



**A Report to the
Audit Committee**

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Audit of Metropolitan Water Services Water and Sewer Billing Process

March 2, 2021

Metropolitan
Nashville
Office of
Internal Audit

EXECUTIVE SUMMARY

March 2, 2021



Why We Did This Audit

The audit was requested by Mr. Scott Potter, Director of Water Services, due to the increasing number of concerns from customers and Metropolitan Nashville Councilmembers about high water bills.

What We Recommend

- Evaluate Call Center staffing levels along with call volume to ensure customer calls are answered with minimal wait times and abandonment.
- Evaluate the options for call center logging to include detailed metrics to assist in evaluating potential areas of concern. Implement policies and procedures that ensure a consistent level of detail for both internal and external communication about accounts.

Audit of the Metropolitan Water Services Water and Sewer Billing Process

BACKGROUND

Metro Water Services provides drinking water, wastewater treatment, and stormwater services to Davidson County and portions of surrounding counties. Water and sewer services are billed based on usage and meter size, and billing rates are set through Metropolitan Nashville Government Ordinances. Metro Water Services implemented a rate increase in January of 2020, the first increase in rates since 2011.

For fiscal years 2019 and 2020, Metro Water Services billed customers for the following:

Fiscal Year	Customers	Billings
2019	2,564,430	\$253,595,376
2020	2,379,382	\$297,400,670

OBJECTIVES AND SCOPE

The objective of this audit was to determine if Metro Water Services has implemented adequate processes and controls to ensure that monthly water and sewer bills are accurate. Specifically, to determine if:

- Water and sewer bills are being properly calculated and invoiced to customers.
- Controls exist to ensure that meter readings are accurate and properly reflected in the customers' bills.
- Communications to customers were reasonable to ensure understanding of rate increases.
- Processes are in place to ensure customer concerns are communicated, reviewed, and remedied.
- Procedures are being followed to ensure customers are granted proper payment options and that shut-off actions for nonpayment were postponed in accordance with the Metropolitan Nashville Government's pandemic response plan.

The scope of the audit included all water and sewer bills between September 2018 and August 2020. Due to the COVID-19 pandemic and resulting collections process changes, this audit does not include normal cash and customer collections. A future audit will include this process.

WHAT WE FOUND

Processes and controls are in place to ensure accurate calculation of water and sewer charges on residential and commercial customer bills. Recalculations found no errors in billings. Rates were accurately input into the billing system in accordance with approved rate ordinances. Parameters used to evaluate bill abnormalities were reasonable and resulting kick outs were investigated.

Information regarding the rate changes was clearly and appropriately communicated to Metro Water Services customers. However, communication with customers after the fact could be improved.

GOVERNANCE

The Metropolitan Code of Laws, Chapter 15, Division I includes established water and sewer rates as well as billing and collections requirements. Metro Water Services establishes new rates through ordinances. Current water and sewer rates were established through BL2019-045 (as amended), which was approved on December 9, 2019.

Metro Water Services is led by the Director of Water Services. The Customer Service department is responsible for customer billing and collections and is overseen by the Assistant Director, Customer Service.

BACKGROUND

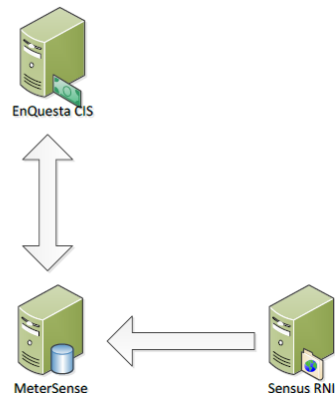
The billing process for water and sewer services begins with the water meters recording usage at applicable locations and ends with an invoice sent to the customer.

Information Technology

Metro Water Services uses Sensus brand meters and the Sensus FlexNet Regional Network Interface (RNI) SaaS system. The Sensus RNI system interfaces with MeterSense Meter Data Management (MDM) SaaS system. The MeterSense system interfaces with the Customer Information System, Systems and Software's enQuesta. Exhibit A shows the dataflow of information between the systems.

Exhibit A: Meter Data Flow

Customer Daily Processing Diagram



Source: Metro Water Services

Metro Water Services has used Systems and Software's enQuesta Customer Information System since 2012. The enQuesta system houses customer account information, meter reading data, billing and invoices, as well as a workflow for each account consisting of general notes, work orders, account changes, and other details relevant to the account.

