Fairfax County
Internal Audit Office

Facilities Management Department
Work Order Process and Tririga System Audit
Final Report

March 2019

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Background

We performed an audit of the Facilities Management Department (FMD) Work Order Process and Tririga System. FMD had requested the audit due to some concerns regarding the functionality of the Tririga system. FMD's Operation and Maintenance Division performs preventative maintenance, minor repair services and emergency maintenance for County-owned and designated leased facilities. Maintenance services provided include general building maintenance (e.g. roof, flooring, and walls), electrical services (e.g. lighting and life safety systems) and mechanical services (e.g. air conditioners and boilers). In addition, the county has facilities such as laboratories and data centers that require knowledge of specialized equipment used. The Operation and Maintenance Division maintains 246 facilities totaling approximately 11 million square feet.

The Operations and Maintenance Division uses Tririga, a facilities system, to track and schedule maintenance work orders. Tririga is the agency's Computer Maintenance Management System (CMMS) supported by dedicated Department of Information Technology (DIT) staff. DIT staff act as system administrators and assist FMD by creating the structure for data FMD wishes to report.

The Work Control Center (WCC), was located at Burke Station Road and was responsible for Tririga data and statistics. The WCC staff was supervised by FMD HR Administration, which was overseen by FMD Administration. There was a management analyst at the WCC who supervised five WCC agents, four at the WCC and one at the Government Center. All WCC agents received work requests in the form of phone calls, emails, online requests, supervisor requests, etc. The WCC agents worked directly with their assigned shop supervisors/technicians to provide various services.

Subsequent to the completion of substantive audit testing, Internal Audit learned that the Tririga system was scheduled to be replaced by a system called ServiceNow. To prepare for the ServiceNow model, the Work Control Center has been recently moved to the Government Center and is now operated by three FMD staff persons.

ServiceNow is a flexible cloud infrastructure that automates workflows and processes and is more effective in utilizing and reporting on data. The ServiceNow/Nuvolo Facilities platform provides the following capabilities to help maximize equipment and facilities uptime, and improve service management efficiency:

- Mobile functionality
- Intuitive floor mapping technology with native AutoCAD integration to immediately transform an entire facility on paper into a digital, interactive, floor by floor map of facilities infrastructure and equipment.
- Automated active knowledge that enables it to pre-populate every make and model, procedure, manual, checklist and more to optimize maintenance processes and activities.
- Real time reporting and analytics
- Cloud-powered inventory control

The Facilities Management Department and the Department of Information Technology are working together to replace Tririga with ServiceNow. The estimated time for implementation is summer 2019.

Executive Summary

Our original audit focused on assessing the efficiency and effectiveness of FMD's work order process and determining if Tririga's system functionality, reporting and configuration effectively met FMD's business needs. During our audit, FMD made the decision to replace Tririga with ServiceNow. Due to this development, we decided to limit our scope. We completed the substantive testing for the work order operations process and limited the IT control testing for Tririga to the inquiry portion only as the system would soon be obsolete. Our IT controls testing results for Tririga was used to develop recommendations for FMD to help prevent problems that had plagued Tririga in the past and proactively develop control requirements for configuring and implementing the ServiceNow system. We categorized the results of our audit into four sections where controls needed to be strengthened: Standard Operating Procedures, Data Entry/System Functionality, Workflow, and Reporting/Information Retrieval.

Standard Operating Procedures

- FMD did not have adequate written standard operating procedures related to work order processes and the Tririga system.

Data Entry/System Functionality

- In 31 of the 50 work orders tested, agency information for the work task was not identified on the work order.
- In 13 of 50 work orders with a "completed" status, no labor hours were reported. In addition, we noted two completed work orders with no work end date as well as four active work orders with a work end date.
- Information captured in various fields of the work orders was either incorrect, incomplete or did not reconcile to other calculated fields contained in the work order.
- Work orders did not indicate the date tasks were completed, resulting in a risk of delayed or omitted billings to departments.

Work Flow

- There was no documented supervisory review and approval of labor hours and completion of work task captured in Tririga.
- The Tririga database reflected 570 work orders that had an "Active" status as of June 30, 2017. These work orders were started *before* fiscal year 2017 (before July 1, 2016) and went as far back as July 2015.
- Controls over granting system access to Tririga were insufficient. Additionally, no

log/trail was kept for changes to system access permissions.

