



CITY OF RICHMOND
CITY AUDITOR

DATE: September 20, 2021

TO: Lincoln Saunders
Acting Chief Administrative Officer

FROM: Louis Lassiter *LL*
City Auditor

SUBJECT: Department of Public Works (DPW):
Milling and Overlay Contract Audit

The City Auditor's Office has completed the DPW Milling and Overlay Contract audit and the final report is attached.

We would like to thank the DPW staff for their cooperation and assistance during this audit.

Attachment

cc: The Richmond Audit Committee
The Richmond City Council
Bobby Vincent, Director of Public Works

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City of
RICHMOND
Office of the City Auditor

Audit Report# 2022-03
Department of Public Works
Milling and Overlay Contract Audit
September 20, 2021

Audit Report Staff

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Highlights

Audit Report to the Audit Committee, City Council, and the Administration

Why We Did This Audit

The Office of the City Auditor conducted this audit as part of the FY2021 audit plan approved by the Audit Committee. The objectives for this audit were to examine the milling/overlay program and test internal controls regarding monitoring of quality of work and for compliance to contract terms and conditions.

What We Recommend:

The DPW Director:

- Continue to seek additional infrastructure funding for longer term rehabilitation and reconstruction of problematic roads.

The Chief Administrative Officer:

- Evaluate if the function for administering the certificate of insurance tracking contract should be housed in Procurement Services or the Risk Management Division.

The Senior Capital Project Manager:

- Develop and implement standardized billing and payment procedures.
- Develop and implement a formal process to ensure warranty inspections are performed and documented.
- Enhance the paving inspection SOP to provide more guidance and ensure documentation consistency among all the inspectors.

The Inspector Supervisor:

- Make improvements to the current tracking process to ensure that the inspectors are properly certified, certifications are timely renewed and adequate supporting documentation is maintained.

Department of Public Works (DPW): Milling & Overlay Contract Audit

Background - DPW is responsible for maintaining approximately 2,600 lane miles of streets, including 1,830 moving lanes throughout the City. The remaining lane miles include turning and parking lanes and on-ramps. DPW's paving program typically runs from March to December in temperatures of 40 degrees or higher.

One of the paving techniques used in the City to maintain and extend the life of the streets is milling and overlay. Milling and overlay consist of removing up to 2 inches of existing asphalt and replacing it with a new surface. This maintenance technique is anticipated to extend the life of the roads by 10-12 years. Contractors complete the milling and overlay work and guarantee workmanship and materials under a one-year warranty.

What Works Well

- The auditor reviewed ten invoices totaling approximately \$3 million that were processed for two contracts under review. All line items were billed at the correct bid unit prices.
- Approximately 1.8 million square yards of pavement were milled and paved during 2018-2020. The auditor visited 25 locations where 396,522 square yards of pavement were milled and paved and noted that 20 of the repairs were in good condition with minor areas of pavement failure.

Needs Improvement

Finding #1 Repair Conditions – Twenty percent (5 out of 25) of the visited streets exhibited significant pavement failures, including cracking, potholes, depressions, and multiple patches.

Finding #2 Contract Billings – The auditor traced the billed quantities for ten invoices totaling approximately \$3 million to the inspectors' daily logs and supporting documentation and noted minor billing discrepancies.

Finding #3 Certificate of Insurance – The contractors provided initial insurance certificates to the City for the 17 milling and overlay contracts that were active during calendar years 2018-2020. However, the insurance coverage period on the certificates expired before the contract work was completed for approximately 76% (13 out of 17) of the reviewed contracts. The contractors provided updated insurance certificates upon audit request.

Finding #4 Inspector Certifications – Adequate controls and procedures were not in place to track the paving inspectors' certifications. The auditor could not determine if some inspectors have the required certifications based on the provided documentation.

Finding #5 Warranty Inspections – The contractors guarantee their work under a one-year warranty at the time of completion. The projects must be re-inspected before the expiration of the warranty period to determine if any workmanship or material defects have developed. The auditor could not conclude if the required warranty inspections were completed due to lack of documentation.

Finding #6 Standard Operating Procedures - The Department of Public Work's Paving Inspection Standard Operating Procedure (SOP) does not provide sufficient guidance to allow employees to consistently carry out their job duties. Also, the SOP does not reflect the current inspection practices.

Additional findings and observations regarding paving data, inspection tracking and minority business enterprise participation goals were issued.

Management concurred with 13 of 15 recommendations and concurred partially with one (1). We appreciate the cooperation received from management and staff while conducting this audit.



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BACKGROUND, OBJECTIVES, SCOPE, METHODOLOGY, MANAGEMENT RESPONSIBILITY and INTERNAL CONTROLS

This audit was conducted in accordance with the Generally Accepted Government Auditing Standards promulgated by the Comptroller General of the United States. Those Standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on the audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on the audit objectives.

BACKGROUND

The Department of Public Works (DPW) is responsible for maintaining approximately 2,600 lane miles of streets, including 1,830 moving lanes throughout the City. The remaining lane miles include turning and parking lanes and on-ramps. DPW's paving program typically runs from March to December in temperatures of 40 degrees or higher.

One of the paving techniques used in the City to maintain and extend the life of the streets is milling and overlay. Milling and overlay consist of removing up to 2 inches of existing asphalt and replacing it with a new surface. This maintenance technique is anticipated to extend the life of the roads by 10-12 years. Contractors complete the milling and overlay work and guarantee workmanship and materials under a one-year warranty.

The roads selected for milling and overlay are based on the assessment of the current Pavement Condition Index (PCI) ratings of all the streets in the City. This rating is one of the tools used to track and prioritize the City's Paving Program. Other factors include work being conducted on the roads by other Department or entities (e.g., Public Utilities), as well as the type of road and the extent of travel on the road.

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PCI Ratings

There are 10,750 street segments in the City. The pavement condition for each segment is evaluated by a third-party contractor every three years and a PCI rating is assigned. The last pavement condition survey was completed in October 2018. The PCI ratings range from 0 (failed) to 100 (Good). Per the Senior Capital Project Manager, the PCI ratings are reset to 100 after the streets are paved. There is a deterioration calculation in the system that reduces the ratings by 3 points each year. Below is a breakdown of the streets' predicted PCI ratings by category as of April 5, 2021.

PCI Category	PCI Category Description	# of Street Segments	% of Street Segments
0 - 10	Failed	626	6%
11 - 25	Serious	1282	12%
26 - 40	Very Poor	1431	13%
41 - 55	Poor	1488	14%
56 - 70	Fair	1637	15%
71 - 85	Satisfactory	1963	18%
86 - 100	Good	2322	22%

Note: One street segment did not have a predicted PCI rating.