Meters

Metro Water Services uses three types of meters: AMR meters, AMI meters, and Neptune meters. Neptune meters are for 1.5-inch meters and larger. Neptune meters are fully compatible with Sensus products and software.

Both AMR and AMI meters are programmed to be digitally read. AMR meters are read by the Sensus system on the computer in the field technician's truck as the truck drives past the address. AMI meters can be read as a drive-by, or they can be read hourly through a nearby tower. The tower automatically

pulls meter data from the AMI meters on an hourly basis and puts the data into a secure server that is accessible by Metro Water Services staff without leaving the office. Currently, there are only nine towers covering a limited portion of the service area. Therefore, the most common method used to read meters is the drive-by method.

Water and Sewer Rates

Water and sewer charges on a Metro Water Services bill are calculated using two primary factors: the size of a meter and the centum cubic feet (CCF) usage during the period. One CCF is equal to 748 gallons.

In late 2019, the Metropolitan Council approved a rate increase for Metro Water Services customers to be effective January 1, 2020. This was the first-rate increase seen by Metro Water Services customers since 2011. The changes in rates were based on a rate study performed by Raftelis Financial Consultants, Inc.

Prior to the rate changes in 2020, one rate was applied for all CCF volume usage above 2 CCF. The 2020 rate change created a tiered system for CCF usage, with lower rates for lower usage. See Exhibit B for the increase in rate for each tier. Sewer rates did not adopt the tiered structure.

Exhibit B: Increase in Residential Water and Sewer Rates by Volume After Rate Change

Residential Volumetric Rate	2019 Water	2020 Water	2019 Sewer	2020 Sewer
0-2 CCF*	\$0.00	\$0.00	\$0.00	\$0.00
3-6 CCF	2.33	3.50	4.74	5.85
7-10 CCF	2.33	4.20	4.74	5.85
11+ CCF	2.33	5.25	4.74	5.85

Source: Metro Nashville Code of Laws, Chapter 15.32 – 15.44

Along with usage, a customer is charged a flat fee for each meter every month, based on the size of the meter. See Exhibit C for the increase in flat fees for meter size.

Exhibit C: Increase in Residential Water and Sewer Meter Fees After Rate Change

Meter Size	2019 Water	2020 Water	2019 Sewer	2020 Sewer
5/8-inch	\$3.13	\$5.09	\$7.62	\$8.14
3/4-inch	10.62	12.12	21.63	36.00
2q11-inch	12.77	15.28	26.05	46.58
1.5inch	18.77	26.85	38.29	90.67
2-inch	25.29	37.91	51.57	127.38
3-inch	33.38	60.58	68.04	158.59
4-inch	54.41	137.72	110.88	449.98
6-inch	85.42	171.93	174.12	536.44
8 and 10-inch	133.59	223.72	272.29	686.89

Source: Metro Nashville Code of Laws, Chapter 15.32 – 15.44

Water bills vary by customer based on their individual water and sewer needs. The type and size of the property, the amount of time spent at home, and outdoor irrigation will affect the total usage of water each month.

Billing Review

Metro Water Services utilizes billing review functions within enQuesta to determine if individual customer billing data has abnormalities that may be the result of a leak, equipment malfunction, or other issues. Parameters are set to notify Metro Water Services if a customer bill has:

- Negative usage
- Zero usage for five months
- No reading for the month
- Billing average increase of 300%
- Billing average decrease of 50%
- Duplicate readings

Upon notification of a billing abnormality, a Metro Water Services employee will review the notification and determine next steps. Investigations by Field Activities employees may include visiting the residence and checking the meter for damage or visible leaks. Customer Service Center employees may also contact the property owner about the abnormality and recommend steps to determine if internal leaks may be an issue.

Collections

In early 2020 when a tornado struck Nashville, Metro Water Services temporarily halted late fees, water disconnects for non-payment, and collections efforts of water and sewer bills. Shortly after, the COVID-19 pandemic created hardships for many Nashville residents and Metro Water Services customers. In response to both the tornado and the pandemic, late fees, disconnects for non-payment, and collections efforts remained halted until December 2020. Beginning in November 2020 and leading up to when collections efforts would again resume, accounts with outstanding balances were given the opportunity to create a payment plan in order to pay back their balance over time.

