



City of Fort Lauderdale

Water/Sewer Metering and Billing Review

September 9, 2019

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1. Executive Summary

The City of Fort Lauderdale (“The City” or “Fort Lauderdale”) engaged KPMG to provide an objective review of the City’s Water Metering and Billing processes. The City’s objective for the engagement was to determine whether water and sewer meter readings and billings are systemically accurate, and, if such readings and billings are inaccurate, to determine the root causes of such inaccuracy and recommend remedial or corrective action. This Executive Summary summarizes KPMG’s scope and presents a high level summary of key observations and recommendations contained throughout the report. **The report should be read in its entirety to gain a full understanding of the context for the recommendations.**

Scope and Approach

KPMG developed a phased project approach to accomplish project objectives. KPMG’s project approach included the following three phases:

- **Phase 1: Project planning and kickoff** – In Phase 1, KPMG met with key project stakeholders including City staff in Finance and Public Works to reaffirm project goals; approve the project schedule, workplan, and deliverables; and confirm that the appropriate resources were in place.
- **Phase 2: Information gathering and analysis** – In Phase 2, KPMG focused on reviewing existing Water and Sewer Metering and Billing information and documenting current relevant operations. KPMG assessed key operational areas within the City’s Water and Sewer Metering and Billing function. KPMG assessed water and sewer metering and billing controls and processes for potential opportunities for improvement, especially as they may relate to inaccurate water and sewer meter readings and inconsistent water and sewer billing reports. Current processes, procedures, and controls were analyzed and compared to leading practices for any gaps. Key steps in assessing water and sewer metering and billing processes included:
 1. Conducting interviews with the City and water and sewer metering and billing processes personnel to gain an understanding of processes for meter reading, service and consumption charge issuance, billing and collection, meter repairs or replacements, and the issuance of other service charges.
 2. Reviewing relevant water and sewer metering and billing documentation, including, but not limited to:
 - Audited financial statements of the Water and Sewer Funds
 - BERMEX, INC. processes and procedures for performing meter reading on behalf of the City
 - Reports to external oversight bodies
 - Internal reports/dashboards
 - Policies and procedures
 - Job descriptions and FTE allocations
 - Cost allocation methodologies and outputs
 - Capital project improvement plans, documents, and financial analysis
 3. Documenting water and sewer metering and billing processes including, but not limited to:
 - Reading the meter
 - Billing and collection of charges for consumption or other fees
 - Meter repair and replacement
 - Issuance of service charges

- Internal cost projection/analysis
 - Water and sewer usage analysis and consumption analysis
 - Account error resolution, analysis, and review
4. Collecting three years of the City’s historical data for over 60,000 water/sewer accounts, including consumption, billing, and service histories. KPMG used this data to perform data analysis to identify key trends and observations related to the City’s environment and the execution of processes throughout the meter reading and billing lifecycle
 5. In addition to the City-wide multi-year water/sewer consumption and billing review, , selecting a sample of customer account histories to perform a detailed account history review against the City’s defined processes and procedures to augment the data analysis performed in Item 4 and the in-depth review of business processes in Item 3. KPMG selected an appropriate sample size to identify potential trends in billing accuracy and underlying causes in order to provide meaningful recommendations to the City. KPMG worked with the City to identify the population and appropriate sample size of customer billing information based on available documentation
 6. Conducting a benchmarking analysis to compare key performance metrics, and reviewing potential process and control enhancements related to meter reading and billing
- **Phase 3: Reporting and Validation** – In Phase 3, KPMG drafted this deliverable which contains the results of our research, interviews, and analysis. Our methodology for developing the deliverables stresses the thorough identification of issues to facilitate the discussion of management options. A wide range of management, operational, and process issues are typically identified in studies such as this. KPMG provided the City with a draft report to allow for City review and feedback. As part of the final report production process, we obtained and incorporated appropriate and agreeable City responses and feedback to our findings and recommendations.

Summary of Observations

KPMG identified observations and recommendations (where applicable) related to KPMG’s assessment of the City’s water and sewer metering and billing processes. KPMG did not identify systemic issues resulting in widespread inaccurate customer bills. KPMG’s findings primarily consist of opportunities to improve process and operational controls, efficiency, or effectiveness, as well as specific identified instances of documented issues that are not likely to result in widespread inaccurate billings. KPMG identified a potential system issue in which the City’s billing system (Cayenta) may have miscalculated a consumption estimate; the specific issue identified occurred in a rare set of circumstances, and the City lacked formal processes for human review and correction of these estimates.

The following table provides a succinct summary of the observations and recommendations contained in the full report. Observations and recommendations are presented in sequential order according to the structure of the report and should not be considered prioritized from most important/significant to least important/significant.

Observation 3.1 - Lack of a Common Leadership Structure

Water metering and billing governance, management, organizational reporting, and operations are bifurcated between two departments – the Department of Public Works oversees the Utilities Division and the Finance Department oversees the Utility Billing Office. The two functions reside in different departments reporting to different department directors. Organizational and operational silos may reduce the efficiency and effectiveness of water metering and billing. KPMG noted a positive working relationship between these departments and did not observe specific issues related to the separation of functions across departments.

Recommendation – The City should consider an organizational alignment to install a single position or organizational unit to oversee and manage end-to-end water metering and billing processes for the City. While KPMG did not observe specific issues, and the two departments appears to have good working relationships with each other, as roles, responsibilities, and activities change, particularly with the implementation of Advanced Metering Infrastructure (AMI) the City may want to consider a single organizational point of accountability. Theoretically speaking, a bifurcated organizational structure between two departments performing functions supporting a common service delivery goal may impact communication, execution of daily processes and procedures, and accountability for personnel performing tasks that cross departmental and divisional lines.

Having a single point of governance over end-to-end water metering and billing processes, may better enable holistic management of customer service delivery, increased visibility into and control over internal/external reporting, and process standardization and consistency.

Observation 3.2 – Meter Services Staffing

Meter Services lacks sufficient staffing levels to sustain ongoing demand for maintenance around meter services. Meter Services may have a need for additional staff to manage:

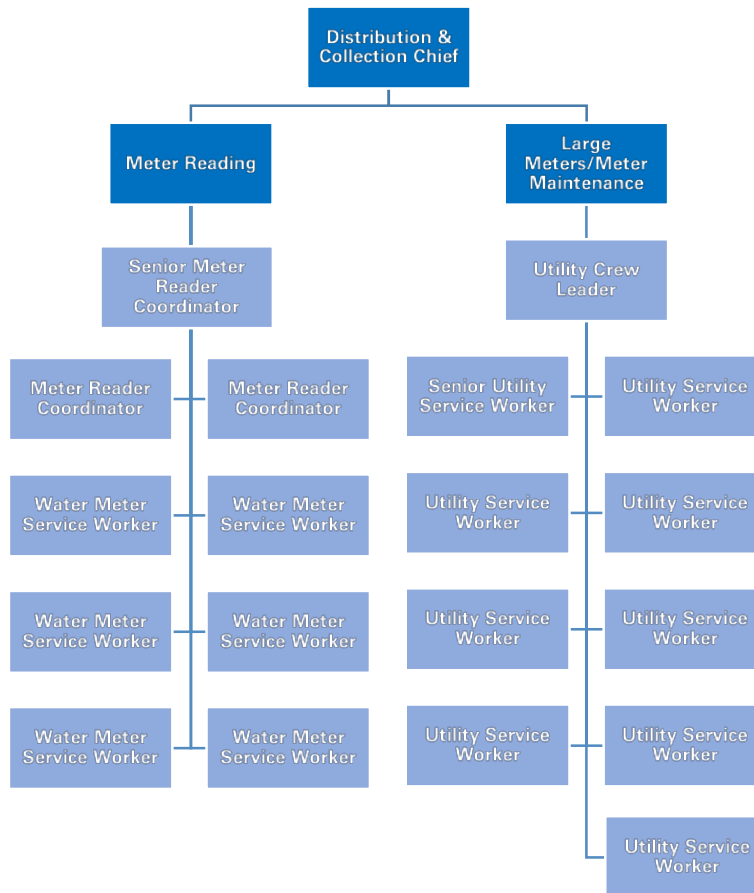
- Workload related to meter services, billing, non-payment, adjustment and other functions
- Manual, paper intensive processes to perform service orders and other activities

Meter Services lacks sufficient spans of control to ensure effective oversight over processes, work quality, and employee performance. In addition, Public Works leadership indicated that staff are performing tasks outside of their position's classification due to staffing shortages and skills gaps.

Recommendation – The City should review staffing levels and supervisory roles within Meter Services to identify specific opportunities to augment staffing where appropriate. Specifically, the City should consider:

- Creating a new Meter Coordinator position to facilitate increased workload and backfill this position with existing meter service worker supporting this role
- Converting a Meter Coordinator position to Senior Meter Coordinator position to oversee and be responsible for the 8-9 positions within this group

Below is a potential organization chart highlighting the proposed changes.



Observation 3.3 – Incentives for Accurate Contractor Reads

The City has implemented sound penalties to disincentivize Bermex from falsifying or superfluously estimating meter reads. The incentive for a false meter read (a \$0.66 charge to the City) is significantly less than the \$10 penalty Bermex would face if, upon a future actual read, the read was shown to be erroneous. The contractual penalties act as deterrents to Bermex performing systemic false readings.

Recommendation – N/A

Observation 3.4 – Aging Meters

The City's meter infrastructure is aging, with most meters past or nearly past their useful life. Meters that have been in the ground beyond their useful life run the risk of delivering faulty or incorrect water usage data, and inaccurate bills. It should be noted, however, that faulty aging meters typically return lower consumption levels, as opposed to higher consumption levels, than actual. The City plans to replace existing meter infrastructure in the coming years with meters to support new AMI technology.

Recommendation – The City should prioritize replacing the existing manually read meters as it begins its AMI implementation.

Observation 3.5 – AMI Implementation Considerations

While implementing new digital meters that support AMI will help promote more accurate gathering and real-time reporting of consumption data, the installation of new meters will likely result in capturing higher (and more accurate) consumption data, and may result in customers experiencing higher bills as a result.

Recommendation – The City should develop an education campaign to inform customers of the benefits of the AMI implementation, as well as provide information about what to expect throughout the implementation process, including the possibility of higher bills due to more accurate consumption data.

Observation 3.6 – Complex Bill Schedules

The water, sewer, and irrigation rate schedules are complex to understand for a typical customer depending on a multiple factors, including usage, meter size, and range of customer account characteristics. Inclining block rates in conjunction with fluctuations in usage, particularly irrigation, can cause wide swings in monthly bills. The existing City website and bill descriptions do not provide adequate explanations of the rate structure or how individual charges are calculated. The utility bill format does provide good information relative to historical consumption patterns which helps explain bill history. The website also provides explanations of the various bill sections and components.

Additional charges for sanitation, stormwater and fire service (as applicable) are included on the monthly utility bill that increase monthly bills and cause customer questions. For low usage bills (e.g., 4,000 gal/mo.), these additional charges may consist up to 50% of the total bill.

Recommendation – The City should develop and promote enhanced collateral to educate customers on the numerous parts of a utility bill, including how block rates are calculated and the inclusion of non-water/sewer charges on the bill.

Observation 3.7 – Usage of Irrigation Meters

Customers that use domestic water meters for irrigation could obtain savings from installation of separate irrigation meters. Customers with high irrigation consumption could realize payback from meter and installation costs in 1-2 years. Customers with lower irrigation usage could recoup meter and installation costs in 3-5 years depending on usage and costs. Some service areas have very low use of irrigation meters (e.g., 4%) when compared to other areas (27%).

Recommendation – The City should continue efforts to educate and encourage customers on the benefits of adding irrigation meters to their accounts, as well as routinely monitoring personal consumption. The City should continue to evaluate the potential to provide payment programs to encourage customers to install irrigation meters.

Observation 4.1– Initial Meter Read Processes in Line with Industry Standards

KPMG observed the initial meter read processes performed by the City and Bermex and did not identify significant deficiencies in how the processes were performed. The processes both entities use to support the initial meter read are consistent with industry standards given the analog meters currently used by the City. During the initial meter read process, Readers do not have access to the account's historical consumption data, making falsifying a read difficult without triggering an exception.

Recommendation – N/A

Observation 4.2 – Manual Data Entry

While meter reading processes are commercially reasonable given the City's current analog technology, manual data entry inherently increases risk of human data entry errors.

Recommendation – The City should continue with its planned conversion to Advanced Metering Infrastructure, which would remove the risk of human data entry from the meter reading process, provide customers with greater assurance that bills are accurate, and free up City resources to perform more value-add activities than confirming analog meter read accuracy.

Observation 4.3 – Potential Control Weakness in Rereading Process

Meter Reread Service Orders provided to Bermex include recent historical consumption data for the requested account. Using this data, a Bermex employee could theoretically record a false read to ensure that Bermex receives the \$0.66 charge from the City for completing a read. However, this potential control weakness is mitigated by a number of factors to the point that there is a high likelihood that there has been no material impact to the City or customers. These factors include:

- Because Bermex meter readers do not have access to the consumption data during the initial read, and Bermex does not typically receive the Meter Reread Service Orders until approximately 10 AM the day after meters are initial read, the window of time during which Bermex has access to the data is small enough to mitigate against the likelihood of a bad actor conceivably falsifying a read
- If a read was falsified, the following month's read could reveal that the read was an error by being lower than the false read. The City's penalties for Bermex's performance (\$10 per error above a certain monthly threshold) greatly outweigh the \$0.66 to be gained by falsifying a read

KPMG did not identify any instances where Bermex intentionally falsified a read using historical consumption data.

Recommendation – The City should work with Cayenta to remove historical consumption data from Meter Reread Service Order reports.

Observation 4.4 – Reliance on Key Personnel

A single position within the UBO (Senior Billing Specialist) is responsible for a significant portion of managing Exceptions processes in order to ensure that bills are processed as accurately and timely as possible. This employee is highly seasoned and possesses significant institutional knowledge. While the UBO has cross-trained additional staff that can substitute for the Specialist in event of absence, the assignment of this degree of responsibility on a single employee increases risk of institutional knowledge loss and inability to maintain continuity of operations.

Recommendation – The City should identify opportunities to ensure that the UBO maintains institutional knowledge, particularly as the City moves towards AMI, by enhancing desktop procedures and continuing to cross-train employees within the UBO.

Observation 4.5 – Limited Human Controls Over Estimates

Estimates for instances in which the City is not able to obtain an actual meter read are automatically generated in Cayenta, according to a programmed estimate calculation that should determine a twelve month average of actual consumption (tied to the history of the location and not necessarily to the current account holder). During exception processing, UBO staff typically (but not always) review the Cayenta-generated estimate against actual consumption history as provided on a meter reread service order. City processes and procedures do not require manual confirmation of all estimate calculations. As part of our data analysis, KPMG identified an instance in which Cayenta calculated an average for a new customer account that did not reconcile with the location's previous twelve months of actual consumption history (See Data and Sampling Analysis section).

Recommendation – The City should add a process by which estimates calculated in Cayenta are confirmed to be in line with verified consumption history. The City should also work with Cayenta to understand and address issues with estimate calculation programming for new accounts.

Observation 4.6 – Billing, Issuance, and Collection of Service Charges Processes in Line with Industry Standards

KPMG observed Billing, Issuance, and Collection of Service Charges processes performed by the City and Bermex and did not identify significant deficiencies in how the processes were performed. KPMG compared generated billing amounts to a KPMG-developed billing model that incorporated identified consumption and the City's billing methodology and rate structure, KPMG did not identify instances in which actual amounts billed to customers did not match modeled billed amounts based on identified consumption.

Recommendation – N/A

Observation 4.7 – Relief Options Provided to Customers

In addition to adjustments in the event of erroneous consumption charges, the City provides multiple avenues for customers to seek relief in the event of large instances of actual confirmed consumption. By offering Leak, Pool, and Unusual Consumption credits, the City helps customers mitigate the financial impact of one time spikes in consumption to the extent allowable under City ordinances and bond agreements.

Recommendation – The City should continue to make customers aware of these credit programs in instances of large isolated consumption incidents. The City should evaluate options to provide status notifications to customers after submission of the adjustment application and supporting documents. Cayenta provides the capability to create alerts for credit applications and could be used provide status updates via letter, email, text or online application. Such information could also be integrated with the City's online customer billing account.

Observation 4.8 – High/Low Exceptions

Exceptions from meter reading generate a high volume of work related to rereads and account reviews and updates. High/low parameters are configured within the Cayenta system based on customer service types (e.g. Water or Irrigation) and factors established during installation of the system in 2009. Billing staff indicated that a software update to Cayenta was made in October 2018 that possibly increased the number of high/low exceptions generated by the system. The methodology utilized, as well as setup within the Cayenta system, are complex in nature and generally not understood by Billing staff. Cayenta indicated that these factors are “standard” for most customers and have not been revised since installation. These exception parameters may not be sufficiently accurate or calibrated to adapt to the City’s customers that experience fluctuating month to month usage (especially during seasonal periods).

Recommendations – The City should consider the following potential actions:

- Identify/evaluate alternatives for providing reread service orders to Bermex electronically (and/or directly to meter readers on the route) and other means to use technology to streamline the exception processing and reread process.
- Review the high/low calculation methodologies and system configurations, and discuss with the Cayenta vendor to obtain a better understanding of this feature.
- Determine whether a re-evaluation and adjustment of these exception parameters is warranted and whether City or Cayenta staff should conduct the evaluation and any revised configurations.
- Identify and monitor meter reading routes with the highest number of exceptions that may help in providing information to assess the high/low calculation methodologies and well as possible meter reading errors.

Observation 4.9 – Turnoffs for Non-Payment

Delinquent accounts and non-payments are an on-going issue for utility billing. There were over 13,100 turnoffs for non-payment (over 30 days after due date) that were completed during 2018 for 7,800 individual accounts (representing over 12% of all accounts). A large portion of the accounts (1,300) had more than 3 non-payment actions during 2018, and payment arrangement letters were sent to 290 accounts. There were also 3,800 lien reviews generated as a result of non-payment under the ordinance provisions. *Note: The scope of this project did not include a review of the City’s payment collections, accounts receivables and write off practices.*

Recommendation – The City should consider the following potential actions:

- Create a nonpayment risk pool as a part of the “customer engagement” program (see Observation 5.1) that includes accounts with multiple repetitive turnoff actions to focus and coordinate efforts to mitigate and respond to these issues
- Coordinate the City’s various payment arrangements, adjustments, credits, and other programs to help address non-payment issues
- Assess various effectiveness of mechanisms available under existing ordinance including notifications, turnoff services, payment penalties, collections, and lien practices
- Identify options for enhanced measures not in ordinance in conjunction with those provided by Government Finance Officers Association (e.g. “Collecting Delinquent Revenues” 1995) as well as other industry sources

Observation 4.10 – Meter Services Workload

Paper documents used in most meter service actions present opportunities for written and input errors as well as time lags in updating Cayenta. A typical service order may include many data elements to be documented manually (e.g., accounts, location, order number, meter number, usage, customer contacts). One case was identified where a new irrigation meter was installed in October 2018 and was not metered and billed until March 2019 because the meter and service were not entered into Cayenta. This resulted in a significant “catch up” bill that included several months of usage.

Recommendation – The City should develop and implement additional quality control measures and internal reporting to ensure timely and accurate updates to Cayenta and related bills from service actions such as meter installations, replacements, and repairs. In addition, the City should consider the Meter Services staffing recommendations identified in Observation 3.2.

Observation 4.11 – Technology and Workflow

The Utility Billing and Collections and Meter Services groups operate in two distinct locations with different work objectives and processes but have the same goal of providing timely and effective billing and customer services. The daily flow of data from meter reading to bills and payments is voluminous, generating continuous and often complex work efforts in the office and field. Technology with streamlined work processes strengthened by effective management, staffing, and internal controls provides the foundation that can make this valuable service function seamlessly.

Recommendation – The City should explore the following avenues to better leverage existing and/or potential future technology to make Field Services processes more efficient and effective:

- Better utilizing features within Cayenta that could facilitate controls and notifications of pending work
- Improving reporting of workflow statuses and backlogs from Cayenta and Q-Alert
- Enhancing training of Meter Services employees related to Cayenta, Q-Alert, and tablet technologies
- Assessing of new/enhanced technologies to capture meter inventory and service data in the field to reduce reliance on manual paper processes (e.g., expand use of tablets for image-taking and other functionality to capture data and other meter services)

Observation 5.1 – Bill Amounts and Fluctuations

City utility bills include not only water and sewer services, but also stormwater, sanitation, and other charges/fees. The combination of all the different charges may be higher than customers would expect their “water bill” to be. Depending on a customer’s consumption, the water and sewer charges may be a small or large portion of the overall bill. For example, a residential customer having 2,000 gal/mo. would have a total bill of \$79/mo., whereas the water/sewer portion would be only \$31 (39%). Customer with 2,000 gal/mo. represents 25th percentile of all residential accounts; the median residential (50th percentile) consumes 4,000 gal/mo. whereas the “average” customer has 6,000 gal/mo. A residential customer having 11,000 gal/mo. consumption (75th percentile) would have monthly bill of \$215/mo. with water/sewer charges being \$155 (72%).

Many customers’ usage fluctuate significantly on month to month basis due to weather and other seasonal events such as tourism. Irrigation usually is greater than domestic water consumption with the average residential irrigation consumption being 13,000 gal/mo. – on its own is \$85/mo. (with 5/8” meter). The current City bill provides the customer with a 12 month history of domestic and irrigation water.

Recommendation – The City should consider the following activities to help customers better understand how fluctuations in consumption, as well as non-water/sewer costs, significantly impact their total billed amount:

- Develop a “customer-centric engagement” program that integrates existing and new programs involving conservation, billing/payments, leak/unusual consumption credits, and other utility roles. This program would enhance customer information and interactions with the City to mitigate and resolve customers’ consumption, service, and billing issues.
- Develop special reports to flag accounts with higher than normal readings. Reports could include:
 - A summary list of accounts with readings filtered by property type, meter size and consumption that is 50% higher than its 12 month average.
 - A detailed report by account that provides a recent history of consumption, estimates, communications, and field service orders or actions.
- Conduct special internal reviews, communications, and field actions for accounts that exceed the high reading thresholds. Provide notification mechanisms for communicating a potential high usage on the bill and via email and other means. For example, Duke Energy provides high bill alerts for its electricity customers halfway through the billing cycle (accomplished with AMI).
- Create and assign a business analyst position to help develop, monitor, and coordinate processes and reports for the customer engagement program.

Observation 5.2 – Estimated Consumption Amounts

Estimated billing is a normal process for utilities to handle the range of factors that can prevent an actual or accurate meter reading to occur on a monthly basis. Estimates are based on last 12 months of actual readings when such data is available. When estimates are lower or higher than normal, the following actual reading may cause a low or high “catch up” bill. KPMG identified instances where multiple and consecutive estimates are conducted because of on-going access issues with the property or customer which can have a cumulative low or high impact on a bill. The consumption fluctuations discussed above can also exacerbate a low or high bill when estimates are being made.

A selected review of a number of these SFRES estimated billed accounts indicated that the estimated readings were relatively normal when compared to actual historical readings. However, one account had several months of estimates with significantly higher than normal bills for the account or location. When a new customer took over the location, six consecutive estimated bills ranged from \$400-over \$500/mo., whereas the previous customer for the location had bills of \$50-\$70/mo. The City’s billing staff could not explain this anomaly and referenced a possible issue in the estimation calculations within the Cayenta software. KPMG verified an estimation calculation error output from Cayenta, but KPMG did not have access to Cayenta source code and calculation inputs, and cannot determine if this estimation calculation error is more widespread than the single instance identified, nor was analysis of Cayenta’s system configurations within the scope of this review.

Recommendation – The City should consider the following actions regarding estimated consumption amounts:

- Strengthen existing internal procedures for handling and estimating bills including follow-up steps for habitual accounts. This would include the methods used when an automated estimate is not provided by the Cayenta system. Additionally, progressive measures in communication and field services should be developed and implemented when 2 or more estimates are made consecutively or within a 12 month period.
- Develop special reports to monitor accounts with multiple estimated readings (in conjunction with higher than normal readings). Reports could include:
 - A summary list of accounts with multiple estimated readings filtered by property type, meter size and estimated times
 - A detailed report by account that provides a recent history of consumption, estimates, communications and field service orders or actions.
- Assign a billing specialist or assistant to help develop, monitor and manage the processes and reports for estimated bills.
- Obtain from Cayenta software vendor the estimated bill methodology and validations specifically related to accounts that have multiple consecutive estimates and changes in customer account for the location.

Observation 5.3 – Variances Among Districts/Service Areas

The City provides water and sewer services over a wide geographic area having 4 Commission Districts as well as portions of Broward County and other non-city areas. These areas have different residential, commercial, and socio-economic characteristics that are unique in their services, consumption, and bills. District characteristics are summarized as follows:

- Districts 1, 2 & 4 have relatively high levels of residential irrigation meters (15%-27% of accounts) whereas District 3 has 4% of accounts with irrigation meters. Average bills in Districts 2 & 4 are \$240-\$250/mo. including irrigation.
- District 3 has the lowest average single family residential bill of \$107/mo. District 1 is the highest with \$182/mo. District 3 also has significantly fewer commercial properties than the other Districts.
- In terms of Meter Services, District 3 varies significantly from the others with the lowest number of meter rereads and the highest number of non-payment service turnoffs.

Recommendation – Within the customer engagement program, the City should evaluate variation in service needs associated with Meter Services among Districts to better understand differences between the Districts and identify potential opportunities to better align Meter Service delivery to District needs. Within its customer management activities, the City should further evaluate the level of meter rereads, customer service investigations and non-payment turnoffs among Districts in consideration of services such as leak/usage adjustments, payment plans, and irrigation meters.

Observation 5.4 – Outcomes of Sampling Analysis

KPMG's review of sample customer accounts indicates that high bills are not uncommon and can occur as a result of many different conditions, such as specific consumption patterns, physical conditions of location or meter, as well as errors in data entry and processing. Irrigation presents greater frequency of high consumption both with and without irrigation meters and opportunities for customers to better manage such usage. The City has routine, established procedures to respond to the various conditions that create exceptions as indicated by the high level of meter re-reads conducted daily. Follow-up field services via Customer Service Investigations (CSIs) and meter maintenance, testing and replacements are also routinely provided to correct inaccurate or inaccessible readings and other issues.