DPW publishes the PCI ratings in an interactive map on the Department's website. The map is updated quarterly. See **Appendix A** for the PCI rating map as of June 1, 2021.

Paving Statistics

Approximately 1.8 million square yards of pavements were milled and paved during 2018 –2020 for 190 projects. Below is a summary of the completed projects and square yards of milling per fiscal year.

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Year	No. of Completed Projects	Square Yards of Milling
2018	33	330,860
2019	10	138,527
2020	147	1,293,286
Totals	190	1,762,673

The contractors completed milling and paving projects throughout the City. See **Appendix B** for a map of the completed paving projects in each Council District.

Paving Budget

DPW's adopted paving budgets for FY2018 – FY2021 are noted below.

FY2018	FY2019	FY2020	FY2021
\$3,483,467	\$2,891,812	\$15,000,000	\$24,425,892

Contracts

During the audit scope, there were 17 executed contracts for the citywide milling and overlay program. Below is a summary of the total contract amounts and expenditures by contractor:

Contractor	Total Expenditures	Number of Contracts
A	\$10,320,875.21	7
B	\$10,303,980.15	6
C	\$ 7,278,816.15	3
D	\$ 1,746,304.35	1
Grand Total	\$29,649,975.86	17

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Inspection and Invoice Payment Process

DPW has four paving inspectors and one supervisor responsible for monitoring the milling and overlay projects to ensure the work is conducted in accordance with contract terms and conditions and paving standards. The inspectors create daily logs to document the work performed and the corresponding quantities (e.g., square yards of milling and asphalt tonnage) and forward them to the Senior Capital Project Manager. The Project Manager keys the quantities from the daily logs into an Excel spreadsheet, reviews and approves the contract billings.

Traffic Control

The contractors coordinate with the Richmond Police Department to enhance traffic safety during paving operations and these costs are included in the invoices.

OBJECTIVES

The objectives for this audit were to examine the milling/overlay program and test internal controls regarding monitoring of quality of work and for compliance to contract terms and conditions.

SCOPE

DPW contracts for the milling and overlay projects were reviewed and assessed for compliance with their respective contracts' terms and conditions and the quality of repairs from Jan 1, 2018 to December 31, 2020 including the current operating environment.

METHODOLOGY

The Auditors performed the following procedures to complete this audit:

- Interviewed pavement staff;
- Tested invoices to ensure they were properly billed and supported;

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- Conducted site visits to assess the conditions of the repairs and quality of work; and
- Performed other tests, as deemed necessary.

MANAGEMENT RESPONSIBILITY

City of Richmond 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.

INTERNAL CONTROLS

According to the 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. An effective control structure is one that provides reasonable assurance regarding:

- Efficiency and effectiveness of operations;
- Accurate financial reporting; and
- Compliance with laws and regulations.

Based on the audit test work, the auditors concluded internal controls over the milling and overlay program and contracts need improvement to ensure:

- Consistency in the inspection process and automation of documentation and tracking;
- Warranty inspections are completed and documented;
- Inspectors obtain and retain the required certifications;
- Contractors are properly billing for completed work; and
- Completed paving projects are updated in the paving management system.

These deficiencies are discussed throughout the report.

FINDINGS and RECOMMENDATIONS

What Works Well

Contractor Payments

The Auditor reviewed ten invoices totaling approximately \$3 million that were processed for two contracts under review. All line items were billed at the correct bid unit prices.

Repair Quality

Approximately 1.8 million square yards of pavement were milled and paved during 2018 –2020. The Auditor and a Virginia Department of Transportation (VDOT) expert visited 25 locations for which 396,522 square yards of pavement were paved and noted that 20 of the repairs were in good condition with minor areas of pavement failure.

What Needs Improvement

Finding #1 – Repair Conditions

Condition:

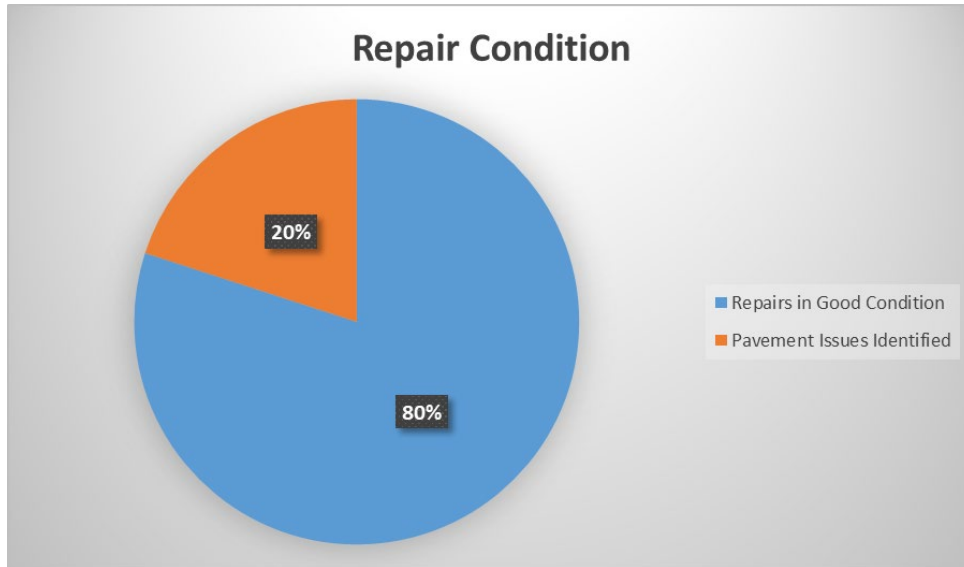
Approximately 1.8 million square yards of pavement were milled and paved during 2018 –2020 for 190 projects. The auditors conducted site visits for 25 streets totaling approximately 396,522 square yards with a VDOT expert to evaluate the current conditions and quality of the repairs. The VDOT expert generally noted that the majority of the reviewed paving sites were in good condition with some minor areas of pavement failure (e.g., potholes, cracking, unraveling). The site visit observations are summarized in the below pie chart. Pictures of some of the observed minor pavement failures are included in **Appendix C**.

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Significant pavement failures were noted for five of the reviewed streets. Below is a summary of the noted observations and photos of the streets are included in **Appendix C**.