The COVID-19 pandemic significantly changed collections processes for Metro Water Services. In order to ensure the safety of customers and employees, certain aspects of the collections process were altered. Due to these changes, the Office of Internal Audit could not perform an audit of collections processes. The Office of Internal Audit will perform a full audit of collections processes in 2021.

Exhibit D: Water and Sewer Billing vs. Collections by Fiscal Year

Fiscal Year	Amount Billed	Amount Collected	% Collected
FY19	\$253,595,376	\$235,795,513	93%
FY20	\$297,400,770	\$272,787,459	92%

Source: enQuesta Customer Information System

Audit Methodology

In order to best determine the accuracy of the customer water and sewer bills, one month was selected prior to the rate change, and one month was selected after the rate change for recalculation of water and sewer charges. Exhibit D shows the totals included in the audit per enQuesta.

Exhibit E: Water and Sewer Bill Population Totals by Month

Month	Number of charges	Total amount	Total CCF
October 2019	219,857	\$7,029,013	3,388,205
May 2020	220,280	\$6,746,265	2,161,452
Total	440,137	\$13,775,278	5,549,657

Source: enQuesta customer information system

Review included both water and sewer charges on both residential and commercial customer accounts during the month. Stormwater charges were not part of this audit and were not included in the recalculations.

AUDIT OBJECTIVES AND CONCLUSIONS

1) Has Metro Water Services implemented adequate processes and controls to ensure that monthly water and sewer bills are accurate?

a) *Are water and sewer bills being properly calculated and invoiced to customers?*

Yes. Two billing months were judgmentally selected for review. Using the billing algorithm for both residential and commercial accounts during these two months, water and sewer charges from customer bills were recalculated.

Utilizing Audit Command Language software, the Office of Internal Audit recalculated 219,857 charges totaling water services of \$7,029,013 (75 percent) for October 2019. The Office of Internal Audit recalculated 220,280 charges totaling water services of \$6,746,265 (91 percent) for May 2020. Any charges that were not recalculated based on the algorithms used were included as a separate population for sampling. A random representative sample of 47 Metro Water Services billings was chosen for further review. No discrepancies or control weaknesses were found in the calculation of bills.

Additionally, the Office of Internal Audit reviewed the rate change process and controls. The process to update rates included sufficient controls to ensure rates are tested and reviewed prior to releasing to production. System access to alter rates is appropriate and reviewed regularly.

b) *Do controls exist to ensure that meter readings are accurate and properly reflected in the customers' bills?*

Yes. Metro Water Services utilizes meters that do not require manual readings. Meter readings are reliant on drive-by reads or tower reads that relay data. Manual readings are performed if there is an error in remote readings. Access to manipulate meter readings is limited to appropriate staff, and access is reviewed regularly.

The Office of Internal Audit independently confirmed with the meter manufacturer that no recalls or significant meter malfunctions have occurred within the scope of the audit. The Office of Internal Audit researched to determine if the meter models used by Metro Water Services have had reported issues in other public utilities and noted no reports. Software updates are performed as needed, and the servers on which data is maintained are regularly patched and updated by Metropolitan Nashville Government's Information Technology Services department.

Metro Water Services utilized parameters within enQuesta to determine abnormalities of billing data. The Office of Internal Audit reviewed the criteria and ensured reports with abnormalities were reviewed by Metro Water Services employees. The Office of Internal Audit reviewed a random sample of 69 accounts with abnormalities to ensure review by Metro Water Services was performed. No discrepancies were noted. Additionally, the Office of Internal Audit reviewed 47 randomly selected work orders within enQuesta to determine if appropriate follow up was performed. Work orders included billing inquiries, investigations, high bill complaints, meter exchanges, and other billing related issues. No issues were noted.

c) *Were rate increases reasonably communicated to customers?*

Yes. The Office of Internal Audit reviewed Metro Water Services' communications against ten essential communication components as described by the *Journal of American Water Works Association*. Metro Water Services began communicating with the public about the rate increase as early as September 2019. The rate increase went into effect in January 2020. Several methods

of communication were used to reach all customers including social media, local news, bill inserts, community meetings, and open houses. The Metro Water Services website has interactive bill calculators, sample bills, examples of how to read bills, and other tools for customers to be prepared for their bill and how the rate increase would affect them. Metro Water Services updated their website in response to questions and concerns heard as customers felt the effects of the rate increases. The website specifically details the impact of irrigation and how the summer months will generally have higher bills for customers. Metro Water Services satisfied all best practices when it comes to communicating rate increases with the public.

