

Audit

Follow-Up

As of March 31, 2010



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Water Infrastructure

(Report #0919 issued September 30, 2009)

Report #1018

June 7, 2010

Summary

Thirteen of the 16 action plan steps due for completion as of March 31, 2010, have been completed or resolved. Actions have been initiated to complete another one of the 16 steps. Upon completion of that step, the remaining two steps should be completed.

In audit report #0919 we noted that, overall, Underground Utilities adequately accounts for and maintains the City's water infrastructure. We reported adequate processes, for the most part, were in place to ensure new infrastructure is properly designed and installed, and to ensure replacements and expansions are adequately planned and funded. As noted, several of those processes were the result of recent improvements and enhancements initiated by Underground Utilities. We also identified issues indicative of the need for further improvements and enhancements. Accordingly, recommendations were made that related to:

- Physically accounting for and tracking infrastructure components;
- Maintaining infrastructure;
- Designing, constructing, and installing new infrastructure; and
- Planning infrastructure replacements.

Forty-two action plan steps were developed to address the identified issues. Of those 42 steps, 16 were due for completion as of March 31, 2010. During this follow-up period,

Underground Utilities completed 13 of those 16 steps and initiated actions to complete another one of those 16 steps. Completion of the remaining two steps is contingent on completion of that initiated step.

Actions completed in the six-month period addressed by this follow-up engagement included:

- Implementing a process to ensure complete and accurate attributes are recorded in the City's Geographic Information System (GIS) for fire hydrants.
- Adding and reflecting all automatic flush stands in GIS.
- Removing invalid work orders from the Mobile Work Management System.
- Using the Mobile Work Management System to schedule, document, and monitor sandblasting and painting of fire hydrants.
- Executing a contract to provide timely repairs of water well backup engines and generators and to provide rental of generators when needed.
- Requiring vendors performing 5-year inspections of elevated storage tanks to be currently licensed in accordance with FDEP regulations.
- Establishing written procedures for various inspection and maintenance activities relating to water wells and storage tanks.
- Determining that aviation warning lights are not needed on applicable elevated water storage tanks.

- Revising processes to ensure proper engineering design and review of in-house infrastructure additions.
- Developing and implementing a standard checklist for inspectors to formally document their inspections and approvals of new water infrastructure additions.
- Improving documentation showing resolution of problems identified by inspectors.
- Developing a process to ensure applicable projects are self-permitted as required by FDEP regulations.
- Amending the contract for the City's Water Master Plan update to provide for assistance in development of a "downtown water infrastructure replacement plan."

The three action plan steps not yet completed pertain to the determination and entry of complete attribute specifications (for various water infrastructure components) into the PeopleSoft Financials System and ensuring subsequent term contracts contain appropriate provisions to help ensure acquisition of proper components.

We appreciate the cooperation and assistance provided by Underground Utilities and Utility Supply Center staffs during this audit follow-up.

Scope, Objectives, and Methodology

We conducted this audit follow-up in accordance with the International Standards for the Professional Practice of Internal Auditing and Generally Accepted Government Auditing Standards. Those standards require we plan and perform the audit follow-up to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit follow-up objectives.

Report #0919

The scope of report #0919 included a review of Underground Utilities' processes established to install (construct), maintain, and account for the City's water infrastructure. The objectives were to determine whether:

- Adequate and complete records were maintained to enable Underground Utilities to effectively and efficiently track, monitor, and manage the City's potable water system (water) infrastructure;
- The Underground Utilities had a process in place to ensure the City's water infrastructure is appropriately maintained in accordance with industry standards and state regulations;
- The Underground Utilities had a process in place to ensure additions and changes (expansions, relocations, and replacements) are properly designed, constructed, and installed;
- The Underground Utilities had a process in place for planning, funding, and providing for replacement of certain water infrastructure components at the end of their useful service lives;
- The Underground Utilities had an adequate process in place for planning and funding water infrastructure expansion due to City growth and increased demand.

The audit focused on programs and processes in effect during the time of our initial audit fieldwork in winter and spring 2009.

Report #1018

This is our first follow-up on action plan steps identified in audit report #0919. The purpose of this follow up is to report on the progress and status of efforts to complete action plan steps due for completion as of March 31, 2010. To determine the status of the action plan steps, we interviewed staff, made observations, and reviewed relevant documentation.