Street Name	From	To	Completion Date	Square Yards Completed	Site Visit Observations
Kuhn Street	North 31st Street	North 33rd Street	3/3/2020	1,308	Open and segregated pavement Pavement cracking with exposed mud and rocks
North 31st Street	Kuhn Street	Nine Mile Road	3/5/2020	16,677	Pavement cracking and potholes with exposed dirt and soil Pavement depression/sink hole Multiple large patches the entire length of the street where the pavement was cut out and replaced
Commerce Road	Ingram Avenue	Royall Avenue	8/13/2018	63,851	Severe pavement cracking Areas of bad utilities
West Graham Road	North Avenue	Alley West of North Avenue	7/11/2018	4,031	Pavement cracking and depression Pavement bleeding in which the asphalt binding agents seep to the top of the pavement.
Sherwood Avenue	Hermitage Road	Brook Road	12/15/2019	14,492	Major deterioration of the road Severe pavement cracking and road fatigue Numerous patches, which are coming apart, the entire length of the street Potholes with standing water and mud

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Criteria:

The roads selected for milling and overlay are based on the assessment of the current Pavement Condition Index (PCI) rating of all the streets in the City. This rating is one of the tools used to track and prioritize the City's Paving Program. Other factors include work being conducted on the roads by other departments or entities (e.g., Department of Public Utilities), and the type and the extent of travel on the road.

The paving inspectors within DPW are responsible for monitoring the milling and overlay projects to ensure the work is conducted in accordance with contract terms and conditions and paving standards. The inspectors create daily logs to document the work performed and the corresponding quantities (e.g., square yards of milling and asphalt tonnage) and forward them to the Senior Capital Project Manager. The contractor's workmanship and materials are guaranteed under a one-year warranty.

Cause:

DPW has to maintain all streets in a safe and drivable condition within available funding. The Senior Capital Project Manager indicated it is more economical for them to address the pavement failures that occur than reconstruct a street. Milling and overlay is not the preferred paving technique for some of the City's streets. This maintenance technique removes and replaces up to two inches of the existing asphalt. According to the Senior Capital Project Manager, this technique does not address structural and sub-base issues that occur because the City has an old infrastructure. Some of the roads were not designed to handle the current weight and travel load. Also, some of the roads were built on clay and river stone and are subject to premature pavement failure if moisture penetrates the sub-base.

Additionally, paving for 12 of the reviewed sites may have been completed during non-optimal weather conditions (temperatures less than 40 degrees and/or in precipitation). Pavement cracking, depressions, and patching were present for 5 of these 12 streets. The weather

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conditions may have contributed to these pavement failures, identified on Commerce Road, West Graham Road, Sherwood Avenue, Claremont Avenue, and Nottoway Avenue. Photos of these streets are included in **Appendix C**.

Effect:

Paving funds were used to mill and overlay City streets with structural deficiencies and/or sub-base issues resulting in premature pavement failure. As a result, the City is not obtaining the maximum life expectancy of this maintenance technique, which is anticipated to expand the useful life of the roads by 10-12 years. The auditor was unable to quantify the cost of the additional re-work.

Recommendations:

- 1. We recommend the DPW Director continue to seek additional infrastructure funding for longer term rehabilitation and reconstruction of problematic roads.*
- 2. We recommend the Senior Capital Project Manager ensure the contractors are not completing paving operation in non-optimal weather conditions.*

Finding #2 – Contract Billings

Condition:

The auditor reviewed ten invoices totaling approximately \$3 million for two milling and overlay contracts active during the calendar years 2018-2020. The auditor traced the billed quantities to the inspectors' daily logs and supporting documentation and noted the below minor billing discrepancies (less than 1%).

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Contract	Contractor Billed Amount	Auditor Calculated Amount	Difference
A	\$1,768,312	\$1,780,350	\$(12,039)
B*	\$1,224,037	\$1,207,760	\$16,277

* Contractor billed amount excludes off-duty police officers, vehicles, and hourly mark up. The contractor used off-duty Richmond police officers (RPD) and Sherriff's Office deputies for traffic control. The contractor had multiple contracts and the RPD and Sheriff's Office did not bill by contract. As such, the auditor could not determine which expenditures were incurred for the contract under review.

The DPW paving inspectors' daily logs included more quantities than captured on the billings for contract A. The billing discrepancy for contract B could be higher or lower since the auditor could not conclude on the police-related expenditures.

The auditor also noted the additional observations:

- The Senior Capital Project Manager did not recalculate the contractors' billings to ensure they were correct. The auditor noted minor calculation errors totaling approximately \$300 for six of the reviewed invoices.
- The contractor incorrectly calculated the retainage for contract B at 10%. Per the contract, retainage should have been calculated at five percent.
- The billings for contract B included speed humps totaling approximately \$13,000. However, speed humps are not a billable line item in the contract. Also, there was no indication on the daily logs of such work. Per the Senior Capital Project Manager, this was completed and paid under another bid line item.
- The inspectors are not tracking the completed quantities for pavement markings. As such, there was no supporting documentation to compare to the billings. Per the Senior Capital Project Manager, he uses Google Maps to gauge the reasonableness of the billings.

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- The billed amounts for the police officers, police vehicles, and hourly markup were not reconciled to an independent source. The Senior Capital Project Manager relied on the contractors' billings to issue these payments.
- Police supervisors were billed for three of the five reviewed invoices for contract A. However, based upon the information from RPD, police supervisors were not provided to assist the contractor with traffic control for the period under review. Police Supervisors are billed at a higher rate than police officers.

Criteria:

The paving inspectors within DPW are responsible for monitoring the milling and overlay projects to ensure the work is conducted in accordance with contract terms and conditions and paving standards. The inspectors create daily logs to document the work performed and the completed quantities (e.g., square yards of milling and asphalt tonnage). The logs are forwarded to the Senior Capital Project Manager, who serves as the project manager for this contract. The Project Manager keys the quantities from the daily logs into an Excel spreadsheet, reviews and approves the contract billings.

Cause:

The billing and reconciliation process can be approved by researching the billing discrepancies and tracking all bid items.

Effect:

Without a standardized billing reconciliation process, the contractors may be under or overpaid. Additionally, the contractors could bill for goods and services not provided.

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Recommendations:

- 3. We recommend the Senior Capital Project Manager develop and implement standardized billing and payment procedures to include the following:*
 - o Validating the billed quantities for off-duty officers and supervisors, police vehicles and the hourly markup;*
 - o Researching and resolving billing discrepancies prior to approving payments.*
- 4. We recommend the Senior Capital Project Manager research and resolve the billing discrepancies identified during the audit.*
- 5. We recommend the Senior Capital Project Manager submit a request to Procurement Services to add a bid line item for speed tables.*

Finding #3 – Certificate of Insurance

Condition:

The City has a contract with a third-party vendor to review, collect, and track certificates of insurance and monitor for compliance with the City's insurance requirements. The Risk Management Division is responsible for administering this contract to ensure compliance with the deliverables.