For the 37 accounts included in this review, a summary of service actions provided by the City included the following:

- 79 individual meter rereads (21 accounts)
- 29 CSI service orders (18 accounts)
- 26 actions – turnoff's completed for nonpayment (6 accounts)
- 16 accounts – meter replace glass or lids
- 6 accounts – 12 meter tests
- 5 accounts – meter replacements
- 3 accounts – lien reviews completed

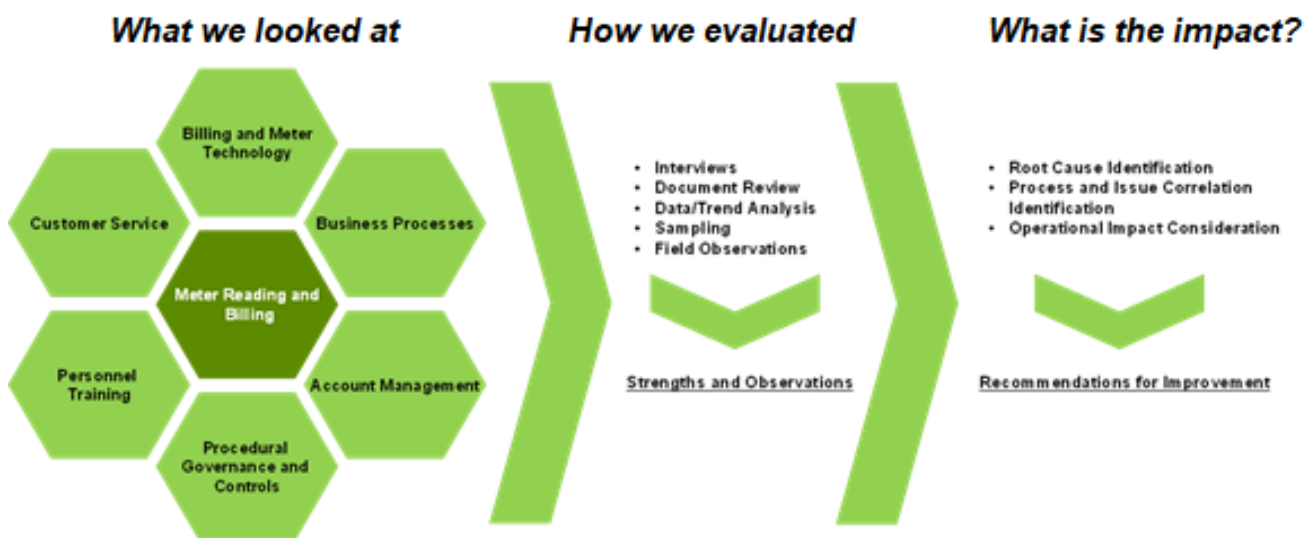
As indicated elsewhere in this report, of the 37 accounts selected, KPMG identified one instance in which a selected account had a series of inaccurate estimates associated with Cayenta calculation issue. The issue was resolved and the customer's account was credited according to City procedures.

Recommendation – N/A

2. Introduction

Project Overview

The City of Fort Lauderdale (“The City” or “Fort Lauderdale”) engaged KPMG to provide an objective review of the City’s Water Metering and Billing processes. The City’s objective for the engagement was to determine whether water and sewer meter readings and billings are systemically accurate, and, if such readings and billings are inaccurate, to determine the root causes of such inaccuracy and recommend remedial or corrective action. The graphic below highlights the key focus areas of the meter reading and billing lifecycle that the KPMG team evaluated, our high level approach, and impact of our outputs.



Our Approach

The following graphic highlights KPMG’s three-phased project approach and presents the multiple tasks performed to achieve the City’s project objectives. The assessment was conducted under the American Institute of Certified Public Accountants (“AICPA”) Standards for Consulting Services. Our observations and recommendations are presented to facilitate discussion of management options. Our methodology for developing this report (as follows) focuses on the identification of issues through research, interviews, and analysis.



Phase I: Project planning and communication

During Phase I, KPMG met with key project stakeholders including City staff in Finance and Public Works to reaffirm project goals; approve the project schedule, workplan, and deliverables; and confirm that the appropriate resources were in place. Specific tasks for Phase I included:

- a) Conducting Project Initiation Meeting: Conducted a planning and scoping meeting with key stakeholders from the City to understand project objectives, stakeholder concerns and feedback, and identify key personnel within the project. During this meeting, the City and KPMG agreed upon a proposed project workplan that included key tasks and objectives.
- b) Preparing Key Documents and Interviews Request: KPMG prepared an initial document and interview request list and submitted to the City. The City worked with KPMG to identify the sources of information and people to interview based on KPMG’s request.

Phase I – Outputs

- Finalized agreed-upon detailed workplan including project milestones, tasks, and deliverables
- Document request list
- Preliminary interview list

Phase II: Information gathering and analysis

During Phase II, KPMG focused on reviewing existing Water and Sewer Metering and Billing information and documenting current relevant operations. KPMG assessed the following operational areas within the City’s Water and Sewer Metering and Billing function:

- Effectiveness and accuracy of customer billing
- Efficiency and effectiveness in key operational areas
- Billing and Customer Services process inputs, outputs, and controls
- Internal Water and Sewer Metering and Billing accounting processes
- Bermex, Inc., processes and procedures for performing meter reading on behalf of the City
- Internal procedures and controls supporting water and sewer metering and billing outputs

- Potential factors contributing to billing discrepancy, such as meter installation, malfunction, and misreading errors, data entry errors and undetected leaks
- Multiplier(s) used by the City to calculate bills

KPMG assessed water and sewer metering and billing controls and processes for potential opportunities for improvement, especially as they may relate to inaccurate water and sewer meter readings and inconsistent water and sewer billing reports.

Current processes, procedures, and controls were analyzed and compared to leading practices for any gaps. Areas of focus included:

- Assessing current billing and fee collection methodologies and data sources
- Assessing specific related processes such as meter reading, billing, collections, work order management, meter repairs, and meter replacements
- Assessing documented policies and procedures for water and sewer operations, including the collection of fees, invoices, or contracts related to water and sewer metering and billing
- Assessing current vendor agreements or service level agreements related to water and sewer metering and billing
- Reviewing current water and sewer metering and billing staffing and responsibilities to verify if services performed are accurate and verified

Key steps in assessing water and sewer metering and billing processes included:

1. Conducting interviews with the City and water and sewer metering and billing processes personnel to gain an understanding of processes for meter reading, service and consumption charge issuance, billing and collection, meter repairs or replacements, and the issuance of other service charges.
2. Reviewing relevant water and sewer metering and billing documentation, including, but not limited to:
 - Audited financial statements of the Water and Sewer Funds
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 - Account error resolution, analysis, and review
4. Collecting three years of the City's historical data for over 60,000 water/sewer accounts, including consumption, billing, and service histories. KPMG used this data to perform data analysis to identify key trends and observations related to the City's environment and the execution of processes throughout the meter reading and billing lifecycle

5. Selecting a sample of customer account histories for review against the City's defined processes and procedures to augment the data analysis performed in Item 4 and the in-depth review of business processes in Item 3. KPMG selected an appropriate sample size to identify potential trends in billing accuracy and underlying causes in order to provide meaningful recommendations to the City. KPMG worked with the City to identify the population and appropriate sample size of customer billing information based on available documentation
6. Conducting a benchmarking analysis to compare key performance metrics, and reviewing potential process and control enhancements related to meter reading and billing

Phase III: Reporting and validation

The draft deliverable contains the results of our research, interviews, and analysis. Our methodology for developing the deliverables stresses the thorough identification of issues to facilitate the discussion of management options. A wide range of management, operational, and process issues are typically identified in studies such as this. KPMG is providing the City with a draft report to allow for City review and feedback. As part of the final report production process, we will obtain and incorporate appropriate and agreeable City responses and feedback to our findings and recommendations.

After the City and KPMG are satisfied with the final report, an exit meeting, or public presentation, will be conducted with City management or the City Commission, as directed by the City. The report is designed to show findings and recommendations by each task performed, as outlined in Phase II.

Phase III Outputs (Project Deliverables)

- Draft Report
- Final Report delivered 2 weeks after delivery of Draft Report and receipt of City feedback and/or proposed edits

3. Background

Overview

The City of Fort Lauderdale provides water and sewer service to residents throughout the City's four districts, as well as select residents outside city limits. The City also maintains wholesale agreements for potable water supply with the municipalities of Oakland Park, Wilton Manors, Tamarac, Davie, and Port Everglades. As of April 2019, the City had 63,442 active residential and non-residential accounts. Exhibit 3.1 as follows provides a distribution of accounts by account type.

Exhibit 3.1 – City of Fort Lauderdale Water and Sewer Account Overview

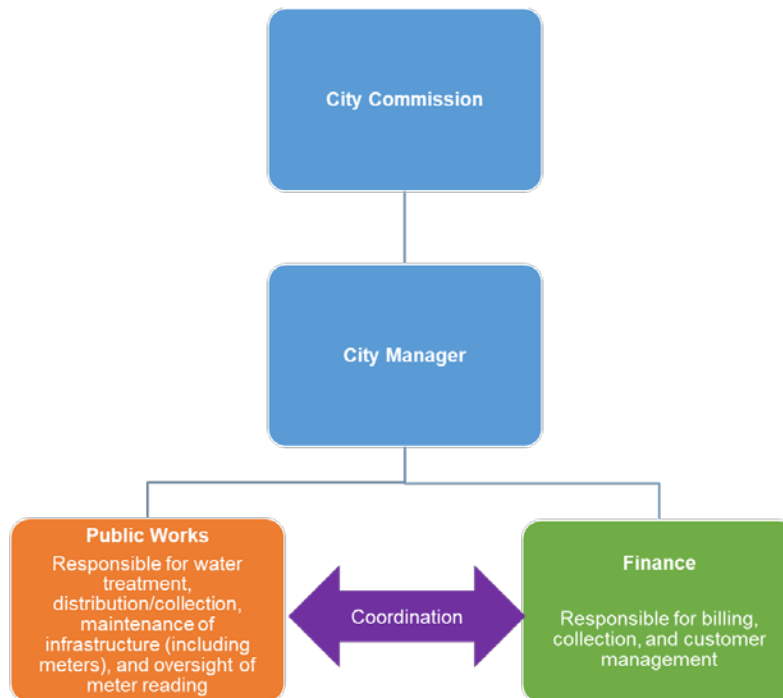
Account Type	Number of Accounts
Single Family Residential	48,984
Duplex	2,985
Triplex	741
Multi-Family Residential	3,259
Commercial	7,431
Master Meters	42
Total	63,442

The City of Fort Lauderdale's water metering and billing operations are managed and executed on a daily basis between two organizational entities:

- Within the Public Works Department, the Utilities Division (Utilities) is the primary operational, regulatory, and metering entity whose mission is to ensure the effective and safe distribution of water throughout the City, as well as the safe collection and treatment of the City's wastewater.
- Within the Finance Department, the Utility Billing & Collections Office (UBO) is the financial and administrative component supporting the City's water metering and billing operations. The UBO primarily focuses on the back office and customer-facing billing processes that support daily execution of the City's water utility operations.

Exhibit 3.2 as follows illustrates the high level functional governance and organization of these entities within City government, while the following subsections discuss the functions and operations within each department.

Exhibit 3.2 – High Level Functional Governance Structure



Observation 3.1 - Lack of a Common Leadership Structure

Water metering and billing governance, management, organizational reporting, and operations are bifurcated between two departments – the Department of Public Works oversees the Utilities Division and the Finance Department oversees the Utility Billing Office. The two functions reside in different departments reporting to different department directors. Organizational and operational silos may reduce the efficiency and effectiveness of water metering and billing. KPMG noted a positive working relationship between these departments and did not observe specific issues related to the separation of functions across departments.

Recommendation – The City should consider an organizational alignment to install a single position or organizational unit to oversee and manage end-to-end water metering and billing processes for the City. While KPMG did not observe specific issues, and the two departments appears to have good working relationships with each other, as roles, responsibilities, and activities change, particularly with the implementation of Advanced Metering Infrastructure (AMI) the City may want to consider a single organizational point of accountability. Theoretically speaking, a bifurcated organizational structure between two departments performing functions supporting a common service delivery goal may impact communication, execution of daily processes and procedures, and accountability for personnel performing tasks that cross departmental and divisional lines.

Having a single point of governance over end-to-end water metering and billing processes, may better enable holistic management of customer service delivery, increased visibility into and control over internal/external reporting, and process standardization and consistency..

The Public Works Utilities Division

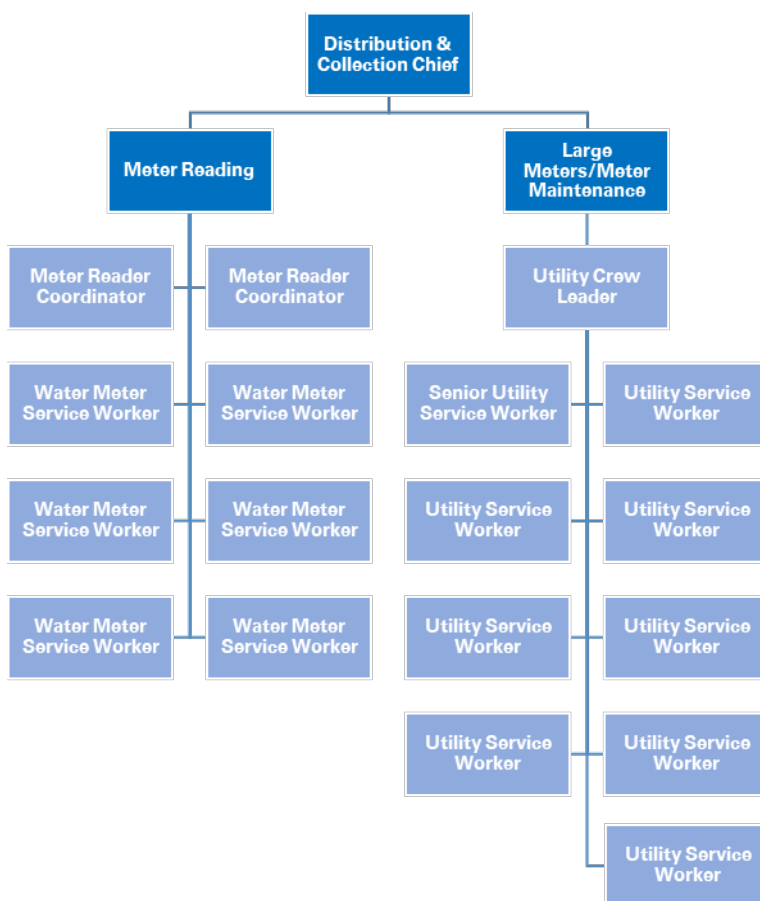
The Utilities Division is comprised of two offices:

- Treatment: provides residents with safe and efficient water treatment, water production, and wastewater treatment and disposal
- Distribution and Collection (D&C): responsible for the operation, maintenance, repair, and improvement of the water distribution, wastewater collection, and pumping system

As it relates to water metering, D&C is primarily responsible for field service operations, and maintenance of approximately 65,000 water meters and 10,500 irrigation meters throughout the City. While D&C does not have a direct role in managing or overseeing the City's water billing activities completed by the UBO, D&C does interact extensively with the UBO to support meter services. Detailed information on the execution of processes can be found in Section 4 of this report.

D&C consists of 17 full time and 2 part time employees, with spans of control of nine employees per supervisor. Exhibit 3.3 as follows provides an overview of the D&C organizational structure.

Exhibit 3.3 – Distribution and Collection Organization Chart



The Meter Reading section works closely with Bermex, the City's third party meter reading service provider (see later in this section for further information on Bermex's responsibilities). Meter Reading is

responsible for entering new account data into Cayenta for billing. In addition, they respond to customer inquiries (Customer Service Investigations) concerning issues such as read accuracy or high consumption. Meter Reading These interactions include investigating trouble codes provided by Bermex and performing turn-ons and turn-offs, and other meter maintenance tasks.

Meter Reading staff that directly support Billing consists of eight employees, including two coordinators who administer the routes, handheld devices, and updates to Cayenta for billing. There are six Meter Reading workers who conduct Customer Service Investigations (CSIs), tests, turn on/off, and a range of other meter actions to support various billing, connection, and credit services. In addition to the eight Meter Reading employees, there is a Senior Customer Service Representative (coded to the Finance Department) that is located at the Public Works office, serving as a liaison with meter and other operational staff as well as conducting leak and back billing adjustments. The adjustment processes are generally paper intensive and time consuming tasks to collect, validate, and execute billing adjustments.

The Large Meters/Meter Maintenance section is responsible for replacing existing meters due to age or damage and adjusting meter boxes, lids, and other actions. They also test meters for accuracy and maintain the large meter vaults and associated piping and performs the monthly reads on the large consecutive system meters for billing purposes.

Observation 3.2 – Meter Services Staffing

Meter Services lacks sufficient staffing levels to sustain ongoing demand for maintenance around meter services. Meter Services may have a need for additional staff to manage:

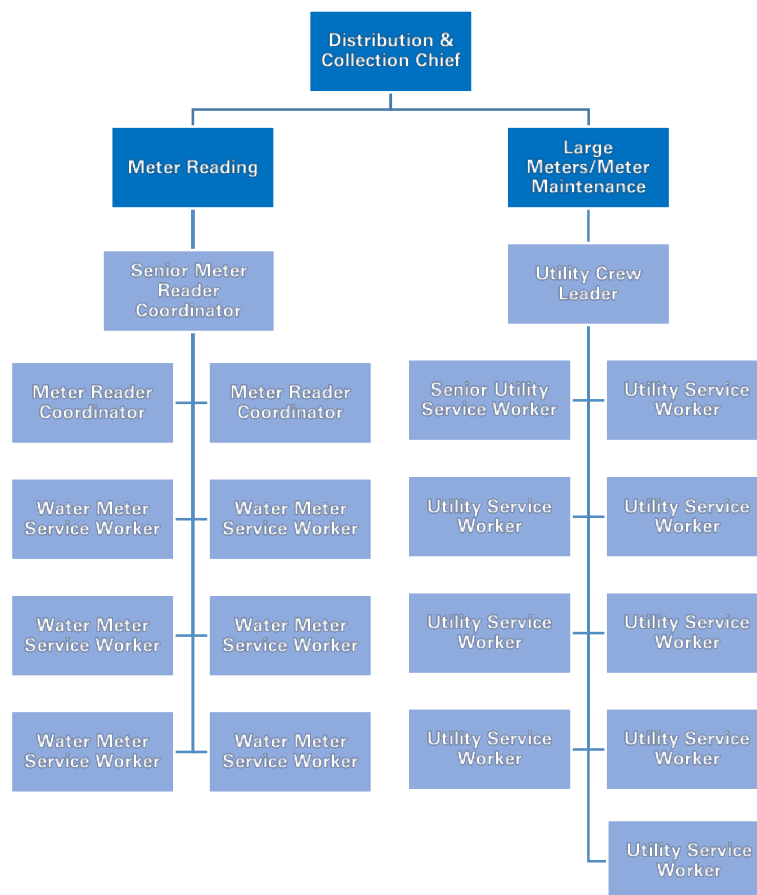
- Workload related to meter services, billing, non-payment, adjustment and other functions
- Manual, paper intensive processes to perform service orders and other activities

Meter Services lacks sufficient spans of control to ensure effective oversight over processes, work quality, and employee performance. In addition, Public Works leadership indicated that staff are performing tasks outside of their position's classification due to staffing shortages and skills gaps.

Recommendation – The City should review staffing levels and supervisory roles within Meter Services to identify specific opportunities to augment staffing where appropriate. Specifically, the City should consider:

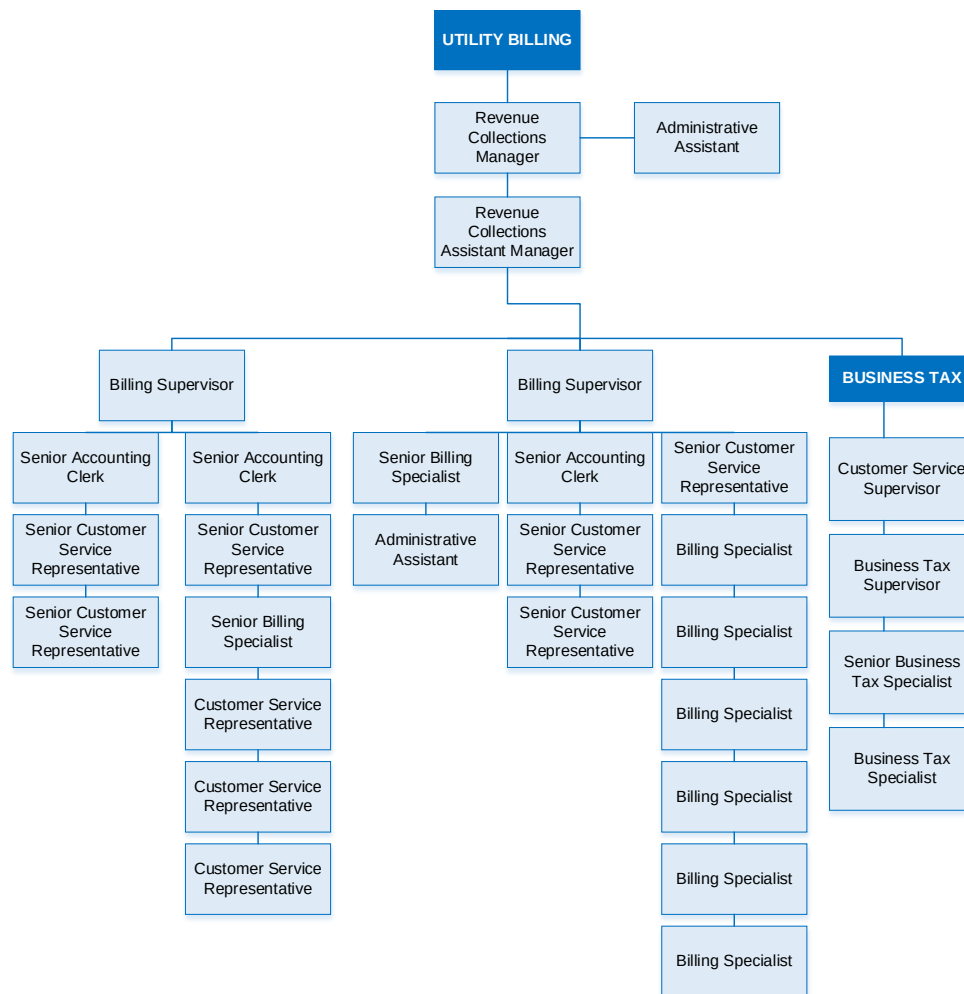
- Creating a new Meter Coordinator position to facilitate increased workload and backfill this position with existing meter service worker supporting this role
- Converting a Meter Coordinator position to Senior Meter Coordinator position to oversee and be responsible for the 8-9 positions within this group

Below is a potential organization chart highlighting the proposed changes.



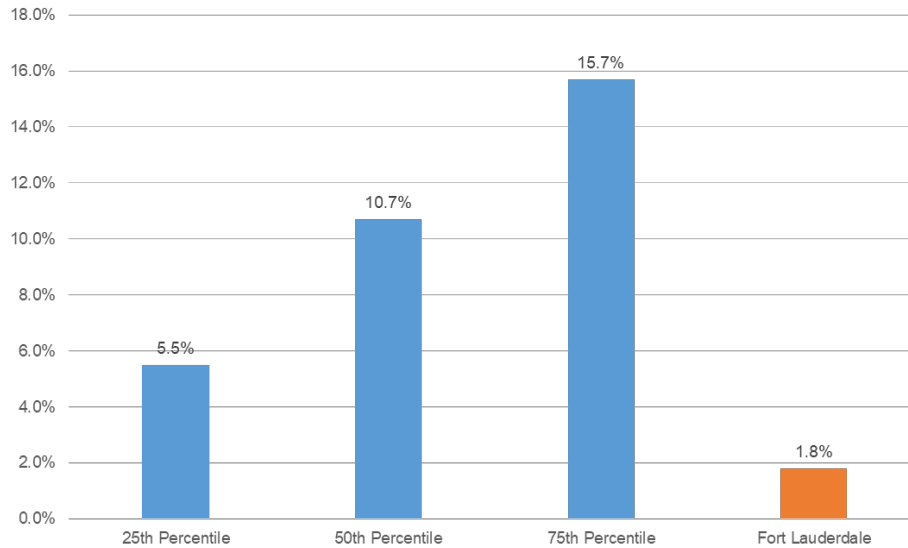
The UBO is responsible for generating, distributing, and collecting utility bills based on metered consumption documentation. The UBO also serves as the primary point of contact for customers through multiple mediums, including: in person, via telephone, and online through the City of Fort Lauderdale website. The UBO also performs payment processing and accounts receivables functions for a range of miscellaneous fees from other City agencies (e.g., Business Tax) which are outside the scope of this project. The UBO is overseen by the Revenue Collections Manager, who reports to the City's Finance Director. Excluding the Business Tax function, the UBO consists of 23 filled positions, and as of April 2019 had three vacancies. Among these employees, seven perform customer service/call center responsibilities, and two perform the billing function. Exhibit 3.4 provides an overview of the UBO organizational structure.

