



Richmond City Council

The Voice of the People.

Richmond, Virginia

OFFICE OF THE CITY AUDITOR

REPORT # 2013-11

AUDIT

Of the

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

OFFICIAL GOVERNMENT REPORT

Richmond City Council

OFFICE OF THE CITY AUDITOR

900 East Broad Street, 8th Floor
Richmond, Virginia 23219

804.646.5616 (tel); 804 646.2230 (fax)

*Committed to increasing government efficiency, effectiveness,
and accountability on behalf of the Citizens of Richmond.*

TABLE OF CONTENTS

Executive Summary..... i

Comprehensive List of Recommendations..... V

Introduction..... 1

Methodology..... 1

Background..... 2

Internal Controls..... 8

Management Responses..... Appendix A



Richmond City Council

The Voice of the People Richmond, Virginia

Office of the City Auditor

Executive Summary

May 9, 2013

The Honorable Members of the Richmond City Council
The Honorable Mayor Dwight C. Jones

Subject: Roadway Maintenance and Capital Improvement sidewalk operations

The City Auditor's Office has completed an audit of the Roadway Maintenance and Capital Improvement sidewalk operations in the Department of Public Works. The auditors conducted this performance audit in accordance with generally accepted government auditing standards.

The City Auditor's Office appreciates DPW's commitment to address discrepancies identified in this report expediently. During the audit, DPW developed several procedures to address some of the discrepancies. In addition, the Department began working with the Department of Information Technology to improve the use of functionality of their work order system. This will allow DPW to capture operational information along with relevant costs for them to manage the sidewalk operations more effectively in the future.

Introduction

The City of Richmond is responsible for maintaining approximately 832 miles of sidewalks. Maintaining the sidewalks is a coordinated effort between the Capital Improvement Project (CIP) and the Roadway Maintenance sections within the Department of Public Works.

A July 2012 citizen survey conducted by the City indicated significant concerns about the conditions of City sidewalks and roadways. The citizens rated maintenance of City sidewalks as very important to them, but they were least satisfied with the current repairs and maintenance.

The City has many competing priorities and may not be able to address every need equally. Sidewalk repairs, maintenance, and replacements do not represent funding priorities for the City. Only a small percentage of the adopted capital improvement funding for infrastructure improvements (e.g. roads, sidewalks, and curb ramps) was allocated for sidewalks. The recent City's biennial fiscal plan includes funding to improve only 0.7% of known sidewalks. At the current funding level, the sidewalk infrastructure may continue to deteriorate.

Salient Findings

Based on the results and findings of the audit methodology employed, the auditor concluded that controls and procedures need to improve significantly to effectively and efficiently manage Roadway Maintenance and CIP sidewalk operations.

- Policies and procedures are inadequate;
- Appropriate information is not gathered to determine the workload;
- Adequate oversight is not in place;
- Recordkeeping is inadequate which results in incomplete operational information;
- Compliance with regulations is not assured;
- Proper procurement and inventory controls are lacking; and
- Adequate performance standards do not exist.

Effective management of this function is not possible without a thorough knowledge of all of the above issues. In addition, for effective management, the Divisions must have operational data to quantify their workload and exercise controls over employee productivity and accountability over City resources as described below:

1. Currently, the Divisions do not have complete information to manage their operations. The issues related to this matter are as follows:
 - The Divisions do not have complete information related to their workload. Without this information, future planning and requesting for adequate funding for sidewalk maintenance is not feasible.

- Roadway Maintenance does not have properly organized and complete information for labor and materials used per project. This information is not captured in the automated system although the system has the functionality to process it. Instead, the information is captured in daily logs. The auditor found that some of these logs were missing.
2. Management oversight needs improvement as described below:
- Roadway Maintenance has 15 business days from the date the request is reported to inspect the location. The Division is not always able to comply with the inspection timeframe. The inspection dates are not recorded for the service requests. The field in CityWorks is not being utilized and there is no field in the Citizen Request System to record the inspection date. Inspections for 53 selected open customer requests since 2006-2009 were not completed until 2012. Adequate records were not available to determine if prior inspections were conducted.
 - Sidewalk ratings were inconsistently completed sometimes by not using all of the rating criteria.
 - Roadway Maintenance needs to improve controls over labor costs. In selected situations, there was no oversight to determine the reasonableness of the labor hours spent. The auditor did not observe any procedure for verifying accountability over labor costs which are a large portion of Roadway Maintenance budget.
 - Roadway Maintenance's Operational reports included overstated work accomplishments.
 - In the auditor's sample of Roadway Maintenance projects, about 21% of project records indicated completion of repairs at respective locations. However, the auditor did not find evidence of repairs at these sites.
 - Roadway Maintenance purchased about \$18,000 of pre-mixed concrete from a vendor in violation of procurement policies.
 - Expenditures totaling approximately \$142,000 for CIP expenditures were not supported by proper documents.
 - The CIP Division did not have proper documentation to indicate proper inspection and construction verification practices were followed. Without such assurance, it is difficult to determine if the City received quality construction for the money spent.

- CIP Division did not have adequate controls in place to verify that materials used complied with specifications.

The City Auditor's Office appreciates the cooperation of the Department of Public Works' staff. Please contact me for questions and comments on this report.

Sincerely,

Umesh Dalal

Umesh Dalal, CPA, CIA, CIG
City Auditor

cc: Mr. Byron C. Marshall, CAO
The Richmond City Audit Committee
Mr. James Jackson

#	<i>COMPREHENSIVE LIST OF RECOMMENDATIONS</i>	<i>PAGE</i>
1	Develop a formal, comprehensive policies and procedures manual for the sidewalk operations in both Roadway Maintenance and CIP.	9
2	Establish performance measures that management can use to evaluate performance and productivity of the Divisions and supervisory personnel.	11
3	Use proper benchmarks to evaluate the Richmond sidewalk operations' performance.	11
4	Implement an asset management approach that systematically quantifies the sidewalk repair, maintenance, and replacement needs for use in prioritizing repairs and maintenance activities based on available funding.	14
5	Comply with the Underground Utility Damage Prevention Act requirements.	16
6	Establish procedures for monitoring compliance with the Underground Utility Damage Prevention Act.	16
7	Document inspection completion dates to ensure that inspections are completed within the established timelines.	17
8	Establish procedures for conducting sidewalk inspections to ensure consistency among different raters.	18
9	Consistently use the established criteria for rating requests.	18
10	Establish sidewalk repairs priority schedule using established criteria.	18
11	Improve oversight over labor costs and employee productivity	22
12	Keep accurate count of brick used	22
13	Establish materials re-order point to prevent loss of productivity.	22
14	Work with the Fleet Services Division to replace equipment in a timely manner.	23
15	Until the records are automated, ensure retention of all daily logs for a pre-determined period to allow meaningfully analyses and comparison for several fiscal	25
16	Establish appropriate procedures to ensure accurate work accomplishment reporting to DPW management	25
17	Conduct field inspections to verify the quality of repairs completed.	26
18	Group the requests by location and address them during the repair crew's visit to the area of these requests.	28
19	Communicate the service needs to DPU and Urban Forestry using CRS. Follow up the resolution of the requested services.	30
20	Monitor and hold staff accountable for adherence to safety regulations	32
21	Evaluate the cost effectiveness and feasibility of concrete recycling. Recycle concrete if found cost effective.	34
22	Comply with the City's Procurement Policy.	36
23	Establish proper specifications for materials and conduct necessary testing to ensure suitable quality of materials used on the City's sidewalk projects.	42
24	Retain project documentation from initiation to close out.	42

Overview

Introduction and Scope

The City Auditor's Office has completed an audit of the Roadway Maintenance and Capital Improvement sidewalk operations in the Department of Public Works. This audit covers the 12-month period that ended June 30, 2012. The objectives of this audit were to evaluate:

- Economy and efficiency of operations, including safeguarding of assets and achievement of desired outcomes;
- Reliability of financial and management reports; and
- Compliance with policies, laws, and regulations.

The auditors conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require 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.

Methodology

The auditors employed the following procedures to complete this audit:

- Reviewed relevant records, policies and regulations;
- Performed various tests;
- Visited the sites and photographed the conditions of the selected sidewalks and completed repairs;
- Researched industry standards (ASTM) for brick specifications;
- Evaluated the appropriateness of materials used by conducting an analysis of materials purchases and consumption;

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

- Verified safety procedures by site visits, research of regulations and interviewing staff;
- Conducted interviews; and
- Performed other audit procedures, as deemed necessary.

