prepare or budget for future replacement or maintenance needs. Equipment could malfunction and the Department may lack the necessary funds to repair or replace the equipment. When equipment is purchased, the necessary information should be documented and keyed in the system for servicing, budgeting, and replacement purposes.

### **Recommendation**

- 21. The PRCF Facilities Management Operations Manager should ensure that a comprehensive equipment listing exists and is keyed, along with all equipment information, in the MainTrac system.***

### ***Safety Inspections***

---

Per the National Fire Protection Association guidelines, fire extinguishers are to be inspected annually by certified personnel and fire alarms and sprinklers should be tested on varying intervals

---

**Richmond City Auditor's Report# 2018-06**

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

throughout the year. According to management fire extinguishers' inspections were not conducted during FY16 and evidence of a sprinkler system inspection was only provided for one of the three applicable locations. The Department received estimates and started testing the fire systems in FY2017.

Without fully functional fire protection equipment, buildings are more susceptible to damage if a fire occurs. As both employees and citizens use the Parks facilities, this poses a large risk to public safety and increases the risk/liability for the City of Richmond.

### **Recommendation**

***22. The PRCF Facilities Management Operations Manager needs to ensure the fire extinguishers and sprinkler systems are inspected in all Parks and Recreation maintained buildings as required.***

### ***Work Order System Functionality***

---

As previously stated, PRCF tracks its facilities activities in MainTrac. Based upon a demonstration and walkthrough of the system with the vendor, audit noted that the system has the capability to track:

- all maintenance costs and activities for all PRCF assets (e.g. buildings, parks, equipment; vehicles);
- material inventory;
- inspections; and
- staffing resources.

The three core building blocks for the MainTrac are:

- Who – The resources (labor, equipment, materials, and outside contracts) that are used to perform the work.
- What – The activities and tasks completed to perform the work.

---

**Richmond City Auditor's Report# 2018-06**

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

- Where – The location of where the work was performed or the piece of equipment that was worked on.

Numerous reports, statistics and cost analyses can be generated when the below five key elements are entered for the work performed:

- Name of the employee(s) that completed the work
- Date of when the work was performed
- Tasks and activities performed
- Location where work was performed
- Time required to complete the work

Currently, the work order system is not being used to its fullest extent. The inventory stock room needs to be built and the building components and equipment need to be set up in the system. Also, staff are not using Mobile MainTrac, which allows staff real-time access to the system. If provided the necessary equipment and internet hotspot, staff could create, track and review work orders via a smart phone or tablet; post work as it is completed and track work hours.

Based upon a meeting with the PRCF management, it was noted that staff would benefit from additional training on MainTrac and guidance from management on what information needs to be tracked and how to track it.

### **Recommendation**

***23. The PRCF Director needs to develop and implement a plan to ensure that the Facilities staff are adequately trained and have the necessary resources to efficiently and effectively utilize the MainTrac system.***

***24. The PRCF Facilities Management Operations Manager needs to develop and implement a timeframe for setting up the inventory stock room and building equipment and components in the MainTrac system.***

## Contract Collaboration

Maintenance inspections and repairs for equipment such as boilers and fire extinguishers are outsourced annually by all three departments. The auditors found that they are using the same vendors for certain tasks (i.e. fire extinguishers and boilers).

All three departments have used the same vendor for their fire extinguisher inspections, parts, and replacements. In looking at invoices, the departments are paying varying prices for each set of inspections and consistent prices are not being charged. For instance, two extinguishers were inspected for \$25 each on one invoice, three were inspected for \$16.75 each on another, and four were inspected for \$12.50 on another invoice.

The City does not currently have a contract for boiler services. For the boilers, the City is using a contract from another locality. Also, some departments are using different vendors and using three quotes for their boiler needs. With the dollar amount and frequency, the City should consolidate these purchases in order to get a better price for our specific needs.

As all three departments are performing these tasks throughout the year, they should work together to establish a contract for fire extinguishers, boilers and any other items that they perform consistently. By working together, they can get the best prices for the City and their specific needs.