Reporting/Information Retrieval

- Reporting in the Tririga system was not sufficient to meet management's operational needs. Reports required by FMD management for analysis, monitoring and decision making could not be produced by the Tririga system. Significant resources were needed to manipulate data from the system into useful information.
- In 29 of the 50 work orders tested, original service requests for work tasks could not be provided for review; and for the remaining 21 service requests, the service request date did not appear on the service request.
- There was no automated log entry for changes made to data in the Tririga system.

Scope and Objectives

This audit was performed as part of our fiscal year 2018 Annual Audit Plan and was conducted 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 objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit covered the period July 1, 2016, through June 30, 2017, and prior to July 1, 2016 for open work orders as of June 30, 2017. The objectives of the audit were to determine that:

- There were efficient/effective processes and procedures for the work order process.
- Tririga functionality was designed to maximize efficiency for work order processes and procedures.
- Data was adequately and accurately captured in the Tririga system.
- There was adequate reporting of work order status and outcomes.
- Access to the Tririga system was adequately controlled.

Note: Internal Audit completed the survey phase and part of fieldwork phase of the audit. The survey phase included gaining information about controls related to work orders processes and the Tririga system. We only completed substantive testing of work order samples in the fieldwork phase and did not perform substantive tests for IT controls. When we learned that the Tririga system would be replaced by ServiceNow system, we limited our scope for audit testing due to the fact that the Tririga system would soon be obsolete. Therefore, the results of this audit were based on information obtained in our survey phase for work order operations and IT controls testing and substantive testing of work orders.

Methodology

Our audit methodology included a review and analysis of controls over the FMD work order process and Tririga system. Our audit approach included interviewing management

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and staff to obtain an understanding of internal controls over the work order process, completing an internal control questionnaire, developing a risk assessment, and detailed testing of various work order sample transactions. We also evaluated the processes for compliance with sound internal controls and business practices.

The Fairfax County Internal Audit Office (IAO) is free from organizational impairments to independence in our reporting as defined by Government Auditing Standards. We report directly and are accountable to the County Executive. Organizationally, we are outside the staff or line management function of the units that we audit. We report the results of our audits to the County Executive and the Board of Supervisors, and IAO reports are available to the public.

Findings, Recommendations, and Management Response

STANDARD OPERATING PROCEDURES

1. Inadequate Documentation of Work Order Standard Operating Procedures

There were inadequate written standard operating procedures for FMD's work order process to explain how tasks were carried out; who was assigned the specific authority and responsibility for carrying out the related tasks; and, how goals were to be achieved. The department primarily relied on the Tririga System User Manuals as a reference and operated based on immediate maintenance needs, work requests, and past experience. There was no documentation describing roles and responsibilities, department specific definitions of various work order terminology, internal controls, work flows, reconciliations, training, reporting, and other issues related to the work order process. In addition, FMD did not have formal training program for work orders; training was informally provided by other Work Control Center agents and the Work Control Center manager.

Standard Operating Procedures ensure efficiency, quality output, consistency in day-to-day operations, and reinforce management's expectations for the agency.

The lack of documented standard operating procedures increases the potential for inconsistencies in work processes, errors, omissions, and control weaknesses. Further, it increases the time it takes to train staff in the event of employee turnover and decreases employee accountability for properly fulfilling their responsibilities.

Recommendation: We recommend that FMD develop, document and implement a comprehensive standard operating procedures manual associated with the work order process in the ServiceNow system. Management should involve staff from all levels in the process to ensure resulting operating procedures are practical, include adequate internal controls, and support the employees to address their day-to-day challenges. This is also an opportunity to enlighten staff about the purpose and need for effective internal controls. Functions that should be documented include, but not limited to, purpose, scope, definitions, roles and responsibilities, internal controls, work flows, reconciliations, training, emergency

work orders, material and labor costs, and reporting.

Management Response: FMD plans to draft a Standard Operating Procedures manual as work-flow processes are finalized for the ServiceNow system. Management anticipates completing this action by September 1, 2019.

DATA ENTRY/SYSTEM FUNCTIONALITY

2. Customer Organization Information

In 31 of the 50 work orders tested, agencies for whom work tasks were performed could not be identified on the work order. FMD staff indicated that agency name was supposed to be mapped to the customer agency per the original work task request; however, FMD staff was unsure what caused this to happen. Possible reasons stated were improper Tririga system configuration and migration from Tririga Version 9 to Version 10.