Background

The City's Water Utility was established in 1907. Effective April 1, 2008, the water, sewer, gas, and stormwater utility functions were consolidated into a new City department, Underground Utilities. At the time of our initial audit, the City's water infrastructure was comprised of:

- 27 active production wells;
- 8 elevated storage tanks;
- 1,224 miles of water mains;
- 73,440 water laterals (representing pipe sections connecting water mains to residential or commercial premises or to fire hydrants);
- 6,949 fire hydrants;
- 24,489 system and control valves (excluding valves on individual service lines); and
- Other miscellaneous components comprised of various fittings (e.g., bends, caps, sleeves, taps, etc.).

Traditionally, water infrastructure expansion and replacement has been performed by a combination of City crews, City contractors, and private developers. For example, City crews or contractors hired by the City may be used to install new infrastructure as part of a road infrastructure project. On the other hand, a private developer may have water infrastructure installed when building a new neighborhood. Upon completion of that new development (neighborhood), the City will take ownership of that infrastructure.

Several Underground Utilities divisions perform functions pertaining to water infrastructure, including:

- Constructions and Operations;
- Gas Operations and Regulatory Compliance (helps maintain water valves in addition to gas valves);
- Water Quality;
- Water Resources Engineering (WRE); and
- Business and Technology Development.

There are two major software applications used to help track, maintain, and manage the City's water infrastructure: (1) Geographic Information System (GIS) and (2) Mobile Work Management System.

The primary authorities that control and regulate the City's water distribution system infrastructure are the Florida Department of Environmental Protection (FDEP) and Northwest Florida Water Management District.

Costs incurred under capital projects established for the City's water infrastructure in fiscal year 2008 totaled \$9.1 million.

Previous Conditions and Current Status

In report #0919, we noted that, overall, Underground Utilities adequately accounts for and maintains the City's water infrastructure. We reported adequate processes, for the most part, were in place to ensure new infrastructure is properly designed and installed, and to ensure replacements and expansions are adequately planned and funded. As noted, several of those processes were the result of recent improvements and enhancements initiated by Underground Utilities. We also identified issues indicative of the need for further improvements and enhancements. Accordingly, recommendations were made that related to:

- Physically accounting for and tracking infrastructure components;
- Maintaining infrastructure;
- Designing, constructing, and installing new infrastructure; and
- Planning infrastructure replacements.

Forty-two action plan steps were developed to address the identified issues. Of those 42 steps, 16 were due for completion as of March 31, 2010. As shown below in Table 1, Underground Utilities has successfully completed or resolved 13 of those 16 action plan steps. Actions have been initiated to complete another one of the 16 steps. Upon completion of that step, the remaining two steps should be completed.

**Table 1
Action Plan Steps from Audit Report #0919
Due as of March 31, 2010, and Current Status**

Action Plan Steps Due as of March 31, 2010	Current Status
Ensure critical and useful component attributes are tracked in GIS	
<ul style="list-style-type: none"> • Efforts will be enhanced to capture and record accurate and complete fire hydrant attribute data in connection with the on-going “GIS data cleansing” project. 	<p>3 In the initial audit, our review showed incomplete and inaccurate attribute information reflected in GIS for hydrants that had been surveyed by the GIS data cleansing crew. We recommended additional efforts to capture and record complete and accurate hydrant data in GIS. To address this issue, Underground Utilities created an automated interface between GIS and the Mobile Work Management System (Mobile System). Under that interface hydrant attributes as recorded in GIS are now reflected on Mobile System “hydrant maintenance work orders” created for the purpose of scheduling and documenting annual hydrant inspections (as well as hydrant repairs and maintenance work). That interface allows work crews performing annual hydrant inspections (or repair/maintenance work) to complete or correct hydrant attribute data reflected in GIS through the work order completion process. Specifically, those work crews can complete blank attribute fields, or correct inaccurate data reflected in those fields, on the applicable Mobile System work order. When that system work order is closed, the interface automatically records the updated/corrected hydrant attribute data in GIS. Accordingly, the annual hydrant inspection process now provides a means to ensure complete and accurate hydrant attributes in GIS.</p>
Ensure efficient tracking of all infrastructure components	
<ul style="list-style-type: none"> • All automatic flush stands will be added to and reflected in GIS. 	<p>3 In the initial audit, we noted 7 of 18 automatic flush stands were not reflected (depicted) in GIS. Our follow up fieldwork showed Underground Utilities has now added those stands to GIS.</p>
Ensure proper, logical, consistent, and informative data in the Mobile Work Management System	