The auditor reviewed all 17 milling and overlay contracts that were active during calendar years 2018-2020 to determine if the contractors provided the required insurance certificates and noted they were provided before all of the contracts were executed. However, the insurance coverage period on the certificates expired before the contract work was completed for 76% (13 out of 17) of the reviewed contracts. The contractors did not provide updated insurance certificates. Upon auditor's inquiry, the Chief of Risk Management obtained updated certificates.

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Criteria:

In accordance with Section 2.23 of the Invitation for Bids for the milling and overlay projects, contractors were required to provide and maintain the specified insurance during the performance of the contract. The certificate should include the contract number and identify the City as an additional insured on the policy. If the coverage period on the certificate lapses prior to completing the contract/work, the contractor shall provide a certificate with the new coverage period.

At the onset of this contract, the vendor was responsible for scanning the certificates, creating an online database for existing contractors, and sending out introduction letters outlining their tracking process. The vendor is required to provide a DVD containing the images of the processed certificates to Risk Management.

Cause:

The certificates with new coverage periods were not provided. The below reasons were attributed to the third-party vendor not collecting and tracking the applicable certificates.

- The current contract was executed in May 2019. A proper transition of the information and data did not occur. The prior vendor did not provide copies of the certificates that the City requested. The current vendor only uploaded and tracked the certificates that were provided. Without the previous certificates to reference, the vendor could not follow up on the certificates for open contracts.
- There was a period between the end of the prior contract and the start of the current contract when a tracking vendor was not in place. Per the Chief of Risk Management, it is unknown which certificates were missing during this time.
- The contract information provided by Procurement Services does not include all of the information needed by the vendor to carry out the contract adequately. A link to the City's active contract listing was provided. However, the listing did not include the

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contact information (e.g., contact name, telephone number, and email) needed to reach out to the contractors.

Also, contractors may not be clear on the certificate tracking process. According to the Chief of Risk Management, the milling and overlay contractors sent some certificates to the prior contractor, Purchasing Services and Risk Management.

In addition, adequate contract administration procedures were not in place to ensure that the tracking vendor adhered to the contract terms and conditions.

Effect:

City contractors are responsible and liable for damages to individuals or property caused by any negligent act or omission or willful conduct of the contractor, subcontractors, employees related to work conducted under City contracts. The City may be subject to a lawsuit for such damages if the contractor does not have adequate insurance or a lapse in coverage.

Recommendations:

- 6. We recommend that the Procurement Services Director provide the information needed by the third-party vendor to adequately track and manage the certificates of insurance.*
- 7. We recommend that the Chief Administrative Officer evaluate if the function for administering the certificate of insurance tracking contract should be housed in Procurement Services or the Risk Management Division.*
- 8. We recommend that the department assigned by the CAO develop and implement adequate contract administration procedures to ensure the vendor adheres to the terms and conditions of the insurance certificate tracking contract.*
- 9. We recommend that the department assigned by the CAO ensure that all active contractors are notified of the certificate of insurance tracking process.*

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Finding #4 – Inspector Certifications**Condition:**

Per the Senior Capital Project Manager, the inspectors overseeing the paving projects in the City are required to have the material and work zone certifications outlined in the below table. The auditor reviewed the provided certification documentation for the four paving inspectors and the paving inspector supervisor and noted the below observations.

Employee	Certifications				Basic or Intermediate Work Zone
	Asphalt I	Asphalt II	Concrete	Slurry Seal	
A	Expired*	Expired*	✓	✓	✓
B	✓	✓	✓	✓	✓
C	Expired*	✓	CNC	Expired*	CNC
D	✓	X	✓	✓	✓
E	CNC	CNC	CNC	CNC	CNC
* Per the final guidance issued by VDOT on May 14, 2021, the renewal dates for all certifications in the 2019-2021 range were extended until January 31, 2022 due to the pandemic.					
✓ = Inspector has an active certification.					
X - Inspector does not have the certification.					
CNC - Cannot conclude if inspector has the certification.					

The auditor could not verify if the inspectors had some of the required certifications based upon the provided documentation. The auditor also noted that some of the inspectors' certifications were not captured in the provided tracking spreadsheet.

Criteria:

Per the Senior Capital Project Manager, the milling and overlay contractors are certified by the Virginia Department of Transportation (VDOT). The DPW paving inspectors are required to have the same level of certification as the contractors. The VDOT materials certifications are valid for five years, and the paving inspectors must recertify.

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Cause:

Adequate tracking and monitoring procedures were not in place to ensure the inspectors are properly certified. The provided tracking spreadsheet was compiled in response to a request for the Heat Scarification audit and has not been updated. The inspectors are responsible for obtaining their certifications, completing timely renewals, and maintaining supporting documentation. The certification documentation was not collected and retained in a centralized location.

VDOT extended the renewal dates for the material certifications in the 2019-2021 range due to the pandemic. The inspectors have until January 31, 2022 to renew their expired material certifications.

Effect:

The inspectors may not be properly certified per DPW requirements. Also, the inspectors may not be properly trained to inspect the paving projects. As such, work not completed in accordance with contract terms and conditions may be accepted.

Recommendation:

- 10. We recommend the Inspector Supervisor make improvements to the current tracking process to ensure that the inspectors are properly certified, certifications are timely renewed and adequate supporting documentation is maintained.*

Finding #5 – Warranty Inspections

Condition:

The contractor guarantees its milling and overlay projects under a one-year warranty at the time of completion. The projects must be re-inspected before the expiration of the warranty period to determine if any workmanship or material defects have developed. The auditor could not conclude if the required warranty inspections were completed as they are not documented.

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Criteria:

In accordance with Sections 6.12 and 6.15 of the Invitation for Bid language, the contractor shall guarantee all workmanship, materials, equipment, and completed products for a minimum of one (1) year from the date of completion. A City representative will inspect the project sites before the expiration of the warranty period to determine if any workmanship or material defects have developed. The inspections should be conducted within 9-12 months of the work completion date. The contractor will, upon written notice, promptly visit the site with a City representative to determine the extent of all defects or non-conformities and correct them.

Cause:

A formal process is not in place to conduct and document the warranty inspections. According to the Senior Project Capital Manager and the paving inspectors, they periodically ride (e.g., on rainy days, during weather months) the paving routes looking for defects before the warranty expires. However, the warranty inspections, results, identified defects, and corresponding repairs are not formally documented.

Effect:

The lack of a formalized warranty inspection process and documentation may result in projects not being inspected before the expiration of the warranty period. As such, workmanship and material defects may not be identified timely, resulting in the City incurring the liability for any required re-work.

Recommendation:

- 11. We recommend the Senior Capital Projects Manager develop and implement a formal process to ensure warranty inspections are performed and documented.*

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Finding #6 – Standard Operating Procedures

Condition:

The Department of Public Work's Paving Inspection Standard Operating Procedure (SOP) does not provide sufficient guidance to allow employees to consistently carry out their job duties. Also, the SOP, which has an effective date of 1/26/15, does not reflect the current inspection practices.

