Date: July 17, 2023

To: Sheryl M.M. Long, City Manager

From: Lauren Sundararajan, CFE, Internal Audit Manager

Copies to: Internal Audit Committee
William Weber, Assistant City Manager
Jerry L. Wilkerson, Jr., Director of Public Services

Subject: **Pothole Repair Operations Audit**

Attached is the Pothole Repair Operations audit report. The primary objective of this performance audit was to assess program performance and operations, the reliability and timeliness of pothole repairs, and the efficiency of coordinated pothole repair efforts.

We would like to thank the management and staff of the Department of Public Services (DPS) for their assistance and cooperation during this audit.

If you need any further information, please contact me.

Attachment

Pothole Repair Operations Audit

July 2023

Lauren Sundararajan, CFE
Internal Audit Manager

Ann Herzner
Senior Internal Auditor

Table of Contents

Executive Summary

Internal Audit (IA) conducted a performance audit of the pothole repair operations within the Department of Public Services (DPS). The primary objective of this audit was to assess program performance and operations, the reliability and timeliness of pothole repairs, and the efficiency of coordinated pothole repair efforts.

The audit revealed several opportunities for strengthening the internal controls over the pothole repair process. IA found there is no standard operating procedures (SOP's) for the operations to allow for consistency and efficiency in daily repairs, and a paper process is used to assign, manage, and complete a customer service request (SR). Creating a SOP and implementing an electronic system would allow management to review and track employee performance and increase efficiency.

Additionally, IA found there is no systematic method used by the department to ensure all City streets are inspected for potholes. Developing a methodology to ensure streets are inspected will ensure the process is equitable and more effective. Also, performance metrics are not clearly defined and data analysis is not performed. Establishing performance metrics is necessary for an efficient operation and analyzing data trends is imperative for sharing information with other City departments and improving road conditions.

IA found the pothole repair logs are incomplete. The logs are completed by the field crews to document key information pertaining to the pothole repairs. Ensuring the entire document is completed daily is necessary for tracking the timeliness of pothole repairs and holding employees accountable.

To strengthen the internal controls over the pothole repair process, the following recommendations should be incorporated: create a SOP, implement an electronic system, develop a methodology to ensure all streets are inspected for potholes, establish well-defined performance metrics, analyze SRs for any data trends, and complete the daily pothole logs. Implementing these recommendations will ensure management that the proper internal controls have been established in the pothole repair process to increase efficiency.

I. Introduction

Background

The Traffic and Road Operations Division (TROD) is responsible for providing clean and safe travel conditions in the City's public right of way (ROW). In order to maintain reliable roadways, the division provides a variety of maintenance services including asphalt maintenance and pavement repair, attenuator maintenance, curb repair, emergency services, fleet management, snow and ice control, structures, and traffic control.[1]

TROD has three locations around the City that service potholes. These locations include Crookshank, Dunbar,[2] and Millcreek. Millcreek is operational only during the construction season, which varies year to year, but typically ranges from spring to late fall. Every yard is managed by one or two Service Area Coordinators (SAC's).

SAC's are responsible for managing the maintenance services provided at their specific location, including pothole repairs. Crookshank and Millcreek work within a specific geographical region, and it is the responsibility of the SAC's to ensure the potholes are repaired accurately and in a timely manner.

Potholes develop typically in the winter due to the freeze-thaw cycles and are inevitable. They pose a risk to travelers because of the pavement deterioration.[3] Depending upon the time of year, different materials may be used to fill potholes. In the winter, QPR bags (commonly referred to as cold mix) or bulk are used to fill potholes due to the frigid temperatures.[4] However, in the summer, bags of asphalt or hot asphalt (commonly referred to as hot box) can be used to fill a pothole along with tar. The City launches a pothole blitz once per year. Typically, the blitz begins with a press conference toward the end of winter or early spring and asks citizens to report potholes.

When a pothole is reported,[5] the information is captured in the Customer Service Request (CSR) system, creating a SR. Every SR is assigned a number and prior to assigning it, the SAC reviews the ticket for specific information that might be helpful for the field crew to locate the pothole. Once the SR is preliminary reviewed, it is assigned to a field crew for repair.

After the field crews have filled the potholes, the information is shared with their SAC and with Central. Central refers to a group of DPS employees who manage the radio communication for TROD and the Neighborhood Operations Division (NOD). Central consists of two customer service representatives and one dispatcher, and it is the responsibility of Central to update the completed pothole repairs (or SRs) in the CSR system after the work has been completed.