Management Responsibility

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

Background

The City of Richmond is responsible for maintaining approximately 832 miles of sidewalks. Maintaining the sidewalks is a coordinated effort between Capital Improvement Project (CIP) and the Roadway Maintenance Section within the Department of Public Works. Repairs greater than half a block in size are contracted out by CIP. Repairs that are half a block or less in size are completed by Roadway Maintenance. Each Division's budgets are allocated and expended separately.

Nationwide, several local governments are experiencing deteriorating infrastructure assets and corresponding rising maintenance costs for these assets. The assets beyond repairs need to be replaced demanding even bigger funding requirements. This situation has resulted from years of postponement of infrastructure repairs and maintenance. The local governments frequently face competing priorities. Therefore, the priority for infrastructure maintenance is deferred as it does not show immediate impact. This allows the government to use the funding, that otherwise would have been used for maintenance, for the other priorities. This method may be effective in the short term. However, if repeated multiple times, the sidewalks will begin to show deterioration, which will require much larger funding. Nationwide, the American

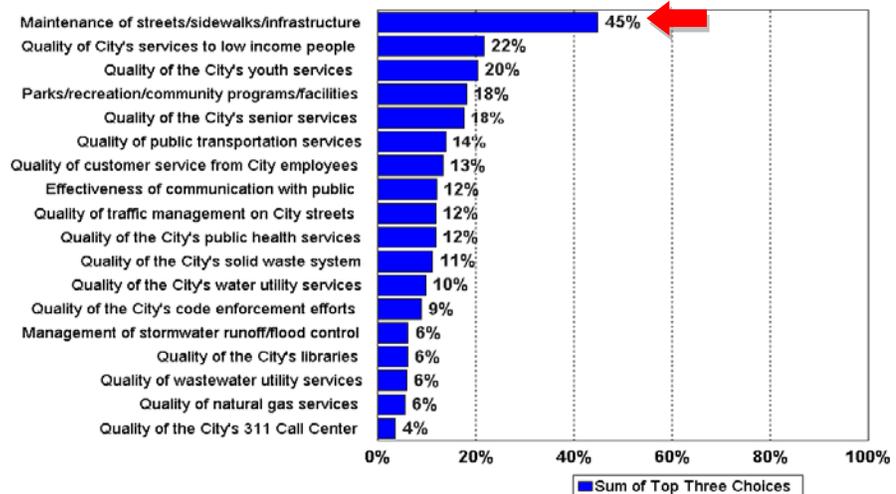
Society of Civil Engineers rated the infrastructure conditions as “D-plus.” Therefore, Richmond is not unique in encountering deteriorating infrastructure.

Sidewalk repairs and maintenance is important for the Richmond citizenry

Richmond residents are concerned about the conditions of sidewalks
 A July 2012 citizen survey conducted by the City indicated significant concerns about the conditions of City sidewalks and roadways. The following charts and information demonstrates the significance of these concerns:

Q3. Major Categories of City Services Most Important For the City to Provide

by percentage of respondents who selected the item as one of their top three choices

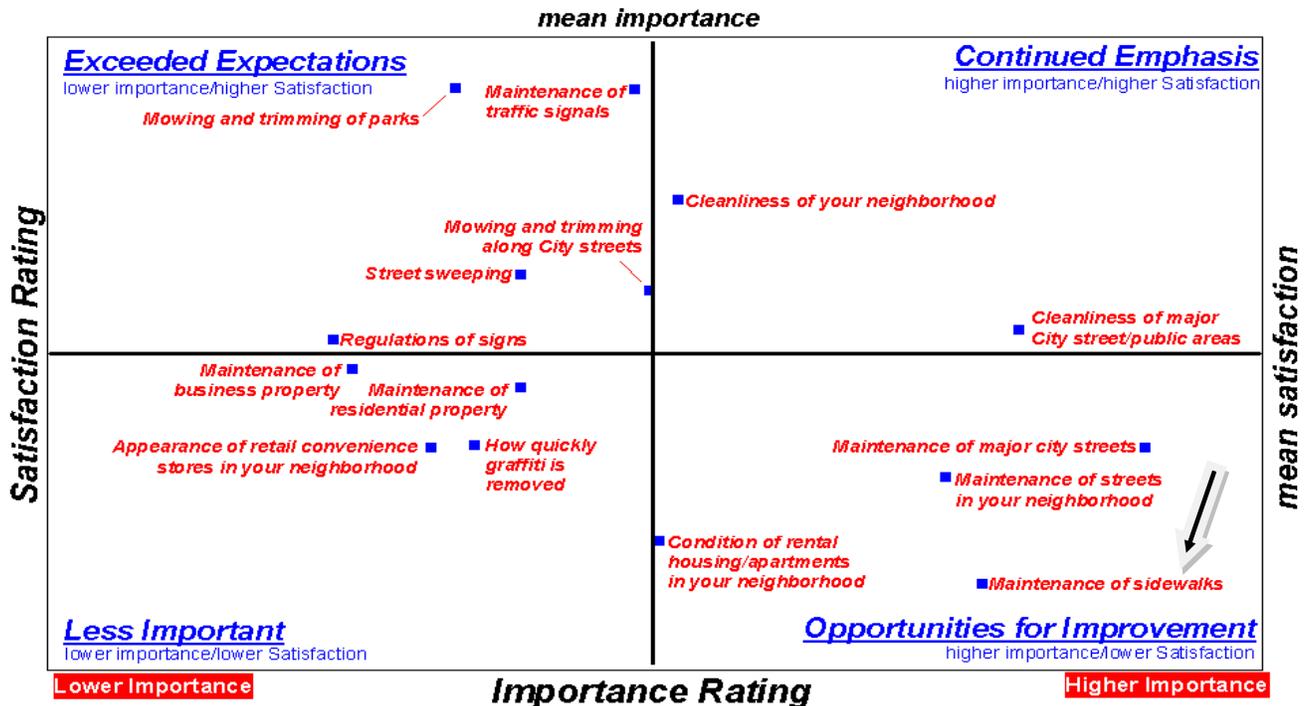


Source: ETC Institute (2012 City of Richmond Community Survey)

The Richmond citizenry is least satisfied with the sidewalk conditions

2012 Richmond Community Survey Importance-Satisfaction Assessment Matrix -Maintenance and Appearance of the City -

(points on the graph show deviations from the mean importance and Satisfaction ratings given by respondents to the survey)



Source: ETC Institute (2012)

Note: The City sidewalks were rated as very important but as the function in which the citizens are least satisfied.

Sidewalk repairs, maintenance, and replacements are not a funding priority for the City

The City has many competing priorities and may not be able to address every need equally. Sidewalk repairs, maintenance and replacements do not represent funding priorities for the City. As demonstrated below, only a small percentage of the adopted capital improvement funding for infrastructure improvements (e.g. roads, sidewalks, and curb ramps) was allocated for sidewalks:

City of Richmond Audit Report 2013-11
Roadway Maintenance and Capital Improvement Sidewalk Operations
May 2013

<i>A small fraction of the available transportation infrastructure funding is available for sidewalk improvements</i>	Fiscal Year	Transportation Infrastructure (Millions)	Sidewalk (Millions)*	% of Infrastructure Budget
	2009	\$16.5	\$(.07)	0%
	2010	\$8.3	\$0.18	2%
	2011	\$7.2	\$0.50	7%
	2012	\$9.6	\$0.50	5%
	2013	\$14.8	\$0.75	5%

Source: Adopted Capital Improvement Plans (includes only City funding)

* excludes money allocated for special projects

The City's current goal is to improve 0.7% of sidewalks in the City

The recent City's biennial fiscal plan includes improving six miles of sidewalks as a short-term priority. Based on the available data, it is not clear if this is an adequate goal. However, this goal represents 0.7% of the known sidewalks in conditions ranging from excellent to worst. Currently, the Division has limited funding, and accomplishing additional work may not be feasible. This goal may not be appropriate to address the significant concerns expressed by citizens about the conditions and maintenance of sidewalks. At the current funding level, the sidewalk infrastructure may continue to deteriorate.

The CIP sidewalk projects are funded through general obligation bonds, state funds, federal funds, and council appropriations. According to the CIP Administrator, sidewalk maintenance alone would not qualify for State or federal priority lists. In order to leverage funding, sidewalks are incorporated as a part of larger projects.

Routine sidewalk maintenance is funded as a part of the Roadway Maintenance budget. DPW collectively budgets funding required for all activities including sidewalk maintenance without identifying costs of each activity separately.