Exhibit 3.4 – Utility Billing Organization Chart



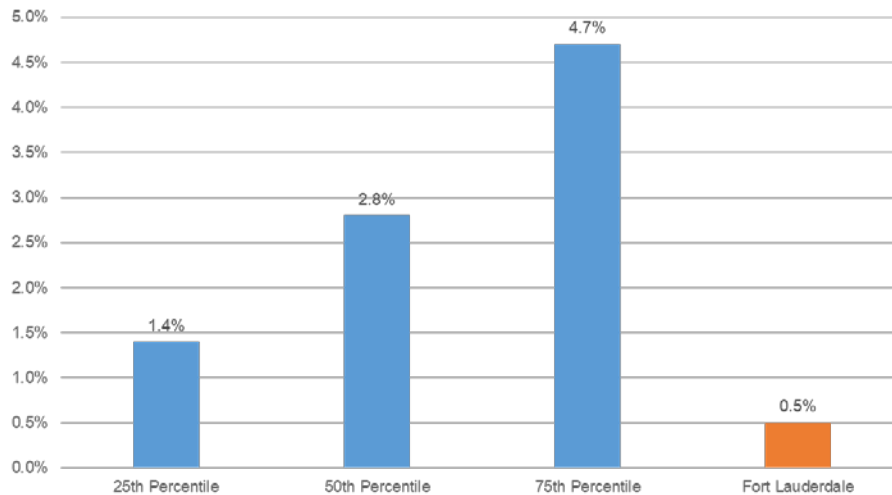
KPMG conducted a benchmark analysis on key datapoints relevant to the billing and customer management functions, the outputs of which can be seen in Exhibits 3.5-3.8 as follows. Source: American Water Works Association (AWWA).

Exhibit 3.5 – Customer Service/Call Center FTE As Percent of Total Utility FTE



As shown in Exhibit 3.5, the City has a lower percent of staff dedicated to customer service activities than peers, which may impact its ability to address customer issues in a timely manner and take a proactive approach to managing and educate customers on water consumption and conservation.

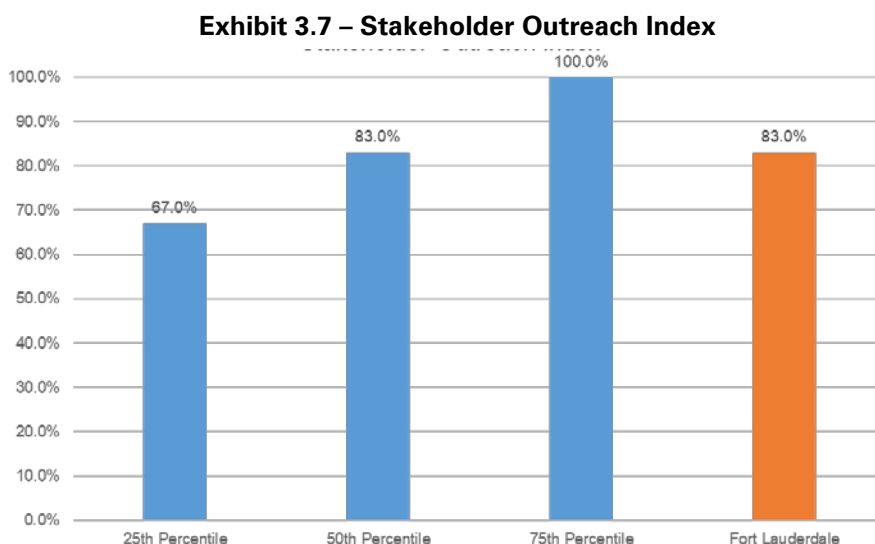
Exhibit 3.6 – Customer Billing FTE as a Percent of Total Utility FTE



With only two employees performing the customer billing function (Exhibit 3.6), the City is significantly below industry benchmarks in staffing these activities. Limited billing staff may not have sufficient coverage to perform tasks which could impact process cycle times, particularly given the manual nature of billing and consumption review the City currently leverages.

As part of its annual benchmarking survey, the AWWA solicits a self-assessment from water and wastewater utilities nationwide around their efforts to engage a variety of stakeholder groups. KPMG

provided AWWA’s questionnaire to the City. The results in Exhibit 3.7 as follows depict how the City and surveyed peers scored as a percentage of the maximum possible score. The City scored in line with industry averages.



Bermex, Inc.

The City contracts with Bermex, Inc. (Bermex) to provide meter reading services for residential and non-residential accounts. Bermex’s scope of work includes performing meter reads and disconnections on behalf of the City. Bermex’s compensation is based on a combination of meters the company reads, as well as other factors such as missed reads and errors (described below). Bermex receives \$0.66 for each meter successfully read (either on initial read attempt or as a reread. Please see Section 4 for additional detail on the meter read/meter reread processes). The City also compensates Bermex \$10 for each illegal hookup (straight pipe or stolen meter) identified by the meter reader and reported to the City and \$5 per customer shutoff performed. In addition to these incentives, Bermex’s contract includes the following penalties for failing to meet certain performance requirements:

- Bermex is penalized \$10 per meter read error in months where meter read errors exceed 62 in total (out of over 60,000 meter reads per month). Errors are defined as “misreads” found by field audits; readings the following month, which are reported on the previous month as an accurate read; or customer requested rechecks which, after investigation, confirms a reading error.
- Bermex is penalized \$10 per estimated read in months in which estimates exceed 0.8% of the total dials read.
- Bermex is penalized \$10 for certain inaccurate and/or inappropriate work orders submitted to the City during the meter read process. This penalty is designed to ensure that City resources are not requested to address unnecessary or incorrect issues.

The Department of Public Works is responsible for oversight of the Bermex contract, including reviewing penalties for the proper charges and penalties. Public Works reviews Bermex’s performance against service levels agreements as part of monthly invoicing processes; the City has not conducted a formal contract audit on the agreement with Bermex. Exhibit 3.8 provides a sample Bermex invoice showing how the contractor bills the City for its services, including incentives and penalties.

Exhibit 3.8 – Sample Bermex Invoice



INVOICE

to: Bermex, Inc.
Akron, OH 44310

Bldg. Suite
33311

Billing Rate Per Contract: *

Meter Unit Price: \$0.61.0
Read Error Unit Price: \$10.00

For: The City of Ft. Lauderdale
100 N. Andrews Ave, 6th Floor Remit
Fort Lauderdale, Florida 33301
Attn: Finance Department

Subsidiary of ACRT, Inc.
1333 Home Avenue

PO # [REDACTED]
Project Number:

Inquire At:
2880 West Oakland Park
Oakland Park, Florida
[REDACTED]

Invoice # [REDACTED]

Description of Services Provided:

ITEMS BILLED	ITEM TOTALS	CREDIT	AMT BILLED
Total Meters Read for the month of March 2018	63,260		\$ 38,538.60
Fire Service Deductions		\$0.00	
Total Read Errors Subject to Penalty			
Total Allowed Errors	62		
Read Errors Subject to Penalty	7	\$70.00	
Unread/Estimated Meters Subject to Penalty	0	\$0.00	
Inappropriate Work Orders Subject to Penalty	0	\$0.00	
Found Stopped Meters Eligible for Incentive	2	\$20.00	
Found Straight Line Hookups Eligible for			

PLEASE PAY THIS AMOUNT : \$ 38,538.60

REMARKS: Invoice March 2018

In August 2016, the City renewed its contract with Bermex for the period of February 20, 2019 through December 19, 2020. As seen in Exhibit 3.9, Bermex conducts an estimated 758,400 reads on 63,200 meters per year. Bermex's total cost to the City for 2018 was \$548,544.

Exhibit 3.9 - 2018 Cost of Bermex's Meter Reading Services

<u>Description</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>UOM</u>	<u>Total Cost</u>
1. Meter Reading* (Annual Estimate 758400)	63200	\$ 0.66	12 Months	\$ 500,544.00
2. Cost Per Meter Read	1	\$ 0.66	each	\$ 0.66
3. Disconnections (Meter Shut offs)	800	\$ 5.00	12 Months	\$ 48,000.00
Total Project Cost \$ 548,544.00 /year				

Observation 3.3 – Incentives for Accurate Contractor Reads

The City has implemented sound penalties to disincentivize Bermex from falsifying or superfluously estimating meter reads. The incentive for a false meter read (a \$0.66 charge to the City) is significantly less than the \$10 penalty Bermex would face if, upon a future actual read, the read was shown to be erroneous. The contractual penalties act as deterrents to Bermex performing systemic false readings.

Recommendation – N/A

Key Relevant Infrastructure and Systems

Water Meters

The City exclusively uses analog water meters to measure water usage for residential and non-residential accounts. The City uses mostly 5/8", 3/4", 1", and 1 1/2" meters for single family residential accounts. The analog meters use an odometer dial to measure and display water consumption. Only the dial numbers for 1,000 gallon units (white dials) are read. The majority of the City's meters are over 15 years old and, according to City leadership, are past or nearly past their useful life. It is best practice to begin replacing meters before they reach their useful life and show signs of deterioration and inaccuracy. Exhibit 3.10 shows a typical meter in-use within the City.

Exhibit 3.10 – Typical City of Fort Lauderdale Water Meter



The City's water meters must be read through manual visual inspection. The City does not currently use Automated Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) technology on any accounts. As of June 2019, the City has solicited proposals to begin implementing AMI citywide, and is currently in contract negotiations. Exhibit 3.11 provides an overview of these technologies.

Exhibit 3.11 – Overview of AMR and AMI

Automated Meter Reading (AMR)	Advanced Metering Infrastructure (AMI)
- Consists of meters that transmit consumption data to reading equipment located in the hands or vehicle of the meter reader. - Meter readers typically walk or drive by the location to retrieve the consumption data without visual inspection. <i>Source: American Water Works Association</i>	- Fixed network system in which meters transmit data through radio or cellular communication to reading equipment located in fixed geographical locations (such as ground storage tanks, buildings, or light poles), which connects to a central infrastructure. - The use of meter readers in the field is limited primarily to error resolution.

Observation 3.4 – Aging Meters

The City's meter infrastructure is aging, with most meters past or nearly past their useful life. Meters that have been in the ground beyond their useful life run the risk of delivering faulty or incorrect water usage data, and inaccurate bills. It should be noted, however, that faulty aging meters typically return lower consumption levels, as opposed to higher consumption levels, than actual. The City plans to replace existing meter infrastructure in the coming years with meters to support new AMI technology.

Recommendation – The City should prioritize replacing the existing manually read meters as it begins its AMI implementation.

Observation 3.5 – AMI Implementation Considerations

While implementing new digital meters that support AMI will help promote more accurate gathering and real-time reporting of consumption data, the installation of new meters will likely result in capturing higher (and more accurate) consumption data, and may result in customers experiencing higher bills as a result.

Recommendation – The City should develop an education campaign to inform customers of the benefits of the AMI implementation, as well as provide information about what to expect throughout the implementation process, including the possibility of higher bills due to more accurate consumption data.

Cayenta

Cayenta is the City's Customer Information System and serves as the primary system for storing and managing consumption, billing, meter, and customer data. The system is also used to initiate and process service orders to support meter reading, investigations, installation, and replacements. The City implemented Cayenta in 2009 and is integrated with the City's financial system (FAMIS), LauderServ (QAlert) online portal, and VersaTerm meter reading system. Water meter read data obtained by Bermex and/or City employees is input to Cayenta through data upload from handheld VersaTerm technology (see Northrop Grumman Technology below). UBO uses this consumption data to generate customer water and sewer bills. Public Works employees use Cayenta to process Customer Service Investigations (CSIs), execute work orders, and perform other tasks to support operational services.

QAlert

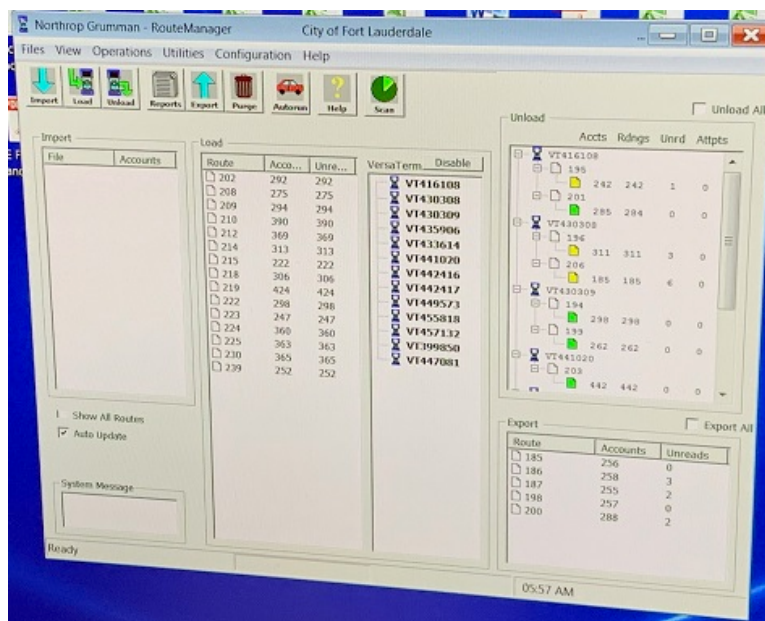
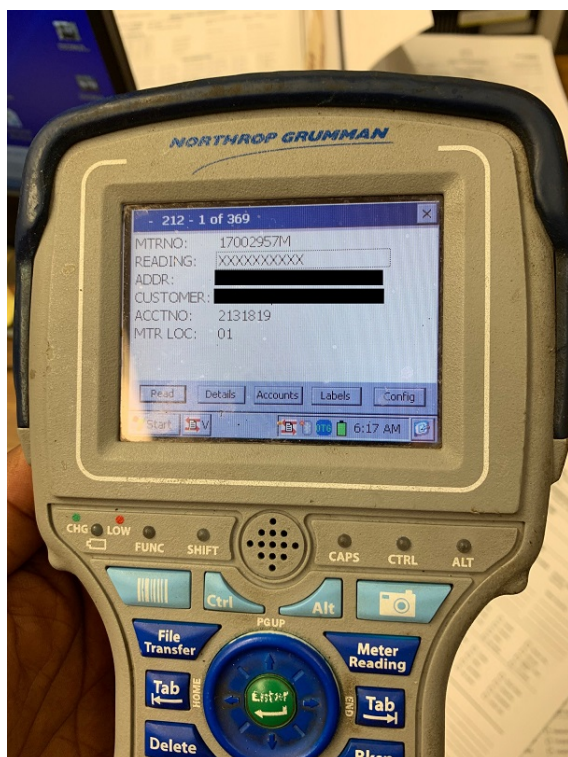
QAlert is an external-facing customer intake system (accessed via LauderServ online) that allows residents and customers to submit a variety of issues directly to the City. Residents can submit requests related to their water and sewer service and billing issues using LauderServ on the City of Fort

Lauderdale website. QAlert interfaces to generate service actions in Cayenta and allows mobile access by City employees and neighbors.

Northrup Grumman Technology

The City provides handheld Northrup Grumman VersaTerm devices (VersaTerms) to Bermex meter readers to allow direct entry of customer consumption in the field. The City loads daily meter reading route data using Northrup Grumman's RouteManager system before providing the VersaTerms to Bermex personnel on a daily basis. The City then downloads data from the VersaTerms to support billing and meter services processes. Exhibit 3.12 illustrates the Northrup Grumman technology used by the City. For further detail on these processes, please see Section 4: Process Review.

Exhibit 3.12 – Images of VersaTerm and RouteManager Technology



Overview of Water and Sewer Bill Calculation

The City provides services for water, sewer, irrigation, stormwater, and sanitation services. The "water" bill includes a range of different charges and methodologies for these services. With all the above services being included on the "water" bill, the bill may be difficult to comprehend and sometimes higher than expected for a typical customer. This section presents a description of the various charges found on a City utility bill and sample calculations to better understand how rates are applied at different usage levels. Because utility bills contain numerous components beyond water charges, throughout this report we may refer to the water components of the utility bill, or other similar language. Additionally, a comparative analysis is provided of residential bills with and without irrigation meters.

Description of Fees/Charges

There are several itemized charges as provided on a typical water/sewer bill. The fee components for multi-family and commercial properties are similar to single family residences but are applied differently.

Exhibit 3.13 as follows provides a sample customer bill.

Exhibit 3.13 – Sample Customer Bill



City of Fort Lauderdale
Municipal Service Bill
100 North Andrews Avenue
Fort Lauderdale Florida 33301-1016

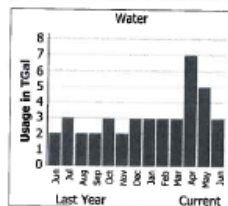
Municipal Services Information	
Water Billing:	954-828-5150
24-Hour Customer Service:	954-828-8000
E-Mail:	customerservice@fortlauderdale.gov
Lobby Hours:	Monday-Friday, 7:30 a.m. to 5 p.m.
Pay Online At:	utilitybilling.fortlauderdale.gov

Account Number	Bill Type	Due Date	Amount Due
	Regular	7/9/19	\$163.58



Customer	
Living Units	1
Period	5/16/19 to 6/13/19
Days	29
Previous Bill	\$172.08
Payments	-\$93.00
Adjustments	\$0.00
Past Due ***	\$79.08
Penalties	\$0.58
Current	\$83.92
Total Due	\$163.58

Service Address: [Redacted]



Description	Meter/Dial	Previous	Current	Usage	\$ Amount
Water Single Family in the City	15003357-M	97	100	3	\$6.96
Water Base (5/8 inch Water meter)					\$7.56
Utility Tax					\$1.45
Sanitation SF 1 Crt Operations					\$32.56
Sewer Single Family City					\$12.30
Stormwater Single Family					\$12.00
Sewer Base City					\$11.09
					\$83.92

Detach and return this stub with remittance - Please make check payable in US funds to CITY of FORT LAUDERDALE - Allow 5 days for mailing			
*** Scheduled termination date for past due: 7/2/2019. Call (954)828-5150 to protest termination. ***			
Account Number	Address Served	Bill Date	Due Date
		Jun 14, 2019	Jul 09, 2019
			Amount Due
			\$163.58

Amount Enclosed \$ [Redacted]

City of Fort Lauderdale
Municipal Services
P.O. Box 31687
Tampa, FL 33631-3687

* DRIVE THRU LOCATION
EAST OF CITY HALL IN PARKING LOT,
A SELF-SERVICE PAYMENT KIOSK IS
AVAILABLE FOR YOUR CONVENIENCE.

OFFICE HOURS:
7:30 AM UNTIL 5:00 PM
MONDAY THRU FRIDAY
CLOSED SATURDAY, SUNDAY AND HOLIDAYS

The key components of a utility bill include the following:

- Water commodity charge – fee per 1,000 gallons from domestic water meter with inclining block structure to encourage conservation. The lowest rate (\$2.32/1000 gal) is often considered in the water industry as a “lifeline” rate for customers that may be low income or small customers with 1 or 2 residents.
- Wastewater commodity charge – fee per 1,000 gallons used with inclining block structure to encourage conservation based on domestic water consumption. A 20,000 gal/mo. maximum is

charged per single family residence to prevent sewer costs that may be attributable to irrigation from domestic water meters.

- Water service availability charge – monthly charge for water system/service availability based on meter size
- Wastewater service availability charge – monthly charge for wastewater system/service availability based on meter size
- Irrigation/Sprinkler commodity charge – fee per 1,000 gallons from irrigation or sprinkler meter with inclining block structure to encourage conservation. A meter equivalency factor is applied to each block based on meter size (see details as follows).
- Water/sewer utility tax – a 10% charge is applied to the total Water and Sewer charges.
- Stormwater fee – residential lots (3 units or less) are charged \$12/unit. Other properties are charged based on per acre basis.
- Sanitation fee – customers receiving City solid waste services are charged a per cart fee (not part of water/sewer utility)

The current rates, effective October 2018, are provided by the City on its website include the following key charges (that are most relevant to residential accounts).

WATER COMMODITY - MONTHLY USAGE CHARGES

		CONSUMPTION	RATE
SINGLE FAMILY (1,000 gallons per month)	BLOCK 1	0 - 3,000	\$2.32
	BLOCK 2	4,000 - 8,000	\$5.12
	BLOCK 3	9,000 - 12,000	\$6.41
	BLOCK 4	13,000 - 20,000	\$8.64
	BLOCK 5	> 20,000	\$12.54

SEWER (WASTEWATER) COMMODITY - MONTHLY USAGE CHARGES

		CONSUMPTION	RATE
SINGLE & MULTIFAMILY RESIDENTIAL (UNITS THAT HAVE SEPARATE METERS)	BLOCK 1	0 - 3,000	\$4.10
	BLOCK 2	4,000 - 20,000	\$9.06
	BLOCK 3	> 20,000	N/A

Single family residences will not be charged a commodity charge for usage in excess of twenty-thousand (20,000) gallons per month per unit.

Water Service Availability Monthly Charges

Meter Size (inches)	Rate
5/8	\$7.56
3/4	\$10.48
1	\$16.36
1 - 1/2	\$31.08

Wastewater Service Availability Monthly Charges

Meter Size (inches)	Rate
5/8	\$11.09
3/4	\$15.81
1	\$25.26
1 - 1/2	\$48.81

SPRINKLER METER COMMODITY MONTHLY CHARGES

		CONSUMPTION	RATE
(1,000 gallons per month X the Meter Equivalency Factor)	BLOCK 1	0 - 12,000	\$6.41
	BLOCK 2	13,000 - 20,000	\$8.64
	BLOCK 3	> 20,000	\$12.54

METER EQUIVALENCY FACTOR	METER SIZE (inches)	FACTOR
	5/8	1
	3/4	1.5
	1	2.5
	1 - 1/2	5

STORMWATER MANAGEMENT MONTHLY CHARGES

CATEGORY I	RESIDENTIAL LOTS/PARCELS (3 OR LESS UNITS)	\$12.00	per unit
CATEGORY II	LOTS/PARCELS OTHER THAN CATEGORY I	\$120.96	per acre
CATEGORY III	UNIMPROVED LAND	\$38.34	per acre

Utility charges under the existing rate structure were initially established in City ordinance for FY2012, then adjusted each year as follows:

- On 10/1/2012 charges shall be adjusted by multiplying the prior year's charge by 6.75%.
- On 10/1/2013, and October 1 of each year thereafter, charges shall be adjusted by multiplying the prior year's charge by 5%.

The Public Works Department is currently conducting an overall water/sewer rate study that is expected to be implemented in October 2019. The revised rate schedule is expected have some changes to the rate design but no increase in overall revenues for FY2020. Average revenue adjustments of 5% are proposed for four subsequent years.

Sample Bill Calculations

KPMG applied the rates presented above to demonstrate how bills are calculated for typical single family residential customers and reviewed bill amounts at different domestic water and irrigation consumption levels. The City website (and bill itself) provides good information to explain the overall bill components and charges. This section dissects the bill to show individual calculations by tier consumption level for typical residential accounts with and without irrigation. KPMG also validated the calculation of residential bills by comparing our calculations to the Cayenta billing system.

The bill calculation for a customer using 6,000 gal domestic water and 10,000 gal irrigation consumption is presented in the example shown in Exhibit 3.14. The Block charges are assigned to each consumption level up to the total gallons used (with higher rates for higher consumption levels). For example, water charges in the example total \$29.88 which includes:

- Service availability charge = \$7.56 for 5/8" meter
- 1st Block: $\$2.32 \times 3,000 \text{ gal} = \6.96
- 2nd Block: $\$5.12 \times 3,000 \text{ gal} = \15.36

The total bill for all charges in this scenario equals \$197/mo. with the water, sewer and irrigation components totaling \$144.55/mo.

Exhibit 3.14**City of Ft. Lauderdale Utility Bill Calculation**

For Customer with 5/8 Meter, Domestic Cons. 6000 and Irrigation Cons. 10000 (gal)

Water Services	Fee/Rate	From	To	Units	\$
Service Availability	\$ 7.56				\$ 7.56
BLOCK 1 0 - 3,000	\$ 2.32	-	3,000	3,000	\$ 6.96
BLOCK 2 4,000 - 8,000	\$ 5.12	4,000	8,000	3,000	\$ 15.36
BLOCK 3 9,000 - 12,000	\$ 6.41	9,000	12,000	-	\$ -
BLOCK 4 13,000 - 20,000	\$ 8.64	13,000	20,000	-	\$ -
BLOCK 5 > 20,000	\$ 12.54	20,000		-	\$ -
Subtotal				6,000	\$ 29.88
Sewer Charges					
Sewer Availability	\$ 11.09				\$ 11.09
BLOCK 1 0 - 3,000	\$ 4.10	-	3,000	3,000	\$ 12.30
BLOCK 2 4,000 - 20,000	\$ 9.06	4,000	20,000	3,000	\$ 27.18
Subtotal				6,000	\$ 50.57
Irrigation Charges					
BLOCK 1 0 - 12,000	\$ 6.41	-	12,000	10,000	\$ 64.10
BLOCK 2 13,000 - 20,000	\$ 8.64	13,000	20,000	-	\$ -
BLOCK 3 > 20,000	\$ 12.54	20,000		-	\$ -
Subtotal				10,000	\$ 64.10
Water Utility Tax	\$ 0.10			30	\$ 2.99
Sewer Utility Tax	\$ 0.10			51	\$ 5.06
Stormwater Charge					
RESIDENTIAL LOTS/PARCELS (3 OR LESS UNITS)	\$ 12.00				\$ 12.00
Sanitation	\$ 32.56			1	\$ 32.56
Water/Sewer/Irrigation Charges Only					\$ 144.55
Total Charges					\$ 197.16

Four different consumption scenarios are calculated to demonstrate how increasing water and irrigation consumption can cause significant increases in monthly bills. Exhibit 3.15 presents sample bill results for these consumption scenarios. As shown in the exhibit, irrigation usage of 25,000 gal/mo. adds \$208/mo. to the bill. Increasing irrigation from 10,000 to 25,000 gal/mo. causes these costs to increase from \$64 to \$208/mo. with the rates increasing from \$6.41 to \$12.54/1000 gal in the highest block.

Exhibit 3.15

Domestic Water & Irrigation Scenarios with Varying Consumption

	Scen#1	Scen#2	Scen#3	Scen#4
Domestic Water Meter	6,000	6,000	6,000	6,000
Irrigation Meter	-	10,000	15,000	25,000
Water	\$ 29.88	\$ 29.88	\$ 29.88	\$ 29.88
Sewer	\$ 50.57	\$ 50.57	\$ 50.57	\$ 50.57
Irrigation	\$ -	\$ 64.10	\$ 102.84	\$ 208.74
Utility Taxes	\$ 8.05	\$ 8.05	\$ 8.05	\$ 8.05
Stormwater	\$ 12.00	\$ 12.00	\$ 12.00	\$ 12.00
<u>Sanitation</u>	<u>\$ 32.56</u>	<u>\$ 32.56</u>	<u>\$ 32.56</u>	<u>\$ 32.56</u>
Total	\$ 133.06	\$ 197.16	\$ 235.90	\$ 341.80
Water/Sewer/Irrig Only	\$ 80.45	\$ 144.55	\$ 183.29	\$ 289.19
% Water/Sewer/Irrig	60%	73%	78%	85%

Cayenta Bill Calculation.

