



ORANGE WATER AND SEWER AUTHORITY

*A public, non-profit agency providing water, sewer and reclaimed water services
to the Carrboro-Chapel Hill community.*

Agenda

Work Session of the OWASA Board of Directors

Thursday, December 13, 2018, 6:00 P.M.

OWASA Community Room

The Board of Directors appreciates and invites the public to attend and observe its meetings. For the Board's Work Session, public comments are invited on only items appearing on this agenda. Speakers are invited to submit more detailed comments via written materials, ideally submitted at least three days in advance of the meeting to the Clerk to the Board via email or US Postal Service (aorbich@owasa.org/400 Jones Ferry Road, Carrboro, NC 27510).

For items on the agenda, public speakers are encouraged to organize their remarks for delivery within a four-minute time frame allowed each speaker, unless otherwise determined by the Board of Directors.

The Board may take action on any item on the agenda.

Announcements

- a. Announcements by the Chair
 - Any Board Member who knows of a conflict of interest or potential conflict of interest with respect to any item on the agenda tonight is asked to disclose the same at this time.
 - Special Work Session on Wednesday, December 19, 2018 at 6 PM in the OWASA Boardroom to Discuss Communications and Community Engagement
- b. Announcements by Board Members
 - Update on the December 5, 2018 Finance Committee Meeting (Ray DuBose)
 - Update on the December 12, 2018 Natural Resources and Technical Services Committee Meeting (John Young)
 - Members of the Orange County Board of Commissioners and Orange County Appointees to the OWASA Board will meet on Wednesday, January 30, 2019 at 8:30 AM in the OWASA Boardroom to discuss items of mutual interest (Ray DuBose)
 - OWASA's Annual Update to the Orange County Board of County Commissioners on Tuesday, February 19, 2019, at 7:00 PM at Southern Human Services Center (Ray DuBose)
- c. Announcements by Staff
- d. Additional Comments, Suggestions, and Information Items by Board Members (Yinka Ayankoya)

Consent Agenda

Action

1. Proposed Key Focus Areas for OWASA's Executive Director (Ed Kerwin)
2. Position Reclassification for Maintenance Coordinator (Todd Taylor)
3. Minutes of the October 25, 2018 Meeting of the Board of Directors (Andrea Orbich)

Regular Agenda

Discussion and Action

4. Resolution Awarding a Construction Contract for Gravity Sewer Rehabilitation (Allison Reinert)
5. Proposed Resources for Capital Improvements Program Execution and Water Distribution System Maintenance (Mary Darr/Todd Taylor/Stephen Winters)

Discussion

6. Review Status of Fiscal Year 2019 Budget (Stephen Winters)

Information and Reports

7. Administration of Strategic Plan
 - A. Annual Review and Update of Strategic Trends and Utility Planning Issues (Ruth Rouse)
 - B. Strategic Plan Progress Report (Ed Kerwin)

Discussion

8. Discuss Water Loss and Non-Revenue Water Key Performance Indicator (Mary Tiger)
9. Discuss Priorities for Natural Resources and Technical Services Committee (John Young)
10. Review Board Work Schedule (Yinka Ayankoya/Ed Kerwin)
 - a. Request(s) by Board Committees, Board Members and Staff
 - b. December 19, 2018 Special Work Session
 - c. January 10, 2019 Work Session
 - d. 12 Month Board Meeting Schedule
 - e. Pending Key Staff Action Items

Summary of Work Session Items

11. Executive Director will summarize the key staff action items from the Work Session

Agenda Item 1:

Proposed Key Focus Areas for OWASA's Executive Director

Purpose:

Review and approve the proposed Key Focus Areas for OWASA's Executive Director for the period of October 2017 to September 2018.

Information:

- Proposed Key Focus Areas for OWASA's Executive Director

December 13, 2018

Proposed Key Focus Areas for OWASA's Executive Director For the Period of October 2018 to September 2019

December 13, 2018

Under the Executive Director's leadership, the OWASA team works together to ensure the organization's Mission is reliably and sustainably met. The Board of Directors acknowledges that the Executive Director will continue to use his judgement on the best use of his time to benefit the organization.

Operational/Business Objectives

1. High Quality and Reliable Service

Ensure OWASA's daily core mission responsibility of providing high quality and reliable drinking water, wastewater management, and reclaimed water services for the Carrboro-Chapel Hill community is met.

Expected Results/Tasks to complete:

a) High Quality

- i. Zero violations of primary drinking water standards
- ii. Maintain certification by the Partnership for Safe Water for Phase IV Excellence in Water Treatment
- iii. Maintain Presidents Award status by the Partnership for Safe Water for Distribution System Operation
- iv. Initiate Partnership for Clean Water Phase III self-assessment process pursuant to Directors Award status for Excellence in Wastewater Treatment
- v. Zero violations of treated wastewater standards
- vi. Zero violations of reclaimed water standards
- vii. Zero violations of biosolids recycling standards
- viii. Meet all Financial Management Objectives

b) Reliable and Resiliency

- i. Complete independent consultant review by end of December 2018 on why pipe in front of water plant broke on November 5, 2018 and why it took eight hours to stop the loss of water.
- ii. As needed, implement action plan to address consultant findings in (b)i).
- iii. Fast track reliability improvements for water distribution piping leaving the water treatment plant as it pertains to the November 5, 2018 water main break.
- iv. Develop new water main replacement/renewal prioritization model. The scope of this work may include system redundancy and resiliency work.
- v. In coordination with (b)iii) and (b)iv), evaluate options to improve the reliability and resiliency of the water distribution system with community input and involvement.
- vi. Fast track priority action items recommended in the water and wastewater treatment plants reliability and risk evaluation.

- vii. Enhance distribution system valve maintenance and related component program and propose needed resources to the Board.

The Board and staff agrees that other than employee and public safety, OWASA's core mission responsibility of providing high quality and reliable drinking water, wastewater management, and reclaimed water service is our highest priority.

2. Agua Vista – Advanced Metering Infrastructure (AMI)

Complete implementation of Agua Vista to include effective customer engagement for use of Agua Vista portal.

Expected Results:

- a) AMI meter installation substantially completed by June 30, 2019.
- b) Provide Agua Vista web portal access to customers with an AMI meter by June 30, 2019.
- c) Customers with an AMI meter are well-informed about their opportunities and benefits for using Agua Vista.

Working with Stephen Winters and Dan Przybyl, Todd Taylor has the lead role for this project. Ed Kerwin's focus will be on processes, performance and resources for a highly successful project.

3. Energy Management

Continue implementation of the Energy Management Program and provide support for achieving energy management goals and objectives. An updated plan will be brought to the Board in the first quarter of 2019.

Expected Results:

- a) Reduce use of purchased electricity, making progress to meet goal of a 35% reduction from 2010 levels by 2020
- b) Reduce use of purchased natural gas, making progress to meet goal of a 5% reduction from 2010 by 2020
- c) Propose a plan to generate renewable energy

Mary Tiger has the lead role for this project. Ed Kerwin's focus will be working with staff to improve the organization's culture to be more energy aware and achieve outcomes set forth in the plan.

Planning Initiatives

4. Long-Range Water Supply Plan

Update the 2010 Long-Range Water Supply Plan (LRWSP) to ensure a safe, reliable supply of water for the next fifty years (2070).

Expected Results:

- a) Projected 2070 raw water demands
- b) Projected shortfall in supply, if any
- c) List of supply and demand management alternatives to meet 2070 raw water demands

During this review period, staff will begin evaluating the supply and demand management alternatives against the goals and objectives approved by the Board of Directors in November 2016. Ruth Rouse has the lead on the LRWSP update; Ed Kerwin's focus will be on process, performance, and resources for a successful update of the Plan.

5. Forestry Management

To support its mission, OWASA owns approximately 2,400 acres of forested land. Some of OWASA's forested lands are diseased, have extensive storm damage, or are pines that were planted too close together. OWASA plans to manage its forests to protect water quality, improve the forest quality, and reduce fire risk.

Expected Results: Board approval of approach and framework for sustainable management of OWASA's forested lands.

Ruth Rouse has the lead to work with staff, the Board and others to prepare the initial plan and its implementation.

Human Resource Objectives

6. Diversity and Inclusion

Continue implementation of the Diversity and Inclusion program.

Goals:

- The diversity of OWASA's workforce reflects the communities we serve.
- Inclusive work environment for everyone that encourages and supports each team member to contribute to their full ability toward OWASA's Mission.

Expected Results:

- a) Continued positive culture change in support of diversity and inclusion (tentatively planning for new organizational assessment within next 18-24 months to help measure progress).
- b) Greater employee participation in voluntary training and other diversity and inclusion activities.
- c) More diverse applicant pools.
- d) Continued progress on diversity and inclusion action items.

Stephanie Glasgow has the lead. Ed Kerwin will ensure the team has the time and resources needed to meet the established goals and objectives.

7. Employee 457 Deferred Compensation and Retiree Health Insurance

Update the employee 457 deferred compensation and retiree health insurance plans as determined desirable by the Board in consideration of employee feedback.

Expected Results: Working closely with the HR Committee, recommend to the full Board changes to the 457 and retiree health insurance plans.

8. Employee Safety

Support Stephanie Glasgow in the recruitment, hiring and training of the new Safety and Risk Manager. Initial tasks for the position include crisis management, OSHA inspections, analyzing data and determining the need for more detailed safety reports and safety performance metrics for Board of Directors and staff.

Expected Results:

- a) Reduction in Safety Incident Rate.
- b) Propose additional safety metrics for the Board's consideration.

Community Engagement Objectives

9. Affordability Outreach Program

Develop and implement Year Four of the Affordability Outreach Program designed to increase community awareness of options to manage and reduce water and sewer bills and to empower low-income customers, and the local agencies that serve them, with information and tools to manage and reduce water and sewer bills.

Expected Results:

- a) Increase in contributions to Care to Share Program towards full support of the utility bill assistance provided by the Interfaith Council for Social Services.
- b) Implementation of Affordability Outreach Program, as approved by the Board.
- c) Promotion of Agua Vista web portal as a key affordability resource.

Mary Tiger has the lead for this program. Ed Kerwin's focus will be on program accountability and to ensure sufficient resources are committed to the program.

10. Communications and Community Engagement Plan

Development of an annual Communications and Community Engagement Plan that is responsive to our customer's information needs and enables inclusive and meaningful dialogue on local water and wastewater priorities.

Expected Results:

- a) Continue improvement in communications with system users, key stakeholders and the community during emergencies.
- b) Develop processes and identify best practices to share timely and relevant information with customers and partners.
- c) Develop community engagement initiatives to support organizational goals in collaboration with community partners.
- d) Pilot community education programs.
- e) Relaunch OWASA's website.
- f) Improve OWASA's social media presence and engagement.
- g) Provide communications training to interested employees.

Linda Low has the lead. Ed Kerwin will work with staff to improve the organization's culture of communications and community engagement, and identify supporting resources to enable meaningful and measurable outcomes.

11. 2019 Wyland National Mayor's Challenge for Water Conservation

The Town of Chapel Hill committed to this challenge. OWASA looks forward to partnering in support of this initiative.

Expected Results: Working closely with all partners, support a successful campaign.

Mary Tiger has the lead.

Agenda Item 2:

Position Reclassification for Maintenance Coordinator

Purpose:

To obtain Board approval to amend the Schedule of Employee Classification and Authorized Compensation to reclassify the vacant Maintenance Coordinator position from Salary Grade 618 to Salary Grade 619.

Background:

In January 2018, the Maintenance Coordinator position was vacated when that employee was promoted to a supervisory role. The position has not been filled due to recruitment challenges. Staff attributes some of these challenges to less than competitive compensation.

The job description for the Maintenance Coordinator position has been revised and is included for the Board's information. Additional responsibilities were added to the position including: staff training and development and budget oversight assistance. Please note that, per our Pay Administration Guidelines, we applied our Job Evaluation procedure which assigns a salary range utilizing a "point factor evaluation" methodology.

Recommendation:

Staff recommends amending the Schedule of Employee Classification and Authorized Compensation to reclassify the vacant Maintenance Coordinator position from Salary Grade 618, \$54,130 - \$83,358, to Salary Grade 619, \$59,001 - \$90,861.