Estimated Funding Needs

DPW has estimated a Capital Improvement need of \$14 million based on the open service requests for repair and maintenance of existing sidewalks. However, this figure is understated as inspections and cost estimates have not been completed for all of the backlog requests. Also, the estimates are not adjusted for inflation and ongoing deterioration. In addition, Roadway Maintenance has a backlog of complaints that need inspections, some of which may need to be referred to CIP operations. Furthermore, this amount does not include money needed for small routine sidewalk maintenance and repair needs for the City because cost estimates have not been assigned.

Based upon the citizens' request, the Department also estimates that an additional \$12 million is needed for new sidewalk installations in areas where none exist throughout the City. The auditor could not verify the reasonableness of these estimates as the completeness of the data could not be assured. According to the Director of Public Works, the Department is in the process of accumulating relevant information which is discussed subsequently in this report.

Historically, the funding for sidewalk repairs, maintenance, and replacement has not been adequate to address the known backlog.

Funding History

DPW has communicated the sidewalk conditions, backlog, and the perceived estimated cost to City Council and Administration. Historically, the funding for sidewalk repairs, maintenance, and replacement has not been adequate to address the known backlog. Only minimal funding has been allocated for sidewalks over several years. Over a five year period, the City has only allocated approximately \$1.86 million for sidewalk maintenance and repairs.

***DPW'S
Commitment***

During the audit, the DPW Director acknowledged that many of the issues identified by this audit are closely connected with the following shortcomings:

- Lack of appropriate operational data
- Unavailability of comprehensive policies and procedures

The Department is currently using a computer system called “CityWorks.” This system is underutilized currently. According to the DPW Director, DPW has been working with the Department of Information Technology since November 2012 to enable them to utilize the system functionalities. This change, if made, would allow the Department to track operational data. Currently, the Department does not have a specific target date for completing this project. Expediting this project is critical for improving controls over significant expenditures in DPW.

In order to compile a comprehensive policies and procedures manual, the Department has sought and received approval from the Chief Administrative Officer to acquire a system that will support this effort. In conjunction with and, as part of this effort, the DPW Director has indicated that the Department is in the process of documenting process flows that will be used to develop detailed procedures.

These measures may not address all the issues identified in the report, but it is a step in the right direction.

Management of Available Resources

Internal Controls

Controls and procedures need significant improvement to effectively and efficiently manage sidewalk operations

According to Government Auditing Standards, internal control, in the broadest sense, encompasses the agency's plan, policies, procedures, methods, and processes adopted by management to meet its mission, goals, and objectives. Internal control includes the processes for planning, organizing, directing, and controlling program operations. It also includes systems for measuring, reporting, and monitoring program performance. Based on the results and findings of the audit methodology employed, the auditors concluded that controls and procedures need to improve significantly to effectively and efficiently manage Roadway Maintenance and CIP sidewalk operations.

- Policies and procedures are inadequate;
- Appropriate information is not gathered to determine workload;
- Adequate oversight is not in place;
- Recordkeeping is inadequate and results in incomplete operational information;
- Compliance with regulations is not assured;
- Proper procurement and inventory controls are lacking; and
- Adequate performance standards do not exist due to the Department's inability to use system resources for the accumulation of relevant information.

Effective management of this function is not possible without a thorough knowledge of all of the above issues. The goal of this function should be preserving sidewalks in good repair and operational conditions in order to extend their useful life.

The following discussion addresses the above issues in the CIP and Roadway Maintenance sidewalk operations:

Policies and Procedures

A formal comprehensive policies and procedures manual needs to be developed

During the audit, the auditor received separate procedures for some of the tasks conducted by Roadway Maintenance and CIP sidewalk operations. A formal comprehensive policies and procedures manual needs to be developed for each Division. Incomplete written policies and procedures and communicating them to staff may lead to unclear job duties and responsibilities, inconsistent job performance by employees, and inadequate service delivery to the public. Also, policies and procedures are important to ensure the continuity of operations during employee turnover.

Recommendation:

1. Develop a formal, comprehensive policies and procedures manual for the sidewalk operations in both Roadway Maintenance and CIP.

Performance Measures

The performance of the Division is impossible to verify

Performance measures are tools for monitoring and evaluating the performance of the function and management effectiveness. They are designed to evaluate efforts, outputs, and outcomes. The auditors observed that adequate performance measures are not in place for the CIP and Roadways Maintenance sidewalk operations. DPW has established the following performance measures:

FY2012 Goal	Standard	Exceeds	Exceptional
Complete 7000 square yards of concrete repairs	75%	85%	95%
Complete 8000 square yards of brick repairs	75%	85%	95%
Complete 6 miles of sidewalk	2.5 miles		

improvement (CIP)

Performance measures were not adequate to evaluate performance and productivity of the Divisions

To accomplish this workload, the Division had 17 full-time equivalent employees. The amount of time these employees spend on sidewalk repairs is unknown because the Division does not have relevant records. Under these circumstances, productivity of either the Division or the employees cannot be evaluated.

In addition, due to the inaccurate recordkeeping related to the square yards of repairs completed, the Division's performance couldn't be evaluated using the above performance measures.

The CIP Division accomplished 1.79 miles of sidewalk repairs during FY2012 as compared to their target of 2.5 miles. According to the City Engineer, the Division did not obtain enough funding to accomplish its target. Accomplishment of workload depends on the available funding. For example, the Department sought \$2 million to complete 12 miles of sidewalk repairs in FY2012. However, only \$600,000 was appropriated for CIP sidewalk projects.

The established performance measures address only the workload accomplishments. In order to use operational information more meaningfully, the following performance measures need to be established:

- Cost per unit of sidewalk repairs,
- The average condition rating,
- Reduction of backlog of complaints, etc.

The use of proper benchmarks may provide additional guidance about the adequacy of the Divisions' performance.

Recommendations:

2. Establish performance measures that management can use to evaluate performance and productivity of the Divisions and supervisory personnel.
3. Use proper benchmarks to evaluate the Richmond sidewalk operation’s performance.

Workload

Appropriate information is not gathered to determine the workload

According to DPW management, the Department's priorities in order of importance are:

- (1) Safety by removing hazards,
- (2) Preservation of asset by maintaining existing infrastructure,
- (3) Construction of new sidewalks, and
- (4) Enhancement of appearance.

Increase in requests indicate a higher demand for the service

The open requests for sidewalk repairs and maintenance increased from 688 requests as of June 30, 2012 to 1,342 as of January 31, 2013 as follows:

Request Type	As of 1/31/2013	As of 6/30/2012
Maintenance	838	271
CIP	504	417
Total	1,342	688

Source: CityWorks

This shows increasing demand for services. The increase in demand may also be the result of increased public understanding of the City’s process for submitting requests. On average, the sidewalk maintenance requests have been open for at least two years, and the CIP requests have been open for at least four years. The Department attributes the

backlog to the lack of resources (e.g. funding, staffing, etc).

The Division does not have complete information related to its sidewalk repairs and maintenance workload.

The above requests do not represent the total workload for the Division. The City has an aging sidewalk infrastructure that presents numerous safety hazards. Not all of the repairs and maintenance needs are communicated to the Department. All unidentified repairs and maintenance must be addressed in order to maintain the integrity of this infrastructure asset.

Open service requests do not represent the complete workload of the Division

Currently, there is no process in place to systemically identify repairs and maintenance needs for both the sidewalks in poor conditions and the sidewalks in good operating condition. The lack of this process prevents preserving and prolonging the useful life of the sidewalks. The following are some examples of unreported maintenance needs:



317 N 21st Street



1715 N Texas Avenue

The auditor observed the following:

The Division does not have a complete inventory of all City sidewalks

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

- The Division conducted a sidewalk inventory in 2005. This inventory captured only the length of sidewalks. DPW's records do not include pertinent measurements, conditions, and repairs/maintenance needs. Any modifications or changes since that time have not been captured. In addition, the estimated miles of sidewalk is calculated based upon the total length of the sidewalk segments in the system with a standard assumed width of 5 feet. However, the sidewalks in certain areas of the City have varying widths.
- Sidewalk conditions are only assessed after the Division receives customer requests or complaints.
- For the period from FY2009-FY2012, the records were found to contain some inaccuracies. The Division does not have a process to assure completeness and accuracy of the compiled information.

Sufficient information is not available for planning purposes. Without the knowledge of the total workload, addressing the City's needs is not possible.

Need for a strategic and systematic approach

The Federal Highway Administration, the Transportation Research Board, and the American Association of State Highway and Transportation Officials encourage state and local agencies to use an asset management approach. This strategic and systematic approach can provide cost effective solutions while minimizing lifecycle costs.