The auditor reviewed all of the daily logs (257) for the two contracts tested and noted the below:

- Contractors did not consistently sign the daily quantities logs.
- The inspectors did not consistently complete the fields on the daily logs.
 - Cross streets and street directions (i.e., north, south) were not always captured, making it difficult to determine the specific locations of the completed work. Some streets were completed in segments over several days. Also, some streets run in multiple directions and/or are located in multiple areas of the City. For example, 21st Street is located in the Eastend, the downtown area, and the Southside of the City.
 - Daily temperatures were not recorded on the majority of the reviewed daily logs. Recording the daily temperatures is important for the paving operation as asphalt should only be placed when the atmospheric temperature is 40 degrees or higher.
- The inspectors did not track some of the completed quantities in the contract billable unit of costs.
 - **Detectable warning strip 2' wide** – The incorrect formula was used to calculate some of the completed quantities. Also, in some cases, the number of warning strips was tracked and not the unit measurement. This billable line item is listed differently on multiple forms. The completed quantity is noted as "each" on one form and "linear feet" on another. The Senior Capital Project Manager identified

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this discrepancy and included the correct calculations in his tracking spreadsheet to reconcile the billings for payment.

- **Off-duty police officers** - The contractors use City of Richmond off-duty uniform police officers and police supervisors for traffic control. The police officers are billed at \$35 per hour, and the police supervisors are billed at \$38 per hour. The daily quantities logs for milling operations and curbs, sidewalks, and handicap ramps do not distinguish between officers and supervisors.

The auditor also interviewed the four paving inspectors and supervisor responsible for overseeing the milling and overlay operations during our audit scope. The inspectors and the supervisor were assigned multiple projects to inspect concurrently. During the interviews, each individual had a different approach to prioritizing their daily workload and balancing their time among the various projects. Also, there were slight variations in what each staff looked for while inspecting the projects.

Criteria:

Written policies and procedures guide employees to perform their duties adequately, consistently and meet management expectations. Also, they serve as an effective training tool. The policies and procedures should be periodically reviewed and updated to reflect the current business practices and compliance requirements.

Effect:

Without updated detailed written policies and procedures, employees may not consistently or adequately carry out their job duties. Also, management cannot evaluate compliance. Additionally, the recording of billable quantities could vary among the paving inspectors, resulting in the City being inappropriately billed.

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September 20, 2021

Recommendation:

- 12. We recommend the Senior Capital Project Manager enhance the paving inspection SOP to provide more guidance and ensure documentation consistency among all the inspectors. The procedures should be periodically reviewed and updated to reflect the current work practices and requirements.*

Finding #7 – MicroPaver

Condition:

The paving history and Pavement Condition Index (PCI) ratings for the City streets are maintained in MicroPaver, DPW's paving management system. The PCI ratings are updated:

- Based upon the pavement condition survey that is conducted every three years by a contractor.
- After paving projects are completed, the PCI ratings are reset to 100 and the last major work date is updated by the Senior Capital Project Manager.
- Based upon a deterioration calculation built into the system. The Senior Capital Project Manager indicated that the PCI ratings are reduced by three points annually to calculate the predicted PCI ratings.

The auditor selected a sample of 11 milling and overlay projects completed between FY2018-FY2020 to determine if the last major work date was updated in MicroPaver and noted the following:

- The last major work date was updated for 8 out of 11 street segments.
- The last major work dates were not updated for 2 out of 11 streets. The last completion dates were indicated as 1/1/69. This date was used as a default when the street segments were initially set up in the paving management system. The PCI ratings captured for these streets ranged from 76 to 96.
- One project, which was included on the paving listing, was never paved.

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Additionally, based on a review of the MicroPaver data as of 4/5/21, the auditor noted that approximately 33% (3,528 out of 10,750) of the street segments' last major work date was from 1969. Nine hundred twenty-two (922) of these segments had good or satisfactory PCI ratings ranging between 71 and 100. This could be another indicator that some street segments were not updated. The auditor was unable to readily conclude on the extent to which street segments were not updated in MicroPaver. It is a manually intensive process to identify and select all the street segments included in the completed projects. Thus, a small sample was selected for this testing.

Criteria:

The Senior Capital Project Manager manually updates the last major work dates for the street segments after the paving is completed, which resets the PCI ratings to 100 in the MicroPaver system.

Cause:

The Senior Capital Project Manager did not have a process in place to ensure that all the paved streets were updated in the MicroPaver system. As such, some of the segments might have been missed in error when the paving data was updated. Also, the Senior Capital Project Manager indicated that some of the updates may have been keyed into the system but incorrectly saved when he was learning how to use the system.

Effect:

Not updating the paving information in MicroPaver will result in incomplete and inaccurate paving history and PCI ratings being captured for the street segments. As a result, street segments may be inappropriately selected or excluded for paving.

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Recommendations:

- 13. We recommend the Senior Capital Project Manager develop a process to ensure all the paved streets are updated in MicroPaver, reflecting the correct PCI rating.*
- 14. We recommend the Senior Capital Project Manager research the paving projects completed during the audit scope to ensure the last major work dates are updated.*

Finding #8 – Automation of Daily Logs

Condition:

The Department of Public Works (DPW) currently uses a manual paper-based approach to track paving inspection activities and completed quantities for milling and overlay projects. The current process creates redundancy in tracking the completed work and could lead to clerical errors during data entry. However, an opportunity exists to automate the inspection documentation and the completed quantities tracking process.

Criteria:

The DPW paving inspectors are responsible for monitoring the milling and overlay projects to ensure that the contractors complete the work in accordance with contract terms and conditions and paving standards. The inspectors use paper daily logs and inspection reports to document their inspection activities and completed milling and overlay work and quantities (e.g., square yards of milling and asphalt tonnage). This documentation is forwarded to the Senior Capital Project Manager, who oversees the contracts. The Project Manager keys the quantities from the daily logs into an Excel spreadsheet to track the completed quantities and approve the contract billings.

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Cause:

The current practice uses a manual process to document the inspection activities and track the completed quantities. The process used by the City is similar to those used by Henrico County and Arlington County.

However, DPW is building an ARC GIS online web-based application to automate the inspection documentation. The inspectors will use tablets to complete the daily logs in the application to be uploaded automatically to the Senior Capital Project Manager to review and generate reports. DPW is in the process of implementing this automated approach.

Effect:

Automating the inspection documentation can improve the efficiency of the tracking process by:

- eliminating redundancy and reducing the potential for clerical errors,
- improving the reconciliation process for invoice billings,
- providing real-time updates and enhance reporting capabilities and,
- replacing the paper documentation this is being prepared by the inspectors.