Information:

- Maintenance Coordinator Job Description
- Resolution to Amend the Schedule of Employee Classification and Authorized Compensation to Reclassify the Maintenance Coordinator Position

December 13, 2018

Maintenance Coordinator

FLSA Status: Non-Exempt

Pay Grade 619: \$59,001 - \$90,861



BRIEF DESCRIPTION:

The purpose of this position is to provide a well-organized, planned and scheduled approach to performing facility maintenance; provides the necessary maintenance resources and record keeping required to ensure successful, safe and reliable operations of all OWASA facilities. This is accomplished by receiving work service requests; coordinating and prioritizing work tasks with Facility Managers and Maintenance Supervisors; updating the Computerized Maintenance Management System (CMMS); ensuring all information is accurate in the CMMS; preparation of reports, metrics, and other tracking tools; . Other duties include developing and maintaining an inventory list of spare parts; reviewing engineer design diagrams, assisting with data collection and condition assessment on assets; performing condition and risk assessments; determining actions necessary to improve life cycle costs; organizing contractor assistance; maintain up to date manuals for equipment and facilities, assist with developing and maintaining standard operating procedures and provide training on procedures, develop and coordinate specialized training for new and existing employees; assist with budget development and purchasing as needed.

ESSENTIAL FUNCTIONS:

Note: This information is intended to be descriptive of the key responsibilities of the position. The list of essential functions below does not identify all duties performed by any single incumbent in this position. Additionally, please be aware of the legend below when referring to the physical demands of each essential function.

(S) Sedentary	(L) Light	(M) Medium	(H) Heavy	(V) Very Heavy
Exerting up to 10 lbs. occasionally or negligible weights frequently; sitting most of the time.	Exerting up to 20 lbs. occasionally; 10 lbs. frequently; or negligible amounts constantly; OR requires walking or standing to a significant degree.	Exerting 20-50 lbs. occasionally; 10-25 lbs. frequently; or up to 10 lbs. constantly.	Exerting 50-100 lbs. occasionally; 10-25 lbs. frequently; or up to 10-20 lbs. constantly.	Exerting over 100 lbs. occasionally; 50-100 lbs. frequently; or up to 20-50 lbs. constantly.

#	Code	Essential Functions
1	S	Establishes maintenance schedule for staff by receiving work service requests; coordinating and prioritizing work tasks with Facility Managers and Maintenance Supervisors; prioritizing work orders; scheduling and issuing work orders; assuring appropriate parts and equipment are available/supplied for the job; maintaining/updating the CMMS with work order information returned from field; coordinating closely with maintenance staff; generating reports on open/closed work orders using CMMS.
2	S	Assists with the development of the Asset Management Plan by assisting with the collection and computer entry of facility equipment information, condition, criticality, purchase date, useful life and replacement cost; working with vendors and outside parties; providing reports on equipment maintenance history; providing annual reviews and input on replacement schedules; working as member of Asset Management Team to improve facility equipment
3	S	Collects and analyzes data on historical trends and repair history by ensuring all data in the CMMS is accurate; analyzing equipment repair history and generating reports; collecting and analyzing data as needed to develop historical trends to schedule future maintenance; developing and maintaining Maintenance

Orange Water and Sewer Authority

		Management benchmarks; providing monthly reports to work order backlog, PM/CM, staff utilization, etc.
4	S	Assist with the acquisition of parts and materials as needed; requesting quotes from multiple vendors to ensure competitive pricing; preparing purchase order requests; sending purchase order requests to purchasing; ordering parts, ensuring parts are received in good condition; submitting invoices and packing slips to accounting for payment.

JOB REQUIREMENT

-Description of Minimum Job Requirements-	
Formal Education	Work requires knowledge of a specific vocational, administrative, or technical nature which may be obtained with a two year associate's degree, diploma or equivalent from a college, technical, business, vocational, or correspondence school. Appropriate certification may be awarded upon satisfactory completion of advanced study or training.
Experience	Over three years up to and including five years.
Supervision	Work requires functioning as a lead or supervising worker performing essentially the same work as those directed, and includes overseeing work quality, training, instructing, and scheduling work.
Human Collaboration Skills	Interactions result in decisions regarding implementation of policies may be made. Contact may involve support of controversial positions or the negotiation of sensitive issues or important presentations. Contacts may involve stressful, negative interactions with the public requiring high levels of tact and the ability to respond to aggressive interpersonal interactions.
Freedom to Act	Receives Limited Direction: The employee normally performs the duty assignment according to his or her own judgment, requesting supervisory assistance only when necessary. Special projects are managed with little oversight and assignments may be reviewed upon completion. Performance reviewed periodically.
Technical Skills	Skilled: Work requires a comprehensive, practical knowledge of a technical field with use of analytical judgment and decision-making abilities appropriate to the work environment of the organization.
Fiscal Responsibility	This job title does research for documents, compiles data for computer entry, and/or enters or oversees data entry. Has responsibility for monitoring budget/fiscal expenditures (typically non-discretionary expenditures) for a work unit of less than department size (programs, activities, projects or small organizational units) or responsibility for fiscal management of capital project(s).
Reading	Intermediate - Ability to read papers, periodicals, journals, manuals, dictionaries, thesauruses, and encyclopedias. Ordinarily, such education is obtained in high school up to college. However, it may be obtained from experience and self-study.
Math	Intermediate - Ability to deal with system of real numbers; practical application of fractions, percentages, ratios/proportions and measurement.

Orange Water and Sewer Authority

	Ordinarily, such education is obtained in high school up to college. However, it may be obtained from experience and self-study.
Writing	Intermediate - Ability to write reports, prepare business letters, expositions, and summaries with proper format, punctuation, spelling, and grammar, using all parts of speech. Ordinarily, such education is obtained in high school up to college. However, it may be obtained from experience and self-study.
Certification & Other Requirements	Valid Class C Driver's License

Orange Water and Sewer Authority

OVERALL PHYSICAL STRENGTH DEMANDS:

-Physical strength for this position is indicated below with "X"-				
Sedentary X	Light	Medium	Heavy	Very Heavy
Exerting up to 10 lbs. occasionally or negligible weights frequently; sitting most of the time.	Exerting up to 20 lbs. occasionally, 10 lbs. frequently, or negligible amounts constantly OR requires walking or standing to a significant degree.	Exerting 20-50 lbs. occasionally, 10-25 lbs. frequently, or up to 10 lbs. constantly.	Exerting 50-100 lbs. occasionally, 10-25 lbs. frequently, or up to 10-20 lbs. constantly.	Exerting over 100 lbs. occasionally, 50-100 lbs. frequently, or up to 20-50 lbs. constantly.

PHYSICAL DEMANDS:

C Constantly <small>2/3 or more of the time.</small>	F Frequently <small>From 1/3 to 2/3 of the time.</small>	O Occasionally <small>Up to 1/3 of the time.</small>	R Rarely <small>Less than 1 hour per week.</small>	N Never <small>Never occurs.</small>
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Note: This is intended as a description of the way the job is currently performed. It does not address the potential for accommodation.

-Physical Demand-	-Frequency-	-Brief Description-
Standing	O	communicating with co-workers
Sitting	F	Desk work, meetings, driving
Walking	O	to other departments/offices/office equipment
Lifting	O	files, supplies
Carrying	R	files, supplies
Pushing/Pulling	R	file drawers, tables and chairs
Reaching	O	for supplies, for files
Handling	F	paperwork
Fine Dexterity	F	calculator, computer keyboard, telephone pad
Kneeling	R	filing in lower drawers, retrieving items from lower shelves/ground
Crouching	O	filing in lower drawers, retrieving items from lower shelves/ground
Crawling	R	
Bending	R	filing in lower drawers, retrieving items from lower shelves/ground
Twisting	R	from computer to telephone, getting inside vehicle
Climbing	O	stairs
Balancing	R	
Vision	F	reading, computer screen
Hearing	F	communicating with co-workers and public and on telephone
Talking	F	communicating with co-workers and public and on telephone
Foot Controls	R	
Other (specified if applicable)		

Orange Water and Sewer Authority

MACHINES, TOOLS, EQUIPMENT, SOFTWARE, AND HARDWARE:

Telephone, calculator, two-way radio, copier, scanner, computer, monitor, printer, CMMS software, Microsoft Office

ENVIRONMENTAL FACTORS:

C Continuously	F Frequently	O Occasionally	R Rarely	N Never
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D Daily	W Several Times Per Week	M Several Times Per Month	S Seasonally	N Never
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-Health and Safety Factors-	
Mechanical Hazards	O
Chemical Hazards	O
Electrical Hazards	O
Fire Hazards	R
Explosives	R
Communicable Diseases	N
Physical Danger or Abuse	N
Other (see 1 below)	

-Environmental Factors-	
Respiratory Hazards	N
Extreme Temperatures	S
Noise and Vibration	W
Wetness/Humidity	S
Physical Hazards	N

PROTECTIVE EQUIPMENT REQUIRED:

Safety glasses, hard hat, traffic vest, safety shoes, etc.

NON-PHYSICAL DEMANDS:

F Frequently From 1/3 to 2/3 of the time	O Occasionally Up to 1/3 of the time	R Rarely Less than 1 hour per week	N Never Never occurs
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-Description of Non-Physical Demands	-Frequency-
Time Pressure	O
Emergency Situation	R
Frequent Change of Tasks	O
Irregular Work Schedule/Overtime	O
Performing Multiple Tasks Simultaneously	F
Working Closely with Others as Part of a Team	F
Tedious or Exacting Work	F
Noisy/Distracting Environment	O
Other	

PRIMARY WORK LOCATION:

Office Environment	X	Vehicle	
Warehouse		Outdoors	
Shop		Other	
Recreation/Neighborhood Center			

The above statements are intended to describe the general nature and level of work being performed by individuals assigned to this position. They are not intended to be an exhaustive list of all responsibilities, duties, and skills required. This description is subject to modification as the needs and requirements of the position change.

**Resolution to Amend the Schedule of Employee Classification and Authorized
Compensation to Reclassify the Maintenance Coordinator Position**

Whereas, the Executive Director has reviewed the duties, functions and responsibilities for the single Maintenance Coordinator position in the schedule of Employee Classifications; and

Whereas, the Executive Director has determined that the position should be reclassified from a Grade 618 position (annual salary range \$54,130 - \$83,358) to a Grade 619 (annual salary range \$59,001 - \$90,861), in order better to reflect the skills and experience required for performance of the position, and to keep that compensation level competitive within the applicable labor market;

Now, Therefore, Be It Resolved:

1. That the single Maintenance Coordinator position at a Grade 618 be reclassified to a Grade 619 (annual salary range \$59,001 - \$90,861), and that the Schedule of Employee Classification and Authorized Compensation shall be amended to reflect this change effective upon adoption of this Resolution.

Adopted this 13th day of December, 2018.

Yinka Ayankoya, Chair

ATTEST:

Raymond E. DuBose, Secretary

Agenda Item 3

Orange Water and Sewer Authority

Meeting of the Board of Directors

October 25, 2018

The Board of Directors of the Orange Water and Sewer Authority (OWASA) held a regular meeting on Thursday, October 25, 2018, at 7:00 p.m. in Chapel Hill Town Hall Council Chamber.

Board Members present: Yinka Ayankoya (Chair), Raymond (Ray) DuBose (Secretary), Bruce Boehm, Jody Eimers, John N. Morris, Robert Morgan, Ruchir Vora and John A. Young. Board Member absent: Jeff Danner (Vice Chair).

OWASA staff present: Michael ChristySam, Mary Darr, Monica Dodson, Robert Epting Esq. (Epting and Hackney), Stephanie Glasgow, Robin Jacobs (Epting and Hackney), Ed Kerwin, Andrea Orbich, Johnny Riley, Kelly Satterfield, Todd Taylor, Mary Tiger and Stephen Winters.

Others present: Ben Poulson (UNC Associate Director of Energy Services).

There being a quorum present, Chair Yinka Ayankoya called the meeting to order.

Motions

1. BE IT RESOLVED THAT the Board of Directors adopts the Resolution of Appreciation to the Staff of Orange Water and Sewer Authority. (Motion by John Young, second by Ruchir Vora and unanimously approved.)
2. BE IT RESOLVED THAT the Board of Directors adopts the Resolution to Amend the Schedule of Employee Classification and Authorized Compensation to Reclassify an Administrative Assistant Position to a Distribution and Collection Systems Coordinator Position. (Motion by John Young, second by Robert Morgan and unanimously approved.)
3. BE IT RESOLVED THAT the Board of Directors adopts the Resolution of the OWASA Board of Directors Adopting a Policy on Confidentiality of Individual Customers' Billing and Water-Consumption Records and Data. (Motion by John Young, second by Robert Morgan and unanimously approved.)
4. John Morris moved to approve the Resolution of the OWASA Board of Directors Adopting an Amended Policy for Adjustment of Customer Accounts for Emergency Situations Involving Loss of Metered Water with the amendment that the second paragraph under Conditions in the proposed Policy be deleted because only two customers are not using the Agua Vista meters and would be a small financial risk to OWASA; second by Jody Eimers. After discussion the motion failed with a vote of one to seven.