The Virginia Department of Transportation's (VDOT) asset management approach consists of:

The strategic and systematic asset management approach can provide cost effective solutions while minimizing lifecycle costs

- Systematically identifying maintenance needs,
- Developing the annual budget request to meet these needs, and
- Guiding the allocation of available resources across maintenance activities and districts.

To adopt the above approach, the Division will have to use the following procedures:

- Compile a complete inventory of the City's sidewalks;
- Assess the conditions of all sidewalks;
- Identify what maintenance/repair treatments are to be utilized based upon asset characteristics and condition;
- Based on the above information, estimate the resources needed to address total repairs and maintenance needs; and
- Prioritize the repairs and maintenance needs based on established criteria that can be accomplished through available funding.

Recommendations:

4. Implement an asset management approach that systematically quantifies the sidewalk repair, maintenance, and replacement needs for use in prioritizing repairs and maintenance activities based on available funding.

Lack of Oversight

Management oversight needs improvement

Audit revealed that management oversight needs to be improved to ensure that work is completed:

- In compliance with regulations,
- Timely, efficiently and effectively, and
- Safely.

These issues are discussed as follows:

***Miss Utility
Notifications***

Compliance with regulations

The Underground Utility Damage Prevention Act requires notifying Miss Utility of Virginia (Miss Utility) at least three working days prior to excavation or demolition work begins. Pursuant to DPW policies and procedures, the Trade Supervisors for the sidewalk crews are responsible for notifying Miss Utility about any excavation work for the sidewalk repairs and ensuring the markings are complete. The auditor observed the following:

***The Division did not
comply with the
Underground Utility
Damage Prevention
Act requirements***

- Miss Utility was notified for the sidewalk repairs for approximately 50% of the concrete repairs reviewed by the auditor. In addition, notifications were not submitted for the brick repairs. The brick crew's work meets the State Code definition of excavation. According to the Supervisor, he did not submit utility marking requests for the majority of the brick sidewalk repairs completed during FY2012.

Two months after the auditor notified DPW, utility marking requests were still not being submitted for brick sidewalk repairs. Failure of proper notification can result in utility line damage, property damage, injury, and service outage.

***The non-compliance
continued two
months after the
Division was notified***

- The auditor observed that excavation work was conducted even though there was clear evidence of unmarked utilities (e.g. gas and water shut off valves.)

- On some occasions, excavation work was conducted prior to utility markings. Sometimes the Division does not comply with these regulations in order to respond to rushed project requests.
- State regulations require confirmation of all applicable utility markings prior to excavation. The supervisor is not following up with Miss Utility of Virginia as required.
- The Professional Excavator's Manual indicates that utilities should not be removed without the utility operator's permission. Auditor observed that an abandoned utility was removed without appropriate authority. Inquiry with DPU revealed that DPW did not have the authority to remove the abandoned utility.

Recommendation:

5. Comply with the Underground Utility Damage Prevention Act requirements.
6. Establish procedures for monitoring compliance with the Underground Utility Damage Prevention Act.

Site Inspections

The Division does not have assurance of timely completion of site inspections

The Division has a backlog of inspections/investigations to be conducted for sidewalk requests/complaints. The Division has 15 business days from the date the request is reported to inspect the location. The Division is not always able to comply with the inspection timeframe. However, according to the Facilities Maintenance Manager, the staff attempts to get to locations as soon as possible. The inspection dates are not recorded for the service requests. The field in CityWorks is not being used and there is no field in Citizen Request

System (CRS) to record the inspection date. As such, the number of requests for which inspections are conducted late cannot be quantified. Therefore, the timeliness of completing the inspections cannot be assured. The rating sheets requested for a sample selected from the 63 open requests from FY 2006 through FY 2009 were dated in 2012 or later. The reasons for untimely addressing these requests are unclear. Untimely completion of inspections could also affect the timeliness of work transferred to CIP or DPU.

Recommendation:

7. Document inspection completion dates to ensure that inspections are completed within the established timelines.

Discrepancies existed in ratings assigned to sidewalk repairs requests

According to the Facilities Maintenance Manager, between 2009 and early 2012, Roadway Maintenance staff was not rating the sidewalk requests. Not assigning ratings would prevent the Division from assigning proper priorities. According to the Facilities Maintenance Manager, staff began rating repair/request locations for open requests in April 2012.

The ratings were assigned inconsistently to repair requests

The auditor found that recent ratings may not be accurate. These ratings were supposed to be based on six criteria, including the age of the request. However, the staff did not always use the age of the request, which is a major rating criterion. This situation created an inconsistency in ratings.

Recommendations:

8. Establish procedures for conducting sidewalk inspections to ensure consistency among different raters.
9. Consistently use the established criteria for rating requests.

***Establishing
Priorities***

According to the Facilities Maintenance Manager, requests are prioritized based upon the age of the request and the severity of the sidewalk condition. However, Roadway Maintenance does not have a prioritized schedule of repairs which outlines all open requests, location ratings and estimated completion periods. Without this information, prioritizing requests using the Roadway Maintenance criteria is not possible.

The Auditor analyzed the Division's CityWorks system database and found that 63 assessment requests from FY2006 through FY2009 were still open. These represent about 9% of the total open requests as of June 30, 2012. The DPW personnel could not explain the reasons for not completing these requests.

Recommendation:

10. Establish sidewalk repairs priority schedule using established criteria.

Roadway Maintenance Sidewalk Operation

***Resource
Management***

The Division does not have operational data required for proper management

The Division uses the CityWorks system inadequately

CityWorks is an automated system that includes work order management capabilities. The System has functionalities to keep records of labor, material, and equipment costs. In order to utilize these functionalities, the staff must input relevant data such as labor and equipment hours, quantity of materials utilized, and relevant cost data. This is critical information which is useful for effective management of the Division. However, the Division does not accumulate this information in the System. Instead, it uses the System just to keep records of open and closed service requests. This represents a limited use of the System's resources and capabilities. This prevents the Division from determining the cost of the services provided and evaluating the reasonableness of resources utilized.

The Division does not use the System functionalities for management purposes

A significant number of manual logs were missing.

The Division is expected to maintain labor and equipment hours and materials used for each projects on manual daily logs. These logs do not include any cost information. Therefore, if supervisors or managers want to evaluate costs incurred for a period or a project, they will have to perform a series of manual calculations from the information maintained on the various manual logs. This process, if followed, would be inefficient. Presently, the Division managers do not evaluate the cost of the operational tasks.

Presently, the costs for operational tasks are not evaluated by the Division managers

The concrete logs were not organized and filed in any order. The

City of Richmond Audit Report 2013-11
Roadway Maintenance and Capital Improvement Sidewalk Operations
May 2013

Missing logs prevented audit analysis of resources utilized

auditor did not receive all the logs requested for various stages of the concrete sidewalk work completed in FY2012. This prevented the auditor from performing any meaningful analysis of resources used by the concrete crew. In this situation, it is not possible for management to evaluate the work performed and the appropriateness of resources utilized. Without this information, establishing reasonable operational goals and managing this operation effectively may not be possible.

Control over labor costs need improvement

Based on the limited review of the brick logs, the auditor identified large discrepancies in the work output calculations as follows:

Observations	Task	Sq. Yard	Labor Hours
Observation 1	Pulled up brick and laid a 5x7 section in old brick	3.9	48
	Pulled up and laid a 4x12,2x19,4x16,4x13, 2-5x5 section in old brick and a 3x7 tree box	30.3	48
Observation 2	Pulled up brick and laid a 5x5 section in old brick and grouted	2.8	24
	Pulled up old bricks and laid a 5x8 section in old brick and grouted	4.4	40
	Pulled up bricks, laid a 6x10 2- 3x3, 4x6 sections in old brick and grouted	11.3	40
Observation 3	Site Preparation: dug up brick, cut tree root out a 12x53section and made safe with stone dust	70.7	54
	Site Preparation: dug up brick, tree roots out of a 12x70 section and made safe with stone dust	93.3	56
	Site preparation: Dug up bricks, cut tree roots out of a 5x72 section and made safe stone dust	40.0	56

Accountability over labor costs needs improvement

In observation 1, the same number of labor hours was used to complete work on 3.9 square yards and identical work on 30.3 square yards. Observations 2 and 3 also depict a similar situation. This shows that at least in the above situations, there was no oversight to determine

reasonableness of the labor hours spent. The auditor did not observe any procedure for verifying accountability over labor costs which are a large portion of Roadway Maintenance budget.