Accurate, timely information should be effectively collected by the system so that it can be communicated to internal and external users so that effective, timely operational decisions can be made. Lack of information on work orders such as the customer agency could prevent accurate, timely information from being reported to those with need for the information. Further, this could affect efficiency of operations and accuracy of performance measurements.

Recommendation: FMD should review the functionality of the ServiceNow system and ensure that customer agency information is properly configured for data entry and reporting. The data migration procedures to move data from Tririga to ServiceNow should be documented and the data transfer should be reviewed and approved for accuracy by FMD.

Management Response: Requestor information will automatically be captured by the ServiceNow system based on user id on Fairfax Network. Management anticipates completing this action by September 1, 2019.

3. Labor Hours and Work Completion Dates in Tririga

In 13 of the 50 work orders tested, no actual labor hours were reported in Tririga, although the status of work orders was marked "completed" and the "Planned" section of the work order did reflect the estimated hours to complete the task. Further, two work orders were marked "completed" but did not have a work end date, and four work orders were marked "active" but had an end date. In addition, for seven work orders we noted that labor hours were incurred *before* the work assigned date.

Failure to accurately track labor hour information and completion dates decreases the accountability for proper task performance. It also affects management's ability to make effective decisions due to incomplete data provided from system reports.

Finally, it weakens management's ability to ensure that overtime charged is appropriate due to incomplete documentation of hours.

Recommendation: FMD should ensure that the ServiceNow system has the capability to properly capture and report on actual labor hours and work completion dates. For instance, adequate system and data entry controls should be configured in the system to restrict users from proceeding to next steps unless critical work order information is entered in the system.

Management Response: This is part of ServiceNow system's capability and will be configured accordingly. Management anticipates completing this action by September 1, 2019.

4. Work Order Information in Tririga

Information captured in various fields of the work order was either incorrect, incomplete or did not reconcile to other calculated fields contained in the work order. The only field that could be reconciled accurately was the employee time cards to the time log section of the work order.

There were many instances where information regarding actual work start date, end date, and hours and days worked to complete the work task was incorrect or incomplete. The work start date was missing for 14 work orders and work end date was missing for 2 completed work orders. For the work orders where this information was available, the work order posted incorrect hours and days information. For instance, one of the work orders selected for our testing was for Demand Maintenance – Fire Alarm, Sprinkler and Security, with task type "Demand". Based on the actual start and end dates on the work order, the actual work days calculated was 307; however, the "Actual Working Days" field indicated 920 days. Actual work hours were 0.20 per the employee time card and time log field on the work order; however, the "Actual Working Hours" field displayed 4 hours. In addition, the field "Total Actual Working Hours" showed 7,364 hours.

Another work order was for "Carpentry" with task type "Demand". Based on the actual start and end dates, the work order was open for 420 days, whereas no employee time card was available for this work task and the time log field section on the work order displayed no hours spent to complete the task. The "Actual Working Hours" field indicated 21 hours and the "Total Actual Working Hours" field indicated 10,077 hours.

According to the work start and end dates on work orders, 18 work orders were open from 100 to 420 days, whereas the time cards entries for those work orders indicated much lesser time spent (zero to 87 hours), with the exception of one work order with 405 actual work hours.

For one work order, the work description, task type and request class were missing.

FMD explained they were aware of these issues so they did not rely on this information.

These system issues resulted in management not receiving accurate and complete information from system reports. Significant manual work-arounds were required to provide accurate information for proper management decision making.

Recommendation: The functionality of the ServiceNow system should be reviewed to ensure the system is configured properly to reflect accurate and complete information. All data fields should be properly defined and calculated fields should be tested to ensure that they are accurate.

Management Response: The ServiceNow system has a vast data field capability. FMD will identify the fields necessary for capture and calculation and beta test for functionality and accuracy. Management anticipates completing this action by September 1, 2019.

5. Work Order Timeliness and Closure Dates

Work orders did not record the date the task was completed. There was a field "Actual End Date" on the work order; however, we were informed that this date did not necessarily indicate the actual completion date. In 20 of the 50 work orders where hours were reported and the actual end date was indicated on the work order, 11 of them had an "Actual End Date" greater than 30 days (up to 331 days) after the time card completion date. Further, for one work order, the "Actual End Date" was 339 days *before* the time card completion date.

Since reimbursable jobs are not billed until the work order is officially closed, a delay in indicating the actual end date and closing the work order could result in delayed billings to other departments.

Recommendation: We recommend FMD establish written guidelines related to the allowed/maximum length of time between when the work order task is physically completed and when a work order is closed in the system. In addition, the system should capture both the work completion and transaction closure date to ensure billings to departments are done in a timely manner.