- d) *Are there processes in place to ensure that customer concerns are communicated, reviewed, and remedied?*

Generally, yes. Processes are in place to receive, review, and remedy customer concerns. When problems or concerns are received, they are appropriately delegated or dispatched if necessary. However, the high volume of customer calls compared to the number of staff was found to have a negative impact on the timely communication and resolution of these concerns. The number of calls received by Metro Water Services in 2020 increased by 24,608 compared to 2019, but the average number of staff remained the same. The percentage of calls answered went from 91 percent in 2019 to 84 percent in 2020, and the percentage of calls abandoned by customers increased from 9 percent abandoned in 2019 to 16 percent abandoned in 2020.

Call information is documented within the customer's account in enQuesta. The ability to analyze call information overall is limited to variations of quantity, hold time, and abandonment. Additionally, there are not detailed procedures in place for what information should be documented for each customer interaction. Notes on accounts were inconsistent in detail about concerns raised, questions asked, or work completed. (See Observation A).

- e) *Are procedures being followed to ensure customers are granted proper payment options, and that shut-off actions for nonpayment was postponed in accordance with the Metropolitan Nashville Government's pandemic response plan?*

Yes. A review of late fees charged to accounts and accounts shut-off for nonpayment during the audit period showed that late fees stopped being charged to accounts and water shut-offs due to nonpayment did not happen beginning on March 2, 2020.

In November 2020, twelve-month payment plans were offered to customers with outstanding balances to assist these customers in paying past due amounts over time. As of February 1, 2021, Metro Water Services had approximately 1,700 customers on varying payment plans. Payment plans were available to customers prior to 2020 but had eligibility requirements. For new payment plans due to the pandemic, eligibility requirements were removed, and any customer with an outstanding balance was eligible to create a plan.

AUDIT OBSERVATIONS

Internal control helps ensure entities achieve important objectives to sustain and improve performance. The Committee of Sponsoring Organizations of the Treadway Commission (COSO), Internal Control – Integrated Framework, enables organizations to effectively and efficiently develop systems of internal control that adapt to changing business and operating environments, mitigate risks to acceptable levels, and support sound decision-making and governance of the organization. See **Appendix B** for a description of the observation *Assessed Risk Rating*.

Observation A – Timeliness and Consistency of Customer Communication

Ensuring customer inquiries and concerns are answered is important to helping customers understand Metro Water Services' billings. Unanswered calls or inadequate information can lead to customer frustrations. A review of call center data for the audit period showed a high volume of calls being made to the Metro Water Services call center. Between 2019 and 2020, the calls received by Metro Water Services increased by 24,608, and the number of staff remained the same. The percentage of calls answered went from 91 percent in 2019 to 84 percent in 2020, and the percentage of calls abandoned by customers increased from 9 percent abandoned in 2019 to 16 percent abandoned in 2020. Additionally, the average hold time increased from 1 minute and 44 seconds in 2019 to 6 minutes and 43 seconds in 2020. When call center staff are overwhelmed by the volume of calls the quality of the customer service and the documentation of the issue can decline.

Additionally, the Avaya call logging service used by Metro Water Services only tracks volume metrics at a high level. These metrics include overall volume, abandoned calls, emergency calls, and hold times. Details of calls are maintained within customer accounts and created into work orders if unable to be answered quickly. Customer calls can be important indicators of areas needing attention. For example, customer call locations could be indicative of localized issues. Additionally, subject matter of calls could be indicative of topics to strengthen communication and explanations. A review of enQuesta notes on accounts found an inconsistency in the level of detail documented on customer calls which makes analysis difficult. There are no procedures that define the level of detail required in the documentation of calls. Determining a method to log and document all calls at a reasonable level of detail could better serve customers.