The DPW management indicated that the above situation resulted from inaccuracy in tracking data. Currently, the same crew is assigned to multiple tasks such as sidewalk repairs, weather maintenance, etc. The crew members are subject to be re-assigned from sidewalk projects to other tasks at a moment's notice. However, the re-assigned staff continued to charge their time to the sidewalk project. In this situation, it may not be possible for management to monitor labor costs and manage employee productivity.

Control over materials need improvements

Reasonableness of material usage

The auditor used available daily logs to analyze the reasonableness of brick usage based upon the manufacturer's suggested number of bricks needed per square foot. The auditor found that, for repairs of 3,971 square feet in the selected repairs, the manufacturer's suggested quantity of bricks was 20,649. However, the Division reported using only 15,105 bricks. This reporting represents 27% less brick usage than the estimated need. The reported quantity did not appear to be reasonable. The auditor inquired with DPW personnel about their procedure to determine actual usage. According to the lead mason of the brick crew, he estimates the quantity of bricks used based on visual inspection. This method does not appear to assure the accuracy of brick usage. Also, without this information, it is difficult to determine if all bricks purchased are properly accounted for.

***Currently, there is
no accountability
over brick usage***

Recommendation:

11. Improve oversight over labor costs and employee productivity.
12. Keep an accurate count of bricks used.

Materials inventory could be managed more effectively

The Materials Supervisor is responsible for ordering materials upon request from the Facility Maintenance Manager and the Operations Manager. The auditor found that the Division has not established a material re-order point to ensure that materials are available when needed. A re-order point is defined as the minimum amount of an item, which is held in inventory, to prevent down time. When the material quantity falls to this amount, the item must be reordered. During this audit, the auditor observed that the work crew left the worksite without completing the repairs, attended other projects, and returned later to complete repairs at the existing work site. The staff attributed some of the delay in the repairs on the unavailability of materials. Establishing a re-order point will prevent the interruption of repairs due to material shortages.

Recommendation:

13. Establish material re-order point to prevent loss of productivity.

Renting equipment for an extended period rather than buying it may have resulted in substantial financial loss to the City

The concrete breaker is a critical piece of equipment used for the sidewalk operations. The equipment is used to break up damaged concrete for removal. The Division has been renting this equipment since 2008. The Division has spent at least \$100,000 in rental costs. According to the Deputy Director of Operations, the replacement cost of this equipment is about \$120,000. This means that the City has spent about 85% of the cost of the new equipment and yet, it does not

Proper inventory ordering procedures could prevent interruptions in repair projects

The City paid equipment rental costs for over four years that almost equaled the cost of buying new equipment

own it. For FY2012 and FY2013, the Division did not have budget appropriations to acquire this equipment. The rationale for renting the equipment rather than buying it prior to FY2012 is not known. Based upon the information received, the equipment is not on the current asset replacement schedule compiled by the Fleet Services Division.

Recommendation:

- 14. Work with the Fleet Services Division to replace equipment in a timely manner.

Reporting Discrepancies

Monthly Maintenance Operation reports, which include information about the workload accomplished, are available but not used by the Deputy Director of Operations. According to the DPW Director, the monthly reports must be used to determine if work is being done, service requests are being completed and to gauge the reasonableness of the materials purchased and used.

The auditor found several discrepancies in the management reports as follows:

The brick crew supervisor over-reported the square yards of repairs accomplished in some instances. The following examples depict this observation:

Auditor found discrepancies in management reporting

Observation	Square Yard Reported	Actual Square Yards*	Overstatement
1	813	53	760
2	138	15	123
3	366	16	350
4	1,396	36	1,360
5	151	21	130
6	54	9	45

City of Richmond Audit Report 2013-11
Roadway Maintenance and Capital Improvement Sidewalk Operations
May 2013

7	244	4	240
8	341	11	330
9	304	24	280
10	844	23	821

* recalculated by auditor using project measurements reported in the above reports

The auditor’s review of the supervisor’s calculation revealed that the supervisor did calculate some of the accomplishments correctly. However, the calculation was overstated in a significant number of times.

Also, the Supervisor’s calculation included separate square yards for each repair activity such as brick removal and laying, grouting, top soiling and mulching for the same repair in the same location. The supervisor added these separate square yards to arrive at the total square yards of repair. However, he should have captured the total square yards covered in the location only once while reporting to management. The current reporting gives the appearance of completing a significantly higher number of sidewalk repairs than the actual accomplishment.

The current reporting significantly overstates the quantity of sidewalk repairs accomplishment

The logs for the concrete crews were not available to verify the accuracy of work performed. The Facilities Maintenance Manager receives information from both supervisors and includes it in the report submitted to the Deputy Director over operations without verifying the accuracy of the information. In this situation, accurate information is not being communicated to DPW management.

Recommendation

15. Until the records are automated, ensure retention of all daily logs for a pre-determined period to allow meaningful analyses and comparison for several fiscal years.

16. Establish appropriate procedures to ensure accurate work accomplishment reporting to DPW management.

No Evidence of Repairs

21% of the selected repairs were marked as completed but there was no evidence of repairs at these sites

During FY2011 and FY2012, the Division closed 354 and 545 concrete and brick assessment service requests respectively. The following are the observations noted during the auditor's review of a sample of 42 closed requests:

- Repairs were in good condition for 60% of the requests and had no issues.
- There was no evidence of repairs for 21% (9) of the requests. At these sites, hazardous sidewalk conditions remain. This situation presents inaccurate information for future planning. Examples of the service requests that were closed without evidence of repairs are as follows:



600 Cumberland Street



3219 Jeter Avenue



3219 Jeter Avenue

Service requests should only be closed after completion of permanent repairs. However, six of the 42 requests were inappropriately closed as only temporary repairs were completed. According to the Facilities Maintenance Manager, there was some miscommunication, and requests were closed in error.

Based on the above observations, supervisory review of repairs and documentation need improvement. Persistent occurrence of these types of discrepancies will prevent the Division from determining the actual work completed and true backlog of work.

Recommendation:

17. Conduct field inspections to verify the quality of repairs completed.

Adjacent Sidewalk Panels

Currently, the Division focuses its efforts to conduct repairs only at the requested locations. The crew would not conduct repair on adjacent

sites even though the need is apparent.

On a typical sidewalk repair, the Division dedicates a crew of seven-to-ten employees and a number of heavy equipment, such dump trucks, backhoes, concrete breakers, trailers, Bobcats, etc. The City incurs cost for transporting these resources to a worksite. This cost is multiplied if the resources have to be transported multiple times to the same location. Therefore, for cost effectiveness of the operation, the Division needs to accomplish all requested and not requested sidewalk repairs in the same area. This is because, once a repair is completed on one site, the residents living on the neighboring sites could make a request if their sidewalk needs repair. Given Roadway Maintenance's current backlog, any subsequent requests may be open for a few years.

For example, as demonstrated below, adjacent and surrounding sidewalk sections in need of repair were not completed while crews were working in the area.



4704 Devonshire Road

The auditor recognizes that the Division is attempting to use very limited funding to meet a significant demand for service. However, it may be in the City's best interest to improve efficiency and cost effectiveness of the resources used.

Recommendation:

18. Group the requests by location and address them during the repair crew's visit to the area of these requests.

Coordination Efforts

Communication with the Department of Public Utilities (DPU) needs improvement

DPU has underground utility infrastructure throughout the City. DPU frequently excavates within the City's streets and sidewalks to repair utility infrastructure. It is DPU's responsibility to restore the excavated sidewalks and streets. Many times, DPW receives requests for sidewalk assessments where the site needs to be restored by DPU.

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

These requests must be forwarded to DPU for them to address. Currently, DPW communicates these requests to DPU using CRS. However, this effort needs improvement as not all the requests are communicated through CRS.

During the audit period, at least 67 requests that needed to be communicated to DPU were identified. The auditor could find only 10 requests in CRS. The Facilities Maintenance Manager indicated that these requests were generally communicated through email and by telephone.

Using CRS establishes a record of transfer and the system can be used to track the status of the request. Communicating these requests by other means may not allow further tracking. If the requests were not addressed, there would be no means to detect and correct them.

Coordination must be improved with Urban Forestry

Trees are planted on or adjacent to the sidewalks. Often, the tree roots damage the sidewalk adjacent to the tree. The repairs at these sites require grinding down the roots or the occasional removal of the tree. An arborist from the DPW's Urban Forestry Division must be present to assess and take appropriate action. The auditor witnessed one occasion when the sidewalk repair was delayed for 15 days. According to the Facilities Maintenance Manager, the repair was delayed for Urban Forestry's action. According to DPW employees, occasionally Urban Forestry requires an extended period to respond. The requests made to Urban Forestry are not communicated through CRS or CityWorks. As such, determining the timeliness of either making requests or Urban Forestry's actions is not possible.