KPMG calculated residential bills (such as those in this section) to validate bills as generated in Cayenta billing system. Using the regular read consumptions from actual bills, a sample of calculated bills were verified as accurate within Cayenta. There are cases where a customer's usage may be manually calculated or adjusted by a billing specialist based on historical records when an auto-estimated bill does not appear accurate or based on updated meter reading data provided by re-reads or other field actions. In such cases, the subsequent actual meter reading will correct over-or-under usage and billing (i.e. credit the customer's account). KPMG identified a specific estimation issue that appeared to overestimate consumption when a customer changed accounts (*see Data and Sampling Analysis section*).

Irrigation Meters

As demonstrated in the previous calculations, bills are significantly affected by amounts of domestic water and irrigation usage that vary among customers and months throughout the year (sewer charges are calculated based on domestic water consumption). Customers that irrigate substantially and do not have a separate irrigation meter can save money on sewer costs by installing one. While water consumed through traditional meters is used to calculate a customer's sewer usage and amount billed, water consumed through irrigation meters does **not** impact sewer usage. The savings are dependent on the average irrigation usage and cost of installing the separate service.

A break-even analysis was conducted to show the number of months (or years) that savings on a water/sewer/irrigation bill could take to recoup costs owed to the City related to installing new City irrigation meter. Based Exhibit 3.16 as follows demonstrates a customer that has 6,000 gal/mo. of normal domestic water consumption and irrigates an average of 5,000 and 25,000 gal/mo. Under Scenario #1 (low irrigation usage), the customer uses 11,000 gal/mo. – 6,000 and 5,000 gal/mo. for domestic water and irrigation, respectively. Potential savings of using the irrigation meter under this scenario are \$50/mo. that recover City meter cost of \$1,267 in 2.1 years. Under Scenario #2 with 25,000 gal/mo. irrigation consumption, the potential savings are \$198/mo. that recover the meter cost in 6 months (0.5 years). Additional costs related to private irrigation system and plumbing are not included here as they can vary significantly among customers and would add to the break-even times depending on the amounts.

Exhibit 3.16 – Break Even Analysis With and Without Irrigation Meters

Irrigation Meter 5/8"		No Irrig.Meter	With Irrig.Meter
#1 Irrigation - Low Usage	Water	11,000	6,000
	Irrigation	-	5,000
	Bill/mo. \$	215.30	\$ 165.11
Savings/mo from Irrigation meter			\$ 50.20
City cost for meter installation			\$1,267
# Mos. To Break Even			25
# Yrs. To Break Even			2.1
#2 Irrigation - High Usage	Water	31,000	6,000
	Irrigation	-	25,000
	Bill/mo. \$	539.81	\$ 341.80
Savings/mo from Irrigation meter			\$ 198.02
City cost for meter installation			\$1,267
# Mos. To Break Even			6
# Yrs. To Break Even			0.5

The City is currently considering the implementation of a program to allow customers to pay off the costs owed to the City for installing an irrigation meter over an extended period of time (i.e. 6-18 months) to reduce up-front costs and encourage customers to add meters to reduce their sewer bills.

Observation 3.6 – Complex Bill Schedules

The water, sewer, and irrigation rate schedules are complex to understand for a typical customer depending on a multiple factors, including usage, meter size, and range of customer account characteristics. Inclining block rates in conjunction with fluctuations in usage, particularly irrigation, can cause wide swings in monthly bills. The existing City website and bill descriptions do not provide adequate explanations of the rate structure or how individual charges are calculated. The utility bill format does provide good information relative to historical consumption patterns which helps explain bill history. The website also provides explanations of the various bill sections and components.

Additional charges for sanitation, stormwater and fire service (as applicable) are included on the monthly utility bill that increase monthly bills and cause customer questions. For low usage bills (e.g., 4,000 gal/mo.), these additional charges may consist up to 50% of the total bill.

Recommendation – The City should develop and promote enhanced collateral to educate customers on the numerous parts of a utility bill, including how block rates are calculated and the inclusion of non-water/sewer charges on the bill.

Observation 3.7 – Usage of Irrigation Meters

Customers that use domestic water meters for irrigation could obtain savings from installation of separate irrigation meters. Customers with high irrigation consumption could realize payback from meter and installation costs in 1-2 years. Customers with lower irrigation usage could recoup meter and installation costs in 3-5 years depending on usage and costs. Some service areas have very low use of irrigation meters (e.g., 4%) when compared to other areas (27%).

Recommendation – The City should continue efforts to educate and encourage customers on the benefits of adding irrigation meters to their accounts, as well as routinely monitoring personal consumption. The City should continue to evaluate the potential to provide payment programs to encourage customers to install irrigation meters.

4. Process Review

Introduction

This section describes key processes and workflow for the following key areas that comprise the in-scope functions of this report:

- Meter Reading
- Billing and Customer Management
- Field Services



We have organized this section based on the typical water metering and billing customer lifecycle to best present and explain the City's current environment related to these processes. This section contains narrative descriptions, supporting data, identified observations, and corresponding recommendations.

Meter Reading



The City measures water consumption in gallons and bills customers in monthly cycles for water, irrigation, storm water, sanitation, and sewer (non-metered) based on the water usage. To bill its customers accurately, the City must have a process to measure water consumption by its customers. The City does so by manually reading water meters.

Water Meter Reading

Unloading Data & Loading Cycles

The Water Meter Reading process begins at the Public Works Department ("PWD") where Northrop Grumman VersaTerms are housed and re-charged in a docking station. VersaTerms are computerized handheld devices that Bermex Field Representatives use to electronically record the water consumption data that they observe on water meter registers. The VersaTerms also store the route schedules (cycles) followed by Bermex Water Meter Readers ('Readers') on a day-to-day basis.

The first step in the meter reading process occurs during the night shift when the Overnight Dispatcher ("Dispatcher") at the PWD charges the VersaTerms and unloads the previous day's read data from the VersaTerms. The Dispatcher unloads the previous day's data from the VersaTerms into Route Manager software via Bluetooth (with a wired option available in case of connectivity issues). Then, either the Dispatcher or the Meter Reading Coordinator ("Coordinator") exports the data out of Route Manager, which creates a text computer file of the previous day's read data, which is reviewed by the Coordinator.

Exhibit 4.1 – VersaTerms Docked for Charging and Data Upload



As data is downloaded, Route Manager generates and automatically prints a variety of reports which, in addition to communicating routine water consumption, catalogs issues with reads. The reports generated for each cycle include:

- Detail Report: detailed report by route displaying water meters and the consumption recorded with high/low ranges and any notes recorded by the meter reader
- Forced Reading Report: if the VersaTerm does not accept an entered read, and the Reader is confident that they are entering the correct numbers, the Reader has the option of "forcing" the VersaTerm to accept the read. Each forced reading is listed on this report
- Reader Remarks Report: Each meter for which the Reader included an explanation for the reading registered
- Unread Meters Report: An accounting for every meter that was not read on a given route
- Work Order Report: Meters that require intervention by PWD staff in order to obtain an accurate reading
- Zero Consumption Report: Meters that registered no consumption. Includes a "remarks" column which allows the reader to make indications such as whether the property is vacant or not

The Detail Report and Forced Reading Report are identical in format. Each communicates:

- Account Number and Address
- Location of the meter at address
- Actual water meter reading entered and date/time of reading
- "High" & "Low" (High/Low) Parameters: Boundaries within which a given reading should fall between based on an account's past usage
- "Force Flag" (FF): Indicates whether a read was made manually or (if made automatically) if the read falls outside of the High/Low parameters
- "Count Changes" (CC): The number of times a reading was entered and/or changed

All reports included in the data file are transferred to Cayenta. The Daily Exception Report most pertinent to the Senior Billing Specialist is the "Daily Exception Report", which is used to flag high/low/missed readings and issue Service Orders for problem reads (e.g. Meter Reread Service Orders – see Rereading). Next, for the current day's meter reads, the Coordinator (or Overnight Dispatcher) uses Route Manager software along with paper copy of route assignments to designate which pre-established routes will go on which VersaTerms. Once loaded onto the VersaTerms, the Coordinator or Dispatcher walks to each device, with paper copy in hand, and checks to make sure the correct routes are loaded on the correct VersaTerm.

At around 6:00 AM, the Bermex Representative arrives at PWD to pick up the VersaTerms and the paper copy of the meter read data. The Bermex Representative returns to the Bermex office and distributes the VersaTerms to the Bermex Water Meter Readers. To help ensure that rereads are performed same-day to facilitate the billing cycle, the Representative reviews the data to identify reads that the City will likely request to be reread based on how far outside of the anticipated consumption target the read was at the same time that he picks up the VersaTerms from the PWD. Based on this analysis, Bermex pre-emptively assigns rereads to the Rereader before formally receiving requested rereads from the Senior Billing Specialist later that morning (see Sending for Reread).

Initial Bermex Water Meter Reading

Bermex's Water Meter Reading Process begins when the Bermex Meter Reading Representative ('Representative') picks up the VersaTerms and a paper copy of the previous day's water meter data reports from PWD at about 6:00 AM.

There are six Bermex Water Meter Readers ('Readers') who begin their work when the Representative returns from the PWD and gives them each their VersaTerm. Each distributed VersaTerm typically has two cycles pre-loaded for a given Reader to complete on a daily basis. To make reads, Readers typically drive to a starting point equipped with multiple items, including:

- Northrop-Grumman VersaTerm: Computerized mobile handheld device that records and stores electronic water meter read data
- Large Screw Driver: Opens water meter boxes; Clears debris out of meter box as needed
- Spray Bottle: Removes debris from odometer as needed

Once the Reader arrives to their assigned area, the Readers park their vehicle and walk the street to make reads. The Reader reads Water Meters in the exact order in which they appear in the VersaTerm, which follows a route schedule programmed by the City. Bermex does not select which meter to read in which order, and meters/addresses may be sequenced out of order. Each account is different, but most residential water meters are located near the street curb or sidewalk at the front of the property in a metal box with a metal or plastic lid.

The Bermex Reader uses a long screwdriver to open the water meter cover, which is typically (but not always) located near the street in front of the associated property. Then, the Bermex Reader observes the water meter register and records the consumption in their VersaTerm, which stores the water meter read data. The Reader observes and inputs the white dial numbers, which represent 1,000 gallon units.

If the water meter register is obscured by debris or buried in sand, the Reader is equipped with a small shovel to remove sand, and a spray bottle to clean debris from the surface of the odometer. If the register's glass surface is scratched such that the Reader cannot observe it, the Reader flags the meter for a PWD Work Order to repair the face of the register. Meters flagged for Work Orders show up on the "Work Order Report" (See "Issuing Work Orders")

As Readers complete their routes for the day, they return to the Bermex office to give their VersaTerm back to the Representative, who, at the end of the day, returns the VersaTerms to the PWD to be re-charged and have the data un-loaded from them the following morning.

Exceptions – Non-Routine Meter Reads

Throughout the course of day, during entry of Meter data, a number of exceptions related to the reading may be flagged by the Reader or automatically by the VersaTerm:

- High/Low: the recorded read is higher or lower than pre-established parameters (Indicated on the *“Detail Report”*)
- Zero Consumption: meter is indicating that no water is being consumed; there is option to add a remark to indicate whether the property is vacant or not
- Missed Read: meter was unable to be read due to a variety of reasons (e.g., car parked over meter, locked gate, etc.) (Shows up on the *“Unread Meters Report”*)
- Forced Reads: Reader entered number that VersaTerm did not accept due to it being outside of preset parameters. In the event of a Forced Read, the VersaTerm will prompt the Reader to review the meter and re-enter. These reads appear on the *“Forced Read Report”*
- Comments: the reader may enter notations (usually an abbreviation such as “NOVAC” when there is zero consumption beep and a property is “not vacant”). If a read requires remarks, it appears on the *“Reader Remarks Report”*

These exception codes are then included in a Daily Exception Report that triggers a Meter Reread Service Order in Cayenta. This report is reviewed by the Senior Billing Specialist at City Hall who coordinates with Bermex to reread the meters with select exceptions the following day.

Rereading (*see also: “Sending for Reread” within Billing and Customer Management*)

After the Representative has distributed VersaTerms to the Readers at the beginning of the day, the Representative works with the Bermex Rereader to review the paper copy of the previous day’s read reports to identify readings that will likely appear on the City’s Daily Exception Report, and thus require a reread. Bermex identifies these anticipated rereads to begin the process of conducting rereads earlier in the day to help ensure that all possible reads are captured in a timely manner to maintain the billing cycle cutoff times.

The Representative assigns likely rereads to the Re-Checker, who then departs the Bermex office to make anticipatory rereads. At around 10:00 AM, the Representative retrieves hard copy Meter Reread Service Orders from the Senior Billing Specialist at City Hall. These Reread Service Orders are compiled by the Senior Billing Specialist using the previous day’s Daily Exception Report.

Exhibit 4.2 – Meter Reread Service Order

ACTION Meter Reread		Service Order # 2,687,635																													
Priority No																															
MISCELLANEOUS INFORMATION																															
Created By: PAULETTE	Location Class: Single Family Residential	Created On: 04/22/2019	Cycle/Route/Seq: 15/176/2010																												
CSR Comments:		Scheduled Date: 4/22/19																													
ACCOUNT INFORMATION																															
Customer: [REDACTED]	Telephone: [REDACTED]	Account Number: [REDACTED]																													
Address: [REDACTED]																															
ALERTS																															
SERVICE / METER / ASSET INFORMATION																															
Location No: 3045352	Location Info: 01	Install Date: 01/28/2016	Register: Single																												
Service Type: WATER	Status: ON	Dials: 4	Decimals: [REDACTED]																												
Meter #: 16000485	Size: 5/8 inch Water meter	Multiplier: 1																													
Meter Reading By:																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>DATE</th> <th>READ</th> <th>USAGE</th> <th>READ TYPE</th> </tr> </thead> <tbody> <tr> <td>4/18/19</td> <td>200</td> <td></td> <td>RR</td> </tr> <tr> <td>3/19/19</td> <td>201</td> <td>1</td> <td>RR</td> </tr> <tr> <td>2/18/19</td> <td>200</td> <td>0</td> <td>RR</td> </tr> <tr> <td>1/23/19</td> <td>200</td> <td>0</td> <td>RR</td> </tr> <tr> <td>12/19/18</td> <td>201</td> <td>1</td> <td>RR</td> </tr> <tr> <td>11/16/18</td> <td>200</td> <td>0</td> <td>RR</td> </tr> </tbody> </table>	DATE	READ	USAGE	READ TYPE	4/18/19	200		RR	3/19/19	201	1	RR	2/18/19	200	0	RR	1/23/19	200	0	RR	12/19/18	201	1	RR	11/16/18	200	0	RR	☐ NO CHANGE ☐ REMOVED ☐ INSTALLED ☐ REREAD		
DATE	READ	USAGE	READ TYPE																												
4/18/19	200		RR																												
3/19/19	201	1	RR																												
2/18/19	200	0	RR																												
1/23/19	200	0	RR																												
12/19/18	201	1	RR																												
11/16/18	200	0	RR																												
		Meter Number	Meter Reading <i>200</i>																												
			<i>1M</i>																												
			<i>1M</i>																												
FIELD OBSERVATION																															
☐ City Leak	☐ Private Leak	☐ No Leak	☐ Broken Valve																												
☐ Broken Top	☐ Stop Meter	☐ Meter is Off	☐ No Tampering																												
☐ Insects	☐ Low Meter	☐ Bad Dog	☐ Covered Meter																												
☐ Stolen Meter	☐ Straight Pipe	☐ Locked Gate	☐ Old Meter																												
☐ Tampering	☐ Faded Dials	☐ Inactive	☐ Broken Box																												
☐ Water in Box	☐ Other	☐ Vehicle Over Meter	☐ Misread																												
☐ No Meter	☐ Occupied																														
FIELD RESOLUTION																															
☐ Left Notice	☐ Replaced Box	☐ Replaced Top	☐ Replaced Meter																												
☐ Raised Box	☐ Turned Off	☐ Turned On	☐ Replaced Valve																												
☐ Gaskets	☐ Correct Read	☐ Moved Meter	☐ Pumped Box																												
☐ Meter Nipple	☐ Adjusted Box	☐ Called Locates	☐ Schedule																												
☐ Cut Bushes	☐ Valved	☐ Already On	☐ Already Off																												
☐ Raised Meter	☐ Locked	☐ Read Meter																													
☐ Pulled Meter	☐ Other	☐ Customer																													
☐ Not Located	☐ Cancelled	☐ Completed																													
☐ Cleaned Box	☐ No Action	☐ Order Out																													
☐ Off at HV																															
Field Notes																															
Comments: <i>Was Read.</i>																															
Completed Crew# <i>CA</i>		Date: <i>04/22/19</i>																													
Start Time		Finish Time																													

The Representative provides the Meter Reread Service Orders to the Bermex Rereader once the Rereader has returned from making anticipatory rereads. There is one assigned Rereader; however, the Representative may help with rereads should volume necessitate their doing so. Unlike current day reads, rereads are recorded on paper directly onto the Meter Reread Service Orders (see Exhibit 4.2). Once these paper copies are filled out with details about the reread, the Representative returns the Meter Reread Service orders in-person to the Senior Billing Specialist at City Hall.

Observation 4.1– Initial Meter Read Processes in Line with Industry Standards

KPMG observed the initial meter read processes performed by the City and Bermex and did not identify significant deficiencies in how the processes were performed. The processes both entities use to support the initial meter read are consistent with industry standards given the analog meters currently used by the City. During the initial meter read process, Readers do not have access to the account's historical consumption data, making falsifying a read difficult without triggering an exception.

Recommendation – N/A

Observation 4.2 – Manual Data Entry

While meter reading processes are commercially reasonable given the City's current analog technology, manual data entry inherently increases risk of human data entry errors.

Recommendation – The City should continue with its planned conversion to Advanced Metering Infrastructure, which would remove the risk of human data entry from the meter reading process, provide customers with greater assurance that bills are accurate, and free up City resources to perform more value-add activities than confirming analog meter read accuracy.

Observation 4.3 – Potential Control Weakness in Rereading Process

Meter Reread Service Orders provided to Bermex include recent historical consumption data for the requested account. Using this data, a Bermex employee could theoretically record a false read to ensure that Bermex receives the \$0.66 charge from the City for completing a read. However, this potential control weakness is mitigated by a number of factors to the point that there is a high likelihood that there has been no material impact to the City or customers. These factors include:

- Because Bermex meter readers do not have access to the consumption data during the initial read, and Bermex does not typically receive the Meter Reread Service Orders until approximately 10 AM the day after meters are initial read, the window of time during which Bermex has access to the data is small enough to mitigate against the likelihood of a bad actor conceivably falsifying a read
- If a read was falsified, the following month's read could reveal that the read was an error by being lower than the false read. The City's penalties for Bermex's performance (\$10 per error above a certain monthly threshold) greatly outweigh the \$0.66 to be gained by falsifying a read

KPMG did not identify any instances where Bermex intentionally falsified a read using historical consumption data.

Recommendation – The City should work with Cayenta to remove historical consumption data from Meter Reread Service Order reports.

Billing and Customer Management



Water meter billing is a critical part of the City's overall management and oversight of the effective delivery of water to its citizens. Sound billing and customer management processes enable effective revenue realization, management, and a positive customer service experiences. The following section documents and provides observations and recommendations regarding the following key relevant process areas:

- Water Billing Processes
- Billing, Issuance, and Collection of Service Charges
- Customer Service

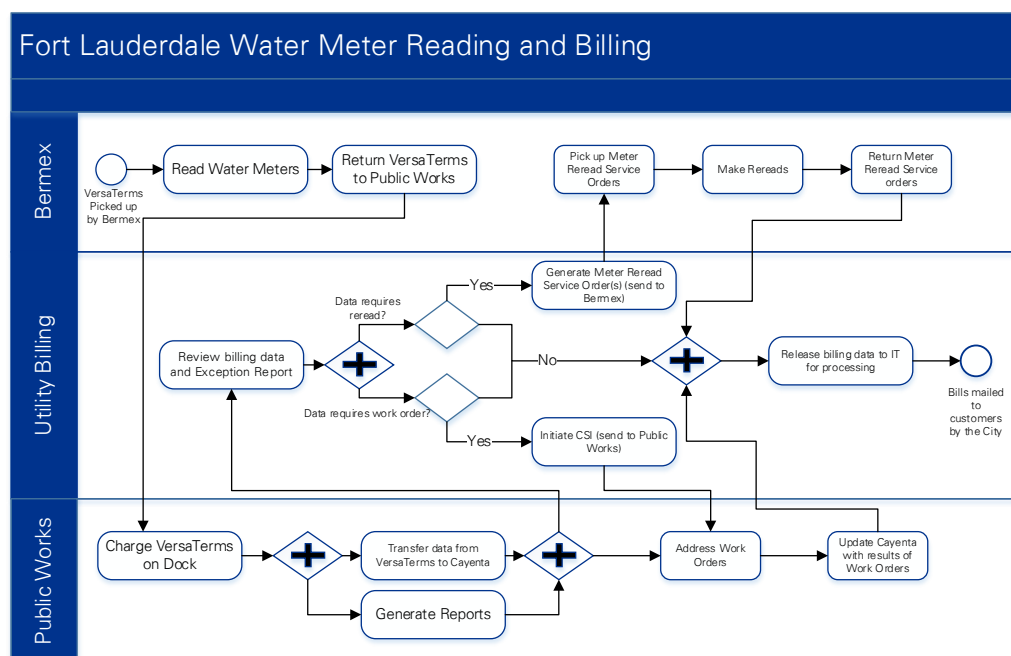
Water Billing Processes

The Water Billing Process is largely performed by the Senior Billing Specialist ("Specialist") working in conjunction with inputs from the Public Works Department ("PWD") and the third party water metering vendor, Bermex. This section presents a process narrative of how the Specialist converts the inputs from the PWD and Bermex into water charges on utility bills for residents of Fort Lauderdale. Specifically, this section includes the following components of the Water Billing Process:

- Exceptions
- Work Orders
- Routine Billing Processes
- Credits

This Billing Process begins in the morning at City Hall where the Specialist retrieves prior day's billing cycle data ("Data") from Cayenta, which was uploaded by Meter Reader Coordinators (or Overnight Dispatcher) at the PWD. The first task for the Specialist is to review the "Daily Exception Report". Exhibit 4.3 as follows provides a high level overview of the Billing Process workflow between City departments and Bermex.

Exhibit 4.3 – Billing Process Flow



Exceptions

The "Daily Exception Report" is a compilation of all exceptions from the previous day's reads. Exceptions are water meter reading issues that could potentially impact accurate billing. They originate during the actual reading process when a Bermex Meter Reader enters a meter's consumption numbers into their VersaTerm. If an issue exists with the numbers entered (or no numbers are able to be entered at all) that read is flagged in the stored data as an "Exception" and placed on the report for the Specialist to review the following day. Potential issues include:

- High Reading: The recorded read is higher than pre-established high/low parameters
- Low Reading: The recorded read is lower than pre-established high/low parameters
- Missing Read: No read recorded (possibly due to locked gate or car parked over meter)

Exhibit 4.4 – Sample Daily Exception Report

Daily Exception Report									
HILO_EXCEPTION_CD	ACCOUNT_NO	LOCATION_NO	SERVICE_TP	CYCLE_CD	ROUTE_NO	READ_DTM	READ_TP	READ_AMT	HILO_EXCEPTION_DESC
LO	2140603	3146257	IRRIG	15	178	Apr 19, 2019 8:30:41 AM	RR	109	Low Reading
Summary: 50									
MISRD									
MISRD	2132543	3044087	WATER	15	176		RR		Missing Read
		3044545	WATER	15	176	Apr 22, 2019 12:00:00 PM	RR	30	Missing Read
	2043189	3045368	WATER	15	176		RR		Missing Read
	2043689	3045818	WATER	15	177		RR		Missing Read
	2043777	3045896	WATER	15	177		RR		Missing Read
	2044485	3046506	WATER	15	183		RR		Missing Read
	2044504	3046523	WATER	15	183		RR		Missing Read
	2135639	3047078	WATER	15	189		RR		Missing Read
	2046236	3048061	WATER	15	182		RR		Missing Read
	2046339	3048154	WATER	15	182		RR		Missing Read
	2046349	3048164	WATER	15	182		RR		Missing Read
	2095192	3049566	WATER	15	182		RR		Missing Read
	2090098	3049660	WATER	15	190		RR		Missing Read
	2048110	3049756	WATER	15	190		RR		Missing Read
Summary: 14									
MRORD									
MRORD	2132026	3044279	WATER	15	178	Mar 20, 2019 11:00:00 AM	CUTOF	450	Meter Read Re-Order
	2131684	3045809	WATER	15	177	Mar 19, 2019 11:00:00 AM	CUTOF	693	Meter Read Re-Order
	2144765	3046691	WATER	15	191	Apr 16, 2019 3:25:00 PM	CUTON	442	Meter Read Re-Order
	2144387	3047309	WATER	15	188	Mar 29, 2019 12:50:20 PM	CUTON	4	Meter Read Re-Order
	2094519	3048597	WATER	15	197	Apr 1, 2019 11:30:00 AM	CUTON	838	Meter Read Re-Order
	2047962	3049631	WATER	15	182	Mar 20, 2019 11:00:00 AM	CUTOF	0	Meter Read Re-Order
Summary: 6									
RDATE									
RDATE	2141333	3044013	WATER	15	176	Mar 14, 2019 1:17:00 PM	RR	102	Read Date <= Last Billed Read Date
	2132026	3044279	WATER	15	178	Mar 12, 2019 9:55:00 AM	RR	450	Read Date <= Last Billed Read Date
	2121892	3044378	WATER	15	178	Mar 13, 2019 2:14:00 PM	RECNP	0	Read Date <= Last Billed Read Date
	2043893	3045998	WATER	15	177	Mar 7, 2019 1:35:00 PM	RECNP	1,237	Read Date <= Last Billed Read Date

Apr 22, 2019

8

8:11:29 AM

As the Specialist reviews the Daily Exception Report, they have several options as to how to individual exceptions on it are handled. These options include:

- Sending for Rereads
- Issuing Work Orders
- Releasing As-Is

Sending for Reread

The most pertinent of these options is for the Specialist to identify those flags that will require a reread. A Bermex Representative retrieves Meter Reread Service Orders ("Service Orders") at around 10:00 AM. Service Orders (See Exhibit 4.2 in Meter Reading section) are given to a designated Bermex Rereader who verifies the reads designated on them. The read is verified or updated by indicating the reading observed and there are options for elaboration via check box for Field Observations, Resolutions, and Notes.