5. BE IT RESOLVED THAT the Board of Directors adopts the Resolution of the OWASA Board of Directors Adopting an Amended Policy for Adjustment of Customer Accounts for Emergency Situations Involving Loss of Metered Water (Motion by John Young, second by Robert Morgan and unanimously approved.)
6. John Young made a motion to approve the Minutes September 27, 2018 Annual Meeting of the Board of Directors; second by Robert Morgan and unanimously approved.
7. John Young made a motion to approve the Minutes September 27, 2018 Closed Session of the Board of Directors for the purpose of discussing a personnel matter; second by Robert Morgan and unanimously approved.
8. Robert Morgan made a motion to leave the out-of-county rates at the current level for both lakes for the 2019 recreational season; second by John Morris and unanimously approved.

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Announcements

Chair Yinka Ayankoya asked if any Board Member knows of a conflict of interest or potential conflict of interest with respect to any item on the agenda tonight to please disclose the same at this time; none were disclosed.

Ms. Ayankoya announced that new Board Members and other Board Members, will meet on Tuesday, November 13, 2018, at 5:00 p.m., in the OWASA Boardroom, for a diversity and inclusion training session with VISIONS, Inc.

Ms. Ayankoya announced that the canceled October 11, 2018 Board Work Session has been rescheduled for Thursday, November 15, 2018 at 6:00 p.m. in OWASA's Community Room.

Ray DuBose said that the Finance Committee met on October 8, 2018 to review and discuss longer-term approaches and strategies for managing operating expenses. The Committee discussed ways to identify and benchmark expenses that may be able to be reduced through innovative approaches. Staff will conduct an initial analysis to help the Committee identify areas of OWASA's operations that may be able to be accomplished more efficiently and less costly. The Committee agreed to meet in the first half of December 2018 to discuss staff's analysis. The Fiscal Year 2020 Budget Calendar and Planning Assumptions will also be discussed.

John Young announced a tour of Cane Creek Reservoir watershed lands scheduled for Friday, October 26, 2018 at 1:00 p.m. for new Board Members and other interested Board Members to inform discussions about source water protection and forestry management.

Mr. Young said that the Natural Resources and Technical Services (NRTS) Committee meeting will meet on Tuesday, October 30, 2018 at 4:30 p.m., in the OWASA Boardroom, to discuss source water protection; the NRTS Committee will also meet on Thursday, November 8, 2018 at

4:00 p.m. to discuss the overall approach for forestry management on OWASA's watershed lands.

Ruchir Vora announced a meeting between the Chapel Hill Town Council OWASA Committee and Chapel Hill Appointees to the OWASA Board of Directors on Thursday, November 15, 2018, at 8:30 a.m., in the OWASA Boardroom, to discuss items of mutual interest.

Todd Taylor recognized OWASA employees who have served for 10, 15, 20 and 25 years at OWASA. The following employees received service awards:

10 Years: Joshua Leonard and Stephen Long

15 Years: Brian Dodson

20 Years: Roy Bryant, Michael ChristySam*, Jackie Mills, Jeff Morris and Ted Shaffer

25 Years: Donnie Nolf

*Michael ChristySam attended the Board meeting and was recognized by his supervisor, Kelly Satterfield, Finance and Procurement Manager.

Ed Kerwin announced that on October 10, 2018, OWASA participated in the Town of Carrboro Citizen's Academy held at Carrboro Fire Station #1 and that Yinka Ayankoya and Robert Morgan also attended. Mr. Kerwin also said an OWASA session was held on October 20, 2018 as part of Chapel Hill's Peoples Academy.

John Morris said that he attended a special ceremony commemorating the 30th anniversary of the Rural Buffer on October 16, 2018 and noted its importance.

Petitions and Requests

John Young petitioned the Board to acknowledge staff with a Resolution of Appreciation for their exemplary efforts in protecting the community during the flooding and other dangers caused by Hurricane Florence; the Board agreed.

John Young moved adoption of the Resolution of Appreciation to the Staff of Orange Water and Sewer Authority which he read aloud; second by Ruchir Vora and unanimously approved. Please see Motion 1 above.

Yinka Ayankoya asked for petitions and requests from the public and staff; there were none.

Item One: 12 Month Board Meeting Schedule

The Board received the 12 Month Board Meeting Schedule as an information item.

Item Two: Quarterly Report on Attendance at Board and Committee Meetings

The Board received the Quarterly Report on Attendance at Board and Committee Meetings as an information item.

Item Three: Position Reclassification for Distribution and Collection Departments

John Young made a motion to approve the Resolution to Amend the Schedule of Employee Classification and Authorized Compensation to Reclassify and Administrative Assistant Position to a Distribution and Collection Systems Coordinator Position; second by Robert Morgan and unanimously approved. Please see Motion 2 above.

Item Four: Approve Agua Vista-Related (Advanced Metering Infrastructure) Policies

John Young made a motion to approve the Resolution of the OWASA Board of Directors Adopting a Policy on Confidentiality of Individual Customers' Billing and Water-Consumption Records and Data; second by Robert Morgan and unanimously approved. Please see Motion 3 above.

John Morris moved to approve the Resolution of the OWASA Board of Directors Adopting an Amended Policy for Adjustment of Customer Accounts for Emergency Situations Involving Loss of Metered Water with the amendment that the second paragraph under Conditions in the proposed Policy be deleted because only two customers do not use Agua Vista meters and would be a small financial risk to OWASA; second by Jody Eimers. After discussion, the motion failed with a vote of one to seven. Please see Motion 4 above.

John Young made a motion to approve the Resolution of the OWASA Board of Directors Adopting an Amended Policy for Adjustment of Customer Accounts for Emergency Situations Involving Loss of Metered Water; second by Robert Morgan and unanimously approved. Please see Motion 5 above.

Item Five: Minutes

John Young made a motion to approve the Minutes September 27, 2018 Annual Meeting of the Board of Directors; second by Robert Morgan and unanimously approved. Please see Motion 6 above.

Item Six: Minutes

John Young made a motion to approve the Minutes September 27, 2018 Closed Session of the Board of Directors for the purpose of discussing a personnel matter; second by Robert Morgan and unanimously approved. Please see Motion 7 above.

Item Seven: Review Draft Water Treatment Plant and Wastewater Treatment Plant Reliability and Risk Assessment Action Plan

Mary Darr and Monica Dodson presented an Action Plan developed by staff from the findings of the Reliability and Risk Assessment Evaluation.

Ray DuBose suggested providing the priority of the items at the highest risk and that fuel should be included.

Jody Eimers said that cybersecurity should be reviewed.

Ruchir Vora suggested a safety and risk assessment once the Safety and Risk Manger is on board.

The Board requested that the Water Treatment Plant and Wastewater Treatment Plant Reliability and Risk Assessment Action Plan be provided annually via email beginning in October 2019.

Item Eight: Discuss Recreational Fees for Out-of-County Visitors

Robert Morgan made a motion to leave the out-of-county rates at the current level for both lakes for the 2019 recreational season; second by John Morris and unanimously approved. Please see Motion 8 above.

Item Nine: Financial Report for the Three-Month Period Ended September 30, 2018

Stephen Winters presented the financial report for the three-month period ended September 30, 2018 reporting that net income for the period was about \$37,000 or 1% less than budget.

The Board requested additional information regarding the chemical costs for the Water Treatment Plant that are over budget. The Board requested staff analysis regarding how position vacancies and Operating Expenses per 1,000 gallons of drinking water treated. Staff will follow up.

Item Ten: Summary of Board Meeting Action Items

Ed Kerwin noted the following items for staff follow-up:

- Incorporate feedback received on Water Treatment Plant and Wastewater Treatment Plant Reliability and Risk Assessment Action Plan in an annual progress report in October 2019;
- Provide response to questions via email regarding the chemical costs for the Water Treatment Plant that are over budget and an analysis regarding how position vacancies and Operating Expenses per 1,000 gallons of drinking water treated;
- November 8, 2018 Board Work Session agenda will include:
 - discuss communications and community engagement planning;
 - discuss process to update the Strategic Plan; and
 - discuss priorities for the Natural Resources and Technical Services Committee.

Item Eleven: Closed Session

Without objection, the Board convened in a Closed Session to discuss a personnel matter.

The Board came out of closed session and the meeting was adjourned at 9:17 p.m.

Respectfully submitted by:

Andrea Orbich
Executive Assistant/Clerk to the Board

Attachments

DRAFT

Agenda Item 4:

Resolution Awarding a Construction Contract for Gravity Sewer Rehabilitation

Purpose:

This memorandum recommends that the OWASA Board of Directors award a construction contract to Moffat Pipe, Inc. (“Moffat”) for the construction of the Gravity Sewer Rehabilitation Fiscal Year (FY) 17-19 Package 3 Project (“Project”).

Background:

The Project, part of OWASA’s ongoing sewer rehabilitation program, will repair or rehabilitate aging gravity sewer mains to ensure the safe and reliable collection and conveyance of wastewater to the Mason Farm Wastewater Treatment Plant. As part of the sewer rehabilitation program, over 150 miles of sewer mains (46% of the collection system) have been inspected and evaluated and about 11 miles (3%) of sewer mains have been rehabilitated or replaced since 2012 through capital improvement projects. Funding has been provided in FY 2019 through FY 2023 for the evaluation and rehabilitation of over 15 miles of sewer mains for approximately \$18 million dollars.

The sewer mains within this current project were identified through the Gravity Sanitary Sewer Evaluation Project (CIP #276-17) and with input from OWASA staff. Attachment 1 shows the sewer rehabilitation project locations. This project will rehabilitate or replace approximately 28,000 linear feet (5.3 miles or 1.6% of the collection system) of gravity sewer pipes ranging in size from 6-inch to 24-inch diameter using cured-in-place pipe (CIPP) lining. Additionally, 152 manholes will be rehabilitated as part of this project, which is 1.4% of the manholes in the collection system. Rehabilitation included in this project reduces inflow and infiltration into the collection system, maintains permit compliance through the reduction of sanitary sewer overflows, and extends the useful life of our infrastructure.

As part of preliminary design for the project, sewer mains were inspected using closed-circuit television (CCTV) and their condition was rated in accordance with a standardized pipe rating protocol. Sewer mains with a condition rating below a certain threshold were identified as needing lining to address cracking and subsequent inflow and infiltration into the collection system. Additionally, as OWASA crews work within the collection system they note any particular areas of sewer mains that need lining or point repairs.

Part of this work is located on the University of North Carolina - Chapel Hill campus (UNC) and communication with the identified stakeholders is well underway. UNC as well as other impacted members of the community will receive periodic project updates. This communication with UNC is part of the overall Community Engagement Plan for this project, which includes periodic project updates and direct customer interaction.

December 13, 2018

Advertising and Bidding:

CDM Smith, Inc. (“Engineer”) developed design and specifications for the improvements during FY 2019. Prospective bidders were screened through our standard prequalification process, which involved having interested contractors submit a package outlining their qualifications, including past performance on similar projects, credentials of their management team, safety record, etc. Only those firms that clearly demonstrated the capability to adequately perform the work were invited to submit bids.

The Request for Qualifications (RFQ) was posted August 9, 2018. After review, fourteen contractors were prequalified to bid on the project (nine general contractors and 5 CIPP lining companies). The invitation for bids was issued to the prequalified contractors on October 17, 2018. A total of three bids were received on November 15, 2018 and opened publicly. Moffat was the low, responsive and responsible bidder for the project with a bid of \$3,055,255.00. A copy of the certified bid tabulation is attached with the Engineer’s recommendation for award (Attachment 2), and the results are summarized below:

Moffat Pipe, Inc.	\$3,055,255.00
Pipeline Utilities, Inc.	\$5,281,000.00
North American Pipeline Management	\$4,700,000.00
<i>Engineer’s Final Estimate</i>	<i>\$3,014,750.30</i>

Minority and Women Business Enterprise (MWBE) Participation:

OWASA’s Minority Business Participation Outreach Plan and Guidelines include all of the statutory requirements from the State of North Carolina and specifies a 10% goal for participation by minority businesses. (Per both statute and policy, the definition of “minority” for purposes of bidding law includes firms owned by women.) In keeping with standard practice, OWASA staff took several actions to solicit minority participation in this contract, including advertising the RFQ in the Greater Diversity News, North Carolina Institute of Minority Economic Development, North Carolina Department of Administration Historically Underutilized Businesses, OWASA’s website, and plan rooms. OWASA also requires bidders to complete “good faith” efforts to solicit participation by minority subcontractors. OWASA staff publicly advertised the formal bid as an additional effort to encourage participation by subcontractors where it was feasible.

The apparent low bidder (Moffat) is a woman-owned business enterprise and they anticipate self-performing at least \$750,000.00 (25%) of the work. While Moffat provided documentation of good faith efforts to employ Minority and Women owned Business Enterprise (MWBE) subcontractors, none of their subcontractors qualify as MWBE contractors. The total percentage of work going to an MWBE in this contract is approximately 25%.

