



# City of New York

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## OFFICE OF THE COMPTROLLER

Scott M. Stringer  
COMPTROLLER



## MANAGEMENT AUDIT

**Marjorie Landa**

Deputy Comptroller for Audit

Audit Report on the Department of  
Environmental Protection's Handling of  
Fire Hydrant Inspections and Repairs

ME19-107A

**June 30, 2020**

<http://comptroller.nyc.gov>



THE CITY OF NEW YORK  
OFFICE OF THE COMPTROLLER  
SCOTT M. STRINGER

June 30, 2020

To the Residents of the City of New York:

My office has audited the New York City Department of Environmental Protection's (DEP's) handling of fire hydrant inspections and repairs. We conduct audits such as this in an effort to help improve public safety and as a means of increasing accountability and ensuring that City agencies handle their responsibilities appropriately and in a timely manner.

The audit found that DEP adequately handled its fire hydrant inspection and repair responsibilities in Fiscal Year 2019. However, improvements are needed. Specifically, during Fiscal Year 2019, DEP had no timeliness standards in place for its so-called "non-priority" hydrant repairs or for certain other fire-hydrant-related repair activities. In addition, DEP did not consistently meet the timeliness standards that were in place for Customer Service Request (CSR) inspections and priority hydrant repairs. Further, DEP relied entirely on the New York City Fire Department (FDNY) to identify priority hydrants, which increased the risk that there could be a delay in identifying hydrants in need of immediate repair. Moreover, DEP needs to improve its communications with the FDNY to help FDNY more clearly identify the problems, priority, and locations of the fire hydrants that FDNY determines need repair. Finally, DEP needs to institute a policy of documented supervisory verification of hydrant inspections and repairs.

The audit makes 14 recommendations to DEP, including that DEP develop written timeliness standards for the fire-hydrant-related repair activities currently without such standards; ensure that it inspects fire hydrants in response to CSRs in accordance with its timeliness standards; identify priority hydrants during its CSR inspections that have not been so identified by FDNY to supplement the FDNY's determinations; improve its communications with the FDNY on fire hydrant repairs; and require crew supervisors to document the results of their field reviews of the fire hydrant inspections and repairs performed by DEP work crews.

The results of the audit have been discussed with DEP officials, and their comments have been considered in preparing this report. Their complete written response is attached to this report.

If you have any questions concerning this report, please e-mail my Audit Bureau at [audit@comptroller.nyc.gov](mailto:audit@comptroller.nyc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Scott M. Stringer".

Scott M. Stringer

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# THE CITY OF NEW YORK OFFICE OF THE COMPTROLLER MANAGEMENT AUDIT

## Audit Report on the Department of Environmental Protection's Handling of Fire Hydrant Inspections and Repairs

ME19-107A

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### EXECUTIVE SUMMARY

The objective of this audit was to determine whether the New York City (City) Department of Environmental Protection's (DEP's) fire hydrant inspection and repair responsibilities are handled in a timely and effective manner.

DEP's Bureau of Water and Sewer Operations (BWSO) is responsible for, among other things, operating and maintaining the City's water and sewer systems, endeavoring to ensure that there is sufficient water for fire protection, and responding to fire hydrant service requests. DEP's records indicate that as of June 30, 2019, there were 109,586 DEP fire hydrants across the City.

The fire hydrant inspection process involves both semi-annual inspections of all City hydrants by the New York City Fire Department (FDNY), and DEP inspections made in response to Customer Service Requests (CSRs) that BWSO receives, mainly through the City's 311 Customer Service Center. The inspection results are entered into DEP's Infor Public Sector (IPS) computer system.<sup>1</sup> If the results of FDNY or DEP inspections indicate that repairs are necessary, IPS automatically generates and electronically forwards work orders to DEP's Repair Yards in the boroughs where the hydrants are located. After each repair is completed, Repair Yard staff manually update the information in IPS.

The FDNY designates fire hydrants as "priority hydrants" where they are near hospitals, day care centers, schools, senior-citizen housing, or other such facilities or large places of public assembly, or are the only hydrant on a block. Where the FDNY has designated a hydrant a priority hydrant, and that hydrant is inoperative, DEP refers to the repair as a "priority hydrant repair." Where the FDNY has designated a hydrant a priority hydrant, but that hydrant is operable, yet in need of some repair, DEP identifies the repair as a "non-priority repair." Similarly, DEP refers to the repair of an operative or inoperative non-priority hydrant as a "non-priority repair."

According to DEP, during Fiscal Year 2019, BWSO received 18,335 unique CSRs and initiated 27,641 unique hydrant-repair work orders based on FDNY and DEP inspections. DEP reported in

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<sup>1</sup> IPS is an information management system DEP uses to track service requests, inspections, and work orders related to fire hydrants and other DEP assets.

the Fiscal Year 2019 Mayor’s Management Report (MMR) that inoperative priority hydrants were repaired in an average of 2.5 days.

## Audit Findings and Conclusions

DEP adequately handled its fire hydrant inspection and repair responsibilities in Fiscal Year 2019. However, improvements are needed. During Fiscal Year 2019, DEP had no timeliness standards in place for the so-called “non-priority” hydrant repairs. Although during the audit DEP set timeliness standards for 4 “non-priority” hydrant repair activities for Fiscal Year 2020, the agency still lacks timeliness standards for 31 other types of activities that encompass more than half of its hydrant-repair work. In addition, since DEP’s recently adopted timeliness standards set only modest goals, we question whether the new repair goals represent the optimum balance of public safety concerns and available resources.

DEP also did not consistently meet the timeliness standards that were in place for inspections and priority hydrant repairs. Moreover, DEP relied entirely on the FDNY to identify priority hydrants even though, in some instances, only DEP would have been in the position to know that a hydrant met the priority criteria. Further, DEP needs to institute a policy of documented supervisory verification of hydrant inspections and repairs to provide greater assurance that the work its crews perform is completed appropriately and as reported. DEP also needs to improve its communications with the FDNY to help FDNY more clearly identify the problems, priority, and locations of the fire hydrants that FDNY determines need repair. Finally, DEP needs to enhance its IPS data entry controls to improve the reliability of its IPS data, and needs to improve its support for the percentage of hydrants it deems inoperative, a performance indicator DEP reports in the MMR.

## Audit Recommendations

To address the issues raised by this audit, we made 14 recommendations, including the following:

- DEP should develop written timeliness standards for the 31 fire-hydrant-related repair activities currently without such standards.
- DEP should ensure that it inspects fire hydrants in response to CSRs in accordance with its timeliness standards.
- DEP should measure the timeliness of all of its hydrant repair activities, including the 31 work activities that it does not currently measure, and seek ways to improve the timeliness of its repairs, especially those involving inoperative fire hydrants.
- DEP should identify priority hydrants during its CSR inspections that have not been so identified by FDNY to supplement the FDNY’s determinations.
- DEP should require crew supervisors to document the results of their field reviews of the fire hydrant inspections and repairs the work crews perform.
- DEP should provide FDNY with a comprehensive set of written instructions on inspecting fire hydrants and on properly recording the problems, locations, and priority of the fire hydrants that FDNY identifies as needing repairs.

## Agency Response

In its response, DEP generally agreed with the audit’s findings and recommendations.

# AUDIT REPORT

## Background

DEP's mission is to enrich the environment and protect public health for all New Yorkers by providing high quality drinking water, managing wastewater and stormwater, and reducing air, noise and hazardous materials pollution. DEP's BWSO operates and maintains the City's water and sewer systems, endeavors to ensure that there is sufficient water for fire protection, and responds to fire hydrant service requests. DEP's records indicate that as of June 30, 2019, there were 109,586 DEP fire hydrants across the City.