[1] https://www.cincinnati-oh.gov/public-services/about-public-services/traffic-road-operations/
[2] Dunbar services potholes on a "as needed" basis and focuses primarily on Stormwater repair work.
[3] Nazzal, Munir, Talha, Sk. Abu, Al-Hosaint, Mukhatar, Hamza, Abbas, Ala R., "Winter Pothole Treatments for Local Roads," Ohio Research Initiative for Locals, May 2022, Final Report, p. 3.
[4] When using bulk materials, tar cannot be used to seal the asphalt due to the cold temperatures.
[5] Potholes are reported through the City's app, www.311cincy.com, by phone or email.

Audit Selection
IA conducted this audit in accordance with the Audit Work Plan.

Audit Objective
The primary objective of this performance audit was to assess program performance and operations, the reliability and timeliness of pothole repairs, and the efficiency of coordinated pothole repair efforts.

Audit Scope and Methodology
In order to achieve the audit objective, IA interviewed appropriate staff, reviewed contracts, observed the pothole repair process, obtained key program data and examined repair logs. The data collected was from fiscal year (FY) 2021 through May 2023.

Statement of Auditing Standards
As required by the Cincinnati Administrative Code Article II §15, this audit was conducted in accordance with the Generally Accepted Government Auditing Standards (GAGAS), except for standard 5.60 pertaining to external peer review requirements. This exception did not have a material effect on the audit.

IA continues to conduct internal quality reviews to assure conformance with applicable GAGAS. IA performed the fieldwork between March of 2023 and June 2023.

Commendations
IA commends the staff of the Department of Public Services for their cooperation throughout the audit.

II. Audit Findings and Recommendations

There are no SOP's for the pothole repair process.

SOP's are essential for establishing program objectives, documenting key policies and procedures, and holding employees accountable. IA requested the program's policies and procedures and was provided with a pothole repair flow chart and a job hazard analysis form for the positions that work in the City's right of way (ROW) conducting pothole repairs. Although these two documents can be incorporated into the program's SOP's, establishing a SOP for the process is necessary to maintain management consistency and program efficiency.

Recommendation 1: Create a SOP for the pothole repair process. At a minimum, the SOP should include sample photos of potholes and general repairs, when to contact the SAC from the field and/or Central and identify the types of equipment used for the different pothole repair jobs.

Department Response: Agree. The Department will have the TROD Division head along with members of his staff create and distribute an SOP. This will be created and implemented by the end of the 2023 Construction Season.

The process management uses to oversee the pothole repair requests needs improvement.

The SAC's are responsible for assigning the new SR's daily. This paper process entails printing each SR, preliminary reviewing the information, then assigning it to a pothole crew of two to four people, depending upon the yard. Each pothole crew may receive up to 30 SRs, depending upon the volume of potholes reported and their location. At the end of the shift, the pothole crews are responsible for returning the SRs to the SACs for processing. The current paper process is time consuming and labor intensive for management and field crews. Having an electronic system in place would increase efficiency and allow management to more accurately review and track employee performance. Additionally, providing employees with tablets that would allow the use of photos to depict the before and after of the pothole repair would enhance the division's performance.

Recommendation 2: Implement an electronic system that would allow management to review and track employee performance and increase efficiency.

Department Response: Agree. The Department will discuss with Budget and ETS this recommendation. Implementation would be based on a schedule that includes funding to order the tablets and funding to for IT services to implement and maintain the software/hardware related to these tablets.

There is no systematic method used to ensure all City streets are inspected for potholes.

Currently, TROD relies upon citizens to report potholes. This can be done through the City's app, website, phone, or email. SAC's are then tasked with assigning the pothole repairs to a field crew and ensuring the work is performed. Although TROD relies primarily upon citizens to report potholes, IA found there is no systematic method used by the division to ensure all City streets are routinely inspected for potholes so that the process is equitable and efficient.

Recommendation 3: Develop a methodology to ensure all City streets are inspected for potholes.

Department Response: Disagree. The Department has not been shown an example of where this is successfully done. It is hard to predict where a pothole is going to develop prior to the pothole existing. The department would recommend bringing the crack seal program back as a funded program.

Performance metrics are not clearly defined.