December 13, 2018

Bid Analysis and Recommendation:

Two of the three bids received were above the anticipated range with favorable pricing for the low bid (the high bid was 72% higher than the low bid). The low bid was approximately 2% higher than the Engineer's estimate and staff is confident it reflects a competitive and fair cost for the job because it aligned with the engineer's final estimate and due to the current variable bidding climate for water and sewer construction.

Moffat's ability to complete this project was evaluated thoroughly during the prequalification process, and they demonstrated sufficient qualifications in past project performance, personnel qualifications/experience, reference checks, and all other rated categories. Moffat is the contractor who performed the Gravity Sewer Rehabilitation FY17-19 Package 2 Project, the Rogers Road Gravity Sanitary Sewer Extension Project, and numerous other successful water main replacements for OWASA over the past several years.

OWASA staff also determined that Moffat's safety performance, relevant project experience, bonding capacity, and other non-rated categories met our requirements.

The Engineer's recommendation that the construction contract for this project be awarded to Moffat is attached along with the certified bid tabulation (Attachment 2). OWASA staff concurs with this recommendation and requests the Board's adoption of the attached resolution (Attachment 3) awarding the construction contract to Moffat.

Action Requested:

Approve Resolution Awarding a Construction Contract for the Gravity Sewer rehabilitation FY 17-19 Package 3 Project

Information:

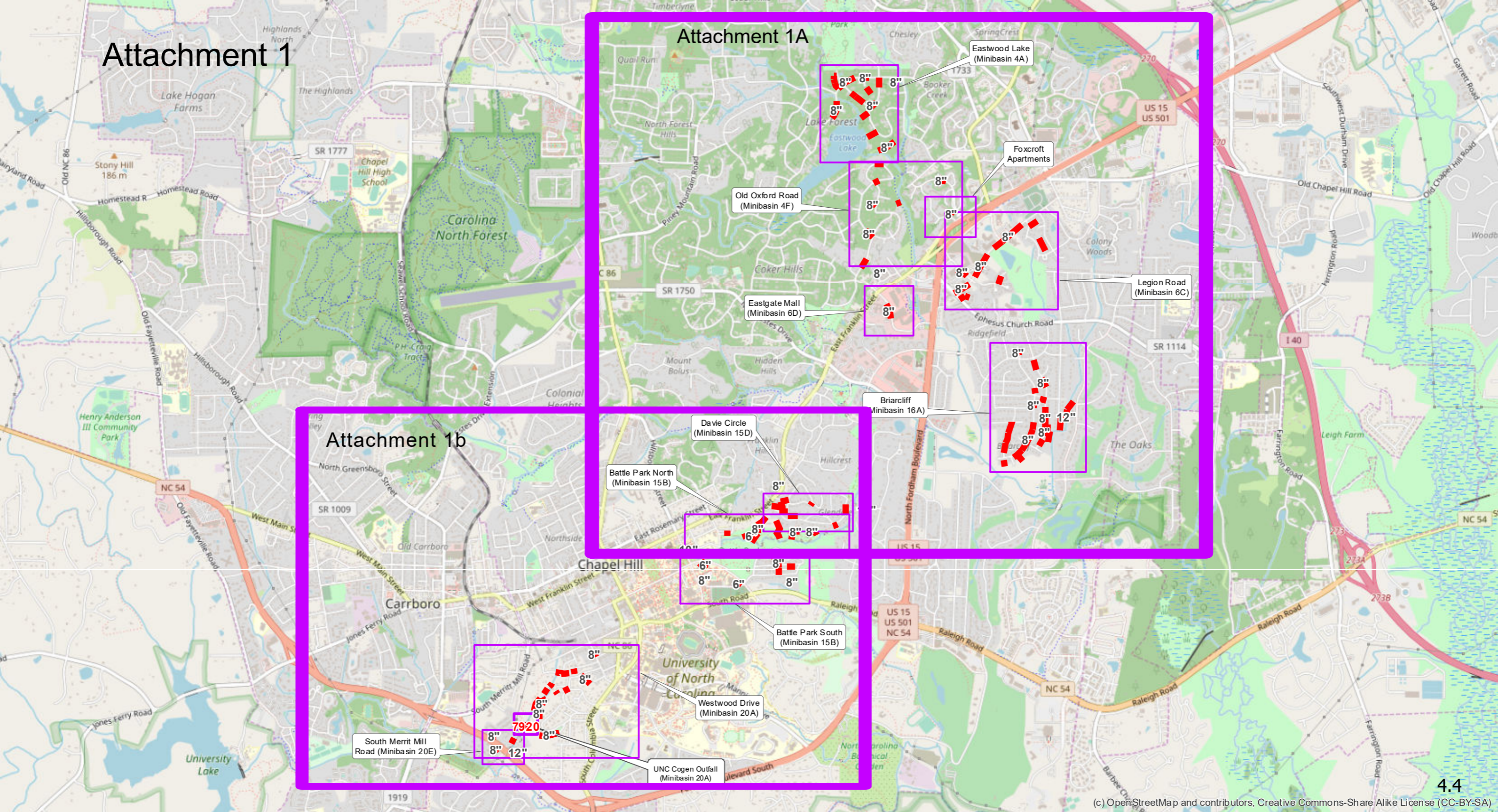
- Project Location Map (Attachment 1)
- Engineer's Recommendation for Award and Certified Bid Tabulation (Attachment 2)
- Resolution (Attachment 3)

December 13, 2018

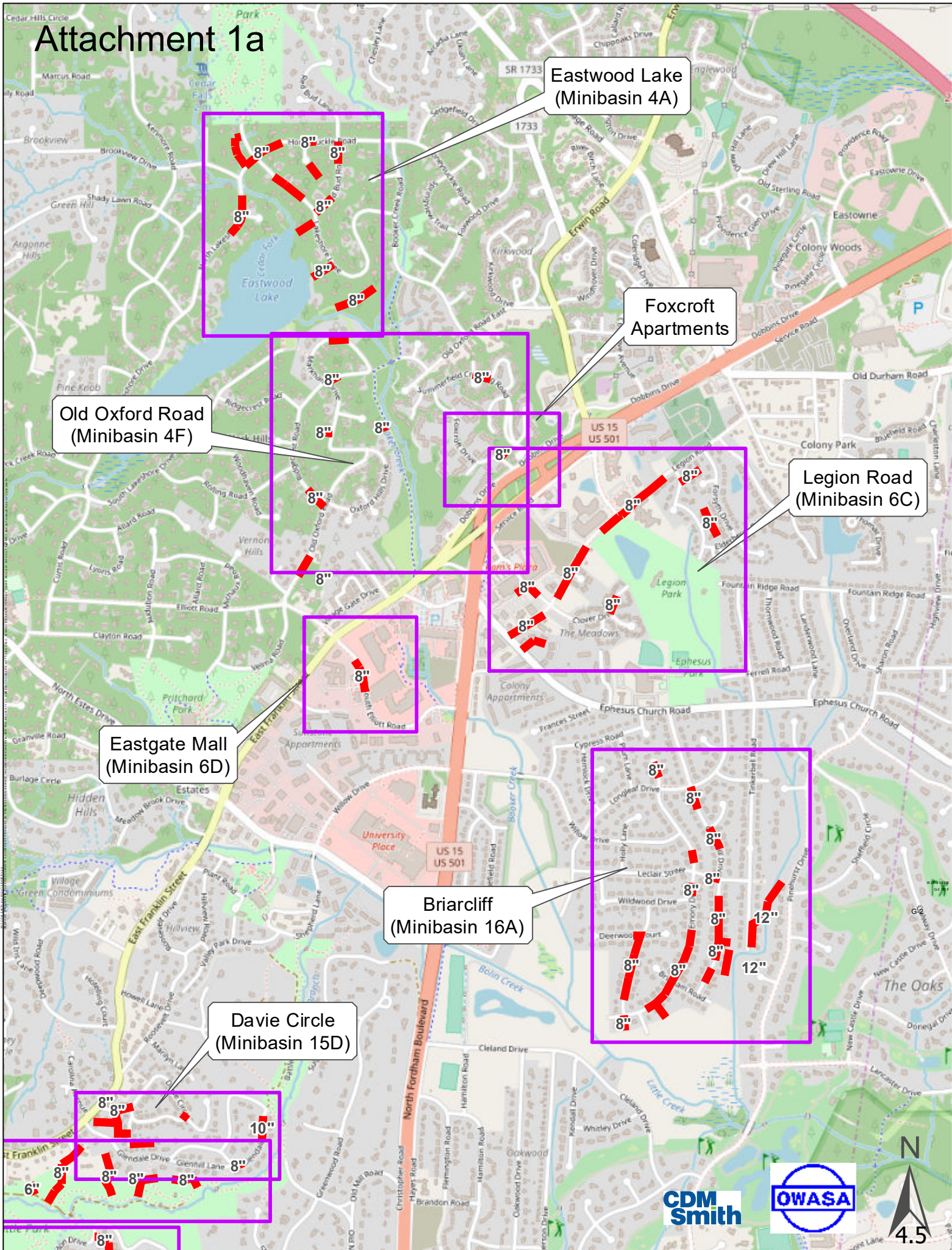
Attachment 1

Attachment 1A

Attachment 1b



Attachment 1a



Eastwood Lake (Minibasin 4A)

Foxcroft Apartments

Old Oxford Road (Minibasin 4F)

Legion Road (Minibasin 6C)

Eastgate Mall (Minibasin 6D)

Briarcliff (Minibasin 16A)

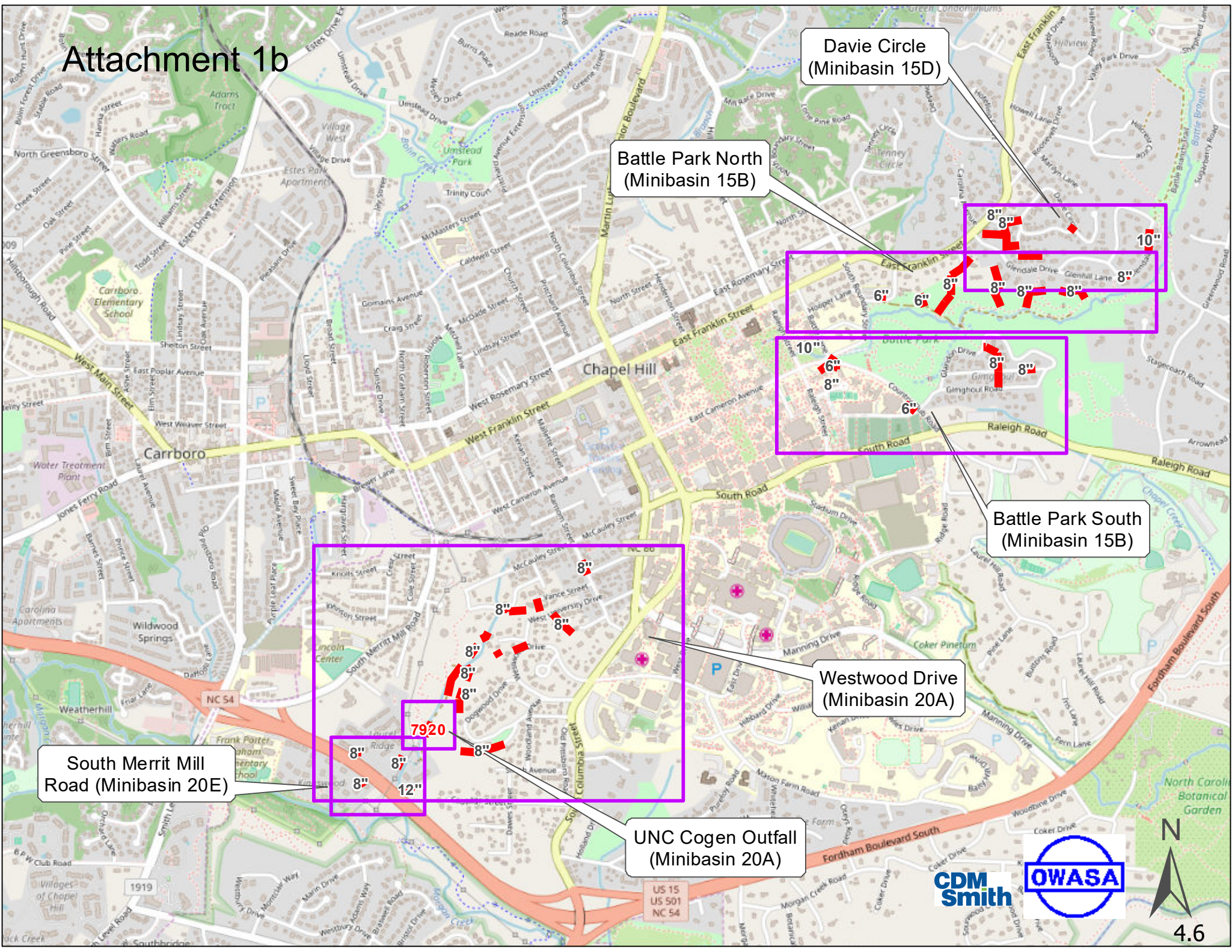
Davie Circle (Minibasin 15D)