### Recommendation

- 25. The CAO should have the Department of Public Works, Department of Public Utilities, and Department of Parks and Recreation Facilities Divisions work together to obtain contracts for fire extinguishers, boiler work, and any other areas in which the three divisions perform a similar task and a contract does not exist.***

---

## Appendix A: Objectives, Scope, & Methodology

The audit was conducted in accordance with the Generally Accepted Government Auditing Standards promulgated by the Comptroller General of the United States. Those Standards require

---

***Richmond City Auditor's Report# 2018-06***

*Departments of Public Works (DPW), Public Utilities (DPU) and Parks & Recreation (PRCF)*

*Facilities Maintenance*

*March 13, 2018*

---

that the auditors plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for their findings and conclusions based on the audit objectives. The auditors believe that the evidence obtained provides a reasonable basis for their findings and conclusions based on the audit objectives.

## **SCOPE**

---

The City Auditor's Office has completed an audit of the Facilities Divisions for the Departments of Public Works, Public Utilities, and Parks, Recreations & Community Facilities. The auditors evaluated the trade functions (HVAC, Plumbing, and Electrical) responsible for maintaining City buildings. All processes, transactions, and decisions for the identified areas were reviewed for the 12 months ended June 30, 2016.

## **OBJECTIVES AND METHODOLOGY**

---

This audit was conducted to determine if the process exists and is appropriately executed to prioritize, adequately repair, maintain, and replace facilities when needed.

The auditors performed the following procedures to complete this audit:

- Performed walkthroughs with staff members to gain an understanding of their processes and procedures;
- Interviewed selected departments' staff/managers to determine the processes for documenting, tracking, and closing work orders;
- Reviewed work order data in the systems for accuracy and consistency;
- Reviewed the departments' building and equipment listings for completeness;
- Reviewed the departments' preventive maintenance schedules for appropriateness and completeness; and
- Performed other tests, as deemed necessary.

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
1	The Director of Public Works needs to develop a plan to address Facilities Management's staffing needs and present for funding in the Department's budget request.	Y	The Department of Public Works, will continue to submit departmental budget requests the funding necessary to fill all vacant positions.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Director of Public Works		30-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	N/A		Implemented. Public Works submits requests to fund all vacant positions during budget preparations.
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
2	The Director of Public Works needs to request funding for training and staff certifications in the Department's budget request.	Y	The Department of Public Works, will work to provide additional training opportunities within its Facilities Maintenance Division.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Director of Public Works		1-Jul-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	Contigent on FY19's budget request acceptance		N /A
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
3	The Chief Administrative Officer needs to assess the Division's pay ranges and make necessary adjustments to ensure the City is competitive with surrounding localities.	Y	The completed review of employee compensation is expected March 2018. The final recommendations on pay adjustments will be presented to the audit staff, once approved by city council in the final budget.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	DCAO of Operations		15-May-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
4	The DPW Facilities Management Deputy Director needs to develop and implement performance measures to assess the Unit and staff productivity.	Y	The Department of Public Works' Facilities Management Division will work to incorporate industry standard performance measure to gauge performance and productivity.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	DPW Facilities Management Deputy Director is working to re-tool its performance measures to include additional metrics in the quarterly reports it provides to its Director.		N/A

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
5	The DPW Facilities Management Deputy Director needs to implement quality reviews to ensure that the required work order information is being captured by staff.	Y	The Department of Public Works' Facilities Management Division will work to improve upon its internal QA/QC process.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	N/A		N/A
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
6	The DPW Facilities Management Deputy Director needs to ensure that all equipment are included in FacilityDude and preventive maintenance schedules are established and performed.	Y	The Department of Public Works' Facilities Management Division, will continue to add buildings, equipment and establish preventative maintenance schedules; as this is an on-going iterative task.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	This is an on-going process due to the total count of buildings and equipment.		N/A
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
7	The DPW Facilities Management Deputy Director needs to ensure that staff are inputting equipment information, such as life expectancy and date placed in service, into the tracking system for all new equipment purchases.	Y	The Department of Public Works' Facilities Management Division, will continue to add buildings, equipment and establish preventative maintenance schedules; as this is an on-going iterative task due.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	This is an on-going process due to the total count of buildings and equipment.		N/A
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
8	The DPW Facilities Management Deputy Director needs to ensure the fire extinguishers are inspected in all Department of Public Works maintained buildings as required.	Y	The Department of Public Works' Facilities Management Division will work to ensure compliance with inspections of fire extinguishers.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	This is an on-going process due to the total count of extinguishers the City has in its buildings.		N/A