Management Response: Due to mobile access and functionality of the ServiceNow system, closing of work orders will be instantaneous with completion of work task, resulting in live reporting of activities. Management anticipates completing this action by September 1, 2019.

WORK FLOW

6. Supervisory Approvals in Tririga

There was no documented supervisory review and approval of labor hours and completion of work task captured in Tririga to provide assurance that the labor

hours entered by technicians were accurate and that the task was completed. Technicians entered their time in Tririga and in FOCUS; however, supervisors approved time only in FOCUS. And, Tririga hours worked were not reconciled to hours posted to FOCUS.

Supervisory approval of time entries and task completion in the work order system is important to ensure accuracy and accountability of labor hours spent as well as to validate that the work was completed. Accountability for staff productivity and overtime charged is weakened. Without proper supervisory approvals in Tririga, the integrity of hours recorded cannot be assured. There is a risk that workers could log in incorrect hours or hours that they never worked, resulting in inaccurate billings to agencies. Finally, failure to reconcile work hours posted to Tririga to hours posted to FOCUS increases the risk of overpayments for overtime in payroll due to inaccurate recording.

Recommendation: FMD should ensure that the functionality of the ServiceNow system includes supervisory approval of labor hours and task completion dates to ensure accuracy, reliability and integrity of labor hours reported as well as confirmation that the task has been completed.

Formal written policies should be developed to implement regular reconciliations between FOCUS and ServiceNow to ensure the accuracy of labor hours posted to each system. Reports should be developed in ServiceNow to be used to be able to perform reconciliation of hours worked to hours posted to FOCUS.

Management Response: Supervisors will use system reports to validate overtime. FMD will use a system report to reconcile overtime hours with FOCUS. Supervisors will be able to monitor completion of work and labor hours of work tasks. Management anticipates completing this action by September 1, 2019.

7. Open Work Orders

The Tririga database reflected 570 work orders that had an "Active" status as of June 30, 2017. These work orders were started *before* fiscal year 2017 (before July 1, 2016) and went as far back as July 2015. Most of these work orders (96%) were in the "Demand" category i.e. work tasks generated by customers (or via WCC agent) to request a repair. FMD explained that this could be due to one of two reasons. First, the technician or shop supervisor performed the work but never closed the work order. The responsibility to minimize open work tasks was with the respective shop supervisors. FMD added that this happened quite frequently. Second, during the data migration from version 9 to 10, the contractor inappropriately altered the work tasks which corrupted some of the data beyond migration.

Since the reimbursable jobs are not billed until the work order is officially closed, a delay in closing the work order could result in delayed or missed billings to other departments. Further, work order reports would not reflect accurate information on the status of work orders for management analysis and review.

Recommendation: We recommend FMD close out work orders in a timely manner after work completion to ensure there are no delayed billings, and for accurate work order status reporting. The system should produce exception reports so FMD staff can be informed in a timely manner which work orders need to be closed. In addition, for future data migration projects, we suggest FMD institute proper internal controls to be able to confirm that data was accurately transferred.

Management Response: Due to mobile access and functionality of the system, closing of work orders will be instantaneous with completion of work task. Live dashboard reporting will inform supervisors of the status and reason for pending work orders. Management anticipates completing this action by September 1, 2019.

8. Documentation for System Access

Controls over granting system access to Tririga were insufficient. FMD was inconsistent in obtaining documentation such as email requests to ensure that requests were appropriate and properly approved. Additionally, there was no formal access request form used. Finally, the FMD staff indicated that no log/trail was kept for changes to system access permissions. There was a "comment" area to document reasons for changes to access permissions but it was not utilized.

Fairfax County Information Technology Security Policy 70-05.01 states:

- Requests for County information system accounts shall maintain a formal and valid access authorization based on approved intended system usage within personnel mission and business functions.
- Fairfax County shall maintain a formal process to modify user accounts to accommodate events such as name changes, accounting changes, and permission changes.

Lack of a documented user access request process creates risks of granting users unauthorized or excessive access rights, changing users' access rights without management approval, and retaining transferred or terminated users as active in the system.

Recommendation: We recommend FMD maintain a documented process for authorization and modification of system access privileges. All access should be approved by an authorized supervisor. And the documentation certifying the user access requests, whether hard copies or electronic e-mails, should be maintained on file.