CDM Smith

OWASA



Attachment 1b



South Merrit Mill Road (Minibasin 20E)

Davie Circle (Minibasin 15D)

Battle Park North (Minibasin 15B)

8" 8" 10" 8" 8" 8" 8"

10" 6" 8" 6" 8" 8"

Battle Park South (Minibasin 15B)

Westwood Drive (Minibasin 20A)

UNC Cogen Outfall (Minibasin 20A)



5400 Glenwood Avenue, Suite 300
Raleigh, North Carolina 27612
tel: 919 325-3500
fax: 919 781-5730

November 27, 2018

Ms. Allison Reinert, P.E.
Orange Water and Sewer Authority
400 Jones Ferry Road
Carrboro, North Carolina 27510

Subject: Recommendation of Award
Orange Water and Sewer Authority
Sanitary Sewer Rehabilitation FY 2017-2019
Package No. 3

Dear Allison:

On November 15, 2018, the Orange Water and Sewer Authority (OWASA) received three (3) bids for the referenced project. All three bids were received, opened, and the bid amounts were read out by the Engineer of record to the bid opening attendees. CDM Smith evaluated each bid based on whether the Contractor submitted all information as required in Sections 00 21 15 and 00 41 44 of the project specifications. A matrix is attached as Exhibit 2 to this letter showing all bidders, the information required in the bid, and a summary of the bid amounts. The matrix indicates that Moffat Pipe, Inc., North American Pipeline Management, Inc., and Pipeline Utilities, Inc. provided the required information. Moffat Pipe, Inc., is the lowest bidder.

Each bid was reviewed for mathematical errors and other discrepancies, and the only error consisted of a \$0.60 error in Pipeline Utilities Bid Form in Bid Item No. 9, which resulted in no effect to the order of bids from low to high.

The bids are as follows from low to high:

- | | |
|---|----------------|
| 1. Moffat Pipe, Inc. | \$3,055,255.00 |
| 2. North American Pipeline Management, Inc. | \$4,700,000.00 |
| 3. Pipeline Utilities, Inc. | \$5,280,756.40 |

Based on our evaluation of the project bids, Moffat Pipe, Inc., appears to be the lowest bidder. CDM Smith recommends awarding the project to Moffat Pipe, Inc.



Ms. Allison Reinert
November 27, 2018
Page 2

If you have any questions, or require additional information, please do not hesitate to call us.

Very truly yours,

A handwritten signature in blue ink, appearing to read "Patrick Stout".

Patrick Stout, P.E.
CDM Smith Inc.

cc: Chris Nesbit, CDM Smith
Brent Johnson, CDM Smith


Exhibit 1
Bid Tabulation
OWASA Sanitary Sewer Rehabilitation FY 2017-2019
Package No. 3

Item No.	Description	Units	Quantity	Engineers OPCC		Moffat Pipe, Inc.		North American Pipeline Management, Inc.		Pipeline Utilities, Inc.	
				Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount
1	Rehabilitation of existing 6-inch sewers using cured-in-place pipe lining methods	LF	1000	\$ 70.48	\$ 70,480.00	\$ 75.00	\$ 75,000.00	\$ 66.00	\$ 66,000.00	\$ 54.20	\$ 54,200.00
2	Rehabilitation of existing 8-inch sewers using cured-in-place pipe lining methods	LF	24000	\$ 42.84	\$ 1,028,160.00	\$ 38.00	\$ 912,000.00	\$ 63.00	\$ 1,512,000.00	\$ 37.85	\$ 908,400.00
3	Rehabilitation of existing 10-inch sewers using cured-in-place pipe lining methods	LF	600	\$ 49.75	\$ 29,850.00	\$ 45.00	\$ 27,000.00	\$ 64.00	\$ 38,400.00	\$ 41.48	\$ 24,888.00
4	Rehabilitation of existing 12-inch sewers using cured-in-place pipe lining methods	LF	1500	\$ 56.66	\$ 84,990.00	\$ 55.00	\$ 82,500.00	\$ 83.00	\$ 124,500.00	\$ 63.41	\$ 95,115.00
5	Rehabilitation of existing 24-inch sewers using cured-in-place pipe lining methods	LF	400	\$ 132.67	\$ 53,068.00	\$ 175.00	\$ 70,000.00	\$ 199.00	\$ 79,600.00	\$ 167.21	\$ 66,884.00
5a	Rehabilitation of existing 24-inch storm sewers using cured-in-place pipe lining methods (vinyl ester resin)	LF	100	\$ 132.67	\$ 13,267.00	\$ 250.00	\$ 25,000.00	\$ 493.00	\$ 49,300.00	\$ 317.35	\$ 31,735.00
6	Point Repair of 6" pipe (0'-10' Deep) (Per 10 feet section)	EA	2	\$ 14,530.11	\$ 29,060.22	\$ 13,500.00	\$ 27,000.00	\$ 7,800.00	\$ 15,600.00	\$ 9,245.14	\$ 18,490.28
7	Point Repair of 8" pipe (0'-10' Deep) (Per 10 feet section)	EA	30	\$ 15,166.09	\$ 454,982.70	\$ 14,500.00	\$ 435,000.00	\$ 8,150.00	\$ 244,500.00	\$ 12,110.54	\$ 363,316.20
8	Point Repair of 8" pipe (10.1'-12' Deep) (Per 10 feet section)	EA	3	\$ 18,376.46	\$ 55,129.38	\$ 16,500.00	\$ 49,500.00	\$ 10,600.00	\$ 31,800.00	\$ 9,871.89	\$ 29,615.67
9	Point Repair of 8" pipe (12.1'-16' Deep) (Per 10 feet section)	EA	4	\$ 20,739.79	\$ 82,959.16	\$ 19,500.00	\$ 78,000.00	\$ 19,700.00	\$ 78,800.00	\$ 9,300.05	\$ 37,200.80
10	Point Repair of 10" pipe (0'-10' Deep) (Per 10 feet section)	EA	1	\$ 15,992.93	\$ 15,992.93	\$ 17,000.00	\$ 17,000.00	\$ 8,700.00	\$ 8,700.00	\$ 62,608.86	\$ 62,608.86
11	Point Repair of 12" pipe (0'-10' Deep) (Per 10 feet section)	EA	1	\$ 16,848.42	\$ 16,848.42	\$ 18,000.00	\$ 18,000.00	\$ 9,100.00	\$ 9,100.00	\$ 55,781.94	\$ 55,781.94
12	Point Repair of 6" pipe (0'-10' Deep) each excess foot	LF	15	\$ 212.57	\$ 3,188.55	\$ 350.00	\$ 5,250.00	\$ 394.00	\$ 5,910.00	\$ 188.43	\$ 2,826.45
13	Point Repair of 8" pipe (0'-10' Deep) each excess foot	LF	50	\$ 291.37	\$ 14,568.50	\$ 355.00	\$ 17,750.00	\$ 402.00	\$ 20,100.00	\$ 194.46	\$ 9,723.00
14	Point Repair of 8" pipe (10.1'-12' Deep) each excess foot	LF	10	\$ 320.02	\$ 3,200.20	\$ 365.00	\$ 3,650.00	\$ 472.00	\$ 4,720.00	\$ 359.59	\$ 3,595.90
15	Point Repair of 8" pipe (12.1'-16' Deep) each excess foot	LF	10	\$ 454.83	\$ 4,548.30	\$ 375.00	\$ 3,750.00	\$ 537.00	\$ 5,370.00	\$ 359.59	\$ 3,595.90
16	Point Repair of 10" pipe (0'-10' Deep) each excess foot	LF	10	\$ 405.33	\$ 4,053.30	\$ 365.00	\$ 3,650.00	\$ 460.00	\$ 4,600.00	\$ 318.04	\$ 3,180.40
17	Point Repair of 12" pipe (0'-10' Deep) each excess foot	LF	10	\$ 454.34	\$ 4,543.40	\$ 370.00	\$ 3,700.00	\$ 486.00	\$ 4,860.00	\$ 272.90	\$ 2,729.00
18	Furnish and install Portland Cement based cementitious liner for 4-ft diameter manholes	VF	1100	\$ 208.29	\$ 229,119.00	\$ 186.00	\$ 204,600.00	\$ 219.00	\$ 240,900.00	\$ 275.73	\$ 303,303.00
19	Reset frame and cover in designated manhole(s)	EA	8	\$ 1,240.09	\$ 9,920.72	\$ 215.00	\$ 1,720.00	\$ 2,400.00	\$ 19,200.00	\$ 923.72	\$ 7,389.76
20	Rebuild bench and channel in designated manhole(s)	EA	5	\$ 2,274.67	\$ 11,373.35	\$ 550.00	\$ 2,750.00	\$ 640.00	\$ 3,200.00	\$ 1,536.16	\$ 7,680.80
21	Furnish and Install Flex Seal by Infi-Shield in designated manhole(s)	EA	78	\$ 690.97	\$ 53,895.66	\$ 570.00	\$ 44,460.00	\$ 670.00	\$ 52,260.00	\$ 614.47	\$ 47,928.66
22	Repair or replace cement exterior on designated raised manhole(s)	EA	9	\$ 1,105.55	\$ 9,949.95	\$ 250.00	\$ 2,250.00	\$ 3,100.00	\$ 27,900.00	\$ 2,674.82	\$ 24,073.38
23	Replace frame and cover with standard frame and cover in designated manhole(s)	EA	1	\$ 1,734.56	\$ 1,734.56	\$ 550.00	\$ 550.00	\$ 3,200.00	\$ 3,200.00	\$ 787.27	\$ 787.27
24	Furnish and install 4-inch taps for lateral connection replacement (0-ft to 10.0-ft Deep)	EA	55	\$ 5,153.30	\$ 283,431.50	\$ 4,800.00	\$ 264,000.00	\$ 5,900.00	\$ 324,500.00	\$ 10,233.18	\$ 562,824.90
25	Furnish and install 4-inch taps for lateral connection replacement (10.1-ft to 12.0-ft Deep)	EA	5	\$ 6,963.54	\$ 34,817.70	\$ 5,700.00	\$ 28,500.00	\$ 6,800.00	\$ 34,000.00	\$ 15,815.59	\$ 79,077.95
26	Asphalt Concrete Base Course (NCDOT B25.0B)	TON	230	\$ 146.70	\$ 33,741.00	\$ 260.00	\$ 59,800.00	\$ 244.00	\$ 56,120.00	\$ 778.46	\$ 179,045.80
27	Asphalt Concrete Surface Course (NCDOT S9.5B)	TON	100	\$ 164.98	\$ 16,498.00	\$ 260.00	\$ 26,000.00	\$ 244.00	\$ 24,400.00	\$ 602.18	\$ 60,218.00
28	Furnish, install, and maintain traffic control	LS	1	\$ 20,456.80	\$ 20,456.80	\$ 100,000.00	\$ 100,000.00	\$ 1,150,000.00	\$ 1,150,000.00	\$ 95,611.39	\$ 95,611.39
29	Heavy Cleaning	LF	3000	\$ 5.53	\$ 16,590.00	\$ 9.00	\$ 27,000.00	\$ 10.00	\$ 30,000.00	\$ 7.08	\$ 21,240.00
UNC Cogen Gravity Sewer Improvements (Sheet C-20)											
30	Furnish and install new 4-foot diameter manhole with watertight manhole frame and cover (0'-10' deep)	VF	10	\$ 889.76	\$ 8,897.60	\$ 1,100.00	\$ 11,000.00	\$ 1,100.00	\$ 11,000.00	\$ 4,111.58	\$ 41,115.80
31	Furnish and Install 12-inch PC 350 Protecto 401 Lined Ductile Iron Sanitary Sewer (0'-10' deep)	LF	205	\$ 207.74	\$ 42,586.70	\$ 175.00	\$ 35,875.00	\$ 370.00	\$ 75,850.00	\$ 411.18	\$ 84,291.90
32	Furnish and Install Cast-In-Place Concrete Encasement	LF	100	\$ 196.15	\$ 19,615.00	\$ 275.00	\$ 27,500.00	\$ 130.00	\$ 13,000.00	\$ 457.44	\$ 45,744.00
33	Erosion Control	LS	1	\$ 3,227.50	\$ 3,227.50	\$ 40,000.00	\$ 40,000.00	\$ 17,110.00	\$ 17,110.00	\$ 56,029.34	\$ 56,029.34
34	Stream Flow Bypass Pumping	LS	1	\$ 16,356.18	\$ 16,356.18	\$ 38,000.00	\$ 38,000.00	\$ 7,800.00	\$ 7,800.00	\$ 37,321.06	\$ 37,321.06