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
9	The DPW Facilities Management Deputy Director should ensure that all required inspections and maintenance work that is contracted out is completed and properly documented.	Y	The Department of Public Works' Facilities Management Division will work to ensure inspections occur and they that they are documented within the division's CMMS system.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	This is an on-going process due to the total count of buildings and equipment.		N/A
10	The DPW Facilities Management Deputy Director should ensure that all buildings have building assessments and plumbing, electrical, and HVAC Preventive Maintenance set up and are being conducted according to the schedule.	Y	The Department of Public Works' Facilities Management Division, will continue to add buildings, equipment, establish preventative maintenance schedules and perform preventative maintenance; as this is an on-going iterative task.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Oct-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	This is an on-going process due to the total count of buildings and equipent.		N/A
11	The DPW Facilities Management Deputy Director should ensure buildings and equipment are deactivated in FacilityDude when taken offline.	Y	The Department of Public Works' Facilities Management Division, will work to archive building information and equipment when they are taken offline; as this is an on-going iterative task.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Deputy Director of Facilities Management		1-Sep-18
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
	This is an on-going process due to the total count of buildings and equipment.		N/A
12	The DPU Facilities Management Operations Manager should ensure that building assessments are being conducted and documented in Mainsaver.	y	Building assessments have always been done and work done based on issues reported accordingly. However, going forward the facilities group will document the assessments via Main Saver
#####	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
#####	Operations Division Administrator		02\08\2018
#####	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
#####			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

13	The DPU Facilities Management Operations Manager should ensure that Facilities staff are inputting work orders in Mainsaver.	y	Appointed Ops Division Admin Project Analyst to be the central point of contact for inputting work requests in Main Saver in the short term. Will eval going forward
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Division Administrator		01\2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR Y/N</b>	<b>ACTION STEPS</b>
14	The DPU Facilities Management Operations Manager should ensure that all equipment/assets that have a required preventive maintenance schedule are set up in Mainsaver and performed.	y	Will evaluate organizational staffing structure, training, performance, reporting and Main Saver feature set alignment with work processes to best insure proper on-going use. All equipment requiring preventive maintenance schedules will be setup and performed in
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Division Administrator		6\30\2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR Y/N</b>	<b>ACTION STEPS</b>
15	The DPU Facilities Management Operations Manager should ensure that the preventive maintenance work orders are completed timely within the established due dates. The reasoning for non-compliance with the established due dates should be documented.	y	will document any delays in performing PM as scheduled in Main Saver.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Division Administrator		February 1, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR Y/N</b>	<b>ACTION STEPS</b>
16	The DPU Facilities Management Operations Manager should ensure labor hours, material costs and actions taken are keyed into Mainsaver for all work orders.	y	Ops Management will initiate a refresher program on proper data capture to include labor hours, material costs, etc for workorder entry in the short term. For the long term will consider adding Main Saver support staff.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Division Administrator		2\28\2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR Y/N</b>	<b>ACTION STEPS</b>
17	The DPU Facilities Management Operations Manager should ensure that equipment data, such as purchase price, is keyed in the Mainsaver System.	y	Will work to insure all newly delivered facility systems data such as purchase price are entered it into Main Saver.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Division Administrator		June 30, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
18	The DPU Facilities Management Operations Manager needs to ensure the fire alarms are inspected in all DPU maintained buildings as required.	<b>Y</b>	Will ensure Fire detection system inspection is done according to scheduled times and scheduled in Main Saver to generate a workorder\task completion.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Division Administrator		3\31\2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
19	The PRCF Facilities Management Operations Manager should ensure that a comprehensive building/location listing exists and that all locations, and their respective information, are keyed in the MainTrac system.	<b>Y</b>	Operations Managers will review with facility leads that buildings/locations to include age of building, square footage, etc. are accurately setup in MainTrac and confirm set up by April 2nd. If not, input information in google doc (spreadsheet) for entering into MainTrac by July 2nd.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Manager		July 2, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
20	The PRCF Facilities Management Operations Manager should ensure that building assessments are being conducted for Parks and Recreation Facilities and documented in the MainTrac system.	<b>Y</b>	Operations Managers will review with facility leads that building assessments are accurately setup in MainTrac and confirm set up by April 2nd. If not, input information in google doc (spreadsheet) for entering into MainTrac by July 2nd. Starting July 2nd Facility Management staff will schedule and conduct assessments to ensure each location's assessments (lights out, leaky faucet, need window repair, etc) are recorded in MainTrac.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Manager		July 2, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
21	The PRCF Facilities Management Operations Manager should ensure that a comprehensive equipment listing exists and is keyed, along with all equipment information, in the MainTrac system.	<b>Y</b>	Operations Manager will review with facility leads that a comprehensive equipment listing is accurately setup in MainTrac and confirm setup by April 2nd. If not, input information into google doc and enter in MainTrac by July 2nd.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Manager/ Office Support Spec.		July 2, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