Performance metrics are used by management to help gauge an operation's effectiveness and efficiency, by highlighting areas that need improvement. Currently, the program adheres to one metric that entails potholes should be filled within a "reasonable amount of time." Using one metric to measure TROD's performance does not accurately reflect the volume of pothole requests the City receives and completes on a continuous basis.

According to the standards for Internal Control in the Federal Government, "management should define the objectives in specific and measurable terms so that performance toward achieving those objectives can be assessed…[and] should establish activities to monitor performance measures and indicators. These may include comparisons and assessments relating different sets of data to one another so that analyses of the relationships can be made, and appropriate actions taken."

Recommendation 4: Clearly define performance metrics for the pothole repair operations process. This may include daily, weekly, or monthly goals or percentages to ensure operational efficiency.

Department Response: Agree and Disagree. The Department cannot predict the volume of potholes that will occur to define a performance metric. The City's legal department has not defined an amount of time that a pothole should be filled. Depending on the time of year, the length of time it takes to respond to a service request varies.

There is no data analysis of the SRs.

Analyzing data is necessary to identify trends and inefficiencies in program operations. For example, a review of pothole repair data could determine if the same pothole is filled repeatedly, or if there is a heavy concentration of pothole repair requests in a specific neighborhood. The CSR system captures key data which includes, but is not limited to, when the pothole was reported, the location of the pothole, when it was completed, and the total number of pothole holes filled at that particular location. This data is currently shared on the City's Insights dashboard through the Office of Performance and Data Analytics (OPDA)[6]. However, IA found there is no data analysis of the SRs.

Recommendation 5: Work with OPDA to analyze pothole repair data to identify trends and inefficiencies in program operations. Additionally, work cross functionally with other departments to share the results, as needed.

[6] The City Insights Dashboard provides a three-year period of activity of pothole repairs that can be filtered by neighborhood, ticket status, and number of days requests have remained open.

Department Response: Agree. The Department will work with OPDA and identify their resources that will be involved in the analysis of this data.

The pothole repair logs are incomplete.

The pothole repair logs are used by field crews to document key information pertaining to the pothole repair process. This information consists of the arrival time, completion time, location and SR number, whether the pothole repair was completed or incomplete, the total number of potholes filled, materials used, field crew names, vehicle number, and total miles driven. IA requested two weeks' worth of pothole repair logs from two different yards, and found 16 of 16 (100%) were incomplete. Ensuring the pothole repair logs are completed daily is necessary for tracking the timeliness of pothole repairs and holding employees accountable.

Recommendation 6: Ensure the pothole repair logs are complete.

Department Response: Agree. With the implementation of recommendation #2 pothole logs could be eliminated. Potholes will be updated with real time information.

Spot checks are not documented by the SAC's.

Spot checks are a key component of an internal control system. They allow management to ensure employees are performing their work as expected and to gauge their employee's effectiveness. Although IA was informed that management does check their field crew on a regular basis, IA found spot checks are not documented by the SAC's. Documentation is necessary to ensure management is providing the quality control in the pothole repair process.

Recommendation 7: Require SAC's to document when spot checks are performed.

Department Response: Agree. The Department Division Head will develop a document for SACs to utilize that will document when site checks are performed. This will be implemented by Fall 2023.

The CSR system creates data redundancy.

Data redundancy is the storage of the same data in a database. When data redundancy occurs, it increase discrepancies between the data because updates are not made concurrently. The CSR system allows for data redundancy to occur when multiple online requests are made for the same pothole location. As such, this data redundancy can make it difficult for SAC's to properly sort and assign pothole repair requests each day.

Recommendation 8: Work with CAGIS to determine if data can be categorized to help SAC's with reviewing and assigning daily pothole repair requests.

Department Response: Agree. The Department will have the Division Head contact CAGIS to see if it is possible for duplicates not to be created when service requests are created via the web.

Pothole repair data is not shared with the Department of Transportation and Engineering's (DOTE's) Street Rehabilitation Program.

The CSR system captures key information concerning pothole repair requests. This information could be useful to other City departments when making decisions about the City's roadways. For example, DOTE's Street Rehabilitation Program provides the resources for systematic repair and resurfacing of the City streets by monitoring the City's pavement condition index (PCI).[7] The pothole repair data maintained in the CSR system may benefit DOTE because it contains pavement history that would be instrumental to the decisions made by the Street Rehabilitation Program.

Recommendation 9: Share pothole repair data with DOTE's Street Rehabilitation Program.