The fire hydrant inspection process involves both semi-annual inspections of all City hydrants by the FDNY and DEP inspections in response to CSRs that BWSO receives, mainly through the City's 311 Customer Service Center.<sup>2</sup> Using IPS, DEP generates and provides FDNY with lists of the fire hydrants to inspect during the spring and fall of each year.<sup>3</sup> FDNY firefighters inspect the fire hydrants and enter the results via a mobile application into handheld devices, which electronically transmit the results back to IPS. Separately, in response to CSRs, DEP Maintenance Yard inspectors check the individual fire hydrants referenced in the service requests to determine whether they need repairs. Maintenance Yard staff manually enter the results of these inspections into IPS, which automatically transfers the results into the 311 system daily. If the results of FDNY or DEP Maintenance Yard inspections indicate that repairs are necessary, IPS automatically generates and electronically forwards work orders to DEP's Repair Yards in the boroughs where the hydrants are located. After each repair is completed, Repair Yard staff manually update the information in IPS.

The FDNY designates certain fire hydrants as "priority hydrants." These include hydrants that are near hospitals, day care centers, schools, senior-citizen housing, or large places of public assembly, or that are the only hydrant on a block. Where the FDNY has designated a hydrant a priority hydrant, and that hydrant is inoperative, DEP refers to the repair as a "priority hydrant repair." Where the FDNY has designated a hydrant a priority hydrant, but that hydrant is operable, yet in need of some repair, DEP identifies the repair as a "non-priority repair." Similarly, DEP refers to the repair of an operative or inoperative non-priority hydrant as a "non-priority repair."

According to DEP, during Fiscal Year 2019, BWSO received 18,335 unique CSRs and initiated 27,641 unique hydrant-repair work orders based on FDNY and DEP inspections. DEP reported in the Fiscal Year 2019 Mayor's Management Report (MMR) that inoperative priority hydrants were repaired in an average of 2.5 days.

## Objective

The objective of this audit was to determine whether DEP's fire hydrant inspection and repair responsibilities are handled in a timely and effective manner.

## Scope and Methodology Statement

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient,

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<sup>2</sup> Other sources of service requests include the City Department of Transportation and the City Department of Design and Construction.

<sup>3</sup> The spring period covers March 1<sup>st</sup> through August 31<sup>st</sup>, and the fall period covers September 1<sup>st</sup> through February 28<sup>th</sup>.



appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The primary scope of this audit was Fiscal Year 2019. In order to assess DEP's handling of Fiscal Year 2019 CSRs and work orders, we reviewed the status of those CSRs and certain work orders up to December 30, 2019. We reviewed the status of most of the remaining work orders up to February 13, 2020, and the remaining work orders on March 12, 2020. Please refer to the Detailed Scope and Methodology at the end of this report for the specific procedures followed and tests conducted during this audit.

## **Discussion of Audit Results with DEP**

The matters covered in this report were discussed with DEP officials during and at the conclusion of this audit. A preliminary draft report was sent to DEP and was discussed at an exit conference held on May 22, 2020. We submitted a draft report to DEP with a request for comments and received a written response from the agency on June 18, 2020.

In its response, DEP generally agreed with the audit's findings and recommendations. However, DEP stated: "Throughout the report, it is stated that 31 work order activity codes for which timeliness standards have still not been established. To reiterate what was discussed at the exit conference, most of these activity codes aren't indicative of operable or inoperable hydrants and are managed accordingly." The 31 fire-hydrant-related work activity codes include the repair of inoperative hydrants, operative hydrants, and DEP assets related to the operational status of nearby hydrants, as well as planned maintenance work. It would be appropriate for DEP to establish timeliness standards for all hydrant-related work orders, especially for those involving the repair of hydrants and the repair of DEP assets related to the operational status of nearby hydrants.

The full text of DEP's response is included as an addendum to this report.



## FINDINGS AND RECOMMENDATIONS

DEP adequately handled its fire hydrant inspection and repair responsibilities in Fiscal Year 2019. However, improvements are needed. Although DEP had established a timeliness standard for “priority hydrant repairs,” that time frame applied to only 330 priority hydrant repairs in Fiscal Year 2019. DEP had no timeliness standards in place for the 27,311 so-called “non-priority” hydrant repairs, which represented 98.8 percent of the hydrant repairs that DEP initiated in Fiscal Year 2019.<sup>4</sup> Because it lacked timeliness standards for most of the hydrant repairs it was responsible to perform, DEP was not adequately able to determine its efficiency in completing them.

Although during the audit DEP set timeliness standards for 4 “non-priority” hydrant repair activities for Fiscal Year 2020, the agency still lacks timeliness standards for 31 other types of activities that encompass more than half of its hydrant-repair work. Moreover, DEP’s recently adopted timeliness standards set only modest goals, for example, 60 and 100 days for the repair of inoperative hydrants, depending on the extent of repair work required. Those time frames could allow thousands of hydrants to remain inoperative for periods of two months or longer. Considering that inoperative hydrants cannot be used for their intended purpose of fire control, we question whether the new 60- and 100-day repair goals represent the optimum balance of public safety concerns and available resources.

DEP also did not consistently meet the timeliness standards that were in place for inspections and priority hydrant repairs. In addition, DEP relied entirely on the FDNY to identify priority hydrants even though, in some instances, only DEP would have been in the position to know that a hydrant met the priority criteria. For example, this could happen when DEP inspections revealed that on a block with only two hydrants, both were inoperative, notwithstanding the fact that earlier inspections by the FDNY found both to be operative. In such an instance, DEP does not designate either of the hydrants a priority hydrant, but rather waits for the FDNY to do so. As a result, neither of the inoperable hydrants would be identified by DEP as a priority repair to be performed within seven days.

Additionally, DEP needs to institute a policy of documented supervisory verification of hydrant inspections and repairs to provide greater assurance that the work its crews perform is completed appropriately and as reported. Moreover, DEP needs to improve its communication with the FDNY to help FDNY more clearly identify the problems, priority, and locations of the fire hydrants that FDNY determines need repair. Finally, DEP needs to enhance its IPS data entry controls to improve the reliability of its IPS data, and needs to improve its support for the percentage of hydrants it deems inoperative, a performance indicator DEP reports in the MMR.

### Insufficient Timeliness Standards for Fire Hydrant Repairs

Section 4.5 of Comptroller’s Directive #1 states: “A sound internal control system must be supported by ongoing activity monitoring occurring at various organizational levels and in the course of normal operations. ... It should include appropriate measurements on regular management and supervisory activities, comparisons, reconciliations, and other actions taken by employees in performing their duties.”

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<sup>4</sup> Only 330 of the 27,641 Fiscal Year 2019 hydrant-repair work orders initiated during Fiscal Year 2019 involved priority repairs (i.e., the repair of inoperative priority hydrants). As a result, “non-priority” hydrant-repair work orders constituted 98.8 percent [(27,641 minus 330) divided by 27,641] of the work orders during that year.