Once rereads are completed, the Bermex Representative returns the Orders to the Specialist at City Hall (typically in the afternoon) for the accounts to be updated. This task is completed by the end of the Specialist's shift and before bills are submitted for final processing and printing. As part of processing these corrections, the Specialist will perform some or all of the following tasks:

- Enter reread meter data (if corrected during the Meter Reread Process)
- Process estimated read for billing (if no meter read is made)
- Review billing & payment history (as needed)
- Review service order histories (as needed)
- Generate letters to customers (in the event of no meter read reads or a read indicated high consumption and/or a leak)
- Generate CSI or other work order for repetitive billing issues

If rereading (or a CSI) resolves the issue with the initial read, when the corrected read is entered into Cayenta, the Specialist marks the account as "reviewed" in Cayenta, so the IT Department, when processing bills, knows that the issue with the read has been addressed. The Specialist also has the option to enter comments onto the account if the Rereader has provided any (e.g., read confirmed).

As indicated above, sometimes rereading the meter does not resolve the issue with the initial read. In this case, or in other cases where repetitive problems with an account have occurred, the Specialist has the option to follow-up by opening a Work Order for Public Works Meter Reader/Service Workers (MR/SW) to verify reads or ensure that a meter is accessible and functioning properly.

Issuing Work Orders

Work orders, such as Customer Service Investigations (CSI's), can be generated by customers, Meter Read Coordinators at the PWD, or by the Senior Billing Specialist. The Specialist generates work orders while reviewing flagged reads in the Daily Exception Report, or after rereads if the reading still appears to not be correct. For example, the Specialist might issue a work order for the following reasons:

- Meter reread, but reading is still abnormal; i.e. read is inconsistent with recent history of account
- Multiple Consecutive Estimates
- Residence is occupied, but meter showing zero consumption

Work Orders (Exhibit 4.5) are issued by the Specialist to the Meter Read Coordinators at the Public Works Department via Cayenta. Meter Read Coordinators then dispatch Meter Reader/Service Workers to address the Work Order (*see Meter Reading section*), and report the results back to the Specialist. The Specialist can then update accounts with the results of the Work Order. Each time the Specialist updates an account, just as was done with rereads, the Specialist flags the account as "Reviewed" in Cayenta for the IT team to see that the read has been verified.

Ranking
5/23

Releasing As-Is

Estimating Consumption

In the event of multiple consecutive estimates for an account (i.e., if a parked vehicle, excessive vegetation, or a gate prevents access to the meter box for an extended period of time), the Specialist will issue a letter informing the customer and requesting that the meter box be made accessible. While the City and Bermex seek to avoid instances of using consecutive estimates, each party is limited in its ability to address the issue.

Observation 4.4 – Over-Reliance on Key Personnel

A single position within the UBO (Senior Billing Specialist) is responsible for a significant portion of managing Exceptions processes in order to ensure that bills are processed as accurately and timely as possible. This employee is highly seasoned and possesses significant institutional knowledge. While the UBO has cross-trained additional staff that can substitute for the Specialist in event of absence, the assignment of this degree of responsibility on a single employee increases risk of institutional knowledge loss and inability to maintain continuity of operations.

Recommendation – The City should identify opportunities to ensure that the UBO maintains institutional knowledge, particularly as the City moves towards AMI, by enhancing desktop procedures and continuing to cross-train employees within the UBO.

Observation 4.5 – Limited Human Controls Over Estimates

Estimates for instances in which the City is not able to obtain an actual meter read are automatically generated in Cayenta, according to a programmed estimate calculation that should determine a twelve month average of actual consumption (tied to the history of the location and not necessarily to the current account holder). During exception processing, UBO staff typically (but not always) review the Cayenta-generated estimate against actual consumption history as provided on a meter reread service order. City processes and procedures do not require manual confirmation of all estimate calculations. As part of our data analysis, KPMG identified an instance in which Cayenta calculated an average for a new customer account that did not reconcile with the location's previous twelve months of actual consumption history (See Data and Sampling Analysis section).

Recommendation – The City should add a process by which estimates calculated in Cayenta are confirmed to be in line with verified consumption history. The City should also work with Cayenta to understand and address issues with estimate calculation programming for new accounts.

Billing, Issuance, and Collection of Service Charges

Once Work Orders are issued, the Meter Reread Service Orders are returned by the Bermex Representative, and the Senior Billing Specialist has made the requisite corresponding corrections on the accounts, they can then release the Daily Route Data to the Information Technology Department (IT), where it is processed for release the next day.

After billing data is processed by IT, personnel in the City Hall mailing room issue bills to residents. Personnel print, stuff, and mail bills to residents from City Hall. Residents can pay their bills via a kiosk at City Hall, mailing in payment, or in person at the billing counter at City Hall.

Observation 4.6 – Billing, Issuance, and Collection of Service Charges Processes in Line with Industry Standards

KPMG observed Billing, Issuance, and Collection of Service Charges processes performed by the City and Bermex and did not identify significant deficiencies in how the processes were performed. KPMG compared generated billing amounts to a KPMG-developed billing model that incorporated identified consumption and the City's billing methodology and rate structure, KPMG did not identify instances in which actual amounts billed to customers did not match modeled billed amounts based on identified consumption.

Recommendation – N/A

Customer Service

The Utility Billing Office (UBO) is responsible for performing customer service for the City's water and sewer services. A combination of Billing Specialists and Customer Service Representatives (collectively referred to in this section as "Representatives") within the UBO provide customer-facing service through multiple avenues:

- Via phone through a call-in number provided on the City website and on utility bills
- In person at City Hall
- Online through email and through customer complaints via the QAlert/LauderServ

UBO Representatives perform a variety of activities in response to customer inquiries, including account set-up/activation, disconnection requests, balance inquiries, customer complaints, and requests for service related to potential account errors and anomalies. Upon initiating contact with a customer, Representatives request identifying information (account number and/or service address) to access the customer's account in Cayenta. Cayenta provides access to the customer's account history, including consumption and billing history, history of customer service interactions, and service requests. Representatives can also access QAlert to track service request history and identify if specific requests are closed, or at what stage in the process the request is. Representatives typically add notes to the customer's account history, providing a brief summary of each interaction to help facilitate future customer interactions.

There are a variety of customer service interactions, such as payment and collections, which are outside the scope of this review. The following subsections detail typical approaches KPMG observed related to two primary customer service processes included in this review relevant to the City's water meter reading and billing activities and scope of this review:

- Service Requests and Account Error Resolution
- Credits and Adjustments

Service Requests and Account Error Resolution

Customers can contact the City in regards to potential issues with their account or meter infrastructure. For example, a customer may contact the City to request that the City to inquire about a high water charge on their utility bill. A Representative typically would access the customer's history in Cayenta and identify the last meter read for the account. The Representative can then submit a Maintenance Request in Cayenta, which creates a Customer Service Investigation for a meter reread through Public Works. These rereads are performed by Public Works Meter Services staff, not Bermex. These requests typically take between seven to ten business days to complete; due to backlog and manual paper-based processes used by Public Works to perform these actions, performing the rereads may take longer.

In the event that an erroneous read is identified through a reread, the UBO will update the Customer's consumption history and apply a credit the customer's account that corresponds to the correct consumption amount. In the event that no error is identified, but a large amount of consumption is identified that may qualify for an account credit, the Representative can assist the customer to request a Credit (see Credits below).

Credits

Credits are adjustments to utility bills. There are three types of Credits that the City of Fort Lauderdale offers: Leak, Unusual Consumption, and Pool. Requirements for obtaining each is governed by City Ordinance and instructions to obtain them are on the City of Fort Lauderdale Utility Billing website. Upon a customer submitting a request for a credit, a Representative can set an alert on the account in Cayenta indicating that the customer is in the process of applying for the credit. In addition, the Representatives prints a hardcopy form, which is provided to the employee that typically processes the type of credit requested. Supporting documentation provided by the customer can be attached to the account,

providing a timeline for anticipated resolution in the event the customer requests a status update. The alert will typically flag the account for a period of three months.

- Leak Credit Adjustment – Customer must:
 - Submit to the UBO a sworn, notarized affidavit formally requesting a Leak Credit Adjustment
 - Submit to the UBO a written statement or copy of a bill from a licensed plumber on company letterhead stating where the water leak was in the customer's system and declaring that the leak has been repaired with the date repairs were completed
 - Wait for a period of two months after the leak has been fixed to allow the City to confirm that consumption returned to account's historical levels of consumption
 - Pay in full all associated bills resulting from the leak (or make payment arrangements with UBO)
- Unusual Consumption Credit – Customer must:
 - Submit a sworn, notarized affidavit attesting that the customer knows of no reason for the high consumption
 - Submit a written statement or copy of a bill on company letterhead from a licensed plumber stating that the property has been checked for leaks and none were found
 - Have the meter tested for accuracy. Meter Reader/Service Worker (MR/SW) will remove the meter, replace it with a new one, and have the old meter tested at the Public Works Department. The resident is allowed to witness the testing and, if the meter is accurate, the resident will be charged
 - Wait for a period of two months after the leak has been fixed to allow the City to confirm that consumption returned to account's historical levels of consumption
- Pool Sewer Credit – Customer must:
 - Pay sewage charges
 - Submit a signed statement by a contractor with a valid occupational license (or the property owner) indicating the dimensions of the pool, how many gallons are required to fill it, and the date that the pool was filled
 - Replace more than 75% of the pool water
 - Applicants with average water usage per month over 20,000 gallons (for a single-family residence) and 8,000 gallons (for a multi-family residence) are ineligible for the Pool Sewer Credit

The Customer Service Representative fielding the request informs the applicant of the requirements and process outlined above. Once all requirements for a Credit are met, the Credit is processed:

- Leak Credit Adjustments are administered by a Senior Customer Service Representative working from the Public Works Department
 - Leak Credit Adjustments are calculated by applying the rate of the applicant's 12-month average consumption to the higher bills caused by the leak
 - There are typically 40-60 Leak Credit Adjustments processed per week and the timeline to process them is about 2 bill cycles/months
- Unusual Consumption Credits are administered by a Senior Customer Service Representative working from City Hall
 - Unusual Consumption Credits are applied by reducing the applicant's wastewater commodity charge to a rate equal to the applicant's previous 12-month average consumption rate
 - There are typically 10-12 Unusual Consumption Credit requests per month and they take 2-3 bill cycles/months to process

- Pool Sewer Credits are administered by a Senior Accounting Clerk working from City Hall
 - Pool Sewer Credits are applied to the sewer portion of the high bill
 - The City typically receives approximately eight requests for Pool Sewer Credits per cycle/month

Typically, residents must initiate the process of obtaining a Credit by contacting Utility Billing & Collections customer service via phone or email. One exception is that if a leak is discovered during a CSI, the City will mail instructions to receive a Leak Credit Adjustment directly to the resident. The above information about credits is summarized in Exhibit 4.6 as follows.

Exhibit 4.6 – Summary of Available Credits

	Leak Credit Adjustment	Unusual Consumption Credit	Pool Sewer Credit
Administration	• Administered by a Senior Customer Service Representative working from City Hall • 40-60 requests per week • 2 bill cycles/months process time	• Administered by a Senior Customer Service Representative working from City Hall • 10-12 requests per month • 2-3 bill cycles/months process time	• Administered by Senior Accounting Clerk working from Public Works Department • 8 requests per month • GAP: Pool Credit Process Time
Requirements	Applicant must: • Submit sworn notarized affidavit formally requesting a Leak Credit Adjustment • Submit a written statement or copy of a bill from a licensed plumber on company letterhead stating where the water leak was in the customer's system and declaring that the leak has been repaired with the date repairs were completed • Pay in full all associated bills resulting from the leak (or make payment arrangements)	Applicant must: • Submit a sworn notarized affidavit attesting that the customer knows of no reason for the high consumption • Submit a written statement or copy of a bill on company letterhead from a licensed plumber stating that the property has been checked for leaks and none were found • Have the meter tested for accuracy.	Applicant must: • Pay sewage charges • Submit a signed statement by a contractor, or the property owner, indicating the dimensions, gallons, and date filled of pool • Replace more than 75% of the pool water • Applicants with avg. water usage/month over 20,000 gallons (single-family residence) and 8,000 gallons (multi-family residence) are ineligible
Application	Calculated by applying the rate of the applicant's 12-month average consumption to the higher bills caused by the leak	Applied by reducing the applicant's wastewater commodity charge to a rate equal to the applicant's previous 12-month average consumption rate	Applied to the sewer portion of the high bill

Observation 4.7 – Relief Options Provided to Customers

In addition to adjustments in the event of erroneous consumption charges, the City provides multiple avenues for customers to seek relief in the event of large instances of actual confirmed consumption. By offering Leak, Pool, and Unusual Consumption credits, the City helps customers mitigate the financial impact of one time spikes in consumption to the extent allowable under City ordinances and bond agreements.

Recommendation – The City should continue to make customers aware of these credit programs in instances of large isolated consumption incidents. The City should evaluate options to provide status notifications to customers after submission of the adjustment application and supporting documents. Cayenta provides the capability to create alerts for credit applications and could be used provide status updates via letter, email, text or online application. Such information could also be integrated with the City's online customer billing account.

Field Services



This section discusses the various responses to billing exceptions and other issues by the Meter Services group within the Public Works Department and the City's meter reading contractor, Bermex. KPMG reviewed Cayenta's service order data for the past three years as provided by the City. Detailed data for individual accounts was provided that included service types, actions, resolutions, and dates that could be linked to the billing data for the account or location. The key processes and data elements reviewed include the following:

- High/Low exceptions (Meter Rereads)
- Customer Service Investigations (CSI's)
- Turnoff for Non-Payment
- Meter maintenance, replacements, and testing

High/Low Exceptions and CSI's

Meter Rereads and Customer Service Investigations (CSI's) are two key services provided upon identifying a meter reading/consumption issue. Typically, a reread is conducted initially based on High/Low exceptions received from meter readings, and then a CSI may be completed as follow-up investigation.

- Meter Rereads –high/low/no read exceptions trigger a meter reread which are conducted by Bermex and/or Meter Services staff usually the day after the initial reading cycle and before data is submitted for billing. The exception is based on a current meter reading that is outside a "normal" range for that customer based on prior actual readings and parameters set within Cayenta system. Reread exceptions also include a skipped or missing read or a reading outside the billing cycle date.

- Customer Service Investigations – conducted by Public Works Meter Services staff to review and document consumption issues in more detail as initiated by requests from customer or billing specialists (after one or more rereads).

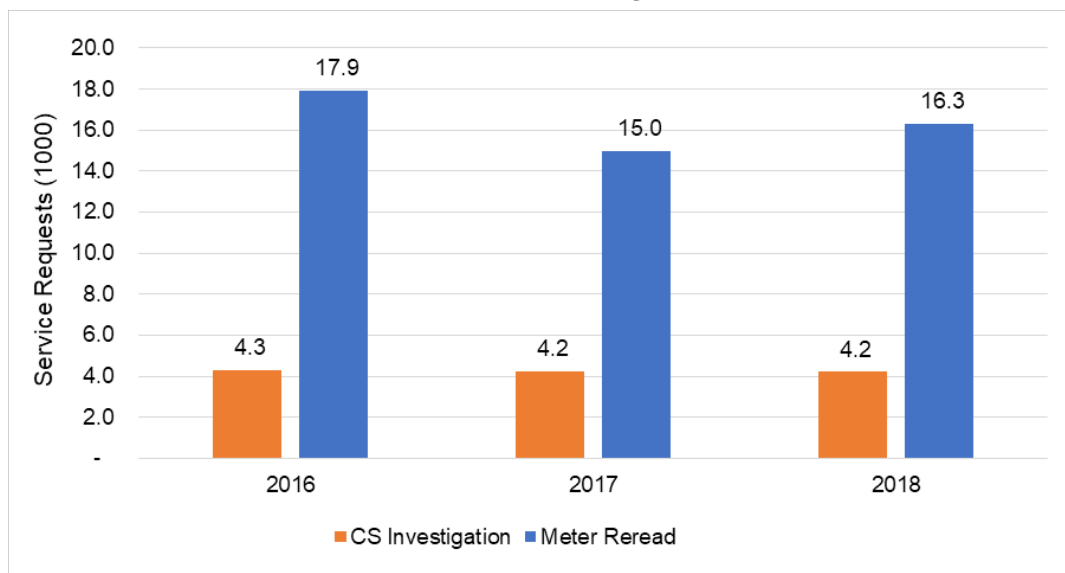
Every morning, the Senior Billing Specialist (“Specialist”) reviews the high/low exceptions and generates a list of accounts to reread by Bermex (or Public Works staff). During the initial review, if the Specialist observes that an actual read is close to the high/low range and recent usage history, they may accept the read and release it for billing. To conduct a reread, individual service action forms are generated in Billing, provided back to Bermex, reread in the field and manually completed by the meter reader, provided back to Billing and then updated in Cayenta by the Specialist. *(For additional information on this process, please refer to the Meter Reading section)*

High/low parameters are configured within the Cayenta system based on customer service types (e.g. Water or Irrigation) and factors established during system implementation in 2009. The high/low calculations are applied during each bill cycle to an individual account’s usage history to determine the consumption range to compare with the actual reading.

Exhibit 4.7 presents the number of meter rereads from High/Low exceptions as well as CSIs conducted over the past three years. The 16,300 rereads conducted in 2018 represent 2.6% of the over 625,000 bills processed during the year. Processing of exceptions presents a major, routine work effort for Meter Services staff to conduct the rereads and billing specialists to individually process them.

City staff indicated that the number of high/low exceptions has increased over the past 6 months and thought it may be related to a system update provided by Cayenta in the fall of 2018. A review of monthly and annual data indicates 8%-9% increase in high/low exceptions between 2017 and 2018. The specialist also indicated that the high/low settings within Cayenta were established when the system was deployed in 2009 and has not be adjusted since. KPMG requested and received from Cayenta documentation for the methodology and specific configuration and calculation of high/low ranges. The methodology uses a number of factors including the customer’s prior actual consumption and the type of customer and meter size.

Exhibit 4.7 – Field Service Investigations and Rereads



As shown in Exhibit 4.8 as follows, the number of high/low exceptions have declined since 2015, which averaged 82/day compared to 70/day in 2018. The number of exceptions can vary significantly by day, with the highest ranging from 128/day (in 2017) to 176/day (in 2015). With the average reads being 3,070 per day, exceptions range from 2.3%-2.7% of total reads (average) and 4.5%-5.7% of all reads on high days.

Usage for an account may often be repetitively low or high creating multiple exceptions in a row or during a period. These may result from temporary vacancies with low/no usage or a dry period requiring additional irrigation. Customer service inquiries relating to bills may also trigger a meter reread as well as other service orders such as a CSI or meter test (particularly if read history shows multiple exceptions).

Exhibit 4.8 – Average Daily High/Low Exceptions

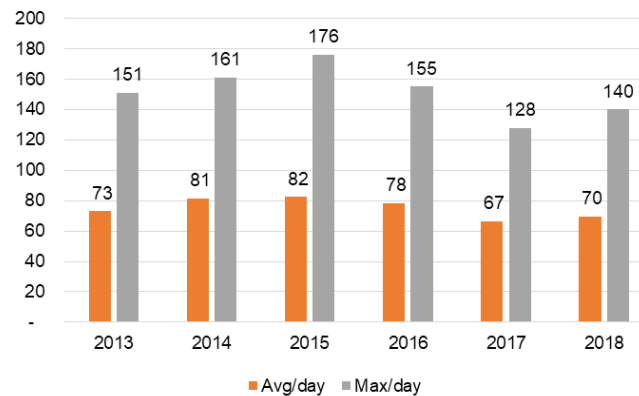


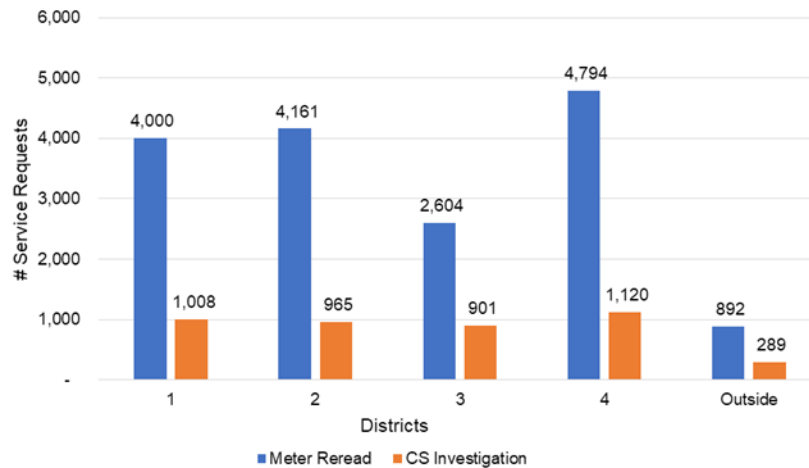
Exhibit 4.9 as follows demonstrates that a large portion of High/Low exceptions are generated multiple times for individual customers. Approximately 3,000 accounts generated two or more High/Low exceptions in 2018 (8,584 representing 53% of 16,300 total). The number of multiple CSIs per account is lower, with 939 CSIs in 2018 (22% of 4200 total) with two or more per account.

Exhibit 4.9 – Accounts with Two or More High/Low Reads (2018)

Hi/Low Exceptions and CSI's > 2 (2018)				
	Hi/Low		CSI	
# Issued	#Accts	#Hi/Lo	#Accts	#CSI's
2	1,937	3,874	398	796
3	526	1,578	26	78
4	238	952	15	60
5	108	540	1	5
6	60	360		
7	39	273		
8	33	264		
9	20	180		
10	15	150		
>10	23	413		
Total	2,999	8,584	440	939

The frequency of meter reread exceptions by District during 2018 is presented in Exhibit 4.10. As shown, Districts 1, 2 and 4 have 4,000-5,000 exceptions and District 3 has a lower amount with 2,600 exceptions during the period. As discussed previously, Districts 1, 2, and 4 have properties with higher consumption levels and greater use of irrigation meters which can trigger high/low exceptions. The number of CSI's are similar among districts ranging from 900-1100 per year.

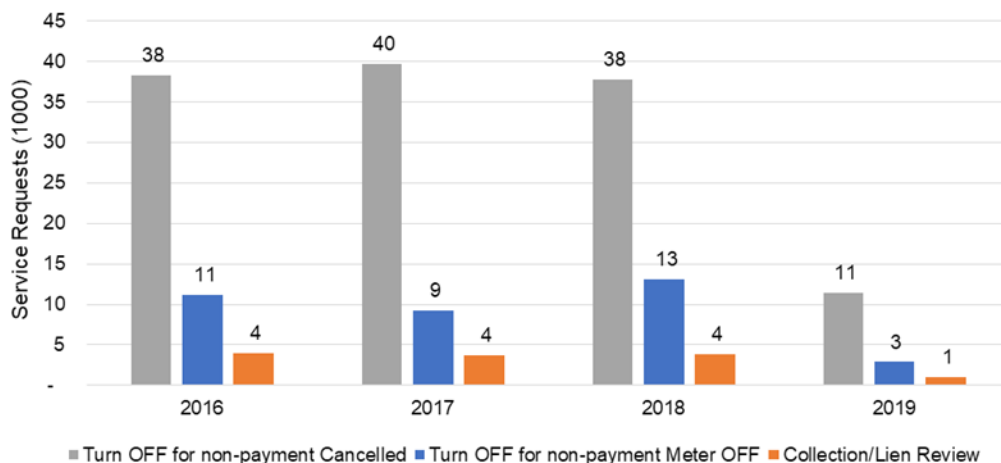
Exhibit 4.10 – Meter Rereads and CSIs by District (2018)



Turn Off Services

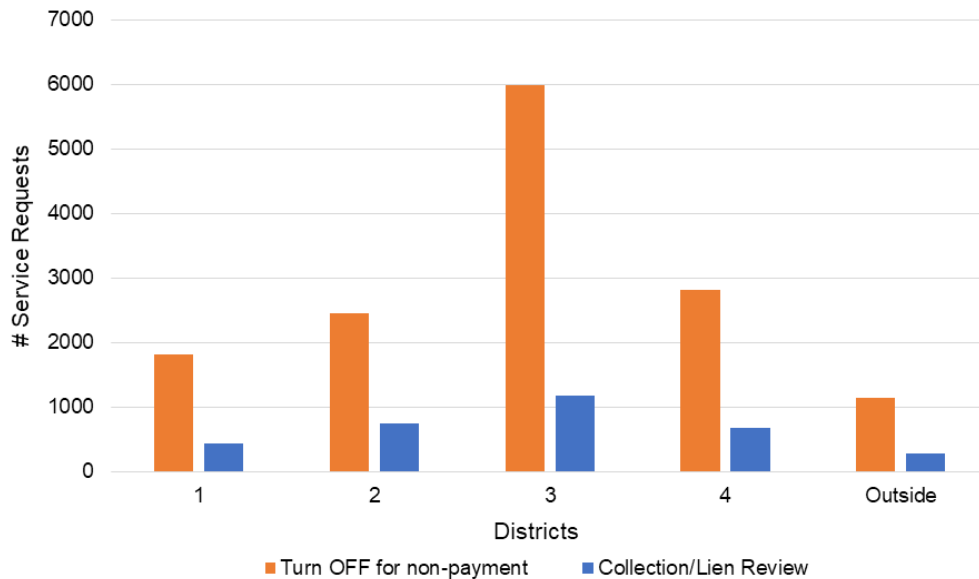
Exhibit 4.11 as follows provides the history of service orders related to Turn Offs for non-payments. If a customer's bill amount due is not paid after 30 days, a Nonpayment Alert and Turn Off service order are generated by Cayenta and notice is provided to the customer. If payment is made within seven days, the Turn Off service order is cancelled as shown in Exhibit 4.11. If the payment is not made within seven days, the UBO forwards the service order to Meter Services to conduct the turnoff (with customer resolution set as "Meter Off"). The number of closed accounts in 2018 from non-payment was 13,100 as shown in Exhibit 4.11. Service may be restored if payment and penalties are paid; if not, the account may be forwarded to collection/lien review (approximately 4,000/year for past 3 years). Letter notifications are generated by Cayenta triggered by these actions.