Exhibit 1
 Bid Tabulation
 OWASA Sanitary Sewer Rehabilitation FY 2017-2019
 Package No. 3

Item No.	Description	Units	Quantity	Engineers OPCC		Moffat Pipe, Inc.		North American Pipeline Management, Inc.		Pipeline Utilities, Inc.	
				Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount
35	Furnish, Install, and Maintain Bypass Pumping of 12-inch Diameter Sanitary Sewers (UNC Cogen Sewer Improvements Only)	LS	1	\$ 12,268.89	\$ 12,268.89	\$ 31,000.00	\$ 31,000.00	\$ 7,800.00	\$ 7,800.00	\$ 50,000.00	\$ 50,000.00
36	Site Access and Miscellaneous Site Restoration (including stream bank stabilization)	LS	1	\$ 45,324.41	\$ 45,324.41	\$ 25,000.00	\$ 25,000.00	\$ 21,700.00	\$ 21,700.00	\$ 1,490,000.59	\$ 1,490,000.59
37	Over-Excavation and Crushed Stone Backfill	CY	200	\$ 70.38	\$ 14,076.00	\$ 50.00	\$ 10,000.00	\$ 106.00	\$ 21,200.00	\$ 125.00	\$ 25,000.00
38	Mobilization/Demobilization	LS	1	\$ 61,979.71	\$ 61,979.71	\$ 91,500.00	\$ 91,500.00	\$ 125,000.00	\$ 125,000.00	\$ 158,430.00	\$ 158,430.00
39	Contingency Allowance	LS	1	\$ 100,000.01	\$ 100,000.01	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00
40	Lane Closure and Street Cut Permit Fee Allowance	LS	1	\$ -	\$ -	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00
Total of All Unit Price Bid Items				\$ 3,014,750.30		\$ 3,055,255.00		\$ 4,700,000.00		\$ 5,281,000.00	

BID TABULATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.



 Patrick Stout, P.E.



Contractor License Number	Addenda 1-3	Proposal	Contractors Affidavit of Organization and Authority	Contractor's Non-Collusion Affidavit	Bid Bond	List of Subcontractors	Power of Attorney	EEO Certificate	Nondiscrimination Clause	MBE Forms	Total Base Bid
54906	X	X	X	X	X	X	X	X	X	X	\$ 3,055,255.00
70877	X	X	X	X	X	X	X	X	X	X	\$ 4,700,000.00
13040	X	X	X	X	X	X	X	X	X	X	\$ 5,281,000.00

Attachment 3

Resolution Awarding a Construction Contract for the Gravity Sewer Rehabilitation FY17-19 Package 3 Project

Whereas, there is a need to repair or rehabilitate approximately 28,000 linear feet of gravity sewer mains ranging in size from 6-inch to 24-inch diameter and over 150 manholes; and

Whereas, plans and specifications for the construction of this project have been prepared by CDM Smith, Inc.; and

Whereas, advertisement for contractor qualifications was published on the websites of the North Carolina Institute of Minority Economic Development, North Carolina Department of Administration, and OWASA on August 9, 2018, and fourteen contractors were qualified to bid; and

Whereas, on October 17, 2018, the prequalified contractors were formally invited to submit construction bids for the project, and three bids were received on November 15, 2018; and

Whereas, Moffat Pipe, Inc. of Wake Forest, North Carolina has been determined to be the low responsive, responsible bidder for the project; and

Whereas, on June 14, 2018 the Board approved a resolution authorizing funds for Capital Improvement Projects, including funds for this project;

Now, Therefore, Be It Resolved:

1. That the Orange Water and Sewer Authority Board of Directors awards the construction contract to Moffat Pipe, Inc., the low responsive, responsible bidder for the Gravity Sewer Rehabilitation FY17-19 Package 3 Project, in accordance with the approved plans and specifications, in the amount of \$3,055,255.00, subject to such change orders as may apply.

2. That the Executive Director be, and hereby is, authorized to execute said contract, subject to prior approval of legal counsel, and to approve and execute change orders and such documents as may be required in connection with the construction contract.

Adopted this 13th day of December, 2018.

Yinka Ayankoya, Chair

ATTEST:

Raymond E. DuBose, Secretary

Agenda Item 5:

Proposed Resources for Capital Improvements Program Execution and Water Distribution System Maintenance

Purpose:

Request resources needed to effectively execute the Capital Improvements Program to renew and replace aging infrastructure and to accelerate valve maintenance program to improve resiliency of the water distribution system.

Background:

Capital Improvements Program (CIP)

[OWASA's Comprehensive Asset Management Program](#) is used to assess and prioritize improvements and investments needed to achieve desired customer and environmental service level objectives, minimize critical assets failures, and ensure long-term viability and resiliency of the water, wastewater and reclaimed water systems. Most of the investment in infrastructure is management by our [CIP](#).

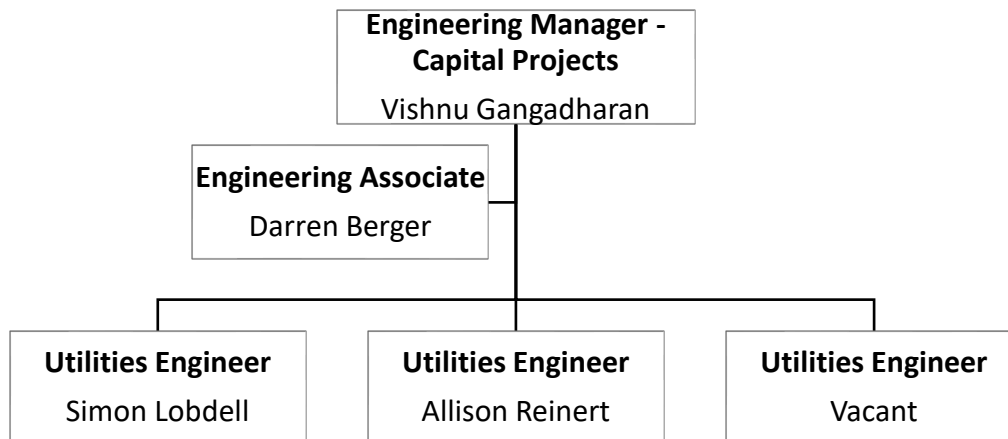
The approved Fiscal Year (FY) 2019-2023 CIP includes \$98.9 million, about 84% of which is planned to renew and replace aging infrastructure.

For the water distribution system, we plan to invest \$33 million to replace 16 miles of pipe over the next five years.

For the wastewater collection system, we plan to invest \$18 million to evaluate and renovate 15 miles of pipe over the next five years.

Our goal is to invest 90-105% of the budgeted CIP each year. Over the past ten years, our annual investment has averaged 81% of budget.

Currently, our CIP is managed by a five-person team in our Engineering and Planning department. Each Utilities Engineer manages about 15 to 20 projects at a time of various scopes and complexities. An Engineering Associate assists the Utilities Engineers and Engineering Manager with various project tasks.



Engineering Resource Needs:

Staff requests the addition of a fourth Utilities Engineer to manage capital projects and provide increased technical support to the Operating departments (Water Supply and Treatment, Distribution and Collection, Wastewater Treatment and Biosolids Recycling). We can use the ongoing recruitment effort for the vacant utilities engineer position to fill the new position. With the FY 2019-2023 CIP at \$98.9 million and similar levels of infrastructure investment forecasted for the long-term (15 years), we have reviewed CIP staffing and determined that the project management workload will continue to be more than our current staff can support. For example, over the past 10 years we have average replacing 1.7 miles of water mains per year. The FY 2019-2023 CIP nearly doubles the water main replacement rate to an average of 3.2 miles per year. There is already a full work load for three Utilities Engineers; and we anticipate additional resilience and reliability improvement projects will be identified as a result of the November 5, 2018 water main break. We also have several important capital projects identified in the [Water and Wastewater Treatment Plants Reliability and Risk Assessment Action Plan](#) presented to the Board in October 2018.

In addition to managing capital projects, Utilities Engineers are being called upon more and more to provide technical assistance to the Operating departments. As regulatory and operating environments become more complex, the need for technical assistance will increase, including activities such as evaluating distribution and collection system maintenance practices for effectiveness and efficiency; assisting with optimization programs such as the Partnership for Safe/Clean Water; evaluating new technologies like leak detection; coordinating condition assessment programs; assisting with implementation of new regulations; and providing support during emergency response.

Capital Improvements Program Needs:

As mentioned at the Board's November 8, 2018 Work Session, staff recommends adding a capital project to fast-track replacement of the 16-inch water line that broke on November 5, 2018 as well as the two adjacent water lines (16-inch and 24-inch) and associated valves at the Jones Ferry Road Water Treatment Plant with a new pipe and valves. We have begun the

qualification-based process to select a consultant for this work. We anticipate that design of the project will begin in FY 2019 with construction starting in FY 2020. We will include this project in the upcoming CIP development process that is part of the FY 2020 budget process.

Valve Maintenance – Water Distribution System

Our drinking water distribution system includes 380 miles of pipe and over 12,000 valves. The valves are critically important for resiliency of the distribution system as they allow the flow of water to be turned on and off as needed to perform planned maintenance and for making emergency repairs to broken water mains. For the major water main break that occurred on November 5, 2018 near the Jones Ferry Road Water Treatment Plant, a total of 17 valves of various sizes had to be closed to stop the loss of water caused by the pipe break.

Operation and Maintenance Resource Needs:

OWASA's current valve exercising program which began in 2013 has a goal of exercising (opening and closing the valves to ensure they work properly) all the valves within the system every five years which is in line with industry best practices. Program resources include two Utility Mechanics and one valve exercising machine that is towed behind a truck. The program is currently on pace to complete the initial round of exercising within approximately seven to eight years.

Several factors contribute to the program falling short of meeting its goal. Because this is the initial round of exercising valves, we underestimated the time involved in locating, accessing and operating valves that have been in the system for decades without routine maintenance. Also, assigned staff can be diverted to other tasks since the crew responsible for the program also has additional responsibilities. The exercising machine requires two Utility Mechanics to operate, which makes maintaining productivity difficult when there is an absence or vacancy. With only one machine, production is limited to begin with, but becomes particularly challenging if the machine is out-of-service for maintenance.

Staff proposes the following solutions to work towards a "best-in-class" valve exercising program:

Additional Valve Exercising Equipment – Productivity in our valve maintenance program is limited by having a single machine. Additionally, we have found this equipment to be especially helpful in responding to large water main breaks or instances where multiple valves need to be closed to isolate a break. Having additional equipment would increase our productivity in regular operations and improve our responsiveness to main breaks. We propose purchasing one additional valve exercising truck which would also require two Utility Mechanics to operate (discussed in the next section).

Establish a dedicated Valve Maintenance Crew – Having an appropriately staffed crew that is solely focused on valve maintenance would improve productivity in this area. Proposed staffing for this crew would include a Crew Leader, a Utility Mechanic III and three Utility Mechanics (Is or IIs). We propose to transfer the two existing Utility Mechanics to the proposed crew and

Proposed Resources for Capital Improvements Program Execution and Water Distribution System Improvements

December 13, 2018

Page 4

add a Crew Leader and two more Utility Mechanics to create a dedicated Valve Maintenance Crew. Technically, the “addition” of the Crew Leader and two more Utility Mechanics would be the retention of three of the seven positions reduced by OWASA’s investment in Advanced Metering Infrastructure, with one minor modification. Instead of a Utility Mechanic I/II we would need to reclassify one Utility Mechanic I/II as a Utility Mechanic III.

Budget Impact:

The table below shows the estimated annual budget impact of these additional resources.

Expenditure	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Addition of a Utilities Engineer in the Engineering and Planning department ¹	\$37,400	\$116,500	\$121,200	\$126,000	\$131,000
Retention of a Crew Leader position ^{1,2}	\$44,900	\$93,300	\$97,000	\$101,000	\$105,000
Retention of two Utility Mechanic I positions, reclassifying one UM I to UM III ^{1,2}	\$64,400	\$139,700	\$145,300	\$151,100	\$157,200
Purchase valve maintenance truck	\$130,000	Truck Operations and Maintenance			
Total	\$276,700	\$349,500	\$363,500	\$378,100	\$393,200

¹ Includes payroll taxes and benefits

² FY 2019 Budget included anticipated AMI savings of 50% of the cost of these positions; therefore, the FY 2019 Budget impact of retaining these positions is 50% of annual salaries, taxes and benefits.

The projected impact on monthly water and sewer rates of these budget additions is discussed in Item 6 of the Board’s agenda for December 13, 2018.