Although DEP established timeliness standards for the repair of priority hydrants as recommended by a previous audit issued by the New York City Comptroller,<sup>5</sup> it did not establish timeliness standards (as that audit had also recommended) for what DEP refers to as “non-priority” hydrant repairs. As a result, DEP did not have a timeliness policy in place for 98.8 percent of its Fiscal Year 2019 hydrant repairs. Only after the auditors inquired in connection with the present audit about such a policy did DEP draft one, which became effective on July 2, 2019 (in Fiscal Year 2020). Of further concern is the fact that this recently-adopted policy covers only 3 specific types of work, designated by 4 of DEP’s 35 specific work activity codes: WA02—inoperative hydrants requiring major repairs; WA03 and WA04—inoperative hydrants requiring less-than-major repairs; and WA05—operative hydrant repairs. The policy does not cover 31 work activity codes relating to other hydrant-related tasks, such as thawing frozen hydrants, investigating reports of removed/missing hydrants, repairing broken hydrant branches,<sup>6</sup> repairing defective hydrant drains, and handling “miscellaneous hydrant repairs” and “other repairs.” DEP officials have not explained why the agency has not established timeliness standards for these 31 work activity codes, which, as discussed later in this report, encompassed 55.7 percent of its hydrant-repair workload in Fiscal Year 2019.

Insufficient timeliness standards have limited DEP’s ability to measure and evaluate the agency’s effectiveness in completing fire hydrant repairs in a timely manner.

## Recommendation

1. DEP should develop written timeliness standards for the 31 fire-hydrant-related repair activities currently without such standards.

**DEP Response:** “DEP implemented internal standards in July 2019. These standards give DEP the ability to measure completing repairs in a timely manner. DEP will review additional hydrant-related repair codes which mostly cover maintenance activities of operable hydrants, while balancing the same resources that are used to maintain the water and sewer collection systems.”

**Auditor Comment:** We appreciate DEP’s response that it will consider implementing standards for additional hydrant-related repair codes. The 31 fire-hydrant-related work activity codes include the repair of inoperative hydrants, operative hydrants, and DEP assets related to the operational status of nearby hydrants, as well as planned maintenance work. It would be appropriate for DEP to establish timeliness standards for all hydrant-related work orders, especially for those involving the repair of hydrants and the repair of DEP assets related to the operational status of nearby hydrants.

## Timeliness of CSR Inspections

DEP needs to improve its monitoring of the timeliness of the fire hydrant inspections it conducts in response to Customer Service Requests.

DEP’s timeliness standards are to inspect a hydrant within 24 hours if the CSR states that a hydrant is “running full” and within 5 days if the CSR notes some other concern with a hydrant. DEP informed us that these standards were in effect during Fiscal Year 2019, but that they were

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<sup>5</sup> *Audit Report on the Department of Environmental Protection’s Fire Hydrant Repair Efforts* (ME10-082A) issued by the Comptroller’s Office on January 6, 2011.

<sup>6</sup> A hydrant branch consists of piping, equipped with a control valve that connects the hydrant to the water main.

not in writing. DEP received 18,335 unique hydrant-related CSRs during Fiscal Year 2019, of which 5,519 concerned hydrants running full and 12,816 involved other conditions. As shown in Table I below, DEP’s CSR inspections were untimely between 14.9 and 17.6 percent of the time. DEP officials have not fully explained why the inspections were untimely. They did state that when there is a heat wave in the summer, so many hydrants are opened by neighborhood residents that it is difficult for DEP to address each running-full complaint it receives within 24 hours.

**Table I**

Timeliness of Inspections for CSRs  
Received during  
Fiscal Year 2019

Type of CSR Inspection	DEP's Timeliness Standard	Number of CSRs Received	Number of Untimely CSR Inspections	Percentage of Untimely CSR Inspections	Range of Days Late	Average Number of Days Late
Inspections of Hydrants Running Full	24 hours	5,519	974	17.6%	1 – 92	38
Inspections of Other Concerns	5 days	12,816	1,908	14.9%	1 – 263	57

Timely inspections are necessary to identify needed hydrant repairs promptly, especially those involving inoperative priority hydrants. Failure to inspect the reported conditions timely increases the risk that a block may be without hydrant coverage for an extended period of time, a potential threat to public safety. In addition, compliance would likely improve if DEP clearly communicated its timeliness standards for CSR inspections to its staff in written procedures.

## Recommendations

- DEP should ensure that it inspects fire hydrants in response to CSRs in accordance with its timeliness standards.

**DEP Response:** “DEP responds to CSRs within the time frames established by its service level agreements (SLAs). The majority of the time, DEP meets these goals. There are times when the number of CSRs received exceeds the resources to perform inspections. Examples include extreme heat waves, when a great number of hydrants are opened illegally.”

**Auditor Comment:** We recognize that DEP met its timeliness standards for CSR inspections “[t]he majority of the time” in Fiscal Year 2019. We indicate in the report that DEP met these timeliness standards for 82.4 to 85.1 percent of the CSRs received in Fiscal Year 2019. We also recognize that various challenges can materialize that limit DEP’s ability to fully comply with these standards at all times. However, we do encourage DEP to review its data and operations in this area to determine whether there are opportunities to improve the timeliness of its inspections.

- DEP should document its timeliness standards for CSR inspections in a written procedure.

**DEP Response:** “DEP will work to establish written procedures to support our existing service level agreements in response to hydrant complaints.”

## Timeliness of Fire Hydrant Repairs

### Priority Hydrant Repairs

During Fiscal Year 2019, DEP initiated 27,641 hydrant-repair work orders, 552 of which were for priority hydrants. Of these 552 work orders, 330 related to inoperative priority hydrants.<sup>7</sup> As stated in DEP’s Hydrant Maintenance/Repair Process, DEP has a 7-day target to fix inoperative priority hydrants assigned the work activity codes of WA02, WA03, and WA04. DEP’s repair efforts for these hydrants were generally timely, with 319 (96.7 percent) of the 330 repairs completed on time. The remaining 11 (3.3 percent) work orders were completed an average of 4 days late, ranging from 1 to 21 days late. DEP officials acknowledged that 6 of the 11 work orders were not completed timely, but offered no explanation as to why. DEP stated that 5 of these 11 work orders ultimately did not involve repairs, but rather were closed after DEP determined that repairs were not required (due, for example, to the order being a duplicate). However, DEP did not make these determinations and close the five work orders within the required 7-day target period. Considering the importance of priority hydrants, the untimely completion of even 3.3 percent of the work orders for inoperative priority hydrants is a cause for concern.

### Non-Priority Repairs

As mentioned above, DEP did not establish timeliness standards for what it refers to as “non-priority” hydrant repairs until Fiscal Year 2020. *The hydrants involved with these repairs are, nonetheless, still essential equipment for fighting fires.* Although DEP’s recently adopted timeliness standards for such repairs were not in place in Fiscal Year 2019, we nonetheless used them as benchmarks when analyzing the timeliness of DEP’s repairs during that period. We did so to review the consequence of DEP not having implemented the recommendation in our January 6, 2011 audit report (noted above) that the agency establish such standards.

Effective July 2, 2019, DEP’s Hydrant Maintenance/Repair Process established timeliness standards ranging from 60 to 365 days for three categories of non-priority repairs: (1) 100 days for inoperative, non-priority hydrants requiring major repairs under work activity code WA02; (2) 60 days for inoperative non-priority hydrants requiring less-than-major repairs under work activity codes WA03 and WA04; and (3) 365 days for operative hydrants under work activity code WA05. Using these three benchmarks, we calculated that DEP’s completed repairs in the above three categories were timely (1) 94.7 percent of the time for inoperative hydrants needing major repairs, (2) 93.0 percent of the time for inoperative hydrants requiring less-than-major repairs, and (3) 97.3 percent of the time for operative hydrants. Table II, below, shows the timeliness of repairs by category.