Criteria:

- COSO 12: The organization deploys control activities through policies that establish what is expected and procedures that put policies into action.
- COSO 13: The organization communicates with external parties regarding matters affecting the functioning of internal control.
- COSO 14: The organization internally communicates information, including objectives and responsibilities

Assessed Risk Rating:

Medium

Recommendations for management of Metro Water Services:

1. Evaluate call volume data and determine optimal Call Center staffing for high volume months. Have documented plans in place to adjust staffing levels if unforeseen call volume increases occur. Regularly review the call metrics to ensure staffing adequately answers calls and results in reasonable hold times and abandoned calls.
2. Explore options to log all calls on a detailed basis. Determine adequate categories and measures for calls and evaluate calls to determine additional needs of customers. Implement policies and procedures that ensure a consistent level of detail for both internal and external communication about accounts.

GOVERNMENT AUDITING STANDARDS COMPLIANCE

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 objectives. We believe that the evidence obtained provides a reasonable basis for our observations and conclusions based on our audit objectives.

METHODOLOGY

To achieve the audit objectives, auditors performed the following steps:

- Reviewed Metropolitan Nashville Government Code of Laws and ordinances, and Metro Water Services policies and procedures.
- Interviewed key personnel within Metro Water Services.
- Reviewed prior audits performed by the Metropolitan Nashville Office of Internal Audit and by other jurisdictions.
- Reviewed and analyzed data to determine compliance with best practices.
- Evaluated internal controls currently in place.
- Considered risk of fraud, waste, and abuse and information technology risks.
- Recalculated customer water and sewer charges to ensure accuracy.

AUDIT TEAM

Laura Henry, CFE, In-Charge Auditor

Lauren Riley, CPA, CIA, ACDA, CMFO, Metropolitan Auditor

APPENDIX A – MANAGEMENT RESPONSE AND ACTION PLAN

We believe that operational management is in a unique position to understand best their operations and may be able to identify more innovative and effective approaches, and we encourage them to do so when providing their response to our recommendations.

Risk	Recommendation	Concurrence and Action Plan	Expected Completion Date
<i>Recommendations for management of the Metro Water Services:</i>			
M	A.1 - Evaluate call volume data and determine optimal Call Center staffing for high volume months. Have documented plans in place to adjust staffing levels if unforeseen call volume increases occur. Regularly review the call metrics to ensure staffing adequately answers calls and results in reasonable hold times and abandoned calls.	Accept: MWS will create a documented plan based on past and expected future call volume to assist in adjusting staffing levels. Call metrics will be reviewed daily and analyzed monthly for necessary changes.	April 30, 2021 and ongoing
M	A.2 - Explore options to log all calls on a detailed basis. Determine adequate categories and measures for calls and evaluate calls to determine additional needs of customers. Implement policies and procedures that ensure a consistent level of detail for both internal and external communication about accounts.	Accept: MWS is in the process of developing an RFP for the replacement of the IVR which will assist in categorizing and measuring calls. We recently hired a trainer who is documenting procedures and determining policy needs, ensuring a consistent level of detail concerning the communication of accounts. MWS will consider hiring a CSC Public Information Advocate with the intent that consumers are better informed therefore reducing call volume.	January 2022 due to acquisition and implementation of a new IVR. Policies and Procedures have been implanted and will be ongoing.

APPENDIX B – ASSESSED RISK RANKING

Observations identified during the course of the audit are assigned a risk rating, as outlined in the table below. The risk rating is based on the financial, operational, compliance or reputational impact the issue identified has on the Metropolitan Nashville Government. Items deemed “Low Risk” will be considered “Emerging Issues” in the final report and do not require a management response and corrective action plan.

Rating	Financial	Internal Controls	Compliance	Public
HIGH	Large financial impact >\$25,000 Remiss in responsibilities of being a custodian of the public trust	Missing, or inadequate key internal controls	Noncompliance with applicable Federal, state, and local laws, or Metro Nashville Government policies	High probability for negative public trust perception
MEDIUM	Moderate financial impact \$25,000 to \$10,000	Partial controls Not adequate to identify noncompliance or misappropriation timely	Inconsistent compliance with Federal, state, and local laws, or Metro Nashville Government policies	The potential for negative public trust perception
LOW/ Emerging Issues	Low financial impact <\$10,000	Internal controls in place but not consistently efficient or effective Implementing / enhancing controls could prevent future problems	Generally, complies with Federal, state, and local laws, or Metro Nashville Government policies, but some minor discrepancies exist	Low probability for negative public trust perception
Efficiency Opportunity	An efficiency opportunity is where controls are functioning as intended; however, a modification would make the process more efficient			