Action Requested:

- Approve the addition of one Utilities Engineer position.
- Approve retaining a Crew Leader and two of the Utility Mechanic I/II positions from AMI, reclassifying one Utility Mechanic I/II position to a Utility Mechanic III position.
- Amend Capital Equipment Budget to purchase valve exercising equipment, a budget amendment will be brought to the Board for approval in January 2019.
- Add a project to the CIP to improve reliability of the distribution system by replacing aging water lines and valves at the Jones Ferry Road Water Treatment Plant.

Information:

- Resolution of Orange Water and Sewer Authority to Approve a New Utilities Engineer Position and to Reclassify a Vacant Utility Mechanic I/II Position to a Utility Mechanic III

Resolution of Orange Water and Sewer Authority to Approve a New Utilities Engineer Position and to Reclassify a Vacant Utility Mechanic I/II Position to a Utility Mechanic III

Whereas, to adequately and appropriately execute the Capital Improvements Program to maintain high quality and reliable water, wastewater, and reclaimed water services to the Carrboro-Chapel Hill community, a sufficient and competent staff is necessary; and

Whereas, the Engineering and Planning Department has evaluated the Capital Improvements Program workload and available staff resources and found that an additional Utilities Engineer position is needed in order to timely and effectively accomplish the workload of the Department for the organization; and

Whereas, the Utilities Engineer position is a skill-based pay position classified as Grade 619 (Utilities Engineer Non-Registered) and Grade 620 (Utilities Engineer Registered); and

Whereas, the Executive Director recommends adding a Utilities Engineer position at Grade 619/620 (annual salary range \$59,001-\$90,861/\$64,901-\$99,948) on the OWASA Schedule of Employee Classification and Authorized Compensation; and

Whereas, the Distribution and Collection Department plans to improve the effectiveness of its valve maintenance program as well as improve emergency response and more effectively manage workloads; and

Whereas, the Executive Director recommends reclassifying one existing Utility Mechanic I/II position at a Grade 610/613 to a Utility Mechanic III position at a Grade 615 (annual salary range: \$44,189 - \$68,051) on the OWASA Schedule of Employee Classification and Authorized Compensation;

Now, Therefore, Be It Resolved That:

1. An additional Utilities Engineer (Grade 619/620) position be added to OWASA’s Schedule of Employee Classification and Authorized Compensation.
2. An existing vacant Utility Mechanic I/II (Grade 610/613) position be reclassified to a Utility Mechanic III position (Grade 615) and added to OWASA’s Schedule of Employee Classification and Authorized Compensation.

Adopted this 13th day of December, 2018.

Yinka Ayankoya, Chair

ATTEST:

Raymond E. DuBose, Secretary

Agenda Item 6:

Review Status of Fiscal Year 2019 Budget

Purpose:

At the November 15, 2018 Board Work Session, staff discussed potential actions we can take to make improvements to OWASA’s water distribution system. We have also received an estimate of consulting fees related to our Diversity and Inclusion program and engineering consulting that were not in the original FY 2019 budget. This memo provides a rough estimate of the impact on this year’s budget and future year budgets and rate adjustments, should the Board approve these expenditures.

Background:

The following table shows the potential unbudgeted expenditures and their estimated impact on this and future years’ budgets.

Expenditure	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Addition of a Utilities Engineer in the Engineering and Planning department ¹	\$37,400	\$116,500	\$121,200	\$126,000	\$131,000
Retention of a Crew Leader position ^{1,2}	\$44,900	\$93,300	\$97,000	\$101,000	\$105,000
Retention of two Utility Mechanic I positions, reclassifying one UM I to UM III ^{1,2}	\$64,400	\$139,700	\$145,300	\$151,100	\$157,200
Purchase valve maintenance truck	\$130,000	Truck operations and maintenance ³			
Evaluation of the cause and OWASA’s response to November 2018 water main break	\$50,000				
Total	\$326,700	\$349,500	\$363,500	\$378,100	\$393,200

¹ Includes payroll taxes and benefits.

² FY 2019 Budget included anticipated AMI savings of 50% of the cost of these positions; therefore, the FY 2019 Budget impact of retaining these positions is 50% of annual salaries, taxes and benefits.

³ Truck operations and maintenance expense not yet determined but not expected to impact rates.

Capital Improvements Program – For this rate-impact estimate, we have not adjusted FY19-23 budgeted CIP expenditures. Projections indicate we will likely execute less than 100% of the FY 2019 CIP budget. However, assuming we are fully staffed in FY 2020, the expenditures not incurred in FY 2019 will likely be spent in the subsequent year. Additionally, we plan to add a project to the CIP budget to address the pipes and valves in front of the water plant.

Operating Expense Budget – After wrapping up November’s internal financial report, we will draft a forecast of operating expenses for FY 2019. However, for the purposes of estimating the rate impact of expenses shown above, we have assumed we will spend 100% of the \$22.5 million FY 2019 operating

expense budget. While we typically end the year a little under budget in operating expenses, we expect the forecast for this year to show higher than expected expenses related to the following.

- Expenses of our biosolids program. Wet weather has limited our ability to land-apply liquid biosolids so expenses related to dewatering have been higher than expected.
- Expenses related to two hurricane events this year. (We expect to be reimbursed for at least a portion of expenses related to Hurricane Florence.)
- Expenses related to the November 2018 water main break were not budgeted.
- Diversity and Inclusion program consulting.
- Communications plan initiatives (to be covered at the Board’s December 19, 2018 Work Session)

Impact on Monthly Water and Sewer Rates:

The table below is an estimate of the impact on future year rate adjustments of the expenditures discussed above. The only change from our previous projection is shown in red.

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Original projection	2.0%	2.0%	3.0%	4.0%	4.0%
Revised projection	2.0%	2.0%	4.0%	4.0%	4.0%

Our projection of future rate increases may change after we complete the forecast of water and sewer sales, operating expenses, and CIP expenditures for FY 2019.

Action Requested:

Review information and provide guidance to staff. If these additional expenditures are approved by the Board, a budget amendment will also be necessary. Staff can prepare a budget amendment for the Board to consider at its Work Session on January 10, 2019.

Agenda Item 7:

Administration of Strategic Plan:

- A. Annual Review and Update of Strategic Trends and Utility Planning Issues
- B. Strategic Plan Progress Report

Purpose:

To provide information about long-term trends and utility planning issues as well as provide an update on progress on the Strategic Plan's initiatives.

Background:

The Board of Directors adopted a Strategic Plan in March 2014 and updated it in June 2016.

The June 2016 update to the Strategic Plan stated that the *Annual Review and Update of Strategic Trends and Utility Planning Issues* report would be modified as a companion document to the Strategic Plan.

The *Annual Review and Update of Strategic Trends and Utility Planning Issues* summarizes recent OWASA's utility trends and issues. This annual report summarizes observed trends in customer growth and demands, water supply and drinking water treatment, wastewater treatment, the reclaimed water system, environmental regulations, and technology to ensure that OWASA continues to provide high quality and reliable water, wastewater, and reclaimed water services. Staff will provide an overview of this report.

Annual Review and Update of Strategic Trends and Utility Planning Issues:

Attached for your review and discussion is the 2018 edition of the "Annual Review and Update of Strategic Trends and Utility Planning Issues" (Attachment A). This annual report to the Board of Directors summarizes observed trends in the water, wastewater, and reclaimed water systems, environmental regulations, and technology to ensure that OWASA continues to provide high quality and reliable services. This report serves as a companion document to the June 9, 2016 [Strategic Plan](#).

One main modification was made to the report this year: In the "Source Water Protection" section of the report, we included information on water quality trends in OWASA's watersheds based on data provided in the July 2018 publication from the US Geological Survey titled "Trends in Water Quality of Selected Streams and Reservoirs Use for Water Supply in the Triangle Area of North Carolina 1989-2013".

December 13, 2018

A few main points from the report are:

- Our customers have reduced peak day drinking water demands by 34 percent since FY 1999 despite a 30 percent increase in customer accounts over that same period. Similarly, demands on our raw water supply have decreased substantially. These reduced demands result from:
 - Increased water use efficiency and conservation by our customers
 - Conservation pricing and conservation ordinances including year-round water restrictions
 - Implementation of the reclaimed water system in partnership with the University of North Carolina at Chapel Hill in 2009, which now meets over ten percent of the community's water needs.
- These reductions in drinking water demand – and the associated reductions in wastewater flows – help defer the need for costly expansion of the capacities of our raw water supplies, water treatment plant, and wastewater treatment plant. More efficient use of water also helps reduce costs for energy and chemicals for water and wastewater treatment.
- Based on current demands, we believe we have sufficient raw water supply for the next few decades under most conditions. Our allocation of Jordan Lake water supply serves as an insurance policy to meet demands during extended droughts or operational emergencies. We are updating projected water supply demands as part of the update to the Long-Range Water Supply Plan and presented draft demand projections to the Board at its November 15, 2018 work session.
- Based on current demands, we anticipate no need to expand the hydraulic capacity of the water or wastewater treatment plants for at least the next 20 years. We will update treatment plant capacity demands following completion of final raw water demands included in the update to the LRWSP.

At the December 13, 2018 Board meeting, we will make a brief presentation highlighting some of the trends included in this report. We look forward to your questions and comments, as well as your feedback regarding the content of the report. We will incorporate any feedback into future annual trends reports for the Board.

Strategic Plan Progress Report:

Key accomplishments during the past year are:

- New System Development Fees (formerly Service Availability Fees) – modified the calculation of System Development Fees in compliance with a new North Carolina statute resulting in a reduction of fees of between 10% and 40%.

- Substantial progress on Agua Vista – about 86% of the meters have been upgraded and the customer web portal is being tested internally.
- Substantial progress on Diversity and Inclusion – Staff along with our consultant VISIONS, Inc. have been working diligently on the Action Plan for Improvements Identified by the Organizational Assessment. Additionally, a comprehensive review of recruitment processes and career development programs has taken place. All of the identified improvements have been prioritized by year and are being addressed by either the Diversity Resource Group, the Diversity Recruitment Group of the Diversity Leadership Group. The organizational race distribution was similar to last year with gender distribution increasing.

Action Needed:

No action is needed; discussion as desired by the Board.

Information:

- A. Annual Review and Update of Strategic Trends and Utility Planning Issues
- B. Strategic Plan Progress Report

Annual Review and Update of Strategic Trends and Utility Planning Issues for Fiscal Year 2018

DECEMBER 2018

Orange Water and Sewer Authority

Carrboro, North Carolina



*A public, non-profit agency providing water, sewer and reclaimed water services
to the Carrboro-Chapel Hill community.*

Table of Contents

Purpose and Summary	iv
Acronyms	v
Background	1
OWASA’s Planning Environment.....	2
Service Area	2
Growth and Development	3
Climate Change	3
Regulations	4
Technology and Research	4
University Partnerships.....	5
Professional Associations.....	5
Engineering Consultants	6
Other Important Utility Planning Issues	6
Energy Management.....	6
Safety	7
Source Water Protection	8
Raw Water Supply and Long-Range Water Supply Plan	18
Quarry Reservoir Storage Volume	22
Water Treatment Plant: Peak-Day Drinking Water Demands and LRWSP	24
Cumulative Number of Water Meter Equivalent (MEs).....	30
Drinking Water and Reclaimed Water Sales.....	32
Average Monthly Water Use and Billed Amount.....	34
Physical Interconnection Capacity and Average Annual WTP Demands.....	36
Drinking Water Distribution System Integrity	38
Water System Audit	42
Wastewater Collection System Integrity	44
Mason Farm Wastewater Treatment Plant Maximum Month Flows.....	48
Mason Farm WWTP Nutrient Capacity.....	51
Reclaimed Water.....	54
Biosolids	57

Purpose and Summary

This report summarizes observed trends for several indicators – such as customer growth and demands, water supply and drinking water treatment, wastewater treatment, use of reclaimed water, and environmental regulations – which are important factors that influence the need for, timing, and scope of our facilities planning and investment decisions. Through the process of regularly reviewing and updating this report, we strive to anticipate and proactively prepare for change so that we are better positioned to provide high quality and reliable water, wastewater, and reclaimed water services for the long-term. Some of the key messages are:

- Our customers have reduced peak day drinking water demands by 34 percent since Fiscal Year (FY) 1999 despite a 30 percent increase in customer accounts over that same period. Similarly, demands on our raw water supply have decreased substantially. These reduced demands result from:
 - Increased water use efficiency and conservation by our customers;
 - Conservation pricing and conservation ordinances including year-round water restrictions; and
 - Implementation of the reclaimed water system in partnership with the University of North Carolina at Chapel Hill (UNC) in 2009, which now meets about 10 percent of the community’s water needs.
- These reductions in drinking water demand – and the associated reductions in wastewater flows – help defer the need for costly expansion of the capacities of our raw water supplies, water treatment plant, and wastewater treatment plant. More efficient use of water also helps reduce costs for energy and chemicals for water supply, drinking water treatment and water distribution, and wastewater collection and treatment.
- Based on current demands, we believe we have sufficient raw water supply for the next few decades under most conditions, but the community will become increasingly vulnerable to drought before the expanded Quarry Reservoir is available around 2035. Our allocation of Jordan Lake water supply, which we can access through our mutual aid agreements with the City of Durham and Town of Cary, serves as an insurance policy to meet demands during extended droughts or operational emergencies. We will update projected water supply demands in 4th quarter calendar year (CY) 2018 as part of the update to the Long-Range Water Supply Plan (LRWSP).
- Based on current demands, we anticipate no need to expand the hydraulic capacity of the water or wastewater plant for at least the next 20 years. We will update treatment capacity demands as part of the update to the LRWSP.
- OWASA is committed to providing high quality and reliable services to our customers. We have an asset management program to evaluate our infrastructure and risks and guide our investments in our ongoing maintenance programs. The trends listed in this report are one mechanism to evaluate how well we meet our core mission.