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<sup>7</sup> The remaining 222 work orders generally related to *operative* priority hydrants that nonetheless required certain repairs. Of these 222 work orders, 71 were assigned work activity code WA05 (operative hydrant repairs), with a timeliness standard of 365 days for repair completion, 149 were assigned work activity codes in the set of 31 activity codes for which DEP has not established timeliness standards for repair completion, and 2 related to private hydrants for which DEP did not have repair responsibility. The work orders on the two private hydrants remained open as of December 30, 2019. It is important for tracking purposes for DEP to close work orders for which it is not responsible upon it notifying the responsible parties. In these two instances, since it is FDNY’s responsibility to notify the owners of defects it finds on private hydrants, DEP should have closed these work orders upon it notifying or reminding the FDNY of its responsibility to inform the private owners about the defects it found.

**Table II**

Timeliness of Non-Priority Fire  
Hydrant Repairs for Work Orders  
Generated during  
Fiscal Year 2019

Category	Type of Repair	DEP's Timeliness Standard	Number of Work Orders Initiated	Number of Untimely Repairs	Percentage of Untimely Repairs	Range of Days Late	Average Number of Days Late
#1	Inoperative Hydrant Requiring Major Repairs	100 days	977	52	5.3%	4 - 329	58
#2	Inoperative Hydrant Requiring Less-Than-Major Repairs	60 days	8,045	564	7.0%	1 - 395	43
#3	Operative Hydrant Repairs	365 days	2,893	77	2.7%	2 - 109	34

An additional 10 (1.0 percent) of the 977 work orders for category #1 repairs were not completed at all as of December 30, 2019. These 10 work orders were past due, ranging from being 93 days to over 10 months (327 days) late, with an average of being 148 days late. An additional 56 (0.7 percent) of the 8,045 work orders for category #2 repairs were not completed at all as of December 30, 2019. By that date, these 56 work orders were past due, ranging from being 126 days to over 1 year and 3 months (463 days) late, with an average of being 251 days late. An additional 9 (0.3 percent) of the 2,893 work orders for category #3 repairs were not completed at all as of December 30, 2019. These 9 work orders were past due, ranging from being 3 days to over 3 months (102 days) late, with an average of being 64 days late. DEP officials have not explained why the agency did not complete the abovementioned repairs in a timely manner. Furthermore, we could not determine the timeliness of 16 work orders in categories #1, #2, and #3 due to date logic issues in the IPS data, discussed in a later section of this report.

DEP has set modest goals—60 to 365 days—for the timeliness of its non-priority hydrant repairs versus 7 days for priority repairs. They potentially allow thousands of hydrants to remain inoperative for periods of 60 to 100 days. In fact, more than 9,000 Fiscal Year 2019 work orders related to the non-priority repair of inoperative hydrants. Because DEP has set only modest goals for non-priority hydrant repairs, it is essential that DEP ensure that, at the very least, it consistently meets them to mitigate the public safety risks posed by inoperative hydrants and others that, while operative, might need repair to function properly. Moreover, considering that DEP had been operating for years without comprehensive timeliness standards for measuring its performance and productivity in completing such repairs, we question whether the new 60- and 100-day repair goals for inoperative hydrants represent the optimum balance of public safety concerns and available resources and recommend that DEP reassess them.



## 31 Types of Repairs with No Timeliness Standards

In addition to the 4 work activity codes discussed in the preceding section for which DEP created timeliness standards in July 2019, DEP uses 31 other fire-hydrant-related work activity codes for which timeliness standards have still not been established. Those 31 codes were associated with 15,394 (55.7 percent) of the 27,641 work orders DEP initiated during Fiscal Year 2019. DEP identified 4 of those 31 work activity codes as potentially involving inoperative hydrants: thawing frozen hydrants, installing a new hydrant and branch, repairing a broken hydrant branch, and repairing a broken water main. We evaluated the timeliness of DEP's repair efforts in relation to (a) those four codes; (b) the code for investigating reports of "removed/missing hydrants," which in our judgment would potentially involve an inoperative hydrant; and (c) two of the remaining work activity codes that DEP stated only pertained to operative hydrants—"miscellaneous hydrant repairs" and "other repairs." Thus, we reviewed the amount of time DEP took to complete repairs in relation to 7 of the 31 work activity codes with no established standards for timeliness.

### *Frozen Hydrant Repairs*

Of the 15,394 hydrant-repair work orders initiated during Fiscal Year 2019 without established timeliness standards, 618 related to frozen hydrant repairs. Of these 618 work orders,

- 98 (15.9 percent) were completed on the day of the work order initiation.
- 264 (42.7 percent) were completed within 60 days of the work order initiation (DEP's standard for the less-than-major repair of an inoperative hydrant assigned code WA03 or WA04).
- 116 (18.8 percent) were completed from 61 to 330 days after the work order initiation, with an average completion time of 197 days after the initiation. One of these work orders concerned a priority hydrant for which the work order remained open for 205 days, from February 1, 2019 to its closing on August 25, 2019. DEP officials have not explained why these repairs were untimely. Although DEP officials stated that thawing hydrants is a shared responsibility with the FDNY, once such a work order has been initiated within DEP's IPS, it is DEP's responsibility to close the work order properly either by ensuring that the hydrant has been thawed (by FDNY or DEP) or by reminding FDNY that the hydrant is one of those that the FDNY has assumed the responsibility to thaw.
- 140 (22.7 percent) were marked in IPS as having been voided. These work orders had been open for up to 10 months (288 days), with an average of having been open for 133 days. One of these work orders concerned an FDNY-designated priority hydrant for which the work order had been open for 70 days, from April 22, 2019 to July 1, 2019, when it was voided.

DEP officials explained that 35 of the 140 voided work orders involved FDNY inspectors erroneously initiating frozen hydrant work orders in May and June of 2019 when selecting the work activity code on their mobile application screen. During FDNY's fall 2019 inspection season, DEP moved the frozen hydrant code to another location on the screen (away from a code commonly used by FDNY inspectors) to limit such errors. As for the remaining 105 work orders, DEP officials simply stated that "frozen hydrants are typically self-correcting as temperatures rise above freezing." Of these 105 work orders, 102 were initiated between January and April of 2019 and were voided at various times between July and October of 2019. DEP's statement only explains why these work orders were voided during the warmer months. It does not explain why the hydrants were not thawed and the associated work orders closed during the colder months.

Because frozen hydrants are considered inoperative and could in fact include priority hydrants, it is important for DEP to ensure that they are thawed as soon as possible during the winter season.

### *Three Other Work Activity Codes that DEP Identified as Potentially Involving Inoperative Hydrants*

For the other 3 (of the 31) work activity codes without established timeliness standards that DEP stated could involve inoperative hydrants (i.e., installing a new hydrant and branch, repairing a broken hydrant branch, and repairing a broken main), a total of 11 work orders were initiated in Fiscal Year 2019. While 7 of the 11 work orders were closed within 54 days of their initiation, 4 were still open as of February 13, 2020. These 4 work orders had been open from over 8 months (259 days) to over 1 year and 7 months (589 days), with an average of having been open for 362 days. By applying DEP's standard of 100 days for a major repair of an inoperative hydrant (work activity code WA02) to these 11 comparable work orders, we found that the 4 work orders that remained open as of February 13, 2020 were 159 to 489 days late as of that date. DEP officials stated that one of the repairs was especially complicated in that it involved a broken hydrant branch that was located under a gas main. Officials have not explained why the remaining three work orders were not completed in a timely manner. The timely completion of these types of work orders is important because they could involve inoperative hydrants, including priority hydrants.

### *Investigations of Removed/Missing Hydrants*

Of the 15,394 hydrant-repair work orders initiated during Fiscal Year 2019 without established timeliness standards, 198 related to the investigation of reportedly removed/missing hydrants, a category that in our judgment would potentially involve an inoperative hydrant. Of these 198 work orders:

- 29 had not been completed as of February 13, 2020. These work orders had been open from 8 months (259 days) to almost 1 year and 7 months (574 days) and for an average of 390 days.