<ul style="list-style-type: none"> The 6,066 invalid preventive maintenance fire hydrant work orders will be deleted from the Mobile Work Management System. 	<p>3 In the initial audit we noted there were 6,066 outstanding hydrant “preventive maintenance” system work orders. Those work orders were created and dispatched to the Fire Department during the period the Fire Department was conducting hydrant inspections. As those inspections are now performed by Underground Utilities, we recommended those outstanding work orders be deleted from the system. Our follow up fieldwork showed the 6,066 invalid work orders were properly deleted from the system.</p>
<p>Ensure tracking of maintenance activities</p>	
<ul style="list-style-type: none"> The Mobile Work Management System will be used to schedule, document, and monitor sandblasting and painting of fire hydrants. 	<p>3 In the initial audit we found, contrary to management’s intent and efficient practices, the Mobile Work Management System was not being used to schedule, document, and monitor sandblasting and painting of fire hydrants. Our follow up fieldwork showed Underground Utilities staff is now using the Mobile Work Management System for that process. At the time of our follow up fieldwork in early May 2010, 444 system work orders for sandblasting and painting hydrants had been created and completed since January 1, 2010.</p>
<p>Ensure availability of backup engines and generators at City wells</p>	
<ul style="list-style-type: none"> A contract will be executed with a vendor to provide for timely responses (i.e., within two hours) in instances where backup engines and generators at applicable City wells are not functional. The contract will include provisions for rental of equipment as needed. 	<p>3 In the initial audit we noted that backup engines and generators for the City’s wells were not always run monthly as required by FDEP regulations. Those circumstances were attributed to various reasons, including construction and mechanical issues. To address those issues, the City executed a contract with a vendor (Ring Power) to provide timely responses for necessary repairs and/or to provide timely backup power when needed through rentals of generators.</p>
<p>Ensure proper and consistent maintenance of wells and storage tanks</p>	
<ul style="list-style-type: none"> Prospective vendors will be required to provide proof of licensure status when submitting their proposals in response to requests for services. 	<p>3 In the initial audit we noted the engineer performing required 5-years inspections for three of the City’s storage tanks was not currently licensed as a professional engineer in the State of Florida at the time the inspections</p>

	<p>were performed. FDEP regulations require inspecting engineers to be so licensed. Our follow up review showed that Underground Utilities included appropriate language regarding licensure requirements on purchase orders issued to the firm performing inspections subsequent to the initial audit. The resulting inspection reports were also stamped with the applicable engineer’s seal (indicating licensure in the State of Florida). Through the State of Florida “licensure status” website, we found the engineer was properly and currently licensed.</p> <p>(NOTE: Rather than relying solely on vendor assertions, we recommend the Water Quality Division consider using the available State of Florida website to verify vendor staff overseeing the inspections are currently licensed as required.)</p>
<ul style="list-style-type: none"> • Written procedures will be established that address (1) annual calibrations of water well meters, (2) exercising well backup equipment, (3) staffing water wells, (4) periodically inspecting, cleaning, and painting storage tanks, and (5) documenting various maintenance activities. 	<p>3 To ensure consistent and appropriate performance of well and storage tank maintenance activities, we recommended in the initial audit that appropriate written procedures be developed. Our follow up review showed Underground Utilities developed written procedures. Overall, those procedures are complete and comprehensive.</p>
<p>Ensure appropriate safety measures are implemented</p>	
<ul style="list-style-type: none"> • Discussions will be held with the Aviation Department, and the Federal Aviation Administration (FAA) if needed, to ascertain if aviation lights are appropriate for each of the City’s elevated storage tanks. If a determination is made that lights are needed for certain tanks currently without such lights, a plan will be developed to install the appropriate lights. 	<p>3 In the initial audit we recommended Underground Utilities consider installation of aviation warning lights on elevated storage tanks currently without those lights. We acknowledged aviation warning lights were installed on the one tank with a height exceeding 200 feet (i.e., lighting is required by FAA regulations for that tank). As reported, the City’s Aviation Department operations manager indicated adding lights to the other elevated tanks would be prudent, even when such lighting was not required by FAA regulations. During this follow up engagement, we found that Underground Utilities staff discussed this matter with the FAA and completed FAA’s online evaluation process. Based on the results of that</p>