Exhibit 4.11 – Turnoff Services and Lien Reviews (2016-2019)



Non-payment work orders by District in 2018 are displayed in Exhibit 4.12 in addition to work orders related to illegal consumption. District 3 had 6,000 non-payment work orders related to 3,900 accounts (out of its total of 13,800 accounts in 2018). Of the total 14,200 turnoff service orders, 91% are related to Single family residential (SFRES) accounts.

Exhibit 4.12 – Work Orders for Non-Payment (2018)



The majority of turnoffs for non-payment are conducted by Bermex as provided by Public Works meter group from the requests forwarded by the Billing Unit.

Meter Services

Meter service orders are conducted for a variety of functions including maintenance, customer service requests and installations or removals. The Utility Billing and Collections and Meter Services groups operate in two distinct locations with different work objectives and processes but have the same goal of providing timely and effective billing and customer services. The daily flow of data from meter reading to bills and payments is voluminous, generating continuous and often complex work efforts in the office and field. Technology with streamlined work processes strengthened by effective management, staffing and internal controls provides the foundation that can make this valuable service function seamlessly.

The Cayenta system serves as the primary system for processing service orders to support customer services and billing. Integrated with Cayenta, the VersaTerm meter reading devices generate service actions in the field when meters cannot be read or need maintenance. The City's LauderServ system (with Q-Alert feature) is also integrated with Cayenta and used for high volume service actions related to CSIs and Turnoff/Turn-on meters. Q-Alert actions are updated from Cayenta, assigned by the meter coordinator and synced with tablets for Meter Services crews to process. Meter data is entered in the tablets (e.g. meter number, meter reading, resolution) and updated in Cayenta via wireless network. Pictures may also be taken of a meter with the tablets and attached to the service action to validate meter data. While the tablets provide a useful tool in improving data entry and accuracy, paper versions are also used in many cases for the CSIs and Turnoff/Turn-on service actions. Paper service actions are generated from Cayenta for meter sets, replacements, repairs and rereads as routine procedure.

A review of all meter service orders for 2016-2018 indicates a reduction in numbers as shown in Exhibit 4.13 as follows.

Exhibit 4.13 – Meter Services Orders (2016-2018)

Service Orders	2016	2017	2018
All Meter Services	9,403	7,556	4,942
Chg from prior year		-20%	-35%

Note: Meter rereads are not included within these meter services.

Below is a typical service order process KPMG observed in which City Meter Services personnel attempted to address a CSI related to a meter issue

- 1) A MR/SW receives address to check verify consumption; drives to residence
- 2) MR/SW opens meter box, verifies last registered read
- 3) After verification, MR/SW marks register at the number at which the needle is pointing
- 4) MR/SW waits and observes the register for five minutes to see whether the needle moves beyond the marked spot
- 5) If the needle is moving beyond marked spot, a leak could be cause for the higher than usual consumption
- 6) Having determined whether there is a leak, the MR/SW then knocks on the door of the resident to inform him/her of next steps
 - i) If there is no answer, the technician leaves a door tag informing the resident of his visit
 - ii) If the resident is home, the technician goes over options with the resident
- 7) If consumption observed matches the last read and there is no significant movement on the marked register (i.e., there is no leak), the technician gives the resident the following options:
 - i) The meter can be tested for a fee of \$16. The meter is removed from the residence and brought back to Public Works for testing. The resident is invited to observe the testing process, which consists of installing the meter in the testing bay (see Exhibit 4.14) and running water through it at high/low/intermediate speeds to determine whether the meter is measuring water flow accurately. While the old meter is being tested, a new meter is put in, which the resident keeps whether the old meter is faulty or not. If the old meter is faulty, the resident is refunded the cost of testing.

Exhibit 4.14 – Meter Testing Bay

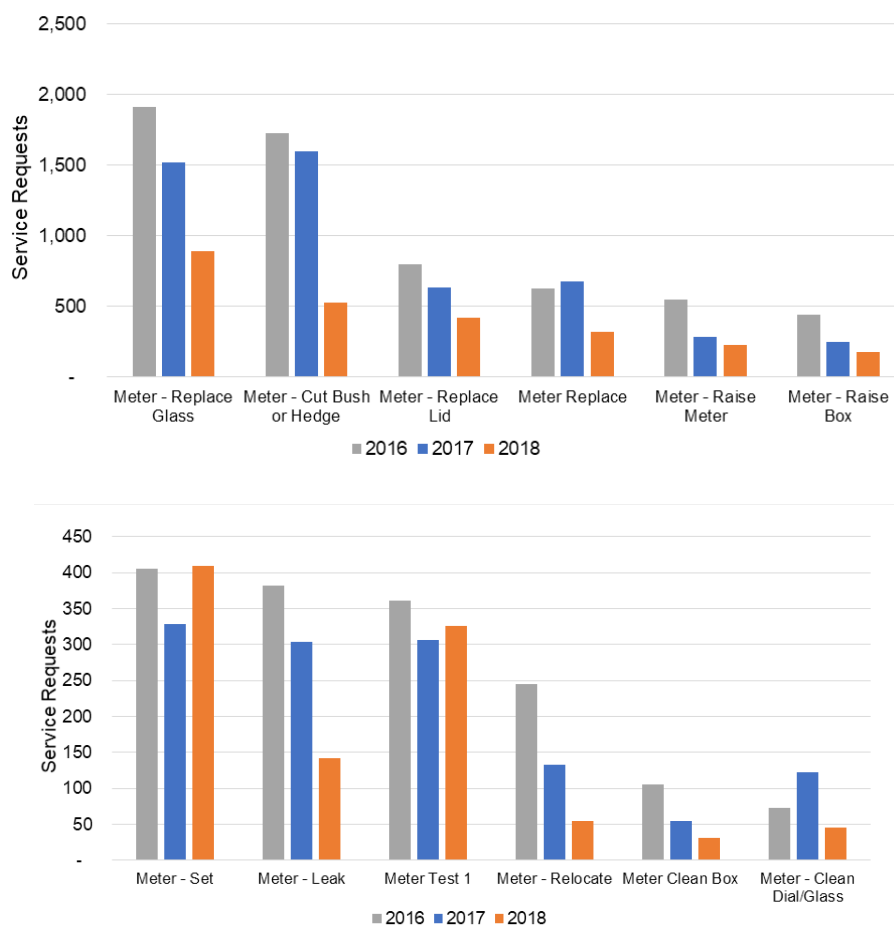


- ii) If the resident does not want the meter tested, the technician can provide advice on what the resident should look out for in regards to consumption (such as monitoring irrigation) and can also suggest having a plumber inspect the premises for leaks in the house that can't be detected from the technician's test.
- 8) If there is a leak, this is communicated to the resident, along with instructions on how to obtain a Leak Credit Adjustment

Exhibit 4.14 provides key meter service orders that make up the summary data in Exhibit 4.13. Most meter service orders completed over the last three years are related to maintenance/repairs and are initiated by meter readers via the handheld devices.

An analysis of service orders showed a reduction for most types of meter maintenance actions between 2016 and 2018 except for meter sets (installations) and meter tests. Actions to replace meter glass or lid declined from 1,500 to 460 and remove vegetation blocking the meter declined from 1,150 to 470 between 2016 and 2018. Public Works staff indicated that meter reading crews generated a greater than normal number of meter maintenance actions in 2016 and 2017 to improve their reads. The increase was also attributed to new meter reading employees and job training. Over the last 1-2 years, measures were taken to clean meter dials with spray bottles resulting in a reduction in meter glass replacements. As discussed earlier, non-payment is an increasing issue with over 40% more turnoff actions in 2018. For the last three years, the number of CSI's conducted has been steady at approximately 4,000 per year.

Exhibit 4.15 – Selected Meter Work Orders



Observation 4.8 – High/Low Exceptions

Exceptions from meter reading generate a high volume of work related to rereads and account reviews and updates. High/low parameters are configured within the Cayenta system based on customer service types (e.g. Water or Irrigation) and factors established during installation of the system in 2009. Billing staff indicated that a software update to Cayenta was made in October 2018 that possibly increased the number of high/low exceptions generated by the system. The methodology utilized, as well as setup within the Cayenta system, are complex in nature and generally not understood by Billing staff. Cayenta indicated that these factors are “standard” for most customers and have not been revised since installation. These exception parameters may not be sufficiently accurate or calibrated to adapt to the City’s customers that experience fluctuating month to month usage (especially during seasonal periods).

Recommendations – The City should consider the following potential actions:

- Identify/evaluate alternatives for providing reread service orders to Bermex electronically (and/or directly to meter readers on the route) and other means to use technology to streamline the exception processing and reread process.
- Review the high/low calculation methodologies and system configurations, and discuss with the Cayenta vendor to obtain a better understanding of this feature.
- Determine whether a re-evaluation and adjustment of these exception parameters is warranted and whether City or Cayenta staff should conduct the evaluation and any revised configurations.
- Identify and monitor meter reading routes with the highest number of exceptions that may help in providing information to assess the high/low calculation methodologies and well as possible meter reading errors.

Observation 4.9 – Turnoffs for Non-Payment

Delinquent accounts and non-payments are an on-going issue for utility billing. There were over 13,100 turnoffs for non-payment (over 30 days after due date) that were completed during 2018 for 7,800 individual accounts (representing over 12% of all accounts). A large portion of the accounts (1,300) had more than 3 non-payment actions during 2018, and payment arrangement letters were sent to 290 accounts. There were also 3,800 lien reviews generated as a result of non-payment under the ordinance provisions. *Note: The scope of this project did not include a review of the City’s payment collections, accounts receivables and write off practices.*

Recommendation – The City should consider the following potential actions:

- Create a nonpayment risk pool as a part of the “customer engagement” program (see Observation 5.1) that includes accounts with multiple repetitive turnoff actions to focus and coordinate efforts to mitigate and respond to these issues
- Coordinate the City’s various payment arrangements, adjustments, credits, and other programs to help address non-payment issues
- Assess various effectiveness of mechanisms available under existing ordinance including notifications, turnoff services, payment penalties, collections, and lien practices
- Identify options for enhanced measures not in ordinance in conjunction with those provided by Government Finance Officers Association (e.g. “Collecting Delinquent Revenues” 1995) as well as other industry sources

Observation 4.10 – Meter Services Workload

Paper documents used in most meter service actions present opportunities for written and input errors as well as time lags in updating Cayenta. A typical service order may include many data elements to be documented manually (e.g., accounts, location, order number, meter number, usage, customer contacts). One case was identified where a new irrigation meter was installed in October 2018 and was not metered and billed until March 2019 because the meter and service were not entered into Cayenta. This resulted in a significant “catch up” bill that included several months of usage.

Recommendation – The City should develop and implement additional quality control measures and internal reporting to ensure timely and accurate updates to Cayenta and related bills from service actions such as meter installations, replacements, and repairs. In addition, the City should consider the Meter Services staffing recommendations identified in Observation 3.2.

Observation 4.11 – Technology and Workflow

The Utility Billing and Collections and Meter Services groups operate in two distinct locations with different work objectives and processes but have the same goal of providing timely and effective billing and customer services. The daily flow of data from meter reading to bills and payments is voluminous, generating continuous and often complex work efforts in the office and field. Technology with streamlined work processes strengthened by effective management, staffing, and internal controls provides the foundation that can make this valuable service function seamlessly.

Recommendation – The City should explore the following avenues to better leverage existing and/or potential future technology to make Field Services processes more efficient and effective:

- Better utilizing features within Cayenta that could facilitate controls and notifications of pending work
- Improving reporting of workflow statuses and backlogs from Cayenta and Q-Alert
- Enhancing training of Meter Services employees related to Cayenta, Q-Alert, and tablet technologies
- Assessing of new/enhanced technologies to capture meter inventory and service data in the field to reduce reliance on manual paper processes (e.g., expand use of tablets for image-taking and other functionality to capture data and other meter services)

5. Data and Sampling Analysis

Overview

The following section includes the output of KPMG's data analysis in regards to the City's water and sewer metering and billing processes. KPMG's analysis includes:

- City-wide data analysis of three years of trends and historical performances focused on City-wide processes, and
- Sampled account documentation to understand impacts and outcomes of the City's processes on specific accounts account.

City-Wide Analysis

This section presents water consumption and billing data to provide a macro-understanding of City customers, consumption and bill amounts, and trends. Monthly consumption and billing data were obtained by individual customer account for over a three-year period and analyzed in aggregate and detail for characterizations, trends, relationships, and anomalies. In a subsequent section of this report, additional more detailed analyses were conducted for selected sample customer accounts which included estimated and high bills and up to a three year history of bills and service actions.

Historical Consumption and Bills

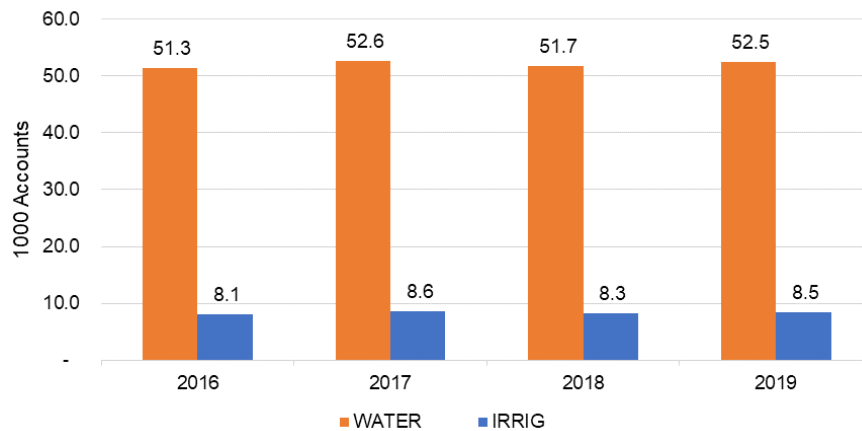
The City provided historical data (2016 to April 2019) from the Cayenta billing system that included monthly consumption and bill amounts by individual customer account. Cayenta identifies customers under the following classes which have unique rate characteristics used in generating their bills:

- Single family residential (SFRES)
- Duplex residential (DUPLX)
- Triplex residential (TRPLX)
- Multifamily residential (MFRES) greater than 3 units
- Commercial (COMM)
- Master metered (MASTM) – wholesale customers

In this evaluation, summary and detailed data is provided for the retail customers above, as well as for City Commission Districts, to portray different consumption and billing patterns. This section also includes the relative use of irrigation meters and estimated billing when meter readings are not available. As cited earlier, the City utility bill includes charges for water, sewer, irrigation, stormwater, and sanitation services calculated under different billing methodologies that are combined to create the total bill amount.

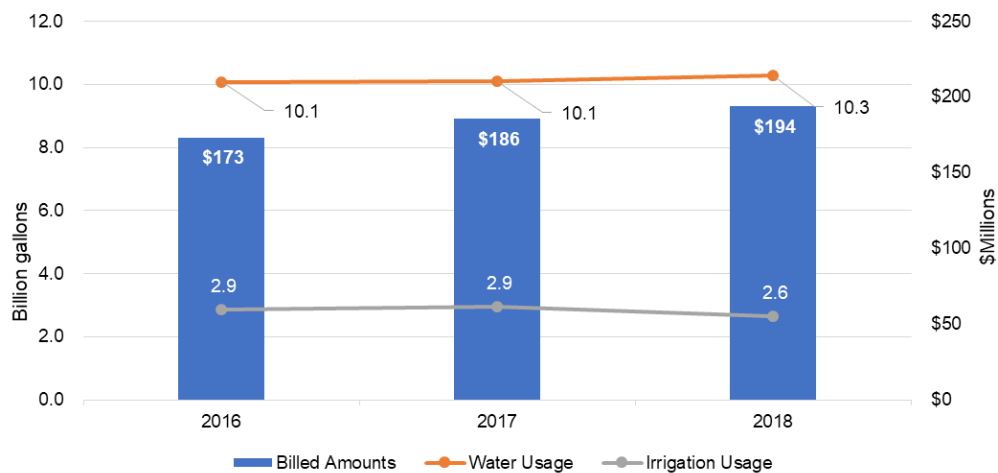
The average number of water and/or irrigation accounts billed monthly over the past 3 years has remained fairly consistent as shown in Exhibit 5.1 as follows. Domestic water accounts represent the primary metered service with sewer service (based partially on water usage) and separate irrigation meters when acquired by customers. Approximately 16% of all accounts include separate irrigation meters.

Exhibit 5.1 – Average Monthly Bills Generated 2016-19



A review of overall billing data (in Exhibit 5.2) shows water and irrigation usage as well as billed amounts over the last three years. Domestic water usage has been generally consistent (+/- 10 billion gal/yr.) during the period whereas irrigation usage shows a decline of approximately 10% between 2017 and 2018. Total billed amounts include utility taxes, stormwater, and sanitation charges, as well as water and sewer charges (actual payments or collections are not included in these amounts).

Exhibit 5.2 – Total Utility Bill Amounts and Usage for Water, Irrigation, Stormwater, Sanitation and Other Charges



As discussed earlier, the utility charges under the existing rate structure have been adjusted each year since October 2013 by 5%. The Public Works Department is currently conducting an overall water/sewer rate study that is expected to be implemented in October 2019.

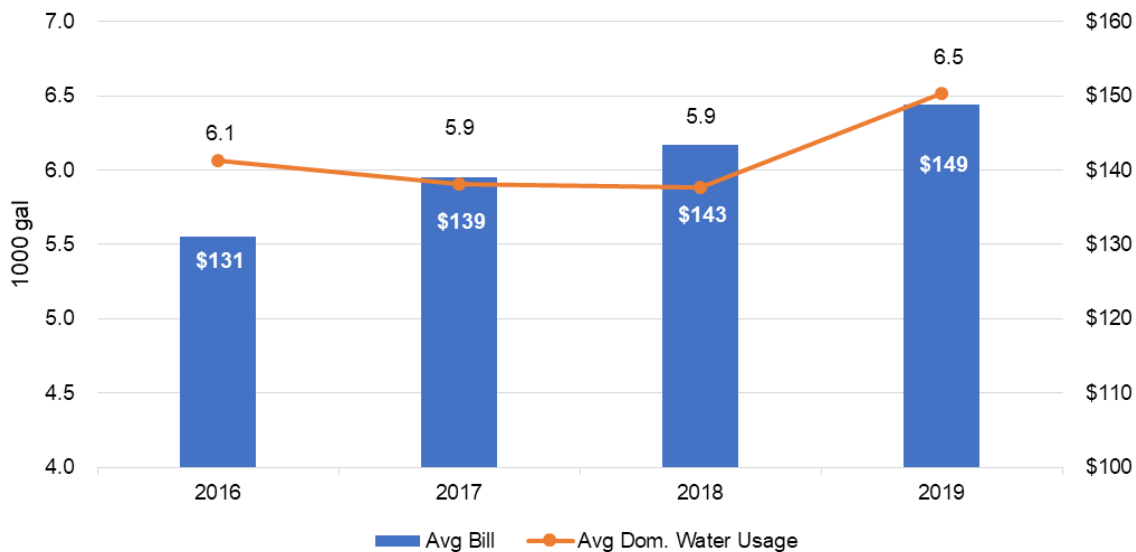
Exhibit 5.3 as follows shows that 65,000 accounts were billed in 2019 with single family residential customers having 76% of the accounts and 33% and 22% water and irrigation usage respectively. Commercial accounts represent the largest group in terms of consumption with 38% of water and 66% of irrigation usage billed in 2018.

Exhibit 5.3 – Total Water Billed by Customer Class (2018)

Total Water Billed by Customer Class (2018)						
Customer Class	#Accounts	%Accounts	Water (1000gal)	%Water	Irrigation (1000gal)	%Irrigation
Single Family Residential	49,150	76%	2,761,512	34%	790,739	30%
Duplex	2,857	4%	268,909	3%	7,827	0%
Triplex	725	1%	78,889	1%	2,577	0%
Multifamily	3,397	5%	2,025,209	25%	416,297	16%
Commercial	8,932	14%	3,025,755	37%	1,422,951	54%
Total	65,061	100%	8,160,274	100%	2,640,391	100%

Evaluation of single-family accounts demonstrates average domestic water consumption declining slightly between 2016 and 2018 (the last full year) and the average monthly bill increasing from \$131/mo. to \$143/mo. Reduced consumption for single family customers may be attributed to relatively high utility bills (with recent rate increases) as well as water conservation efforts.

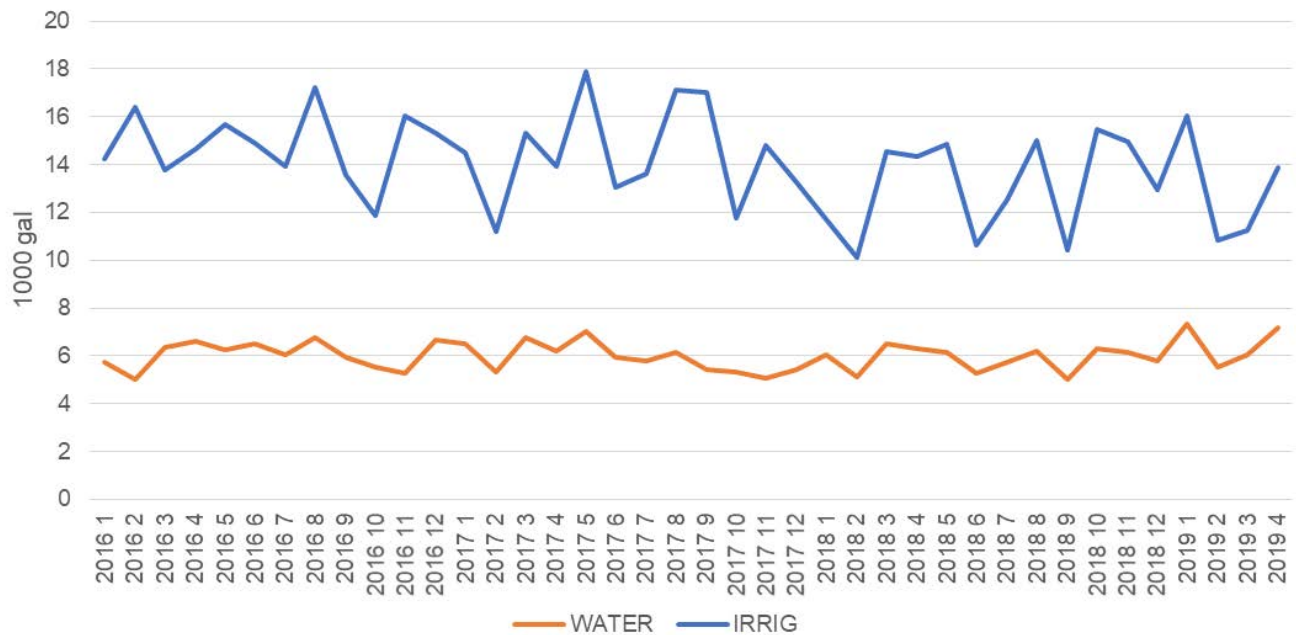
Exhibit 5.4 – Average Monthly Consumption and Bills (Single Family Residential Customer)



Note: 2019 data includes only months Jan-April and is not reflective of entire year.

Average consumption for single family residences was analyzed on a monthly basis over the past 3 years (as shown in Exhibit 5.5 as follows). Customers with domestic water meters averaged 5,900 gal/mo. (2018) and showed monthly averages ranging from 5000 to 7000 gal. For customers that do not have irrigation meters, domestic water meters would include irrigation as used by individual customers. Irrigation meter services (approx. 13% of all accounts) averaged 13,100 gal/mo. (2018) and show monthly variations with averages ranging from 10,100 to 17,900 gal over the 3 year period. The trend data also indicates a slight reduction in average monthly consumption in domestic water usage (from 6,100 to 5,900 gal.) and a greater reduction in irrigation usage (from 14,800 to 13,100 gal) between 2016 and 2018.

Exhibit 5.5 – Average Monthly Consumption-Single Family Residence for Domestic Water & Irrigation Meters



Dom. Water	2016	2017	2018	2019	Irrigation	2016	2017	2018	2019
Low	5.0	5.1	5.0	5.5	Low	11.9	11.2	10.1	10.8
High	6.8	7.0	6.5	7.3	High	17.2	17.9	15.5	16.1
Average	6.1	5.9	5.9	6.5	Average	14.8	14.5	13.1	13.0

Note: 2019 data includes only months Jan-April and is not reflective of entire year.

The “average” domestic water consumption for single family residential accounts is 6,000 gal/mo. (since meters are read in 1000 gal increments only). The “median” domestic water consumption is 4,000 gal/mo. indicating 50% of SFRES customers having higher or lower than that amount. The average is higher than median since the top 10% accounts use significantly more domestic water volume (33%). Of the 44,700 SFRES accounts billed in 2018, the following usage distribution was identified:

- 25% - 2,000 gal/mo.
- 50% - 4,000 gal/mo.
- 75% - 7,000 gal/mo.
- 90% - 11,000 gal/mo.

Exhibit 5.6 presents calculated bill amounts for each of these consumption levels. The median bill for all services and charges is shown to be \$102/mo. with \$52/mo. (approx. 50%) being only water/sewer charges. The “average” bill for SFRES shown previously is \$143/mo. which is based on 6,000 gal/mo. and all billed consumption for 2018.