Recommendation:

15. We recommend the Senior Capital Projects Manager finalize and implement the software application to automate the daily logs and provide training to the paving inspectors.

Finding #9 – MBE Goals

Condition:

Per Section 21-220 of the City Code, the City's goal is to increase the dollar value of contracts awarded to Minority Business Enterprise (MBE) and Emerging Small Business (ESB) contractors and subcontractors to the highest possible level in any particular field of contracting. Per City Code Section 21-216, to increase the number of MBEs and ESBs that participate meaningfully in contracts, the City uses and requires good faith efforts by parties engaging in City contracts:

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1. "To stimulate the creation and development of minority business enterprise and emerging small business contractors and subcontractors, and to advance in reasonable and responsible ways, and deliberately and consistently over the long-term, their entrance into and participation in contracts;
2. To encourage, in reasonable and responsible ways and deliberately and consistently over the long-term, the participation of minority and local disadvantaged individuals at higher skill and responsibility levels within non-minority firms engaged in contracting and subcontracting; and
3. To encourage voluntary efforts by the private sector aimed at increasing the participation of minority business enterprises and emerging small businesses in contracts."

Good faith is defined as the sum total of efforts by a firm to provide for equitable participation of MBE and ESB subcontractors. The past efforts are comprised of documented participation of MBE/ESB firms through subcontracting or joint ventures. Future efforts are comprised of proposed efforts to allow for equitable participation of MBE and ESB subcontractors.

The Auditor analyzed 11 out of 14 fully executed mill and overlay contracts with expenditures during the audit scope. These contracts were reviewed to determine if the prime contractor met their pledged goals, which ranged between 10%-15%, to use good faith efforts to subcontract with MBE/ESB firms. The prime contractors did not meet the pledged goals to use good faith efforts to subcontract with MBE/ESB firms for ten contracts.

Prime #	Total Number of Contracts Reviewed	Number of Contracts that the Prime Did Not Meet Goal	Total Dollars Paid to Prime	Total Proposed MBE/ESB Utilization	Total Payments Issued to MBE/ESB	Actual Utilization
A	3	2	\$ 9,169,987	\$ 1,345,624	\$ 1,139,781	85%
B	5	5	\$ 6,493,017	\$ 836,001	\$ 239,191	29%
C	1	1	\$ 2,445,796	\$ 366,869	\$ 14,640	4%
D	2	2	\$ 7,278,816	\$ 1,055,249	\$ -	0%

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Criteria:

The Office of Minority Business Development establishes the MBE/ESB goals for City procurements where opportunities exist for them to participate as subcontractors. The goals are included in the Invitation for Bid (IFB) for the milling and overlay projects. Vendors must complete the MBE/ESB Participation Commitment Form, indicating the percentage of participation they proposed for the project. Contract awardees are required to submit monthly compliance reports to report their MBE/ESB utilization.

Cause:

A process is not in place to assess a bidder's past MBE/ESB participation efforts for competitive sealed bidding. MBE/ESB participation is not taken into account unless a contract is subject to renewal or modifications. OMBD will recommend approval or denial of renewal or modification requests based upon if the prime is meeting its pledged goal to use good faith efforts to subcontract with MBE/ESB firms for the contract under review. However, not all contracts are subject to renewal or modifications. Also, contracts can still be renewed even if OMBD denies the request.

Effect:

Contractors who fail to meet pledged goals to use good faith efforts to subcontract with MBE/ESB firms may continually receive City contracts. This may negatively impact the City's ability to achieve its goal to increase MBE/ESB participation in City Contracts.

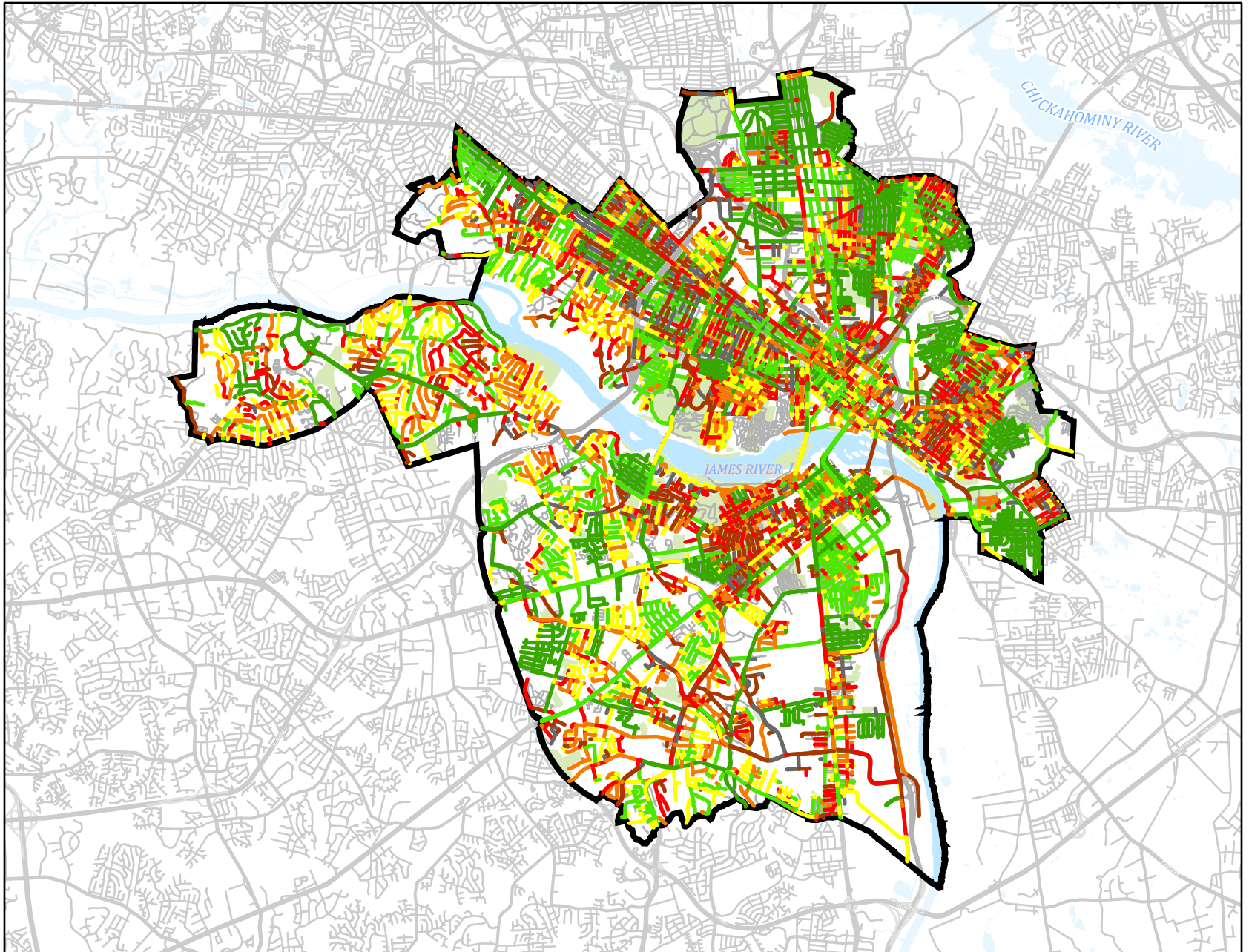
Recommendation:

A recommendation will not be issued, as a recommendation remains open from the 2021-12 Office of Minority Business Development Audit Report:

- We recommend that the Directors of OMBD and Procurement Services develop and implement a process to assess past participation efforts for competitive sealed bidding.***

Pavement Condition Index, as of 6/1/2021

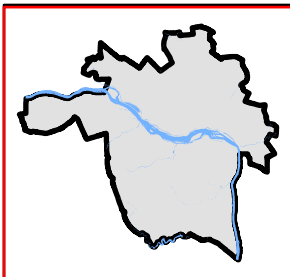
City of Richmond, VA
Geographic Information Systems



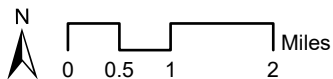
PCI

- 0 - 10; Failed
- 11 - 25; Serious
- 26 - 40; Very Poor
- 41 - 55; Poor
- 56 - 70; Fair
- 71 - 85; Satisfactory
- 86 - 100; Good
- River
- Park

Location Reference



Disclaimer:
The City of Richmond assumes no liability either for any errors, omissions, or inaccuracies in the information provided regardless of the cause of such or for any decision made, action taken, or action not taken by the user in reliance upon any maps or information provided herein.



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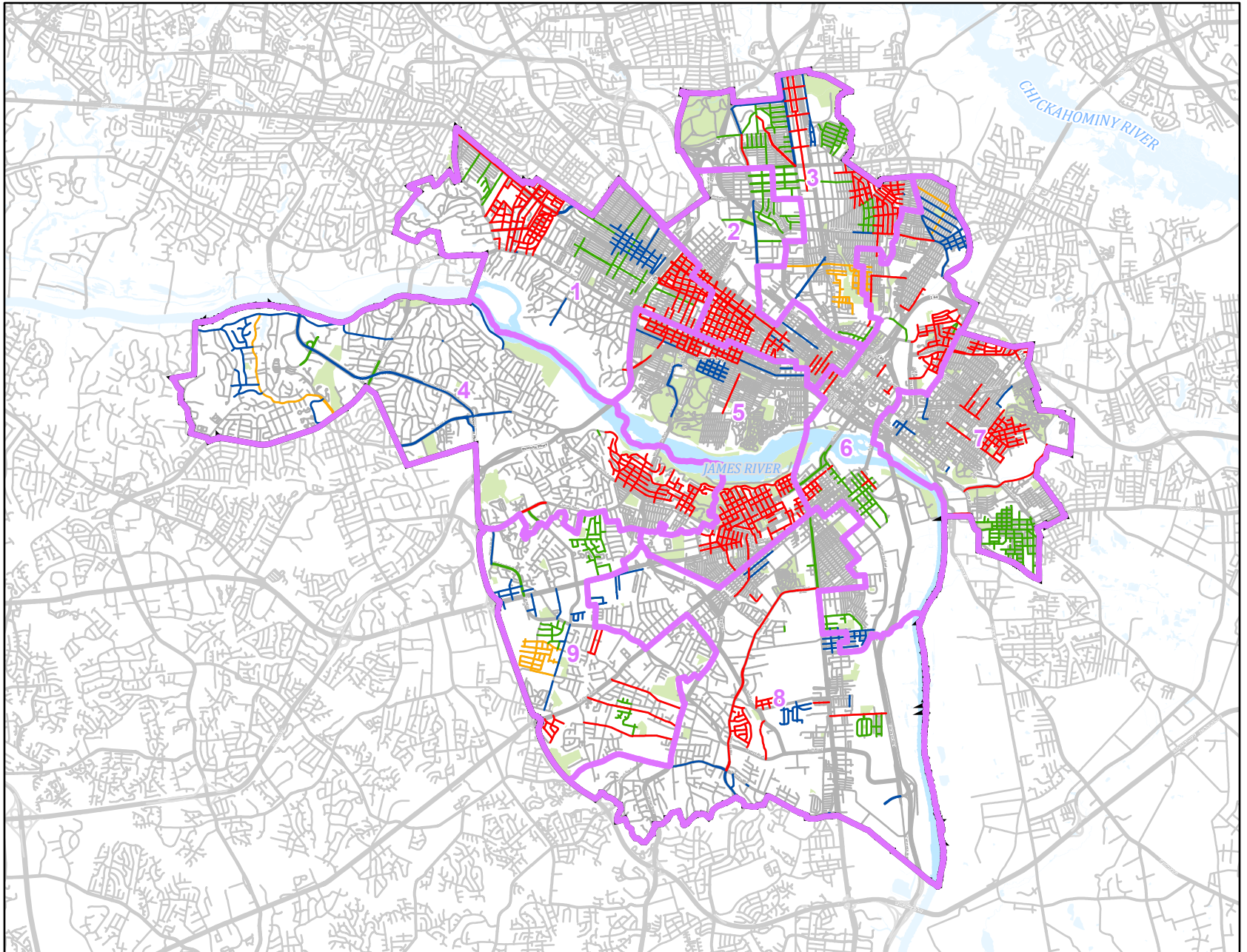
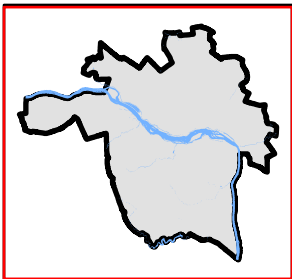
Completed Paving 2018-2021

City of Richmond, VA
Geographic Information Systems

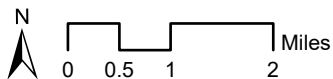


- 2021
- 2020
- 2019
- 2018
- Council District
- River
- Park

Location Reference



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Streets in Good Repair with Minor Pavement Failures