	<p>evaluation, a determination was made by Underground Utilities that installing aviation warning lights on additional tanks was not required or warranted.</p>
<ul style="list-style-type: none"> Plans and processes requiring proper involvement by the Water Resources Engineering (WRE) Division for “in-house” infrastructure additions will be finalized. A standard checklist will be developed to verify and document proper involvement by WRE staff. 	<p>3 In the initial audit we disclosed instances where “in-house” infrastructure additions were not designed or reviewed by WRE staff. We recommended responsibility for ensuring WRE involvement be assigned to specific positions and that consideration be given to development of a standard checklist to assist in ensuring proper design and review by WRE staff. In our follow up fieldwork we found Underground Utilities addressed this issue by assigning responsibility for initiation of in-house projects to WRE staff. Specifically, before construction and operations staff starts an in-house addition or replacement, the WRE Division must first provide appropriate project design and approval. Additionally, staff of both the Constructions and Operations Division and the WRE Division now meet monthly to discuss the in-house projects. WRE staff prepares and distributes periodic status reports on those projects. We determined this revised process should adequately ensure proper design and approval for future in-house projects.</p>
<p>Ensure appropriate inspections are performed and documented</p>	
<ul style="list-style-type: none"> A standard inspection form/checklist will be developed and used by WRE inspectors to formally document their final inspection and approval of new infrastructure additions installed by contractors and private developers. Areas specified in the audit report will be addressed on that form/checklist. The completed form/checklist will be signed and dated by the applicable inspector and the supervising WRE senior engineer. 	<p>3 In the initial audit we found that formal reports were not prepared to document inspections performed by WRE inspectors or the conclusions of those inspections. We found during our follow up fieldwork that the WRE Division addressed this issue through development and implementation of a formal checklist to document applicable aspects of and conclusions resulting from the inspection process (e.g., pressure tests and dates, disinfection tests and dates, whether proper materials were used, whether proper installation methods were used, etc.). Those checklists are completed for each project and are signed and dated by both the inspector and the WRE senior engineer.</p>

<ul style="list-style-type: none"> • WRE inspectors will better document, in their inspector logbooks, the resolution of identified problems. 	<p>3 In the initial audit we reported that inspectors sometimes indicated problems identified during the inspection process (i.e., within their logbooks) but did not clearly show that the applicable problems were satisfactorily resolved. In response to this issue, WRE management emphasized to inspectors the importance of clearly documenting within their logbooks the resolution of identified problems. During our follow up fieldwork, we observed examples where inspectors clearly documented the resolution of identified problems.</p>
<p>Ensure projects are permitted as required</p>	
<ul style="list-style-type: none"> • Each applicable project will be self-permitted in accordance with the delegation order issued by the FDEP. A copy of the applicable self-permit will be attached to and retained with project records. 	<p>3 We reported in the initial audit instances where applicable projects were not self-permitted as required by FDEP regulations. As a result, some projects were not reported to FDEP as required by the FDEP self-permitting authorization order. To address that issue, the WRE Division now maintains a logbook of all projects required to be self-permitted along with a copy of each self-permit. Additionally, periodic reminders are sent to staff reminding them of the requirement to ensure self-permits are completed for applicable projects. A control was also implemented whereby the applicable self-permit number must be included on documentation evidencing final completion of those projects.</p>
<p>Ensure acquisition of appropriate materials and components</p>	
<ul style="list-style-type: none"> • Attribute specifications in the PeopleSoft Financials System for each approved water infrastructure material and component will refer to the Underground Utilities’ “Standard Specifications for the Design and Construction of Water and Wastewater Facilities.” 	<p>: During the initial audit we found attribute specifications for various water infrastructure materials and components were not complete, thereby increasing the risk inadequate or incorrect items would be purchased and installed. During our follow up fieldwork we determined that complete and accurate specifications had been entered into the PeopleSoft Financials System for fire hydrants. Those complete specifications were properly used for recent acquisitions of fire hydrants. However, specifications for other items (i.e., PVC mains, ductile iron</p>

	<p>mains, gate valves, and copper pipe) were still incomplete. Further inquiry during our follow up fieldwork showed Underground Utilities is in the process of determining appropriate materials and components to include in the PeopleSoft Financials System and the related attributes for those items. Those determinations are being made as the former Municipal Supply Center (MSC) transitions to the Utility Supply Center. We recommend Underground Utilities complete their evaluations and update the PeopleSoft Financials System with complete item specifications.</p>
<ul style="list-style-type: none"> • Subsequent purchase contracts for water infrastructure components will refer to the complete specifications established in the Underground Utilities’ “Standard Specifications for the Design and Construction of Water and Wastewater Facilities.” 	<ul style="list-style-type: none"> ♣ Our initial audit disclosed that existing term contracts for water infrastructure materials and components did not include complete specifications established by the WRE Division for those items. Our follow up review showed those term contracts recently expired (i.e., in April 2010). Staff assigned responsibility for executing new term contracts (i.e., Utility Supply Center on behalf of all City utilities) indicated quotes for new contracts will not be solicited until complete item specifications have been determined and provided (i.e., entered into the PeopleSoft Financials System as described in the previous action plan step). Similar to the above, we recommend Underground Utilities complete their evaluations and determine complete item specifications to allow for execution of new term contracts for water infrastructure materials and components. New term contracts executed for those items should include (or refer to) those complete specifications.
<ul style="list-style-type: none"> • Subsequent purchase contracts for water infrastructure components will require suppliers to submit documentation (shop drawings/material submittals) to demonstrate their materials comply with City specifications. 	<ul style="list-style-type: none"> ♣ In the initial audit we reported the WRE Division recommended vendors supplying infrastructure materials and components be required to submit appropriate documentations showing their materials/components comply with City specifications. As noted in the reported status for the previous action plan step, new term contracts for water infrastructure