Exhibit 5.6 – Sample Bill Amounts (SFRES) with Increasing Water Consumption

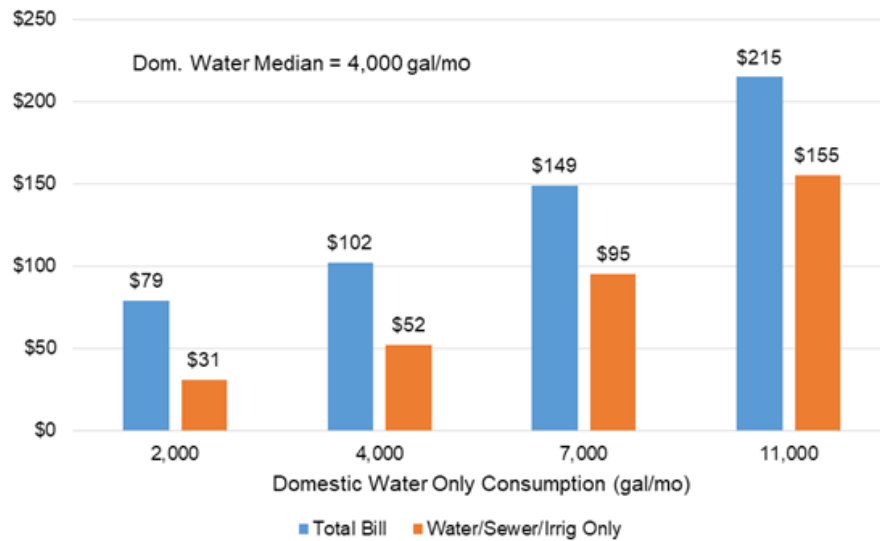
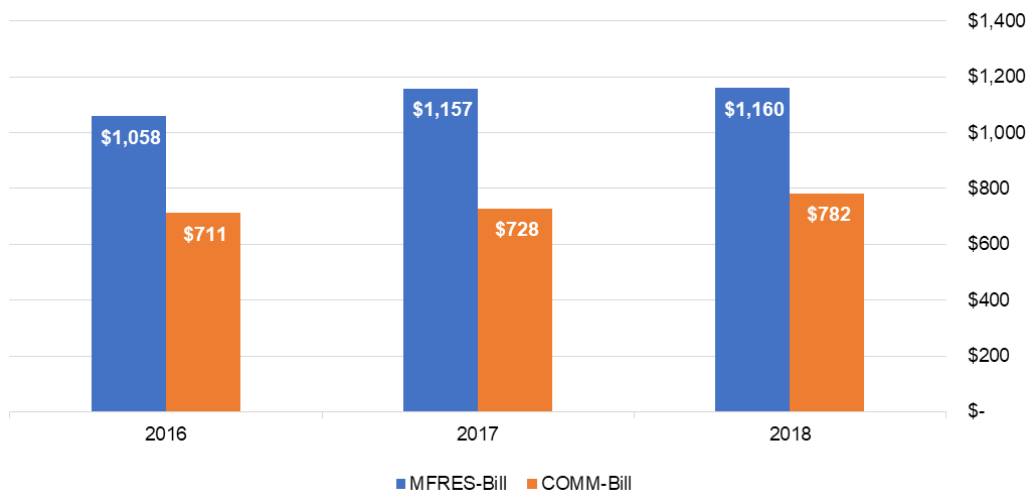


Exhibit 5.7 as follows shows average utility bills for commercial and multi-family residential accounts since 2016 (not including irrigation meters). Average water usage for commercial accounts (making up the largest consuming class) has been fairly consistent while average bills have increases primarily due to the 5% rate increases. Multi-family accounts have shown similar increases in average utility bills since 2016 resulting from the rate increases.

Exhibit 5.7 – Average Monthly Bills for Multi-Family and Commercial Accounts



Observation 5.1 – Bill Amounts and Fluctuations

City utility bills include not only water and sewer services, but also stormwater, sanitation, and other charges/fees. The combination of all the different charges may be higher than customers would expect their “water bill” to be. Depending on a customer’s consumption, the water and sewer charges may be a small or large portion of the overall bill. For example, a residential customer having 2,000 gal/mo. would have a total bill of \$79/mo., whereas the water/sewer portion would be only \$31 (39%). Customer with 2,000 gal/mo. represents 25th percentile of all residential accounts; the median residential (50th percentile) consumes 4,000 gal/mo. whereas the “average” customer has 6,000 gal/mo. A residential customer having 11,000 gal/mo. consumption (75th percentile) would have monthly bill of \$215/mo. with water/sewer charges being \$155 (72%).

Many customers’ usage fluctuate significantly on month to month basis due to weather and other seasonal events such as tourism. Irrigation usually is greater than domestic water consumption with the average residential irrigation consumption being 13,000 gal/mo. – on its own is \$85/mo. (with 5/8” meter). The current City bill provides the customer with a 12 month history of domestic and irrigation water.

Recommendation – The City should consider the following activities to help customers better understand how fluctuations in consumption, as well as non-water/sewer costs, significantly impact their total billed amount:

- Develop a “customer-centric engagement” program that integrates existing and new programs involving conservation, billing/payments, leak/unusual consumption credits, and other utility roles. This program would enhance customer information and interactions with the City to mitigate and resolve customers’ consumption, service, and billing issues.
- Develop special reports to flag accounts with higher than normal readings. Reports could include:
 - A summary list of accounts with readings filtered by property type, meter size and consumption that is 50% higher than its 12 month average.
 - A detailed report by account that provides a recent history of consumption, estimates, communications, and field service orders or actions.
- Conduct special internal reviews, communications, and field actions for accounts that exceed the high reading thresholds. Provide notification mechanisms for communicating a potential high usage on the bill and via email and other means. For example, Duke Energy provides high bill alerts for its electricity customers halfway through the billing cycle (accomplished with AMI).
- Create and assign a business analyst position to help develop, monitor, and coordinate processes and reports for the customer engagement program.

Estimated Bills

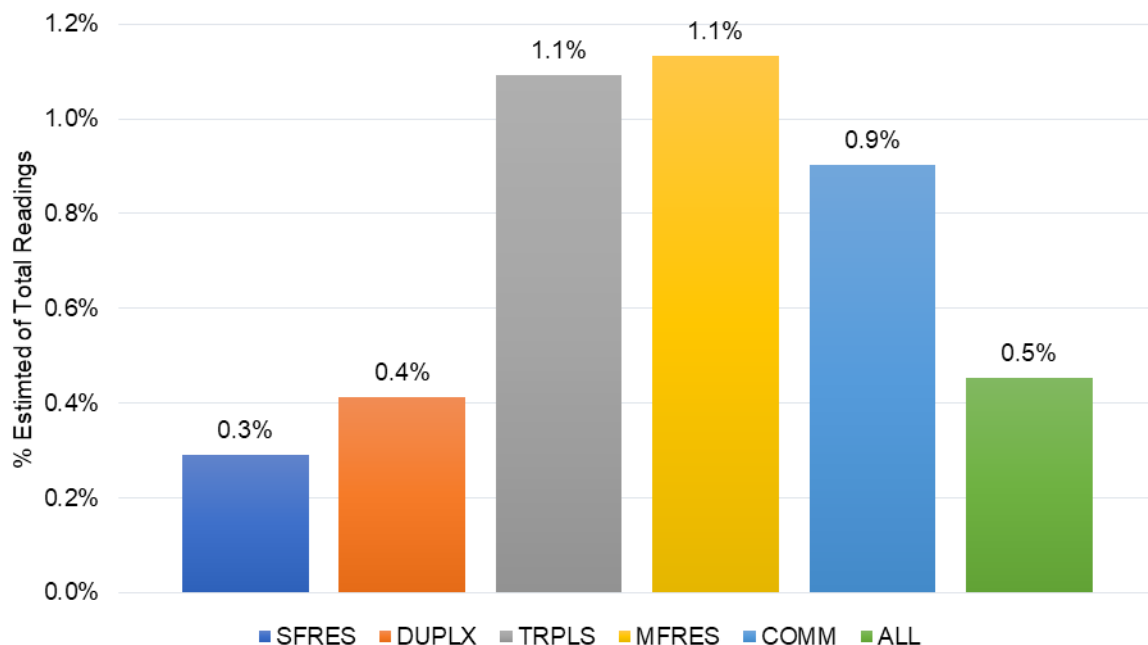
Estimated billing is a normal process for utilities due to conditions that can prevent an actual or accurate meter reading to occur on a monthly basis. There are a wide range of issues that can prevent an actual meter reading and trigger the need for an estimated reading and bill. The table below highlights some of the typical issues that can affect actual and estimated readings.

Exhibit 5.8 – Typical Conditions Affecting Readings

• Seasonal conditions • Inaccurate meter reading • Unusually high or low consumption • Leaks and other plumbing issues	• Inaccurate estimate • Meter inaccessibility • Meter register rollover • Meter spins backward • Meter changeout
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The portion of estimated bills for 2018 is low overall at 0.5% of all bills processed. Exhibit 5.9 provides the estimated bills as a percentage of total bills issued during 2018. The results show that multi-family residential and commercial accounts have highest percentage of estimates (1.1%) which is primarily attributed to accessibility of meters to be read. Single family residential accounts having 0.3% of reads estimated represent the largest customer class with over 49,000 accounts billed.

Exhibit 5.9 – Estimated Meter Readings % of Total by Customer Class (2018)

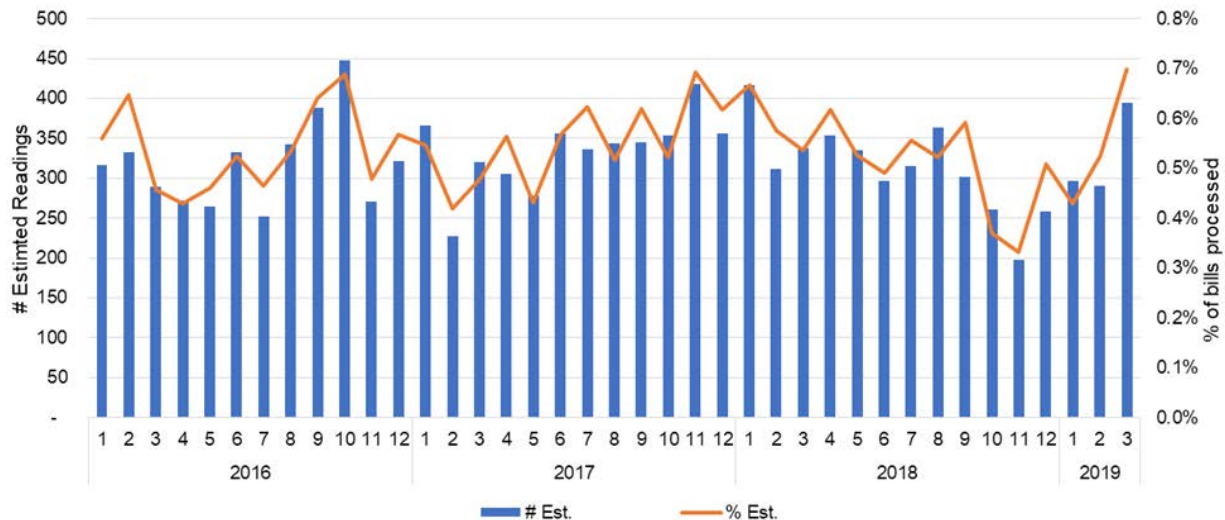


The Bermex meter reading contract allows up to 0.8% of readings to be estimated during a monthly cycle without penalty. Exhibit 5.10 as follows shows estimated bills based on all monthly readings since January 2016. In 2017, Hurricane Irma caused significant disruption in meter reading and billing during September and October (over 25% of bills were estimated in September 2017). Estimates for these months were averaged in the chart based on 2016 and 2018 corresponding months. In all months since 2016 the estimated meter readings were below 0.8% with an overall average of 0.5% for the period.

Estimates are based on last 12 months of actual readings when such data is available. If a customer is relatively new with little or no history, the Billing Specialist will use the account location as the basis for

an estimate. When estimates are lower or higher than normal, the following actual reading may cause a low or high “catch up” bill. Consumption fluctuations (contributed by seasonal irrigation) can also exacerbate a low or high bill when estimates are being made. There are cases where multiple and consecutive estimates are conducted because of on-going access issues with the property or customer which can have a cumulative low or high impact on a bill.

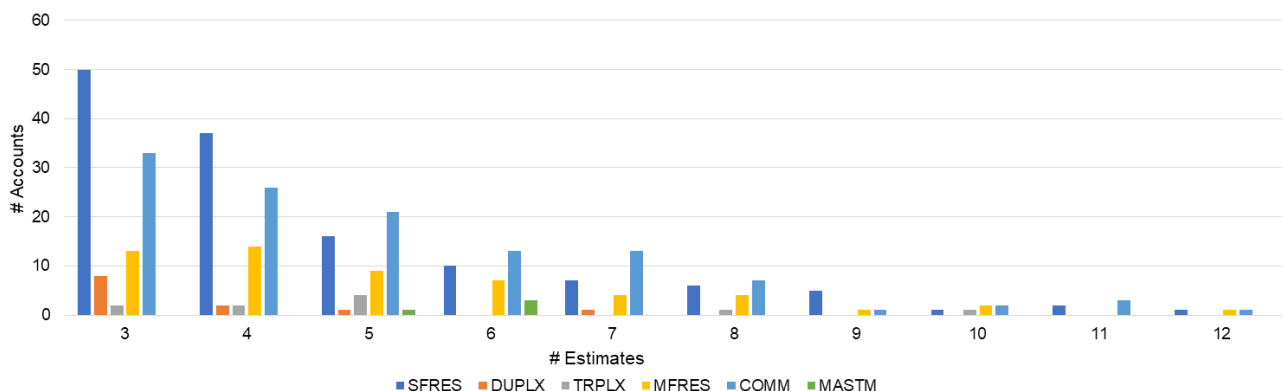
Exhibit 5.10 – Estimated Meter Readings by Month 2016-2019



Note: Data for Sept and Oct 2017 are adjusted due to impacts of Hurricane Irma.

The City has a performance target of not exceeding two consecutive estimates but, in some cases, the goal is not achieved because of unique circumstances such as meter inaccessibility. Typical access issues include locked gates/fences, dogs, and cars or bushes covering meters. In these cases, an exception is generated, and meter reread is attempted preceded by customer contact (e.g. letter/phone). Exhibit 5.11 as follows shows accounts that have exceeded 2 estimates during 2018 (not necessarily consecutive readings). Access to meters is an on-going issue involving routine communication attempts including certified letters and phone calls to gain access and obtain actual readings. Customer service investigations (CSI) are also conducted for habitual estimates as follow-up. The number of accounts with three or more estimates is low when compared to the City’s 65,000 accounts.

Exhibit 5.11 – Accounts with 3 or More Estimated Bills



Observation 5.2 – Estimated Consumption Amounts

Estimated billing is a normal process for utilities to handle the range of factors that can prevent an actual or accurate meter reading to occur on a monthly basis. Estimates are based on last 12 months of actual readings when such data is available. When estimates are lower or higher than normal, the following actual reading may cause a low or high “catch up” bill. KPMG identified instances where multiple and consecutive estimates are conducted because of on-going access issues with the property or customer which can have a cumulative low or high impact on a bill. The consumption fluctuations discussed above can also exacerbate a low or high bill when estimates are being made.

A selected review of a number of these SFRES estimated billed accounts indicated that the estimated readings were relatively normal when compared to actual historical readings. However, one account had several months of estimates with significantly higher than normal bills for the account or location. When a new customer took over the location, six consecutive estimated bills ranged from \$400-over \$500/mo., whereas the previous customer for the location had bills of \$50-\$70/mo. The City’s billing staff could not explain this anomaly and referenced a possible issue in the estimation calculations within the Cayenta software. KPMG verified an estimation calculation error output from Cayenta, but KPMG did not have access to Cayenta source code and calculation inputs, and cannot determine if this estimation calculation error is more widespread than the single instance identified, nor was analysis of Cayenta’s system configurations within the scope of this review.

Recommendation – The City should consider the following actions regarding estimated consumption amounts:

- Strengthen existing internal procedures for handling and estimating bills including follow-up steps for habitual accounts. This would include the methods used when an automated estimate is not provided by the Cayenta system. Additionally, progressive measures in communication and field services should be developed and implemented when 2 or more estimates are made consecutively or within a 12 month period.
- Develop special reports to monitor accounts with multiple estimated readings (in conjunction with higher than normal readings). Reports could include:
 - A summary list of accounts with multiple estimated readings filtered by property type, meter size and estimated times
 - A detailed report by account that provides a recent history of consumption, estimates, communications and field service orders or actions.
- Assign a billing specialist or assistant to help develop, monitor and manage the processes and reports for estimated bills.
- Obtain from Cayenta software vendor the estimated bill methodology and validations specifically related to accounts that have multiple consecutive estimates and changes in customer account for the location.

Bill Analysis by Commission District

The Fort Lauderdale service area includes the four City Commission Districts, retail customers outside of the City, and wholesale customers with master meters. Exhibit 5.12 as follows provides an overview of the retail accounts by type and District for 2018. A total of 65,000 unique retail accounts that were billed in 2018 with 49,150 (76%) being single family residential customers.

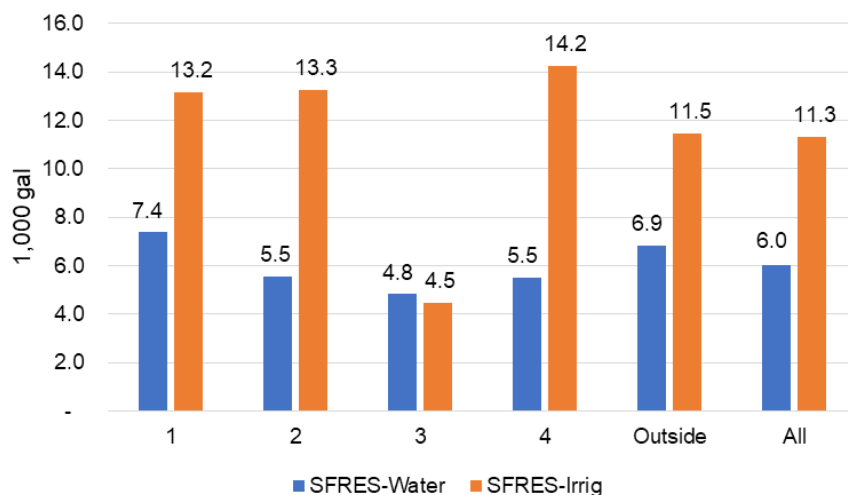
Exhibit 5.12 – Number of Unique Customer Accounts by District (2018)

Property Type	Commission Districts					Total	%
	1	2	3	4	Outside		
Single Family Residential	10,857	10,243	11,772	13,209	3,069	49,150	76%
Duplex	282	1,126	400	923	126	2,857	4%
Triplex	51	327	118	216	13	725	1%
Multifamily	685	1,229	368	775	340	3,397	5%
Commercial	2,192	2,283	1,134	2,838	485	8,932	14%
Grand Total	14,067	15,208	13,792	17,961	4,033	65,061	100%
% by District	22%	23%	21%	28%	6%	100%	

Reflects unique accounts billed in 2018 (may include multiple accounts by location)

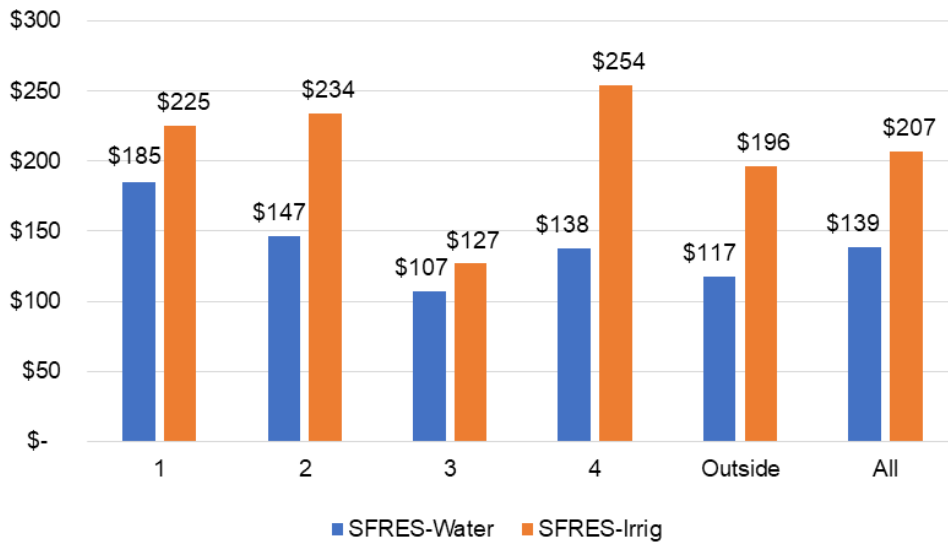
Domestic water and irrigation usage vary by District with single family accounts in District 3 showing the lowest water and irrigation consumption in 2018 (Exhibit 5.13). Typically, having smaller properties and fewer irrigation meters, District 3 water and irrigation usage average 4,800 and 4,500 gal/mo. respectively, significantly lower than other Districts.

Exhibit 5.13 – Single Family Residential Average Monthly Usage by District 2018



Average bills can vary significantly considering the range in domestic water and irrigation usage as shown in Exhibit 5.14. The lowest average single family bills in District 3 are \$107/mo. for domestic water and \$127/mo. when an irrigation meter is installed (as noted these bills include all charges for water, sewer, sanitation, stormwater, and utility taxes). The average bills for all single family customers in 2018 are \$139/mo. for domestic water and \$209/mo. for domestic water with irrigation.

Exhibit 5.14 – Single Family Residential Average Monthly Bill by District 2018



Note: Bill amounts include both Domestic Water and Irrigation when Irrigation meter is installed as well as Sewer, Stormwater, Sanitation and other miscellaneous charges on utility bills.

Estimated bills also vary by District and property type as shown in Exhibit 5.15. As shown earlier, multi-family and commercial accounts show higher estimate levels when compared to single family accounts. The exhibit shows that multi-family accounts in District 3 have almost 2% of its bills estimated.

Exhibit 5.15 – Percentage of Bills Estimated 2018 by Property Type and District

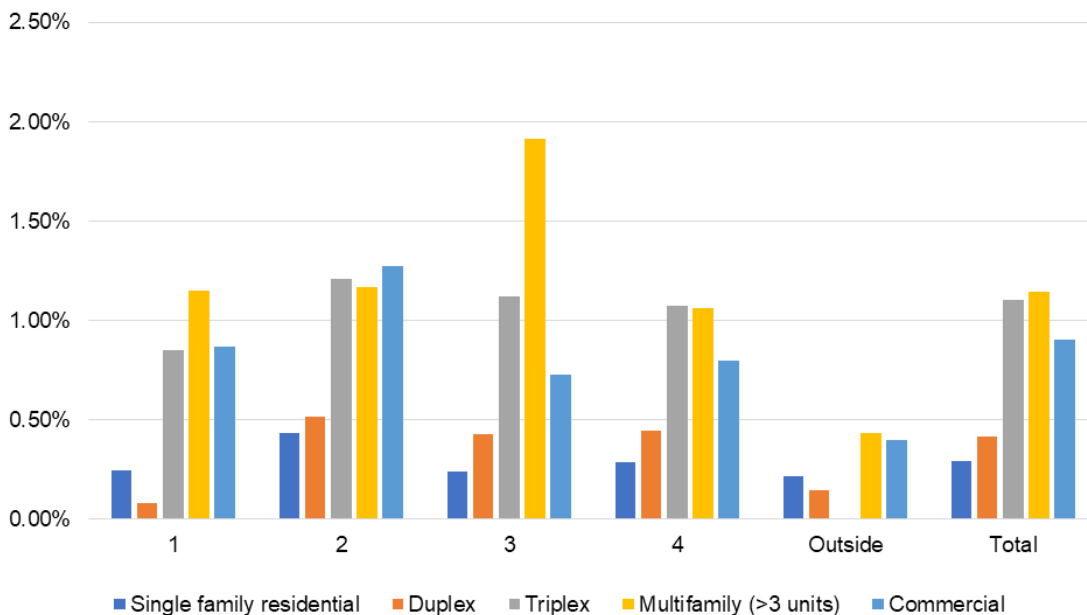


Exhibit 5.16 provides detailed customer, usage, and billing data by District and customer class. In addition to the findings discussed previously, the use of irrigation meters varies significantly among Districts. District 1 consists of accounts with 27% irrigation meters and District 3 consists of accounts with 4% irrigation meters.