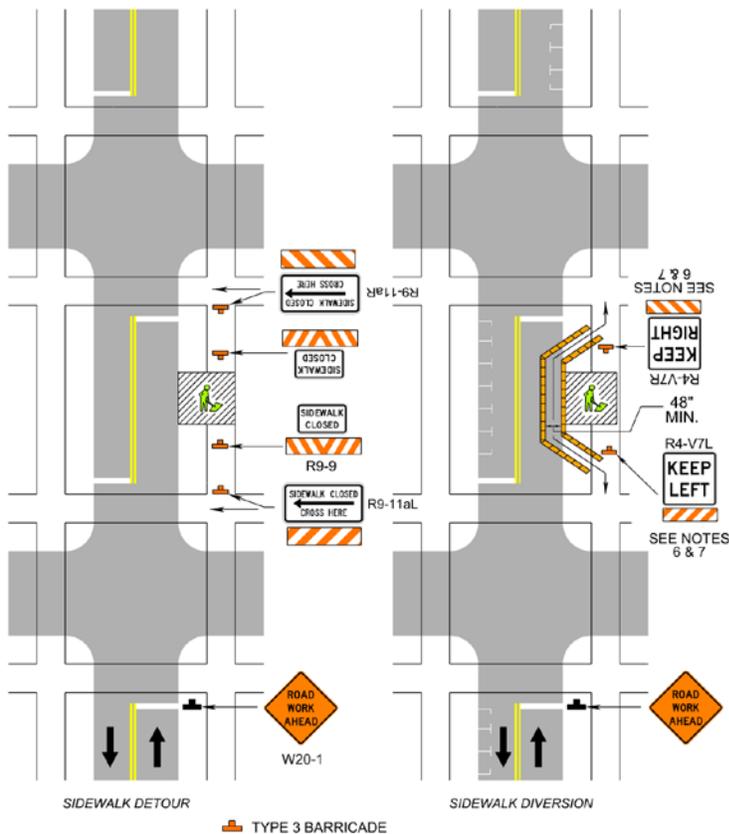
Recommendation:

19. Communicate the service needs to DPU and Urban Forestry using CRS. Follow up the resolution of the requested services.

Safety

Safety procedures during sidewalk repairs projects must be improved

Safety and accessibility of all motorists, bicyclists, pedestrians, and workers should be considered at all times when planning and conducting utility and maintenance work. The Commonwealth's Transportation Board adopted the official standards (manual uniform traffic control devices) for designing, applying, and planning traffic control devices in the Commonwealth of Virginia. These standards require establishing a temporary traffic controls plan for sidewalk repairs as follows:



Source: Virginia Work Area Protection Manual 2011 Edition

Repair crews did not comply with traffic control regulations and could expose users to safety hazards

During two of the visits to work sites in September 2012 and February 2013, the auditor found that sidewalk crews did not comply with the temporary traffic control regulations.

Crews did not set up and work in a temporary traffic control zone. Adequate precautions were not taken to safely and effectively route the road users around and through the work zone; thereby creating a hazard and exposing the City to possible liabilities. Citizens, workers, and equipment were not protected. During the second site visit, the auditor noted that crews unofficially shut down a neighborhood street given the positions of the equipment and vehicles.

Advance notifications of sidewalk closures were not provided. Clearly delineated and usable travel paths were not provided to pedestrians as required by the foregoing standards. Pedestrians were not encouraged through advance signing to cross to the other side of street or re-routed around the work. Absence of these measures could put the pedestrian encountering the work zone in conflict with vehicles, equipment, and sidewalk operations. Only “No Parking” signs were placed in the repair areas. Workers were not wearing high visibility safety apparel, hard hats, or safety goggles.

Also, blocked routes were not adequately communicated to visually impaired pedestrians. Barriers and channeling devices that are detectable to the pedestrians traveling with the aid of a long cane were not used.

According to the Facilities Maintenance Manager, the crew leads and supervisors have been trained on traffic control regulations and work zone safety. According to him, staff needs to be cognizant of the safety standards and follow them. The Facilities Maintenance Manager relies on the supervisors to plan, design, implement, and monitor temporary traffic control zones. However, during the site visits, supervisors were present and safety regulations were still not followed. After the auditor communicated safety issue violations, the DPW Director developed an immediate corrective action plan.

Recommendation:

20. Monitor and hold staff accountable for adherence to safety regulations.

***Concrete
Recycling***

Concrete recycling may improve the cost-effectiveness of sidewalk operations and address environmental concerns

Concrete recycling is becoming an increasingly popular way to utilize concrete waste left behind when structures or roadways are demolished. In the past, most of the jurisdictions dumped the rubble in the landfill. However, with more awareness of environmental concerns, concrete is recycled and reused.

According to the Construction Materials Recycling Association (CRMA), 140 million tons of concrete are recycled each year in the United States alone. There are numerous economical, engineering, and environmental benefits of recycling and reusing. Some of them are:

- Reduction of construction costs by eliminating hauling costs, landfill-dumping fees, etc.;
- Increase project efficiency and improve job costs;
- Minimize impact to community infrastructure by reducing import and export trucking; and
- Reduce waste dumping at the landfill.

The City is currently purchasing crushed concrete for use in alley projects and as a sub-base aggregate for sidewalks. However, the opportunity to recycle and re-use concrete removed during sidewalk repairs/replacements may exist. The concrete removed by City staff and contractors is dumped at the East Richmond landfill.

Based upon research by the audit staff, there are three vendors located in the City that offer concrete recycling services. At least two of the vendors offer on-site recycling. According to the Procurement Services

***There are several
benefits of concrete
recycling***

Director, the best way to obtain the information needed to analyze the feasibility of the recycling and re-using concrete is for DPW to issue a Request For Information (RFI) through Procurement Services to quantify potential costs and savings.

Recommendation:

21. Evaluate the cost-effectiveness and feasibility of concrete recycling.
Recycle concrete if it is found to be cost-effective.

Tree Planting

Like many urban areas, the City is experiencing sidewalk damage due to tree roots. There are numerous tree-sidewalk conflicts throughout the City because the types of trees were inappropriate for the planting site. Due to either aggressive root system or lack of suitable size of the tree well, the tree roots damage the sidewalks. A survey of street trees completed for Urban Forestry noted that 25% of the inventoried trees had sidewalk heaves greater than $\frac{3}{4}$ inch.

Approximately 1,400 trees were planted in or around sidewalks during FY2012. According to DPW management, changes in tree selections and planting sites have been made to minimize future tree-sidewalk conflicts. The City Auditor's Office hired a Certified Arborist to inspect a sample of 132 trees which were planted during FY2012 to:

- determine if the tree selection was appropriate for the planting location and if the tree wells were large enough; and
- identify any potential infrastructure conflicts.

The Certified Arborist's inspection results revealed that positive

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

The Department has improved its process of selecting and planting trees to avoid conflicts with sidewalks

changes have occurred in the tree and planting site selection process. A passing rate was given to 89% of the tree planting sites. This means that the appropriate tree was selected for the appropriate planting site with no-to-minimal potential infrastructure conflicts. According to the Certified Arborist that consulted on this project, adequate space is being allotted for tree growth which reduces the risk of future conflicts.

Eleven percent of the inspected planting sites were given a failing rate because the planting sites were not big enough for the selected trees. According to the Certified Arborist, the tree selections appeared to be planted to match existing trees on the block in these cases. This issue needs to be mitigated before extensive damage is caused by tree roots at these locations.

This information was included to recognize DPW's accomplishments.

Procurement of Materials

The Division did not follow the City's procurement policy for procuring pre-mix concrete

Pre-mixed concrete is used in the sidewalk operations on a daily basis. Pre-mixed concrete is procured through a vendor with whom the City had a contract that expired in August 2011. The Division had not been seeking quotes for pre-mixed concrete since the expiration of the contract even though they are required to in accordance with the procurement policy. Since the expiration of the contract, the total amount spent during FY2012 was at least \$18,000. In accordance with the procurement policy, the Division should have obtained three quotes to procure the pre-mixed concrete.

The contract was not renewed prior to expiration. Procurement Services did not initiate the contract renewal until after the contract was expired. The cause of this delay is not known. The contract could not be renewed because it had already expired. During the audit, the auditor

did not observe any evidence of efforts made to rebid this procurement.