	<p>materials/components will not be executed until appropriate determinations are completed (e.g., complete item specifications provided to the Utility Supply Center via entry into the PeopleSoft Financials System). When executing those new contracts, Underground Utilities (or the Utility Supply Center on behalf of Underground Utilities) should ensure appropriate language is included requiring vendor submission of documentation demonstrating their materials comply with City specifications.</p>
<p>Ensure replacement of deteriorated and older infrastructure</p>	
<ul style="list-style-type: none"> • To the extent funding is available, the current contract with Malcolm Pirnie for the update to the City’s Master Water Plan will be amended to include assistance in development of a “downtown water infrastructure replacement plan.” 	<p>3 In the initial audit we recommended Underground Utilities develop a plan for replacement of the City’s downtown water infrastructure. We also recommended that consideration be given to amending the current contract for the City’s Master Water Plan update to require the consultant (contractor) to assist in this matter. Our follow up review showed Underground Utilities completed this action through a change order to the contract. That change order was accomplished through a \$19,000 purchase order, whereby the contractor was directed to “evaluate the downtown Tallahassee water service area to identify the most critical water mains and valves and develop a strategy for replacing those critical water distribution assets.” To date, the contractor has completed a draft of that plan and provided it to the City as part of the updated Master Water Plan. Underground Utilities staff indicated that once finalized, the overall plan (including the “Downtown Water Replacement Plan”) will be presented to the City Commission for approval and adoption.</p>

Table Legend:

- Issue to be addressed from the original audit.
- 3 Issue addressed and resolved.
- : Action initiated but not completed.
- ♣ Issue to be addressed and resolved after completion of a related action plan step.

Conclusion

Table 1 above shows 13 of the 16 action plan steps due for completion as of March 31, 2010, were completed. The three action plan steps not yet completed pertain to the determination and entry of complete attribute specifications (for various water infrastructure components) into the PeopleSoft Financials System and ensuring subsequent term contracts contain appropriate provisions to help ensure acquisition of proper components.

Significant actions to be completed in future periods include:

- Establishing a quality control process to ensure all new infrastructure additions are added to GIS.
 - Implementing procedures requiring private developers to submit As-Built drawings (formal drawings reflecting added components) for all water infrastructure additions.
 - Identifying and designating critical and useful attributes to be captured and recorded in GIS for new infrastructure additions.
 - Using GIS as the primary record to account for critical attributes of water wells, storage tanks, and privately owned backflow control valves.
 - Making various revisions to the Mobile Work Management System to provide for proper, logical, consistent, informative, and useful data (includes revisions to the work order process and report process).
 - Additional monitoring of valve maintenance activities and efforts to ensure valves are exercised at prescribed frequencies.
 - Establishing written procedures for maintenance activities relating to valves, fire hydrants, and mains.
- Developing a standard inspection form/checklist for in-house and City contractor-installed infrastructure additions to document use of proper materials and installation methods and performance/results of required tests.
 - Finalizing and initiating the downtown water infrastructure replacement plan.
 - Resuming the hydrant replacement program.

Although not addressed within this report, efforts have already commenced to complete several of those actions due for completion in future periods.

We appreciate the cooperation and assistance provided by Underground Utilities and Utility Supply Center staffs during this audit follow-up.

Appointed Official's Response

City Manager:

I am pleased with the progress of this Water Infrastructure audit. It reflects that the Underground Utilities has adequate processes in place to ensure new infrastructure is properly designed and installed, and that the process ensures replacements and expansions are adequately planned and funded. Furthermore, recommended improvements have been embraced by the various divisions involved and implemented on schedule. I am confident that the Underground Utilities staff will continue to work to ensure that the remaining action plan recommendations will be resolved by the time frames identified. I would like to thank the City Auditor and his staff for their work on this audit.

Copies of this audit follow-up #1018 or audit report #0919 may be obtained from the City Auditor's website (<http://talgov.com/auditing/index.cfm>) or via request by telephone (850 / 891-8397), by FAX (850 / 891-0912), by mail or in person (Office of the City Auditor, 300 S. Adams Street, Mail Box A-22, Tallahassee, FL 32301-1731), or by e-mail (auditors@talgov.com).

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