One of the 29 work orders involved a priority hydrant. As of February 13, 2020, that work order had been open for over 8 months (259 days).

- Of the 169 completed work orders, 4 were completed the day the work order was initiated, 63 were completed within 60 days (DEP's standard for a less-than-major repair of an inoperative hydrant assigned code WA03 or WA04), and 102 were completed from 61 days to over 1 year and 4 months (500 days) after the work order initiation, with an average completion time of 189 days after the initiation.

Three of the 169 work orders involved priority hydrants and were completed, respectively, in 9, 15 and 233 days, exceeding DEP's 7-day standard for inoperative priority hydrants.

The timely investigation of reportedly removed/missing hydrants is important for all hydrants and, of course, is even more so for priority hydrants.

### *Work Orders Involving Operative Hydrants*

The 2 remaining work activity codes that we reviewed in the group of 31 codes with no established DEP timeliness standards, "miscellaneous hydrant repairs" and "other repairs," pertain to operative hydrants and were associated with 813 work orders in Fiscal Year 2019. DEP officials stated that these two types of work are essentially the same as that involved in repairing an operative hydrant (work activity code WA05), for which a timeliness standard of 365 days for completing the repair now applies. Of these 813 work orders,



- 710 (87.3 percent) had been closed by February 13, 2020, and had been completed in 110 days on average, ranging from the day of the work order initiation to more than 1 year and 6 months (570 days) later; 18 of the 710 took more than 1 year to complete.
- 93 (11.4 percent) remained open as of February 13, 2020, including 39 that had been open for more than 1 year, ranging from over 1 year and 1 month (417 days) to over 1 year and 6 months (567 days), and on average had been open for over 1 year and 3 months (471 days).
- We could not determine the timeliness of the remaining 10 (1.2 percent) due to date logic issues in IPS data, discussed in a later section of this report.

In the absence of timeliness standards for the 31 work activity codes (including the 7 discussed in detail above), DEP is unable to effectively measure and evaluate the timeliness of its repair efforts and determine whether there are steps it could take to improve the timeliness of its repairs. In addition, as previously noted, some of the 31 work activity codes assigned during Fiscal Year 2019 related to inoperative priority hydrants (see the “Frozen Hydrant Repairs” and the “Investigations of Removed/Missing Hydrants” sections above), but the 7-day standard for the repair of inoperative priority hydrants was not applied.

## Recommendations

4. DEP should measure the timeliness of all of its hydrant repair activities, including the 31 work activities that it does not currently measure, and seek ways to improve the timeliness of its repairs, especially those involving inoperative fire hydrants.

**DEP Response:** “DEP will implement additional measures to track the timeliness of repairs for inoperative hydrants. DEP will review if additional reporting shall be implemented and if it is needed to help manage timely repairs of operative hydrants.”

5. DEP should ensure that it repairs all inoperative priority hydrants within 7 days, including those that involve any of the 31 work activity codes that currently lack timeliness standards.

**DEP Response:** “DEP will evaluate all work order activity codes for inoperative hydrants and implement additional measures to track the timeliness of repairs for inoperative hydrants.”

6. DEP should reassess its 60- and 100-day standards for the repair of inoperative hydrants and its 365-day standard for other hydrant repairs to determine whether they adequately protect public safety and whether it can reduce these time periods using current resources. In reviewing the adequacy of those standards, DEP should confer with FDNY and other relevant emergency agencies.

**DEP Response:** “The agency has expanded targets to measure performance. Such targets aim to prioritize repairs based on the severity of the work, as well as maintain a balance with the ongoing work to repair other critical infrastructure assets. We will continue to work closely with the FDNY to ensure they have the water supply to fight fires anywhere in the City.”

7. DEP should close work orders for hydrants that it is not responsible to repair (e.g., private hydrants or frozen hydrants that the FDNY has agreed to thaw) upon notifying or reminding the responsible parties.

**DEP Response:** “DEP will work with the FDNY on establishing protocols for the close out of work orders that DEP is not responsible for, while ensuring repairs are made.”

## DEP Does Not Identify Priority Hydrants

As stated previously, certain fire hydrants—such as those near a significant facility (e.g., hospital, school) or on a block with no other working hydrant—are designated by FDNY as priority hydrants. According to DEP, however, the agency does not assign any priority designations, but rather relies on the FDNY to do so. Consequently, when DEP inspects a hydrant in response to a CSR and finds it inoperative, the agency does not determine whether the hydrant fits the criteria for designation as a priority hydrant and thus must be repaired within seven days. DEP only determines whether the FDNY had previously designated the hydrant to be a priority hydrant.

Determining whether an inoperative hydrant is a priority hydrant is a prerequisite for determining whether the timeframe for repairing the hydrant is 7 days or between 60 and 100 days after the inspection. DEP’s total reliance on FDNY to identify priority hydrants is problematic for a number of reasons. For example, under the current protocol, if DEP conducts CSR inspections on the only two hydrants on a block and determines that each is inoperative, and if the FDNY had determined each of them to be operative during earlier inspections, then only DEP would know that at least one of these hydrants must be considered a priority hydrant and fixed within seven days. In addition, the protocols do not even prompt DEP to notify the FDNY of the inoperative conditions DEP found for the only two hydrants on a street. Because DEP does not assign priority designations during inspections, even when only DEP would be in the position to know that a hydrant meets the criteria for priority designation, the block in question could go without an operative hydrant for 60 days or more, a gap in service that poses an increased risk to public safety. Adjusting the existing inspection protocol to have DEP also determine whether each hydrant found inoperative meets the criteria for priority designation would address the potential gap in coverage for individual blocks and also help ensure that inoperative hydrants serving significant facilities, whether identified as priority hydrants by the FDNY or not, are scheduled for repair within seven days.

Accordingly, it would be prudent for DEP to determine whether each inoperative hydrant it inspects is a priority hydrant and to schedule its repairs accordingly.

### Recommendation

8. DEP should identify priority hydrants during its CSR inspections that have not been so identified by FDNY to supplement the FDNY’s determinations.

**DEP Response:** “We will work to develop a new methodology to capture hydrants identified by DEP investigations as priority to supplement FDNY’s determination and hold them to the same target.”

## Documentary Evidence of Supervisory Field Reviews of Inspections and Repairs Needed

Section 4.5 of Comptroller’s Directive #1 states: “A sound internal control system must be supported by ongoing activity monitoring occurring at various organizational levels and in the course of normal operations. Such monitoring should be performed continually and be ingrained

throughout an agency's operations.” In addition, section 5.11 of Comptroller’s Directive #1 states: “All transactions and significant events need to be clearly documented and the documentation readily available for use or examination. Internal controls should be documented in management administrative policies or operating manuals.”

According to DEP, supervisors are required to periodically visit crews in the field and review a sample of the crews’ inspections and repairs. In line with that requirement, supervisors in the Maintenance and Repair Yards stated that they go to the field to provide technical support to crew members as needed and conduct unannounced field visits to check on field operations.

However, DEP currently has no written policies and procedures that govern these supervisory activities, nor does it require that supervisors document the results of such field visits. Consequently, DEP had no documentary evidence of supervisory field reviews of fire hydrant inspections and repairs to ensure that the work their crews performed was completed properly and reported accurately. DEP stated that the agency is currently working on a process to track such supervisory reviews in IPS. Written policies and procedures would guide supervisors as to how they could best use field visits to ensure that fire hydrant inspection and repair crews are handling their responsibilities appropriately.