Recommendation:

22. Comply with the City's Procurement Policy.

Capital Improvement Projects (CIP)

Project Documentation

CIP Division had only limited documentation for sidewalk projects

Four CIP sidewalk projects were completed during the audit period totaling approximately \$511,000. Projects were completed using State funds through the Urban Construction Initiative program (also known as First Cities Initiative). With this program, localities are responsible for administering projects to ensure projects are completed in compliance with contract specifications, and applicable federal, state, and local laws and regulations.

Only minimum project documentation could be located and provided to audit. Adequate documentation did not exist to ensure that:

- project expenditures were properly supported;
- projects complied with applicable specifications and standards; and
- proper inspections were conducted on project construction activities;

The CIP staff indicated that project documentation was maintained by the former Project Manager who is no longer employed with the City and his files could not be located. Without proper documentation:

- it may not be possible to verify if the inspections were conducted or if the inspections were adequate;
- billing accuracy and appropriateness may not be verified; and
- adherence to contract specifications may not be verified.

This means that currently a risk exists that sidewalk projects may not

Without proper documentation, it is difficult to determine if proper construction work was done, and whether proper controls exist over material and labor costs

be constructed in accordance with the contract specifications or billing discrepancies may exist. These events if occurred could result in a financial loss to the City and may create a safety risk. This observation is limited to the sidewalk projects only as the City Auditor's Office has not evaluated the rest of the CIP operation.

Project expenditures were not adequately supported

In accordance with the Locally Administered Projects Manual, project documentation supporting all payments for materials, price adjustments, and claims documentation must be maintained and made available for inspection for a minimum of three years after financial closure of the project. The auditor conducted site visits for two of the 14 contract repair locations and verified that repairs had been made. The auditor reviewed six invoices for these projects totaling approximately \$260,000.

However, Audit testing revealed that expenditures totaling approximately \$142,000 were not adequately supported as follows:

- Quantities paid for stone and dumping fees are based on stone plant and landfill dump tickets, but the auditor was unable to trace and agree the billed and paid quantities for these items to available documentation. The auditor noticed that several tickets were missing. Payments were issued for work that was completed beyond April 2012. However, the plant and dump tickets beyond mid-January 2012 were not provided.

- Also, the removal and replacement of concrete sidewalks on Robinson Street was captured in the Inspector's measurements and auditor conducted a site visit and verified that work was conducted. However, no concrete delivery tickets were included in the

provided documentation.

- The auditor was unable to verify some of the billed and paid quantities because the inspector's measurements were not available. For a few items, when measurements were available, they did not match with the billed quantity.

Adequate inspection documentation was not available

DPW Construction Inspectors are responsible for monitoring the performance and workmanship of the contractors to ensure that projects are completed in compliance with applicable standards and specifications.

DPW has four Construction Inspectors. The Inspectors are assigned multiple-ongoing projects at the same time. VDOT notes that "the inspectors must blend and shift emphasis of quality assurance based on the resources available as well as the demonstrated abilities or lack thereof by the contractor to perform in specific areas according to the contract, plans, standards and specifications." VDOT considers that inspections must be conducted during critical stages of concrete sidewalks construction as stated below:

- **Before excavation begins:**
 - verify and document that the length, width and height of excavation meets field and slope conditions;
- **Before placement of bedding and forms:**
 - measure and record quantities data;
 - verify that foundation, bedding material and grades are in conformance with specifications
- **Before placement of concrete:**

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

- check and document line, grade, elevation, dimensions, conditions of forms, braces, tiles and location of reinforcing;
- check and document discharging, conveying, spreading, consolidating, screening, finishing, texturing, curing and protecting operations;
- material testing
 - a. perform slump and air content tests;
 - b. record temperature;
- **Before backfilling operations:**
 - verify concrete strength has been obtained;
- **Before opening to construction traffic or major grading operations:**
 - Verify there is sufficient compacted cover.

These critical phases and work items should receive sufficient inspection to ensure conformance with plans, contracts, standards, and specifications. VDOT also indicates that accurate documentation of daily activities (e.g. quantity and type of materials on hand and used; weight tickets, material acceptance results, etc) are critical to construction contract administration.

Adequate documentation of the construction activities and inspection/monitoring were not provided. The inspector's documentation consisted of numerical measurements without proper description (e.g. dates, locations, etc.) and was not easy to follow.

DPW procedures require retention of documentation as specified below:

- daily diary,

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

- weekly reports,
- photographs,
- material testing results, and
- material delivery tickets.

Based upon the provided documentation, it is not clear what construction activities and inspection/monitoring were conducted.

In response to the audit findings, the CIP Division developed a corrective action plan to ensure that all required documentation is in the files during the project closeout process.

Adequate controls were not in place to verify that materials used complied with specifications

According to DPW policies and procedures, the inspector is responsible for testing or coordinating the testing of the materials to be used to verify compliance with specifications. Temperature, consistency (slump), air entrainment, 28-day compressive strength, and flexural strength are identified in the policy as critical tests for hydraulic cement concrete (HCC).

However, according to the CIP Administrator, the Division did not conduct concrete testing for standalone sidewalk projects. To ensure that concrete met project specifications, the Division relied on the design/mix forms that were produced by the concrete plant and provided to the inspector. However, the design/mix forms were not provided for some of the delivery tickets. Also, the auditor noted that information on some of the design/mix forms was altered.

City of Richmond Audit Report 2013-11

Roadway Maintenance and Capital Improvement Sidewalk Operations

May 2013

The Division needs to have better controls over the quality of materials used in the sidewalk projects

In addition, the Division has no assurance that the contractors are using the appropriate bricks for the repair projects. Documentation is not obtained from the contractors to identify the types of bricks that are being used. ASTM International specifies different brick standards based upon how the bricks and where the bricks are used. The bricks selected for projects should meet the appropriate standards. The use of inappropriate bricks for projects could result in a reduced useful life of the repairs.

Recommendation:

23. Establish proper specifications for materials and conduct necessary testing to ensure suitable quality of materials used on the City's sidewalk projects.
24. Retain project documentation from initiation to close out.