22	The PRCF Facilities Management Operations Manager needs to ensure the fire extinguishers and sprinkler systems are inspected in all Parks and Recreation maintained buildings as required.	Y	At present, the department has four facilities under contract for fire extinguisher/sprinkler inspections quarterly. They are: Hickory Hill Community Center, Randolph Community Center, Bellemeade Community Center, and Pine Camp. Confirm extinguisher purchase by February 1st, if not, procure additional extinguishers/sprinklers, put a contract in place, and schedule inspection by September 3rd.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Manager		September 3, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR</b>	<b>ACTION STEPS</b>
23	The PRCF Director needs to develop and implement a plan to ensure that the Facilities staff are adequately trained and have the necessary resources to efficiently and effectively utilize the MainTrac system.	Y	Operations Manager will report back a training plan for usage of MainTrac. Determine the resources needed to enter data/inventory by June 1st. Plans will be reviewed and implemented as a department policy by July 2nd. Procure resources and order necessary equipment by August 1st. Operations Managers and lead staff will also make recommendations on training needs and how often training is required to be adopted into policy by September 3rd. Training will begin November 1st, 2018
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Director/Deputy Director		November 1, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR</b> Y/N	<b>ACTION STEPS</b>
24	The PRCF Facilities Management Operations Manager needs to develop and implement a timeframe for setting up the inventory stock room in the MainTrac system.	Y	Staff will enter inventory data/stock in google doc (spreadsheet) for MainTrac input by April 2nd. Staff will also send recommendations on the best methods of entering stock and maintaining items in MainTrac. If not, input information into google doc and enter in MainTrac by July 2nd. This process will be added to the adopted policy for MainTrac.
	<b>TITLE OF RESPONSIBLE PERSON</b>		<b>TARGET DATE</b>
	Operations Manager/Office Support Spec.		July 2, 2018
	<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>		<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>
<b>#</b>	<b>RECOMMENDATION</b>	<b>CONCUR</b> Y/N	<b>ACTION STEPS</b>

**APPENDIX B: MANAGEMENT RESPONSE FORM**  
**2018-06 DPU, DPW & PRCF - Facilities Maintenance Audit**

25	The CAO should have the Department of Public Works, Department of Public Utilities, and Department of Parks and Recreation Facilities Divisions work together to obtain contracts for fire extinguishers, boiler work, and any other areas in which the three divisions perform a similar task and a contract does not exist.	Y	The Department of Public Works, Department of Public Utilities, and Department of Parks and Recreation Facilities will coordinate with Procurement to define the scope of work with a target completion date of September 2018.
<b>TITLE OF RESPONSIBLE PERSON</b>			<b>TARGET DATE</b>
Public Works Director			September 30, 2018
<b>IF IN PROGRESS, EXPLAIN ANY DELAYS</b>			<b>IF IMPLEMENTED, DETAILS OF IMPLEMENTATION</b>