Management Response: FMD will maintain a documented process for authorization and modification of system access privileges. All access will be approved by an authorized supervisor and all documentation certifying user access requests will be maintained on file. Management anticipates completing this action by September 1, 2019.

REPORTING/INFORMATION RETRIEVAL

9. Tririga System Reporting

Reporting in the Tririga system was not sufficient to meet management's operational needs. It was cumbersome and time-consuming because often report results required significant manual adjustments to Tririga output data to correct inaccuracies. There were numerous standard reports that Tririga could generate; however, FMD could only use a handful of those reports. FMD was unable to utilize the majority of the standard report functionality and mostly used customized reports to capture the information needed.

The summary data reports for our audit purposes were run twice by the FMD IT group and the reports showed different numbers each time they were run. And, some of the summary numbers did not reconcile with the detailed reports. In addition, we were told that some of the data requested, such as retired records, could not be obtained from the system. After further discussions and advice from the FMD HR Administration, IAO requested the data reports from the FMD Work Control Center (WCC) staff who stated that the reports were initially being run with wrong criteria. WCC provided the summary reports reconciled with detailed reports. The whole process of obtaining data for our audit took a significant amount of time.

Reports needed by FMD management for analysis, monitoring and decision making were not being produced *directly* from the Tririga system. Instead, data from Tririga system had to be collected from the WCC staff and the Operations & Management shop supervisors; reviewed and edited by the WCC staff; and, then revised figures were recorded on an executive report prepared in Microsoft Excel.

FMD indicated that the Tririga (Version 10) system came with a Business Intelligence Reporting Tool (BIRT) capable of producing management reports right off the system. Some of the FMD IT and WCC staff had received training related to this tool; however, it was not being utilized.

Finally, we were informed that the Tririga system was in use since 2005; however, only 50-60% of its features and capabilities were currently being utilized. The system went through an upgrade from version 9 to 10 in 2016.

The inability to efficiently and effectively extract required data from a system increases the risk of obtaining information that may not be reliable or could result in management and other stakeholders receiving incomplete or incorrect information for decision making and managing operations.

Recommendation: The functionality of the ServiceNow system should be reviewed to fully utilize its features and capabilities in the areas of reporting and data downloads. Reporting requirements should be properly defined, approved, documented and tested. Additionally, proper controls should be in place to ensure

that the data imported into the new system is complete and accurate. Finally, data entry standards should be properly documented and communicated to staff.

Management Response: FMD will define, test and document reporting requirements and ensure data entry standards are enforced. Management anticipates completing this action by September 1, 2019.

10. Service Requests

In 29 of the 50 work orders tested, original service requests for work tasks were not provided for review. Additionally, for the remaining 21 service requests, the date service was requested was not indicated on the service request. For the missing service request forms, FMD explained that some of the work orders were generated by the system as a consequence of being an automated preventive maintenance task, and others were lost when the contractor did the data migration during the system upgrade. For dates on service requests, FMD stated that dates were collected in the system; however, the staff who worked on the audit request were not able to retrieve complete information from the system.

Maintaining data from the service request form is critical to ensure work performed is consistent with the original request. In the absence of original service requests, there is no assurance that: work performed is consistent with the original service request, work order categories (i.e. demand, corrective, etc.) are correctly determined, and response time for requested work task is reasonable.

Recommendation: For the implementation of ServiceNow, FMD should ensure that data captured in original service request form is reviewed for completeness and able to be captured in management reports.

Management Response: This will be system-enforced through data entry in required data fields. Management anticipates completing this action by September 1, 2019.

11. Tririga Audit Trail

Per FMD staff, Tririga was not properly capturing an adequate audit trail of critical transactions. There was no automated log entry for changes made to data in the Tririga system.

Any change to an application should create a view-only audit trail record which includes the date and time, user-id, and before-and-after values for changed fields. The presence of a thorough audit trail can assist management in accomplishing security objectives including detecting violations, reconstructing events, and resolving application processing problems.

The lack of an audit trail of changes made to data and an inadequate log of activities in the application leaves the organization vulnerable to possible inaccurate data and potential exposure to error or fraud.

Recommendation: We recommend that the new ServiceNow system maintain an adequate audit trail history of all activities performed in the application by the system administrator and critical users. The audit trail should include the date and time, user-id, and before-and-after values for changed fields and be maintained for at least three months.

Management Response: The ServiceNow system has vast reporting capabilities. FMD will verify audit trail reporting during configuration. Management anticipates completing this action by September 1, 2019.