Exhibit 5.16 – Average Consumption and Monthly Bills by Service Type and District (2018)

	#Meters Read/Est	Avg Consump (1000gal)	#Meters Read/Est	Avg Consump (1000gal)	Avg Mo. Bill (Water Meters)	Avg Mo. Bill (w'Irriga. Meters)	% w' Irrig. Meters
	<u>District 1-Water Meters</u>		<u>District 1-Irrigation Meters</u>		<u>District 1 All</u>		
SFRES	9,135	7.4	2,087	13.2	\$185	\$225	23%
DUPLX	259	7.9	41	6.4	\$218	\$245	16%
TRPLX	47	11.3	12	6.2	\$299	\$315	26%
MFRES	611	83.4	319	46.2	\$1,917	\$1,346	52%
COMM	<u>1,527</u>	37.4	<u>635</u>	59.0	\$815	\$955	<u>42%</u>
Subtotal	11,579		3,095				27%
	<u>District 2-Water Meters</u>		<u>District 2-Irrigation Meters</u>		<u>District 2 All</u>		
SFRES	7,787	5.5	1,180	13.3	\$147	\$234	15%
DUPLX	1,017	6.5	38	4.6	\$177	\$216	4%
TRPLX	290	-	9	5.5	\$254	\$318	3%
MFRES	1,054	48.1	261	37.1	\$957	\$986	25%
COMM	<u>1,569</u>	39.7	670	43.6	\$774	\$775	<u>43%</u>
Subtotal	11,717		2,158				18%
	<u>District 3-Water Meters</u>		<u>District 3-Irrigation Meters</u>		<u>District 3 All</u>		
SFRES	9,165	4.8	195	4.5	\$107	\$127	2%
DUPLX	349	10.8	4	0.2	\$204	\$177	1%
TRPLX	104	10.8	1	-	\$278	\$230	1%
MFRES	347	55.1	16	25.7	\$971	\$719	5%
COMM	<u>892</u>	23.0	<u>230</u>	43.5	\$572	\$715	<u>26%</u>
Subtotal	10,859		447				4%
	<u>District 4-Water Meters</u>		<u>District 4-Irrigation Meters</u>		<u>District 4 All</u>		
SFRES	10,834	5.5	1,270	14.2	\$138	\$254	12%
DUPLX	853	8.8	25	8.2	\$197	\$237	3%
TRPLX	200	9.9	4	18.4	\$241	\$415	2%
MFRES	673	52.3	151	45.7	\$1,038	\$1,317	22%
COMM	<u>2,058</u>	46.4	<u>799</u>	45.9	\$933	\$921	<u>39%</u>
Subtotal	14,617		2,249				15%
	<u>Outside-Water Meters</u>		<u>Outside-Irrigation Meters</u>		<u>Outside All</u>	<u>Outside All</u>	
SFRES	2,405	6.9	201	11.5	\$117	\$196	8%
DUPLX	115	21.3	1	5.5	\$144	\$130	1%
TRPLX	12	10.5		-	\$196	\$0	0%
MFRES	278	35.5	67	33.1	\$526	\$691	24%
COMM	<u>361</u>	25.0	<u>102</u>	34.2	\$320	\$600	<u>28%</u>
Subtotal	3,171		370				12%
	<u>ALL-Water Meters</u>		<u>ALL-Irrigation Meters</u>		<u>ALL Service Areas</u>		
SFRES	39,326	6.0	4,933	11.3	\$139	\$207	13%
DUPLX	2,592	11.1	109	5.0	\$188	\$201	4%
TRPLX	654	10.5	26	7.5	\$254	\$320	4%
MFRES	2,963	54.9	815	37.5	\$1,082	\$1,012	27%
COMM	<u>6,407</u>	34.3	<u>2,436</u>	45.3	\$683	\$793	<u>38%</u>
Subtotal	51,942		8,319				16%
Notes:	#Meters based on regular meter reads (actual & estimate) during 2018 and exclude turnon & turnoff reads						
	Average bills includes all charges for customers with Water (only) and Water+Irrigation meters.						

Observation 5.3 – Variances Among Districts/Service Areas

The City provides water and sewer services over a wide geographic area having 4 Commission Districts as well as portions of Broward County and other non-city areas. These areas have different residential, commercial, and socio-economic characteristics that are unique in their services, consumption, and bills. District characteristics are summarized as follows:

- Districts 1, 2 & 4 have relatively high levels of residential irrigation meters (15%-27% of accounts) whereas District 3 has 4% of accounts with irrigation meters. Average bills in Districts 2 & 4 are \$240-\$250/mo. including irrigation.
- District 3 has the lowest average single family residential bill of \$107/mo. District 1 is the highest with \$182/mo. District 3 also has significantly fewer commercial properties than the other Districts.
- In terms of Meter Services, District 3 varies significantly from the others with the lowest number of meter rereads and the highest number of non-payment service turnoffs.

Recommendation – Within the customer engagement program, the City should evaluate variation in service needs associated with Meter Services among Districts to better understand differences between the Districts and identify potential opportunities to better align Meter Service delivery to District needs. Within its customer management activities, the City should further evaluate the level of meter rereads, customer service investigations and non-payment turnoffs among Districts in consideration of services such as leak/usage adjustments, payment plans, and irrigation meters.

Sampling Analysis

In order to augment our City-wide data analysis, and to gain insights into how the City's processes and procedures are actually performed for actual customer accounts, KPMG conducted a series of detailed reviews of individual accounts with their consumption, billing, and service order histories. The City provided data from the Cayenta billing system that included monthly consumption, meter, and bill amounts by individual customer account (2016 to April 2019). Additionally, Cayenta's service order data for this timeframe included individual accounts with service types, actions, resolutions, and dates that was linked to the billing data for the account or location. A total of 37 individual accounts for single family residential (SFRES) customer types were selected with billing and service action data extracted and reviewed. Three groupings were derived for the account selections:

- Random – selected randomly to include each Commission district
- Estimated bills – selected based on estimated consumption either consecutive or high in nature
- Issue potential – high water or irrigation bills when compared to normal or average bills for that customer

All bill amount data includes water, sewer, irrigation, stormwater, sanitation, and utility taxes charges. Detailed notes from bills and service orders were not included in the data provided by the City. The results presented here are intended to show details for selected accounts and do not represent a statistically valid sampling of all billing records.

The sample accounts reviewed are distributed by the groupings and district as shown in Exhibit 5.17. A larger portion of 'issue' potential bills were sampled from District 1 to provide a greater cross section of high bill accounts.

Exhibit 5.17 - Sample Accounts Reviewed With Consumption, Bills & Service Actions

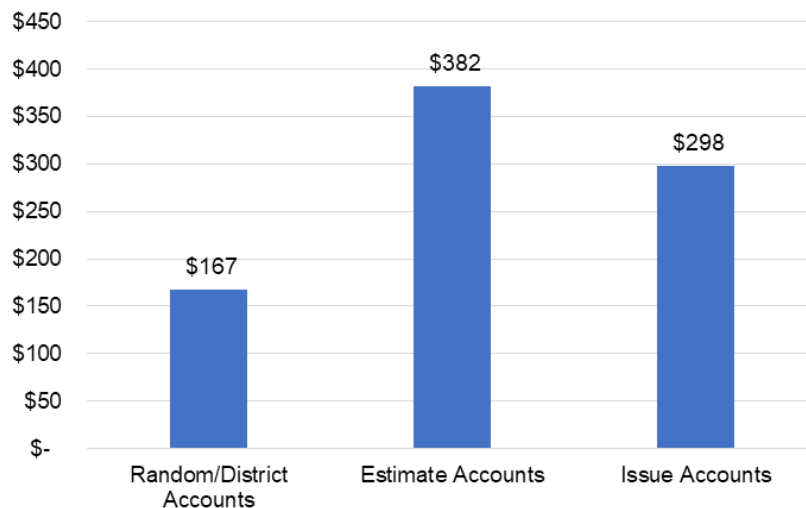
	District					
Sample type	1	2	3	4	Outside	Total
Random/District	3	5	5	3	2	18
Estimated Bills	1	1	1	1	1	5
Issue Potential	8	2	2	2		14
Total	12	8	8	6	3	37
Average Mo. Bill-Dom. Water	\$271	\$165	\$200	\$198	\$299	\$226
Average Mo. Bill w' Irrig. Meter	\$466	\$281	\$83	\$214		\$313
Maximum Mo. Bill	\$3,843	\$1,042	\$2,388	\$828	\$968	\$3,843

Note: the monthly bills for accounts with irrigation meters include charges for both irrigation and domestic water meters as well as sewer, stormwater, sanitation and utility taxes where applicable.

As shown in Exhibit 5.17, accounts with irrigation meters typically have higher overall bills than domestic water only accounts. However, the irrigation bill data from District 3 represents only 1 customer with lower than typical consumption (only 2% of District 3 SFRES accounts have separate irrigation meters).

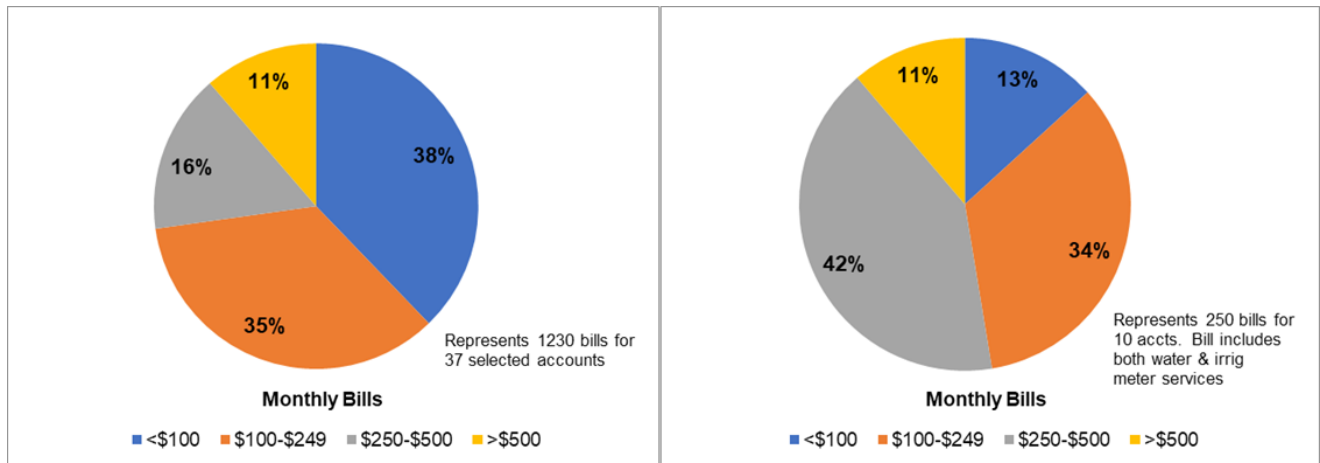
The average monthly bills for each sample type are shown in Exhibit 5.18. The 18 accounts within the random/district group have the lowest average bill of \$167/mo., whereas accounts with 1 or more estimates have average bills of \$382/mo. For this estimated group, the average bill with estimated consumption was \$494/mo. and with actual read was \$351/mo. (mostly attributable to one account with high estimated reads).

Exhibit 5.18 – Average Monthly Bills for Sample Accounts



A comparison of bill amounts is provided in Exhibit 5.19 between accounts with domestic water and irrigation meters for the sampled accounts. For domestic water charges, 73% (38%+35%) are less than \$250 whereas accounts with irrigation meters have 47% with monthly bills less than \$250. Irrigation metered bills \$250 or more represent 53% of bills for these accounts (and 27% for domestic water accounts).

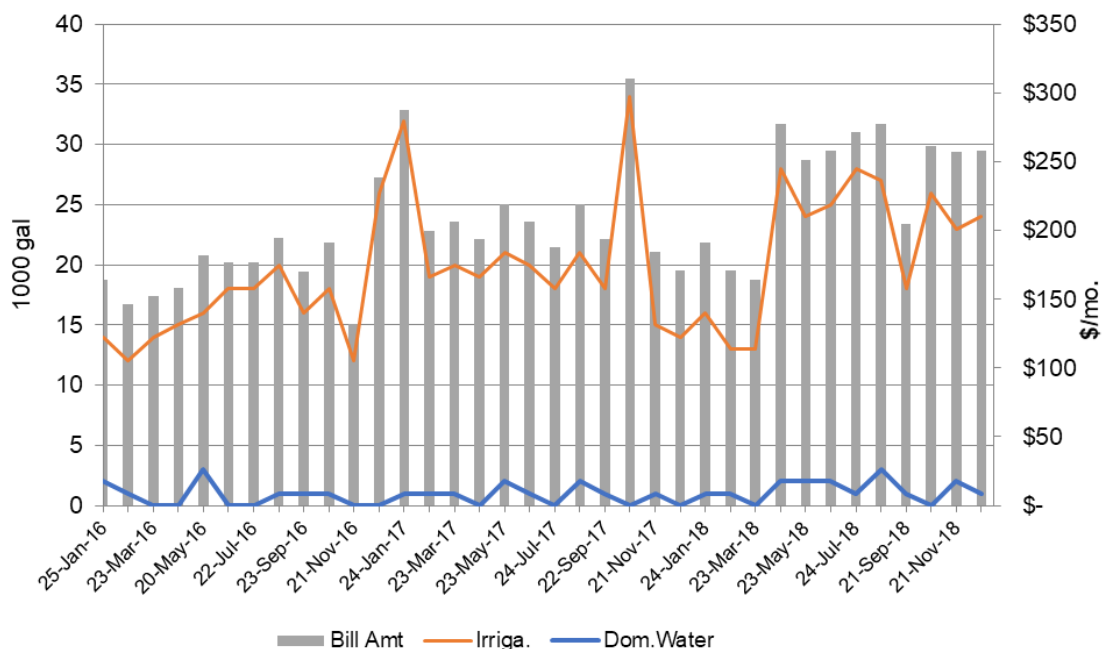
Exhibit 5.19 – All Accounts: Water Meters (Left) and Irrigation Meters (Right)



Note: Monthly bill amounts for accounts with irrigation meters include domestic water, irrigation, sewer and other charges and taxes included on the City bill.

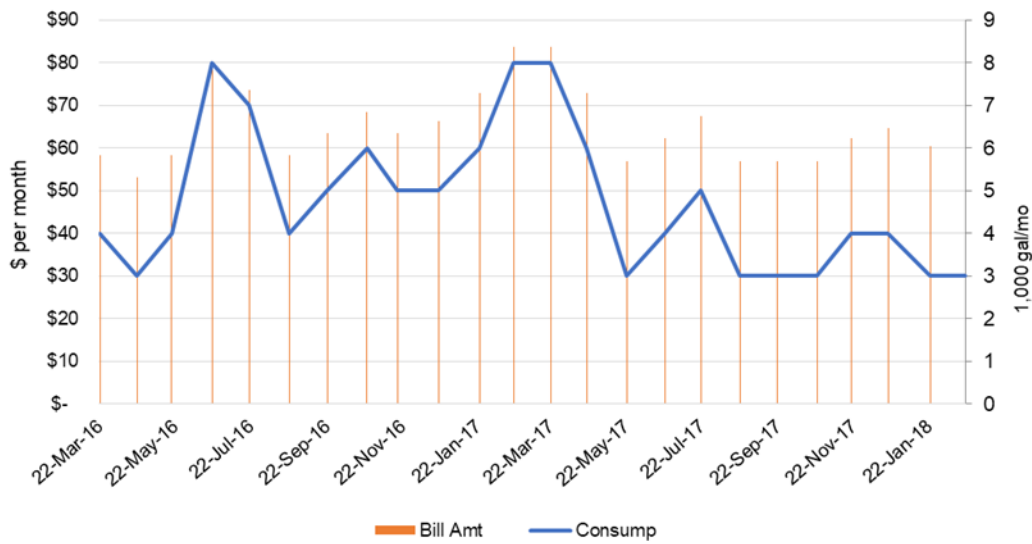
Customers with irrigation meters and/or systems commonly have significant fluctuations and often higher bills when compared to those with domestic water consumption only. Exhibit 5.20 shows a customer (in District 4) with varying irrigation usage over a 3 year period and bill amounts that may be \$150-\$200/mo. and then increase to \$250-\$300/mo. for one or more months. Domestic water for this account was low ranging from 1,000-3,000 gal./mo. whereas irrigation consumption ranged from 12,000-34,000 gal./mo.

Exhibit 5.20 – Sample SFRES Dom. Water & Irrigation Meters Varying Water Usage



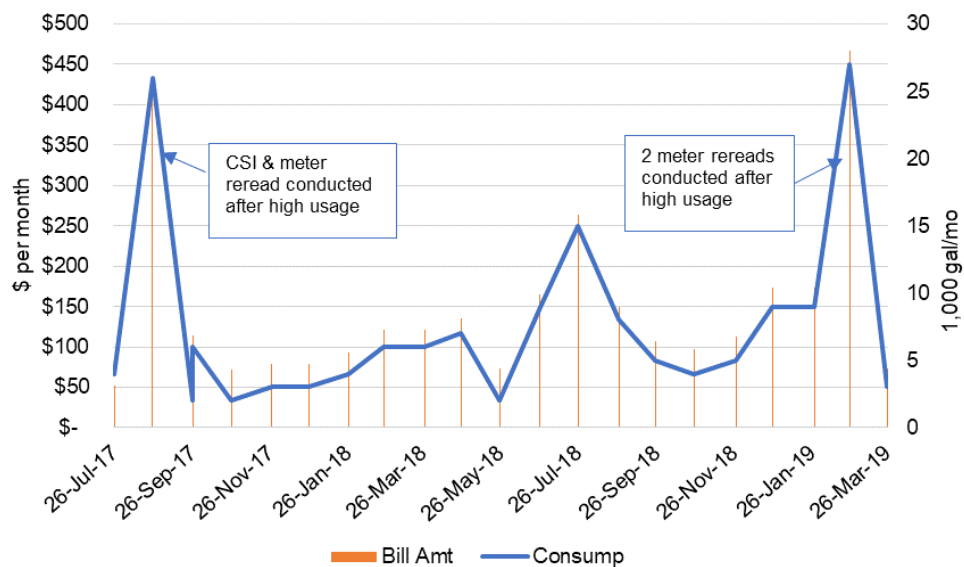
A typical single family account without irrigation (District 1) is presented in Exhibit 5.21 as follows. This account averaged 5,000 gal./mo. over the 2 year period with consumption ranging from 3,000-8,000 gal./mo. For water consumption to more than double over several months is not uncommon particularly when domestic water meter is used for irrigation. In this case, the customer did not have City sewer service and had an average bill of \$63/mo. for water, stormwater, and sanitation services (sewer service plus utility tax would add \$25/mo. to the bill).

Exhibit 5.21 – Sample SFRES Dom. Water Service Low/Avg Water Usage (5/8" meter)



A case of a customer (District 1) with domestic water meter and several high bills over a 2 year period is provided in Exhibit 5.22. The customer experience 2 months where water usage was over 25,000 gal., whereas the other months were comparatively low averaging 5,600 gal./mo. The City conducted a CSI in August 2017 as a result of the first high bill and consumption leveled out to 4-5,000 gal./mo. Subsequently in February 2019, consumption spiked again to 27,000 gal./mo. triggering a high/low exception and 2 meter rereads by the City. The spikes in usage could be related to irrigation usage or leaks and were not specifically identified in these billing records.

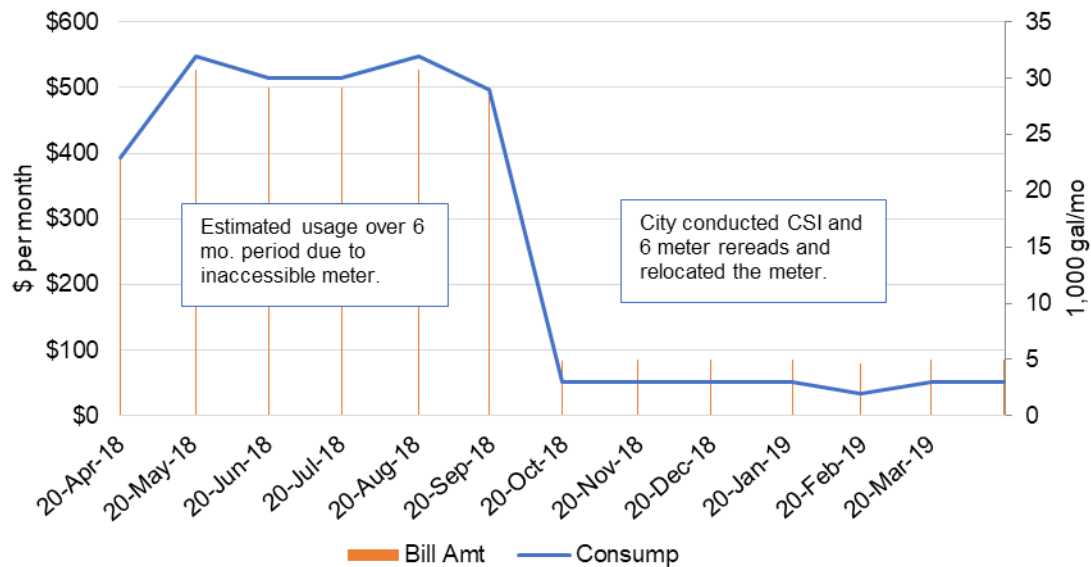
Exhibit 5.22 – Sample SFRES Dom. Water Service Varying Usage (5/8" meter)



From the sample, there were five accounts in the "estimated" grouping exhibiting several high bill amounts. Many of these accounts had multiple estimates during the three year period with accessibility to the meter being an issue. Service order records indicated a high volume of meter rereads as well as CSIs and other service actions being conducted to verify and resolve the issues for these accounts.

Exhibit 5.23 provides an example of an account (District 4) that had a series of estimated bills due to heavy vegetation preventing access to the meter. The account shown initiated service in April'18 with bills estimated by Cayenta's automated feature based on previous accounts at this location. After inquiry and review of the accounts and location details, the City indicated that Cayenta estimation feature most likely overestimated the bills based on the history. There were three separate accounts at this location over a 3+ year period which may have contributed to this error. After several meter rereads and meter relocation, actual meter readings were obtained, and the bills reduced significantly. The City provided a credit adjustment of \$2200 to this account to resolve the billing issue.

Exhibit 5.23 – Sample SFRES Customer Dom. Water Meter (5/8" meter)



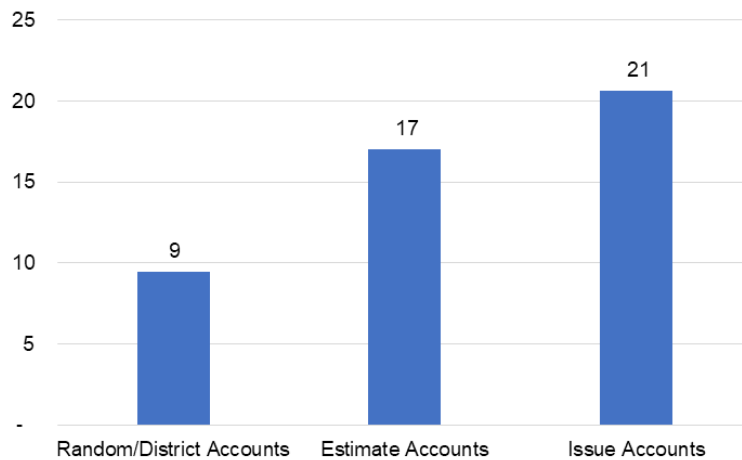
The table in Exhibit 5.24 shows the various service action responses involved in resolving this situation. The table shows the range of field services and bill adjustments to be completed to resolve the issue. This case is considered unique in nature with multiple accounts compounded by meter inaccessibility and high estimates over the period. An analysis across all SFRES accounts showed that estimated bills were not materially different than non-estimated bills (average \$149/mo. for actual meter read vs. \$148/mo. for estimated meter read between 2016 and 2018).

Exhibit 5.24 – Sample SFRES Customer Meter Read and Service Action History

BILL DATE	SERVICE	CONSUMP	EST T/F	BILL	Date	Service Action	ACTION_1	Resolution
20-Apr-18	WATER	23	T	\$394	27-Mar-18	Connect - get start read	FORGN	Cnctd-Start Rd
21-May-18	WATER	32	T	\$526	19-Apr-18	Meter Reread	QALRT	CSI Cmplt
20-Jun-18	WATER	30	T	\$500	01-May-18	CS Investigation	SO	Complete
20-Jul-18	WATER	30	T	\$500	21-May-18	Meter Reread	SO	Complete
21-Aug-18	WATER	32	T	\$526	20-Jun-18	Meter Reread	SO	Complete
19-Sep-18	WATER	29	T	\$487	20-Jun-18	Meter - Relocate	SO	Complete
19-Oct-18	WATER	3	F	\$84	12-Jul-18	Final Review	SO	Mtr Rpl on
19-Nov-18	WATER	3	F	\$86	20-Jul-18	Meter Reread	SO	Cmplt Mtr Rd
19-Dec-18	WATER	3	F	\$86	14-Aug-18	Final Review	SO	Cmplt Mtr Rd
22-Jan-19	WATER	3	F	\$86	21-Aug-18	Meter Reread	SO	Cmplt Mtr Rd
19-Feb-19	WATER	2	F	\$79	11-Sep-18	Final Review	SO	Cmplt Mtr Rd
20-Mar-19	WATER	3	F	\$86	19-Sep-18	Meter Reread	QALRT	Cancelled
19-Apr-19	WATER	3	F	\$86	26-Sep-18	Meter Replace	QALRT	Cancelled
					16-Oct-18	Final Review	QALRT	Cancelled
A credit of \$2200 was provided to the account due to the over billing from								

As cited above, usage and bills typically change from month to month, especially during times of irrigation, precipitating high/low exceptions, and meter rereads as well as customer service inquiries and responses by City billing and operational staff. Over the three year period, 19 of the 36 accounts reviewed had 10 or more service actions (and 4 had over 50 service actions). Exhibit 5.25 as follows shows that the average number of service actions for the Issue group was just over 20 during the period whereas the random group averaged nine service actions.

Exhibit 5.25 – Average Number of Service Actions per Sample Account



For the 37 accounts included in this review, a summary of service actions provided by the City included the following:

- 79 individual meter rereads (21 accounts)
- 29 CSI service orders (18 accounts)
- 26 actions – turnoff’s completed for nonpayment (6 accounts)
- 16 accounts – meter replace glass or lids
- 6 accounts – 12 meter tests
- 5 accounts – meter replacements
- 3 accounts – lien reviews completed

The evaluation shows the volume and range of customer, billing and field service actions necessary to resolve an issue once communicated to or flagged by the City. Additionally, the importance of effective tracking, reporting, and communication of the issues and responses both internally and externally with customers should also be emphasized.

Observation 5.4 – Outcomes of Sampling Analysis

KPMG's review of sample customer accounts indicates that high bills are not uncommon and can occur as a result of many different conditions, such as specific consumption patterns, physical conditions of location or meter, as well as errors in data entry and processing. Irrigation presents greater frequency of high consumption both with and without irrigation meters and opportunities for customers to better manage such usage. The City has routine, established procedures to respond to the various conditions that create exceptions as indicated by the high level of meter re-reads conducted daily. Follow-up field services via Customer Service Investigations (CSIs) and meter maintenance, testing and replacements are also routinely provided to correct inaccurate or inaccessible readings and other issues.

For the 37 accounts included in this review, a summary of service actions provided by the City included the following:

- 79 individual meter rereads (21 accounts)
- 29 CSI service orders (18 accounts)
- 26 actions – turnoff's completed for nonpayment (6 accounts)
- 16 accounts – meter replace glass or lids
- 6 accounts – 12 meter tests
- 5 accounts – meter replacements
- 3 accounts – lien reviews completed

As indicated elsewhere in this report, of the 37 accounts selected, KPMG identified one instance in which a selected account had a series of inaccurate estimates associated with Cayenta calculation issue. The issue was resolved and the customer's account was credited according to City procedures.

Recommendation – N/A

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