## Recommendations

9. DEP should establish written standards for the number or percentage of work crews’ fire hydrant inspections and repairs the crews’ supervisors should review in the field within a given time period.

**DEP Response:** “DEP supervisors are required to check the performance of repair crews with providing technical support as well as unannounced visits. We are currently working on standards to track such reviews and monitoring in IPS.”

**Auditor Comment:** We appreciate DEP’s response that it will develop standards for the supervisory review of its repair efforts. We also encourage DEP to develop similar standards in relation to its inspection efforts.

10. DEP should require crew supervisors to document the results of their field reviews of the fire hydrant inspections and repairs the work crews perform.

**DEP Response:** “We are currently working on standards to track and document such reviews and monitoring in IPS.”

11. DEP should prepare and issue written policies and procedures to guide the supervisors’ field reviews of the work crews’ fire hydrant inspection and repair efforts.

**DEP Response:** “DEP will strengthen standards for supervisory reviews of field crews performing repairs.”

**Auditor Comment:** We appreciate DEP’s response that it will develop standards for the supervisory review of its repair efforts. We also encourage DEP to develop written policies and procedures in relation to both its repair and inspection efforts.

## Communications between DEP and FDNY Need Improvement

DEP needs to improve its written instructions to the FDNY on how FDNY should conduct its semi-annual inspections of City fire hydrants. Section 4.4 of Comptroller's Directive #1 states: "Pertinent operational and financial information must be identified, routinely captured, and distributed in a form and time frame that permits people to perform their duties efficiently. In addition to disciplined internal communication standards, management should ensure that there are adequate means of communicating with, and obtaining information from, external third parties that may have a significant impact on the agency achieving its goals."

DEP officials told us that when FDNY inspectors conduct the fire hydrant inspections, they often assign the wrong inspection result code,<sup>8</sup> incorrectly prioritize the work order, or inaccurately describe the location of the hydrant. DEP officials also told us that FDNY's inspection records for defective hydrants often do not clearly describe the hydrant's defect. The agency officials further stated that FDNY inspectors often submit duplicate work orders.

When asked whether DEP provided FDNY with written instructions, it provided us with two pages of annotated photographs of various hydrant types and defects that it had shared with the FDNY. Although photographs such as these are helpful, a more comprehensive set of instructions would help to improve the quality of the FDNY's recording of inspection results.

In addition, DEP provided us with written procedures dated 2010 that describe how DEP and FDNY should communicate with each other concerning the handling of frozen hydrants, but DEP officials provided no evidence that these procedures were ever shared with the FDNY. On May 29, 2020, DEP provided us with a new set of written procedures (with a June 1, 2020 effective date) for the handling of frozen hydrants.

### Recommendation

12. DEP should provide FDNY with a comprehensive set of instructions on inspecting fire hydrants and on properly recording the problems, locations, and priority of the fire hydrants that FDNY identifies as needing repairs.

**DEP Response:** "DEP has provided FDNY with pictorial and detailed guidance on how to enter hydrant inspection results, generate work orders, and close out frozen hydrant work orders using the desktop and mobile versions of IPS. We will continue to work closely with the FDNY to ensure identified repairs are categorized correctly allowing for repair times to decrease."

## IPS Data Reasonably Reliable but with Some Concerns

Section 5.4 of Comptroller's Directive #1 states: "A variety of control activities [should be] used in information processing to ensure that ... software performs the functions that it is intended to, and that processed data is accurate and reliable."

DEP's IPS data was sufficiently reliable for audit testing purposes. However, we identified concerns with data accuracy involving the date logic of the records. Of the 27,641 fire-hydrant-related work orders initiated in Fiscal Year 2019, 558 (2.0 percent) reflected one or more of three date logic errors, specifically: where the repair start date preceded the work order initiation date;

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<sup>8</sup> Examples of inspection result codes include those identifying frozen hydrants, inoperative defective hydrants, operative defective hydrants, and defective custodian locks.

the repair completion date preceded the work order initiation date; and/or the repair completion date preceded the repair start date.

Each of the 558 work orders reflected one or more of the following date logic errors:

- 545 had a repair start date that preceded the work order initiation date;
- 304 had a repair completion date that preceded the work order initiation date; and
- 27 had a repair completion date that preceded the repair start date.

Additionally, the records of 81 CSRs reflected a CSR inspection date that preceded the CSR receipt date.

DEP informed us that date logic controls had been set for CSR inspections in 2011 and for work orders in July 2018. However, most of the problems we identified occurred after those date logic controls reportedly had been instituted. DEP attributed most of the continuing date logic problems we found to user error. However, the purpose of date logic controls is to prevent such user errors from adversely affecting the agency's records.

DEP acknowledged two other data reliability concerns that it stated its information technology unit was addressing: (1) that a DEP work crew could erroneously report in IPS that a hydrant was out-of-service when it was not; and (2) that IPS does not reflect the service status (in-service or out-of-service) of a newly added hydrant until DEP initiates a work order for the hydrant's repair.

In fact, the list of DEP hydrants as of June 30, 2019 that DEP provided to us included 1,429 out-of-service hydrants and an additional 124 hydrants with no service status indicated. However, a separate list of open work orders for inoperative hydrants as of June 30, 2019 that DEP provided to us identified only 438 inoperative hydrants with open work orders. DEP has not reconciled the significant difference between those numbers, which raises the possibility that its count of inoperative hydrants with open work orders omits hydrants that are out-of-service, i.e., inoperative, but are not associated with an open work order. That possibility, in turn, raises a concern about the reliability of one of DEP's performance indicators as reported in the MMR for Fiscal Year 2019, discussed below.

## Recommendation

13. DEP should review and strengthen its IPS system controls to ensure that they effectively prevent the entry of data with date logic errors or other anomalies.

**DEP Response:** "DEP is working to address the identified date logic gaps. New workflows are currently being tested and will be implemented soon."

## Insufficient Support for MMR Performance Indicator

The number of inoperative hydrants at any one time as reported in the MMR is of questionable reliability.

DEP's goal is to ensure that no more than one percent of its hydrants are inoperative at any one time. DEP reported in the MMR that only 0.46 percent of DEP hydrants were inoperative during Fiscal Year 2019. DEP calculated that figure by determining the average number of inoperative hydrants with open work orders under activity codes WA02, WA03, and WA04 at the end of each month and dividing that number by the total number of hydrants that existed in the City at the end of the fiscal year, i.e., June 30, 2019. For Fiscal Year 2019, DEP calculated the average number

of inoperative hydrants with open work orders to be 500 and the total number of hydrants as of June 30, 2019 to be 109,586, resulting in an inoperative hydrant percentage of 0.46.

To support the 0.46 percent figure presented in the MMR, DEP provided us with lists of open work orders at the end of each month during Fiscal Year 2019, and a list of DEP hydrants as of June 30, 2019. Only inoperative hydrants with work activity codes WA02, WA03, and WA04 were included in the monthly open work order lists that DEP used to calculate this performance indicator.

However, as noted above in the “Timeliness of Fire Hydrant Repairs” section of this report, several other work activity codes—such as the one for thawing frozen hydrants—might also involve inoperative hydrants. DEP officials did not include in their MMR calculations the hydrants with that code or three other codes that they acknowledged could also involve inoperative hydrants. DEP officials did not explain the exclusion of those work orders from their calculations.