MANAGEMENT RESPONSE FORM

Roadway Maintenance and Capital Improvement Sidewalk Operations 2013-11

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
1	Develop a formal, comprehensive policies and procedures manual for the sidewalk operations in both Roadway Maintenance and CIP.	Y	<i>Policies and procedures exist for every aspect of the sidewalk operations within the American Public Works Association National Accreditation files governing all nationally accredited agencies - of which the City of Richmond, Department of Public Works is one. However, the need to have these documents provided and readily available at the division and section level has been recognized, and is being addressed through a recent initiative set out by the department and endorsed by the Chief Administrative Officer in recent discussions. These efforts are demonstrate in the business plan developed by DPW and approved by DIT as well as a memo from the director of DPW to the CAO upon his direction setting forth the department's action to move forward with this initiative [dated April 8, 2013] - which is currently underway and being led by DIT at the CAO's directive.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director, Public Works		1-Jul-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
2	Establish performance measures that management can use to evaluate performance and productivity of the Divisions and supervisory personnel.	Y	<i>The Department has engaged a process to ensure the identified performance measures are utilized to evaluate performance and productivity via the department's balanced scorecard. This performance measurement tool in conjunction with our Balanced Scorecard Melioration program - which is designed to effectively communicate the performance measures identified by the administration, push these measures down to the division and section levels and develop effective communications tools to assist the front line and mid-level supervisors in communicating performance goals and objectives to their subordinates and tracking these performance measures effectively as we address the expansion of capability of our current system - will provide exceptional ability to our leadership at every level to ensure team members at every level are being assessed on based on real time performance data (as captured through our system (CityWorks)) and effectively utilized to provide guidance for forthcoming performance projections. Further reference to this process can be found in the Department's Balanced Scorecard Melioration program brochure, which shares the training elements of the program which are currently being implemented throughout the Department.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director, Public Works		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
3	Use proper benchmarks to evaluate the Richmond sidewalk operations' performance.	Y	<i>We currently believe we have identified the appropriate benchmarks for the completed work based on the funding levels assigned each fiscal year. In addition, our task will be to complete the expansion of additional performance measures from our data collection system (CityWorks) to monitor the effective and efficient use of all resources (i.e., materials, manpower and equipment) in the delivery of services in these areas. We are engaged with DIT to complete the expansion of capabilities of CityWorks for Sidewalk and Grounds Maintenance Operations.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jul-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
4	Implement an asset management approach that systematically quantifies the sidewalk repair, maintenance, and replacement needs for use in prioritizing repairs and maintenance activities based on available funding.	Y	<i>The Department has undertaken to develop an asset management system department-wide as has been assigned to each deputy director as part of their annual performance goals and objectives. The Auditor General will recall the Department assessment conducted by the Director, me, upon arrival, and submit to the Deputy Chief Administrative Officer, Public Works and Public Utilities dated July 27, 2011 and the delivery of this assessment to my DCAO with a copy to the CAO July 27, 2011. The current department-wide goals and objectives were developed as a result of this initial assessment. The asset management system we have chosen is CityWorks. This system is being deployed throughout the Department presently.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jul-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
5	Comply with the Underground Utility Damage Prevention Act requirements.	Y	<i>The Deputy Director will have included within his revised goals and objectives for the remainder of FY13 that he be required to ensure the compliance of this Act is carried out. To validate oversight on his behalf, as well as all supervisors between himself and the Facility Maintenance Manager / Supervisor responsible for the oversight of the operation, each will have this goal / objective included into their annual performance measures effective immediately. Performance will be rated based on a sampling of all documentation captured for the remainder of this fiscal year. To ensure the behavioral change necessary, this measure will be continued until such time as the rates have earned the rating of 100% for this performance measure a minimum of three consecutive years. Failure to obtain the rating of 100% for three consecutive years will indicate the need for training (i.e. time management, effective delegation, etc.) and to monitor remains. Likewise, additional action may be taken as / if needed.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		Jul-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
6	Establish procedures for monitoring compliance with the Underground Utility Damage Prevention Act.	Y	<i>This recommendation will be added to the current FY13 goals and objectives for the division leadership.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
7	Document inspection completion dates to ensure that inspections are completed within the established timelines.	Y	<i>All sidewalk maintenance documentation will be entered into CityWorks as the primary data collection and maintenance system. This process will ensure upon successful completion of reorganization to ensure all work is transferred to system daily.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
8	Establish procedures for conducting sidewalk inspections to ensure consistency among different raters.	Y	<i>Based on the previous explanation of how the Section addresses all requests (See page 10 of 44 in the "Workload" section of this audit report) all service requests deemed to be safety-related do receive inspections within an agreed upon timeframe within the section. Additionally, all requests categorized as a safety issue are prioritized for assignment as soon as all other safety-related requests have been addressed. We also develop and ensure all inspections are completed in accordance with established inspection criteria. This recommendation will be included in the FY13 goals and objectives.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>Per existing policy we will have the timeframe within which all safety-related service requests and all standard requests are inspected inserted into each of the existing Standard Operating Policies and Procedures.</i>		
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
9	Consistently use the established criteria for rating requests.	Y	<i>We also develop and ensure all inspections are completed in accordance with established inspection criteria. This recommendation will be included in the FY13 goals and objectives.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
10	Establish sidewalk repairs priority schedule using established criteria.	N/Y	<i>A priority schedule has been established utilizing CIP criteria as provided. For all Maintenance-related requests, CityWorks will be utilized to identify those requests with highest priority. Once the system is expanded to receive all information as desired, this aspect of the operation will be addressed. This is being included as an FY13 goal and objective.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
11	Improve oversight over labor costs and employee productivity	Y	<i>The employment of CityWorks as the primary repository for all Sidewalk Maintenance data will provide proper calculation, assignment of work and storage of data.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations.		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>As explained previously, this effort is currently underway working with DIT. The goal has been assigned for FY13 and staff has been working to incorporate the use of the system.</i>		

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
12	Keep accurate count of brick used.	Y	<i>With the expansion of CityWorks capabilities this information will be maintained as part of the materials and supplies usage tracking feature within the system. It will also provide cost information for forecasting and budgetary usages. This recommendation will be added to the FY13 goals and objectives.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
13	Establish materials re-order point to prevent loss of productivity.	Y	<i>Item 48 on both operating procedures ("All tools are to be unloaded and put away into locked storage areas.") will be revised to include supply counts - which will include bricks checked out and bricks returned - will be properly recorded for entry into CityWorks. We will also ensure we review and revise the reorder procedures as needed. This recommendation along with the revision of the procedures will be included in the FY13 goals and objectives.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
14	Work with the Fleet Services Division to replace equipment in a timely manner.	Y	<i>Fleet Services has acquired a new Operations Fleet Manager who has created a periodic Fleet Review meeting wherein he meets with all equipment owners in the department to assess equipment needs and service performance by the Fleet Operations team. We can require a fleet review schedule be provided for the Department semi-annually to cross-check annual equipment needs for each fiscal year. This requirement will be included into the FY13 goals and objectives.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jul-13
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>The Fleet Operations Manager replaced the concrete breaker April 30, 2013, through inter-department transfer of surplus equipment.</i>		
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
15	Until the records are automated, ensure retention of all daily logs for a pre-determined period to allow meaningful analyses and comparison for several fiscal years	Y	
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	City Engineer		1-May-13
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>Upon being notified of this discrepancy March 28, 2013, by Lead Auditor, the Director issued a memo for corrective action to the Deputy Director II, Engineering requiring this concern be addressed by April 5, 2013. The Deputy Director II, Engineering submitted a corrective action plan on April 15, which was transmitted to Lead Auditor uncover of memo. This document is available for review upon request.</i>		

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
16	Establish appropriate procedures to ensure accurate work accomplishment reporting to DPW management	Y	<i>The action steps taken or in progress relating to Recommendations 1 thru 13 and 15 adequately address this recommendation.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director, Public Works		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
17	Conduct field inspections to verify the quality of repairs completed.	Y	<i>This recommendation will be included in FY13 goals and objectives. The director will also request (via memo to the Auditor General's office) periodic reviews to ascertain compliance by the Deputy Director, Operations Manager, Facility Maintenance Manager and Supervisors. Said requests will occur without notice. This to ensure accountability at every level within the organization.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
18	Group the requests by location and address them during the repair crew's visit to the area of these requests.	Y	<i>The full deployment of CityWorks will provide this kind of 'clustering' for service requests, which will lend itself to greater efficiencies.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>This effort is currently underway with the deployment of CityWorks.</i>		
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
19	Communicate the service needs to DPU and Urban Forestry using CRS. Follow up the resolution of the requested services.	Y	
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Jan-14
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>The Department prefers to utilize CityWorks as its primary means of communicating tangential support from DPU or Urban Forestry. Utilizing Cityworks allows the department leadership to monitor the performance measures established in the system via the management analysts as part of the Balanced Scorecard monitoring and support activity. Utilizing the BCS system will provide accountability [at all levels] as well as performance and cost data for forecasting and trend analysis.</i>		

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
20	Monitor and hold staff accountable for adherence to safety regulations	Y	
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations		1-Apr-13
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>Upon notification the Director issued a memo directing this issue be addressed immediately, and that measures be taken to ensure the revised procedures were / are adhered to. This activity will be included in the FY13 goals and objectives, and the Director may call upon the Auditor General's office to conduct an unscheduled review of the activity to ensure all aspects of the revised policy are being adhered to. Appropriate action will be taken in all instances where it is found the incorporated measures are not being adhered to. This information was conveyed to Lead Auditor via memo dated March 22, 2013, along with a copy of the corrective action steps put in place by the Sidewalk Maintenance Section [memo dated March 22, 2013], Safety Training was conducted March 27, 2013, pursuant to addressing this deficiency. These documents are available for review upon request.</i>		
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
21	Evaluate the cost effectiveness and feasibility of concrete recycling. Recycle concrete if found cost effective.	Y	<i>This recommendation will be take under advisement and a study done to identify the feasibility. This will be assigned as part of the FY13/14 goals and objectives.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>This matter was discussed during a DPW / DPU Coordination meeting held May 2, 2013. A formal joint review and feasibility plan will be developed to identify if such a project is feasible and if so, what the procedure should be utilized for both departments.</i>		
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
22	Comply with the City's Procurement Policy.	Y	<i>The Contract Specialist position within the Finance & Administration Division will be filled to support this recommendation.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Finance and Administration		1-Jul-13
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
23	Establish proper specifications for materials and conduct necessary testing to ensure suitable quality of materials used on the City's sidewalk projects.	Y	
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Engineering		1-May-13
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>See response to Recommendation #15.</i>		

#	RECOMMENDATION	CONCUR Y-N	ACTION STEPS
24	Retain project documentation from initiation to close out.	Y	
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Deputy Director II, Operations / Engineering		1-May-2013 / 1-Jan-2014
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
	<i>See Recommendation #4; See Recommendation #15.</i>		