Danbury Road



Joints separating

Claremont Avenue



Cracking and depression in road



Cracking and depression with exposed dirt and river rock

Nottoway Avenue



Cracking and patching



Cracking and pot hole with exposed dirt and stone



Cracking and depression near alley entrance

Streets with Significant Pavement Failures

Kuhn Street



Open and segregated paving



Fatigue and cracking



Alligator cracking with mud



More cracking

N 31st Street



Large patch



Multiple patches



Depression in the road



Cracking around a patch

West Graham Rd



Street cracking



More Cracking



Bleeding pavement



More bleeding pavement

Sherwood Avenue



Patch appears to be falling apart



Cracking among the patch



Cracking in a patch and standing water



Multiple patches on top of each other



Cracking patch unraveling



Standing water

APPENDIX D: MANAGEMENT RESPONSE FORM

2022-03 DPW - Milling and Overlay Contract Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
1	We recommend the DPW Director continue to seek additional infrastructure funding for longer term rehabilitation and reconstruction of problematic roads.	Y	The administration is hopeful that additional funding will be made available through the federal government's Infrastructure Investment Jobs Act to address roads that are in need of substantive repairs.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Director of Public Works		09-30-2022
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
2	We recommend the Senior Capital Project Manager ensure the contractors are not completing paving operation in non-optimal weather conditions.	N	The paving program follows VDOT standards for paving 40 degrees and rising. The only time the City would deviate from the temperature requirement is if it was critical that a road is paved.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
3	We recommend the Senior Capital Project Manager develop and implement standardized billing and payment procedures to include the following: <ul style="list-style-type: none"> o Validating the billed quantities for off-duty officers and supervisors, police vehicles and the hourly markup. o Researching and resolving billing discrepancies prior to approving payments; 	Y- Partially	The Capital Project Manager Senior agrees that the City needs to work on the police reconciliation for hours work and hours billed. The Capital Project Manager Senior is using a standardized payment procedure. The auditing staff and the Capital Project Manager Senior consulted with another agency regarding procedures and staffing . Their procedure were identical to the City of Richmond. Their staffing was considerably different than the City's . The other agency resurfaces approximately 80 moving lane mile per year and they have two Inspectors. Each Inspector has a Project Manager and a Contract Administrator to validate quantities and unit cost on all billings prior to submission to the Program Manager for approval. The City of Richmond resurfaces approximately 270 moving lane miles per year. The City has 6 Inspectors and a Program Manager. The Program Manager is responsible for validating all quantities, unit pricing and all billings.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		09-30-2022
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			

APPENDIX D: MANAGEMENT RESPONSE FORM

2022-03 DPW - Milling and Overlay Contract Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
4	We recommend the Senior Capital Project Manager research and resolve the billing discrepancies identified during the audit.	Y	When a contract is complete the Senior Capital Project Manager Senior reconciles the quantities billed with the Inspector quantities and if there are any discrepancies the correction is made before retainage is released. In some cases there are minor discrepancies that need to be corrected.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		30-Jun-22
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
5	We recommend the Senior Capital Project Manager submit a request to Procurement Services to add a bid line item for speed tables.	Y	The Senior Capital Project Manager will submit an amendment request to Procurement Services to add speed tables to the contract bid line items.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		31-Dec-21
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
6	We recommend that the Procurement Services Director provide the information needed by the third-party vendor to adequately track and manage the certificates of insurance.	Y	The finding is more about the City taking responsibility for ensuring third party vendors adhere to all contractual obligations, up to and including, legal action. However, the City will continue to reconcile its records with the contractor.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Procurement Services Principal Management Analyst		31-Dec-21
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
7	We recommend that the Chief Administrative Officer evaluate if the function for administering the certificate of insurance tracking contract should be housed in Procurement Services or the Risk Management Division.	Y	Contingent upon resources and technology to administer. Today, this is incumbent upon the contract administrator's to ensure the certificates are up to date, during the life of the contract; however, the City feels this could be handled more effectively with technology and the City is currently budgeting for resources to procure this technology. Procurement services will request resources to implement this technology as is found as a best practice in other localities.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Procurement Services Director		30-Sep-22
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			

APPENDIX D: MANAGEMENT RESPONSE FORM

2022-03 DPW - Milling and Overlay Contract Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
8	We recommend that the department assigned by the CAO develop and implement adequate contract administration procedures to ensure the vendor adheres to the terms and conditions of the insurance certificate tracking contract.	Y	Procurement will develop a centralized tool to aid contract administrators to certify and track certificates of insurance.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director of Procurement Services		30-Sep-22
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
9	We recommend that the department assigned by the CAO ensure that all active contractors are notified of the certificate of insurance tracking process.	Y	Procurement will notify the contract administrators of the new process once centralized tool is in place.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director of Procurement Services		30-Sep-22
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
10	We recommend the Inspector Supervisor make improvements to the current tracking process to ensure that the inspectors are properly certified, certifications are timely renewed and adequate supporting documentation is maintained.	Y	The Capital Project Manager Senior will set up a process for the Inspector Supervisor to track all Inspector certificates and provide a quarterly report to the Capital Project manager Senior for verification.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Capital Project Manager Senior		1-Jan-22
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
11	We recommend the Senior Capital Projects Manager develop and implement a formal process to ensure warranty inspections are performed and documented.	Y	The Capital Project Manager Senior will prepare a SOP to outline the proper steps for the inspection team for final inspections prior to the end of the one year warrantee. These inspection will have there own inspection report.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Capital Project Manager Senior		1-Jan-22
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
12	We recommend the Senior Capital Project Manager enhance the paving inspection SOP to provide more guidance and ensure documentation consistency among all the inspectors. The procedures should be periodically reviewed and updated to reflect the current work practices and requirements.	Y	The Capital Project Manager Senior will review current SOP and modify, to out line and document the inspectors duties to assure consistency with reporting.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Capital Project Manager Senior		1-Feb-22
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION

APPENDIX D: MANAGEMENT RESPONSE FORM

2022-03 DPW - Milling and Overlay Contract Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
13	We recommend the Senior Capital Project Manager develop a process to ensure all the paved streets are updated in Micro Paver, reflecting the correct PCI rating.	Y	In 2021 the Capital Project Manager Senior started dating the spread sheet when a road segment has been updated in Micro Paver.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		30-Jun-22
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
14	We recommend the Senior Capital Project Manager research the paving projects completed during the audit scope to ensure the last major work dates are updated.	Y	When recommendation #13 has been performed it updates the last major work date.
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		30-Jun-22
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
15	We recommend the Senior Capital Projects Manager finalizes and implements the software application to automate the daily logs and provide training to the paving inspectors.	Y	The Capital Project Manager Senior and GIS team has generated a software program to perform daily quantity tracking for all ongoing Paving projects for tracking. Currently we are testing the program and the team plans to have the program live by October 2021
#REF!	TITLE OF RESPONSIBLE PERSON		TARGET DATE
#REF!	Capital Project Manager Senior		1-Oct-21
#REF!	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#REF!			