Moreover, as noted in the preceding section on the reliability of DEP’s IPS data, the June 30, 2019 list of all DEP hydrants included 1,429 hydrants that DEP identified as out-of-service—almost 1,000 more than DEP’s list of 438 inoperative hydrants as of June 30, 2019. Further, DEP’s June 30, 2019 list of all DEP hydrants included an additional 124 hydrants with no notation of whether they were in- or out-of-service. One possible explanation for at least some of the apparent discrepancy is that work orders were not generated for up to 991 out-of-service, i.e., inoperative, hydrants as of June 30, 2019. Moreover, from the records DEP provided, we have found no basis to conclude that its tally of inoperative hydrants with three types of open work orders provides a more reliable count of inoperative hydrants than the number of out-of-service hydrants reported on DEP’s list of hydrants.

If the 1,429 hydrants that DEP identified as out-of-service as of June 30, 2019 were in fact inoperative, 1.3 percent of DEP’s hydrants would have been inoperative on that date, exceeding both the 0.46 percent average that DEP reported in the MMR and DEP’s goal of keeping that figure at or below 1 percent. To ensure that no more than one percent of DEP’s hydrants are inoperative at any one time, DEP should maintain better support to reliably measure its performance in this area.

## Recommendation

14. DEP should ensure that its calculation of the percentage of inoperative hydrants that it reports in the MMR (1) includes all work activity codes that could involve inoperative hydrants, (2) includes all inoperative hydrants (whether or not there is an open work order), and (3) is consistent with the hydrant service status information presented on its list of DEP hydrants.

**DEP Response:** “With the concerns raised in this audit, we will review all work order activity for inoperable hydrants and include within this metric if needed.”

**Auditor Comment:** We appreciate DEP’s response that it will review all work order activity for inoperable hydrants to include in this metric. We continue to encourage DEP to also include in this metric those hydrants that its data indicates are out-of-service and for which there are no open work orders.



## DETAILED SCOPE AND METHODOLOGY

We conducted this performance audit in accordance with generally accepted government auditing standards. 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 our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The primary scope of this audit was Fiscal Year 2019. In order to assess DEP's handling of Fiscal Year 2019 CSRs and work orders, we reviewed the status of those CSRs and certain work orders up to December 30, 2019. We reviewed the status of most of the remaining work orders up to February 13, 2020, and the remaining work orders on March 12, 2020.

To evaluate DEP's internal controls over its fire hydrant inspection and repair practices, we interviewed the Director of Operations Analysis and Regulatory Compliance, the Chief of the Project Management Office, the Deputy Chief of Maintenance and Repairs for Brooklyn and the Bronx, the Deputy Chief of Maintenance and Repairs for Manhattan and Queens, and the Borough Managers and District Supervisors of Maintenance and Repairs for Brooklyn and Manhattan. We conducted walkthroughs and observations of DEP's day-to-day operations related to fire hydrant inspections and repairs at the maintenance yards and the repair yards in Queens and the Bronx respectively, and interviewed the Supervisors and the District Supervisors of the Maintenance Yards and the Repair Yards in these two boroughs.

To assess the adequacy of DEP's internal controls as they related to our audit objective, we evaluated information obtained from our interviews of agency officials and our review of the agency's policies and procedures. We used the following as audit criteria:

- Comptroller's Directive #1;
- 2018 New York City Local Law No.112;
- DEP Hydrant Maintenance/Repair Process; and
- DEP IPS User Bulletin—Result Codes for Closing Out Hydrant Work Orders.

To gain an understanding of how DEP uses the IPS to track CSRs and work orders, we attended a DEP demonstration of IPS. To evaluate DEP's fire hydrant inspection and repair efforts, we obtained from DEP the following datasets generated from IPS:

- List of DEP fire hydrants as of June 30, 2019;
- FDNY fire hydrant inspections conducted in Fiscal Year 2019;
- Fire-hydrant-related CSRs received in Fiscal Year 2019; and
- Fire hydrant work orders generated during Fiscal Year 2019.

To determine the reliability of IPS data obtained from DEP, we randomly selected a total of 50 CSR inspection reports from the Maintenance Yards—25 from the Bronx and 25 from Queens; and a total of 50 work order reports from the Repair Yards—25 from the Bronx and 25 from Queens. We reviewed key information in the relevant datasets and compared it to the information on the hard copies of the CSR inspection reports and the work order reports to determine whether the information in IPS accurately reflected the information presented in these reports. In addition,



we compared various dates in the CSR and work order datasets to determine whether there were any date logic issues, such as the inspection date preceding the service request date or the repair completion date preceding the work order initiation date.

To determine the number of fire hydrants inspected by FDNY during Fiscal Year 2019 and the number of such inspections that resulted in a work order being generated, we reviewed the dataset on the FDNY fire hydrant inspections conducted during this period.

To determine the timeliness of the CSR inspections, we first eliminated the 7,735 CSRs that DEP identified as being duplicate service requests relating to hydrants for which CSRs had already been received. This step reduced the population of 26,070 CSRs to 18,335 unique CSRs in Fiscal Year 2019. Next, we sorted the data to identify the 5,519 CSRs relating to hydrants that were reportedly “running full,” which needed to be inspected within 24 hours, and the 12,816 CSRs relating to hydrants that reportedly had other problems, which needed to be inspected within 5 calendar days. We then calculated the number of days between the service request date and the inspection date for each CSR in the two subsets of data.

To determine the timeliness of the repairs of priority hydrants, we first identified the 552 work orders that related to fire hydrants designated by FDNY as being priority hydrants in the population of 12,247 unique work orders generated during Fiscal Year 2019 with activity codes WA02, WA03, WA04, and WA05. Next, we identified the 330 of the 552 work orders that related to inoperative hydrants. We then calculated the number of days between the work order initiation date and the repair completion date to determine whether these inoperative priority hydrants had been repaired within seven calendar days, as required.

To determine the timeliness of non-priority hydrant repairs, we first identified the 11,917 work orders that related to non-priority hydrant repairs (in the population of 12,247 unique work orders generated in Fiscal Year 2019 for which there were no established timeliness standards during that year for non-priority hydrant repairs but for which DEP has now established standards). Next, we identified the 977 work orders with work activity code WA02, which denoted inoperative hydrants needing major repair work. We then calculated the number of days between the work order initiation date and the repair completion date to determine whether these inoperative non-priority hydrants with the WA02 activity code had been repaired within 100 calendar days, as required. Additionally, we identified the 8,045 work orders with activity codes WA03 and WA04, which denoted inoperative non-priority hydrants needing less-than-major repair work. We then calculated the number of days between the work initiation date and the repair completion date to determine whether these hydrants had been repaired within 60 calendar days, as required. Furthermore, we identified the 2,893 work orders with activity code WA05, which denoted operative hydrants needing repairs. We then calculated the days between the work initiation date and the repair completion date to determine whether these hydrants had been repaired within 365 calendar days, as required.

To determine the timeliness of DEP repairs related to work orders that were assigned work activity codes that could involve inoperative hydrants but for which DEP has still not established timeliness standards, we identified the 618 work orders for frozen hydrants; the 198 work orders that required investigation of removed/missing hydrants; the 8 work orders that required the repair of a broken hydrant branch or of a broken main; and the 3 that required the installation of a new hydrant and branch. We then calculated the number of days between the work order initiation date and the repair completion date for these work orders. We also performed the same calculation for another 813 work orders that were assigned the work activity codes relating to “miscellaneous hydrant repairs” and “other repairs” and for which DEP has not established timeliness standards, even though, according to DEP, these two codes are essentially the same

as the work activity code for repairing operative hydrants (WA05) and for which a timeliness standard has been established.

To determine whether DEP maintained sufficient support for the performance indicators it reports in the MMR relative to the percentage of fire hydrants that are inoperative at any one time and to the timeliness of its repairs of inoperative priority hydrants, we requested and reviewed its documentary evidence on its performance in these areas.