Department Response: Disagree. The Department of Transportation and Engineering already has access to the CSR system.

Additional management review and oversight is needed.

According to the Standards for Internal Control in the Federal Government, "The oversight body is responsible for overseeing the strategic direction of the entity and obligations related to the accountability of the entity. This includes overseeing management's design, implementation, and operation of an internal control system."[8] IA found senior management is not providing sufficient oversight over the pothole repair process. At a minimum, senior management should oversee the adoption of a SOP for the operation, develop a systematic method to ensure all City streets are inspected for potholes, ensure pothole logs are completed, and require the SAC's to document when spot checks are performed. Applying these internal controls will allow senior management to properly monitor the process and achieve efficiency.

Recommendation 10: Additional senior management review and oversight should occur on a continuous basis to ensure program efficiency and effectiveness.

Department Response: Agree. Additional resources to enhance our operation is welcome. The Department will discuss with Budget based on this recommendation the funding needed to add this additional management.

[7] The PCI is a numerical indicator that rates the surface condition of the pavement. It is one standard (of several) that DOTE uses to determine which streets are selected for resurfacing.
[8] GAO-14-704G Federal Internal Control Standards.

III. Conclusion

TROD is responsible for a variety of maintenance services to ensure roadways are in safe travel conditions. The audit revealed several opportunities for improvement over the pothole repair process.

To strengthen the process, IA recommends the following: create a SOP, implement an electronic system, develop a methodology to ensure all streets are inspected for potholes, establish well-defined performance metrics, analyze SRs for any data trends, and complete the daily pothole logs. Implementing these recommendations will ensure management that proper internal controls have been established in the pothole repair process to increase efficiency.

IV. Department of Public Services Response

Recommendation 1: Create a SOP for the pothole repair process. At a minimum, the SOP should include sample photos of potholes and general repairs, when to contact the SAC from the field and/or Central and identify the types of equipment used for the different pothole repair jobs.

Department Response: Agree. The Department will have the TROD Division head along with members of his staff create and distribute an SOP. This will be created and implemented by the end of the 2023 Construction Season.

Recommendation 2: Implement an electronic system that would allow management to review and track employee performance and increase efficiency.

Department Response: Agree. The Department will discuss with Budget and ETS this recommendation. Implementation would be based on a schedule that includes funding to order the tablets and funding to for IT services to implement and maintain the software/hardware related to these tablets.

Recommendation 3: Develop a methodology to ensure all City streets are inspected for potholes.

Department Response: Disagree. The Department has not been shown an example of where this is successfully done. It is hard to predict where a pothole is going to develop prior to the pothole existing. The department would recommend bringing the crack seal program back as a funded program.

Recommendation 4: Clearly define performance metrics for the pothole repair operations process. This may include daily, weekly, or monthly goals or percentages to ensure operational efficiency.

Department Response: Agree and Disagree. The Department cannot predict the volume of potholes that will occur to define a performance metric. The City's legal department has not defined an amount of time that a pothole should be filled. Depending on the time of year, the length of time it takes to respond to a service request varies.

Recommendation 5: Work with OPDA to analyze pothole repair data to identify trends and inefficiencies in program operations. Additionally, work cross functionally with other departments to share the results, as needed.

Department Response: Agree. The Department will work with OPDA and identify their resources that will be involved in the analysis of this data.

Recommendation 6: Ensure the pothole repair logs are complete.

Department Response: Agree. With the implementation of recommendation #2 pothole logs could be eliminated. Potholes will be updated with real time information.

Recommendation 7: Require SAC's to document when spot checks are performed.

Department Response: Agree. The Department Division Head will develop a document for SACs to utilize that will document when site checks are performed. This will be implemented by Fall 2023.

Recommendation 8: Work with CAGIS to determine if data can be categorized to help SAC's with reviewing and assigning daily pothole repair requests.

Department Response: Agree. The Department will have the Division Head contact CAGIS to see if it is possible for duplicates not to be created when service requests are created via the web.

Recommendation 9: Share pothole repair data with DOTE's Street Rehabilitation Program.

Department Response: Disagree. The Department of Transportation and Engineering already has access to the CSR system.

Recommendation 10: Additional senior management review and oversight should occur on a continuous basis to ensure program efficiency and effectiveness.

Department Response: Agree. Additional resources to enhance our operation is welcome. The Department will discuss with Budget based on this recommendation the funding needed to add this additional management.