The results of the sample tests, while not projectable to the respective population, provided us with a reasonable basis, along with our other tests, to assess DEP's fire hydrant inspection and repair efforts.

June 17, 2020



*Vincent Sapienza, P.E.*  
Commissioner

Marjorie Landa  
Deputy Comptroller for Audit  
Office of the Comptroller  
1 Centre Street  
New York, NY 10007

Re: Draft Management Audit ME19-107A, dated June 4<sup>th</sup>, 2020

Dear Ms. Landa,

Thank you for the opportunity to comment on your draft audit report on the Department of Environmental Protection's (DEP) handling of fire hydrant inspections and repairs. We appreciate the diligence of your auditors and that this draft addresses many of the concerns we raised with the preliminary draft.

DEP's Bureau of Water and Sewer Operations (BWSO) operates and maintains the City's water and sewer collection systems. BWSO is responsible for the repair and maintenance of the City's 109,586 hydrants and as the data shows our efforts are responsive and successful. Over the last three years the average percentage of hydrants out of service has been 0.47% and the average time to repair priority broken and inoperative hydrants identified by the FDNY has been 2.3 days. We recognize our important role in ensuring that there is sufficient water for fire protection, protecting the public, and assisting the members of the FDNY who put themselves in harm's way every day. We continue to work closely with FDNY to ensure that first responders have the water supply they need to fight a fire anywhere in the City. We are meeting this goal.

Below we detail our responses to your recommendations, many of which we found to be very helpful:

**1. DEP should develop written timeliness standards for the 31 fire-hydrant-related repair activities currently without such standards.**

DEP implemented internal standards in July 2019. These standards give DEP the ability to measure completing repairs in a timely manner.

DEP will review additional hydrant-related repair codes which mostly cover maintenance activities of operable hydrants, while balancing the same resources that are used to maintain the water and sewer collection systems.

**2. DEP should ensure that it inspects fire hydrants in response to CSRs in accordance with its timeliness standards.**

DEP responds to CSRs within the time frames established by its service level agreements (SLAs). The majority of the time, DEP meets these goals. There are times when the number of CSRs received exceeds the resources to perform

inspections. Examples include extreme heat waves, when a great number of hydrants are opened illegally.

**3. DEP should document its timeliness standards for CSR inspections in a written procedure.**

DEP will work to establish written procedures to support our existing service level agreements in response to hydrant complaints.

**4. DEP should measure the timeliness of all of its hydrant repair activities, including the 31 work activities that it does not currently measure, and seek ways to improve the timeliness of its repairs, especially those involving inoperative fire hydrants.**

DEP will implement additional measures to track the timeliness of repairs for inoperative hydrants. DEP will review if additional reporting shall be implemented and if it is needed to help manage timely repairs of operative hydrants.

**5. DEP should ensure that it repairs all inoperative priority hydrants within 7 days, including those that involve any of the 31 work activity codes that currently lack timeliness standards.**

DEP will evaluate all work order activity codes for inoperative hydrants and implement additional measures to track the timeliness of repairs for inoperative hydrants.

**6. DEP should reassess its 60- and 100-day standards for the repair of inoperative hydrants and its 365-day standard for other hydrant repairs to determine whether they adequately protect public safety and whether it can reduce these time periods using current resources. In reviewing the adequacy of those standards, DEP should confer with FDNY and other relevant emergency agencies.**

The agency has expanded targets to measure performance. Such targets aim to prioritize repairs based on the severity of the work, as well as maintain a balance with the ongoing work to repair other critical infrastructure assets. We will continue to work closely with the FDNY to ensure they have the water supply to fight fires anywhere in the City.

**7. DEP should close work orders for hydrants that it is not responsible to repair (e.g., private hydrants or frozen hydrants that the FDNY has agreed to thaw) upon notifying or reminding the responsible parties.**

DEP will work with the FDNY on establishing protocols for the close out of work orders that DEP is not responsible for, while ensuring repairs are made.

**8. DEP should identify priority hydrants during its inspections to supplement the FDNY's determinations.**

DEP is held to the target set in the Mayor's Monthly Report (MMR) for repairing priority hydrants received by the FDNY. DEP continues to excel in this effort, with the last three-year average of 2.3 days for a target set at seven (7) days. During DEP's investigations, if a hydrant is found inoperative, the FDNY is notified of such condition.

We will work to develop a new methodology to capture hydrants identified by DEP investigations as priority to supplement FDNY's determination and hold them to the same target.

**9. DEP should establish written standards for the number or percentage of work crews' fire hydrant inspections and repairs the crews' supervisors should review in the field within a given time period.**

DEP supervisors are required to check the performance of repair crews with providing technical support as well as unannounced visits. We are currently working on standards to track such reviews and monitoring in IPS.

**10. DEP should require crew supervisors to document the results of their field reviews of the fire hydrant inspections and repairs the work crews perform.**

We are currently working on standards to track and document such reviews and monitoring in IPS.

**11. DEP should prepare and issue written policies and procedures to guide the supervisors' field reviews of the work crews' fire hydrant inspection and repair efforts.**

DEP will strengthen standards for supervisory reviews of field crews performing repairs.

**12. DEP should provide FDNY with clear, preferably illustrated, written instructions for inspecting fire hydrants and properly recording the problems, locations, and priority of the fire hydrants that FDNY identifies as needing repairs.**

DEP has provided FDNY with pictorial and detailed guidance on how to enter hydrant inspection results, generate work orders, and close out frozen hydrant work orders using the desktop and mobile versions of IPS.

We will continue to work closely with the FDNY to ensure identified repairs are categorized correctly allowing for repair times to decrease.

**13. DEP should review and strengthen its IPS system controls to ensure that they effectively prevent the entry of data with date logic errors or other anomalies.**

DEP is working to address the identified date logic gaps. New workflows are currently being tested and will be implemented soon.

- 14. DEP should ensure that its calculation of the percentage of inoperative hydrants that it reports in the MMR (1) includes all work activity codes that could involve inoperative hydrants, (2) includes all inoperative hydrants (whether or not there is an open work order), and (3) is consistent with the hydrant service status information presented on its list of City hydrants.**

DEP tracks their performance of hydrant repairs using the Mayor's Management Report (MMR) metric that measure the backlog of broken and inoperative hydrant repairs as a percent of the system. Over the last three years, DEP averaged a .47%, below the target established at 1%. This equates to just 515 hydrants inoperable out of 109,586 hydrants. With the concerns raised in this audit, we will review all work order activity for inoperable hydrants and include within this metric if needed.

DEP is proud of our role in the maintenance and state of the firefighting system within the City. Consistently less than one percent of hydrants are out of service at any given time. We work closely with the FDNY, which conducts semi-annually inspections of all hydrants in the City. Repairs to FDNY-identified priority hydrants are repaired in less than three days. The FDNY conducts close to 220,000 inspections annually, which results in 4% requiring maintenance or a repair, of which only 1% identifying as an inoperable hydrant.

Thank you for the opportunity to discuss these responses at the exit conference and to respond in more detail. Throughout the report, it is stated that 31 work order activity codes for which timeliness standards have still not been established. To reiterate what was discussed at the exit conference, most of these activity codes aren't indicative of operable or inoperable hydrants and are managed accordingly. We hope that the final audit report takes these concerns into consideration, and we look forward to working with you in the future.

Sincerely,

*Anastasios Georgelis*

Anastasios Georgelis, P.E.  
Deputy Commissioner

c: Vincent Sapienza, Commissioner