Acronyms

AMI	advanced metering infrastructure
AMWA	Association of Metropolitan Water Agencies
AWWA	American Water Works Association
BG	billion gallons
CIP	Capital Improvements Program
CY	calendar year
DEQ	NC Department of Environmental Quality
EMC	NC Environmental Management Commission
EPA	US Environmental Protection Agency
FY	fiscal year (July – June)
JLP	Jordan Lake Partnership
kWh	kilowatt-hour
KWh/MG	kilowatt-hour per million gallons
lb/yr	pounds per year
LRWSP	Long-Range Water Supply Plan
LT2	Long-Term 2 Enhanced Surface Water Treatment Rule
MCL	maximum contaminant level
ME	meter equivalent
MG	million gallons
mgd	million gallons per day
NCSU	North Carolina State University
OWASA	Orange Water and Sewer Authority
PFAS	per and poly-fluoroalkyl substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
RCW	reclaimed water
SCADA	Supervisory Control and Data Acquisition
TAWSP	Triangle Area Water Supply Monitoring Project
TN	total nitrogen
TP	total phosphorus

µg/l	micrograms per liter
UCMR3	Unregulated Contaminant Monitoring Rule 3
UCMR4	Unregulated Contaminant Monitoring Rule 4
UNC	University of North Carolina at Chapel Hill
WHO	World Health Organization
WRF	Water Research Foundation
WSMPBA	Water and Sewer Management, Planning and Boundary Agreement
WTP	water treatment plant
WWTP	wastewater treatment plant

Background

Orange Water and Sewer Authority (OWASA) publishes this annual report to evaluate how well we are meeting our mission of providing our customers with high quality and reliable water, wastewater, and reclaimed water services through responsible and creative stewardship of the resources we manage.

This report summarizes observed trends for several indicators – such as customer growth and demands, water supply and drinking water treatment, wastewater treatment, use of reclaimed water, and environmental regulations – which are important factors that influence the need for, timing, and scope of our facilities planning and investment decisions. Thus, the information in this document is one item that shapes our Capital Improvements Program (CIP). Through the process of regularly reviewing, updating, and publishing this report, we strive to anticipate and proactively prepare for change so that we are better positioned to engage the community as we consider and decide on how best to sustainably meet service requirements for the foreseeable future.

The OWASA Board of Directors adopted a Strategic Plan in March 2014 and an update to the [Strategic Plan](#) in June 2016. The Strategic Plan identifies the key initiatives and corresponding actions OWASA will take to address the issues we believe are most important for the customers and community we serve. The June 2016 Strategic Plan stated that this Annual Review and Update of Strategic Trends and Utility Planning Issues (Strategic Trends report) would be modified to serve as a companion document to the Strategic Plan. The information provided in this report may be used to update or add initiatives to future updates of the Strategic Plan.

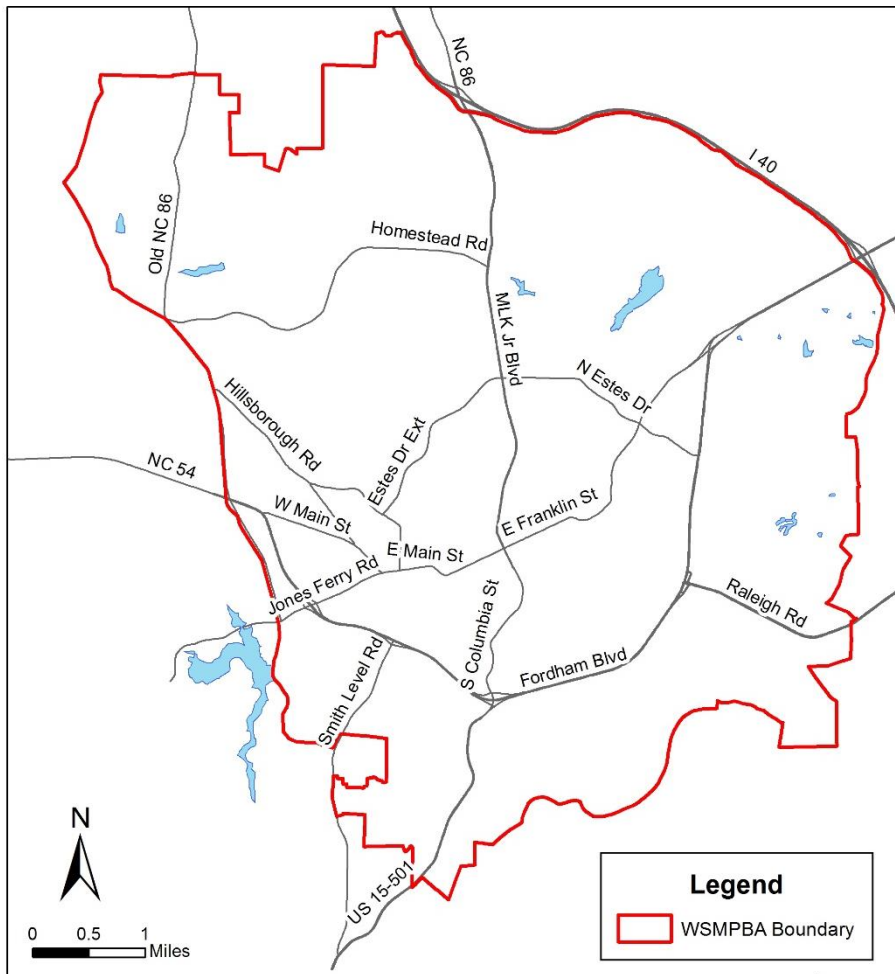
This Strategic Trends report begins with an overview of OWASA’s planning environment which includes a description of those items which may impact the timing and scope of our facilities planning and investment decisions. It then includes a description of OWASA’s main management areas beginning with source water protection; then raw water supply and treatment; distribution of drinking water to our customers; wastewater collection, treatment, and disposal or reuse. Each topic includes information on regulations, technology and research, energy management, links to the Strategic Plan, and follow-up actions.

OWASA's Planning Environment

This section describes the items in OWASA's planning environment that would impact the timing and scope of our facilities planning and investment decisions. Understanding these items ensures that we provide our customers with high quality and reliable water, wastewater, and reclaimed water services through responsible and creative stewardship of the resources we manage.

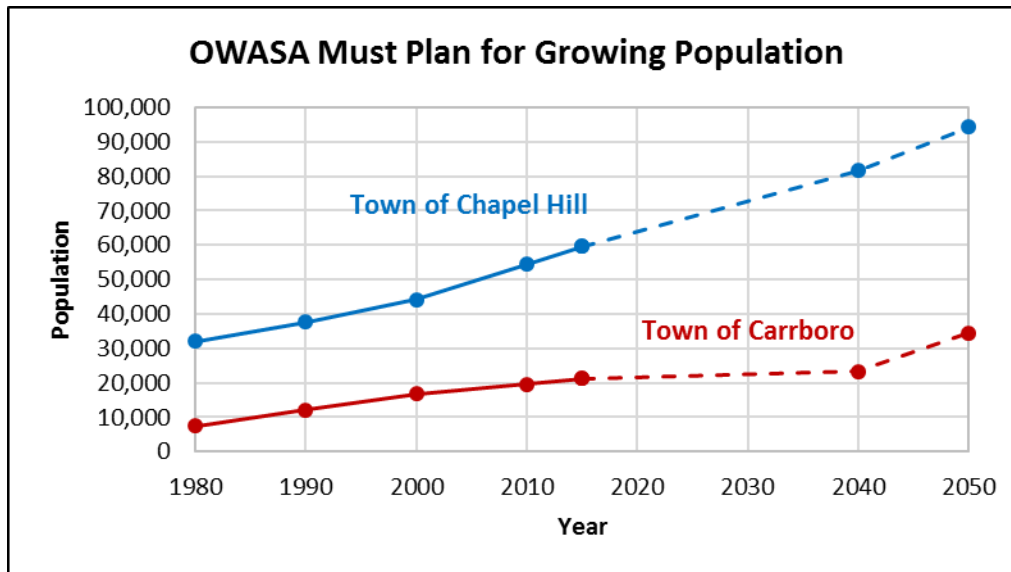
Service Area

The local governments in Orange County have developed several agreements to determine who has jurisdiction over certain areas and what areas are to be served by municipal water and sewer. These agreements help concentrate growth in compact municipal areas, preserve the rural character of the County, and limit urban sprawl. The area that OWASA can provide service to is shown in the map below and is from the [Water and Sewer Management, Planning and Boundary Agreement](#) (WSMPBA) which was adopted in 2001 and amended in 2010 and 2017. The 2017 amendments included minor changes to the boundary along Smith Level Road. If changes are made to OWASA's service area, OWASA will need to ensure its resources and infrastructure will reliably meet the demands of those new areas along with the projected development within our current service area.



Growth and Development

It is important to project when, where, and how much growth will occur, and what the subsequent demands will be on our water, wastewater, and reclaimed water services to ensure we have adequate capacity to meet the community's future needs. The graphic below illustrates past population numbers for the Towns of Carrboro and Chapel Hill as well as the 2040 projected population based on regional transportation planning and the 2050 projected population as presented in the 2018 State of the Community Report.



UNC is included in Town of Chapel Hill population projections

We anticipate that growth will continue to be higher density, with redevelopment and infill projects such as the Blue Hill District (formerly Ephesus Fordham), Carolina Square, and Shelton Station, and with new development projects such as Carraway Village (formerly The Edge). Higher density development tends to result in lower per capita demands and may make better use of existing water and wastewater infrastructure. OWASA will use local government future growth information to ensure that the capacity of our water distribution system and wastewater collection system is sized appropriately.

Climate Change

While experts believe the southeastern United States will receive about the same amount of rainfall on average in the future, that rainfall will likely be provided in more severe storms and flooding events with more severe and prolonged droughts in between. This new pattern of rainfall will impact the yield of OWASA's and the region's reservoirs and the patterns of water demand including the water used for irrigation and cooling. As a result, OWASA and our utility neighbors must address the resiliency of water supply and storage, especially for periods of severe and extended droughts as well as the capacity of our reclaimed water system, which may face higher peak demands.

OWASA worked with our utility neighbors through the [Jordan Lake Partnership](#) (JLP) to develop the Triangle Regional Water Supply Plan to ensure all Partners have sufficient and reliable water supply

through 2060. The JLP also contracted a regional interconnection study to evaluate the interconnection capacity of our drinking water systems and to identify needed infrastructure improvements to meet future needs. The JLP is being disbanded and replaced with the Triangle Water Supply Partnership (TWP). The TWP plans to build on the work of the JLP and use the interconnection model to run planning scenarios to identify strategies to improve the region's resiliency to planned and unplanned water supply challenges. OWASA is updating its Long-Range Water Supply Plan (LRWSP) to ensure we have water to meet our needs through 2070.

Our climate change planning to date has focused on drought management planning and natural disaster emergency preparedness. However, high rain events could result in greater flooding of our infrastructure. While our infrastructure has been designed to meet certain flood events, the frequency of those events could increase in the future. In addition, hurricanes and other storms could damage critical infrastructure. OWASA plans for forecasted events, and coordinates emergency planning with our neighboring communities and other utility partners in North Carolina.

Climate change also has potential implications on the quality of the water in our reservoirs. With temperature change and impacts on rainfall, we could experience more frequent algal blooms in our reservoirs and potential increases in taste and odor events and cyanotoxin concentrations. (Cyanotoxins are toxins produced by blue-green algae and were responsible for the City of Toledo's "Do Not Use" warning in 2014.)

OWASA continues to monitor climate change science, and we participate in applied research projects with universities, other utilities, and other agencies where applicable, to proactively plan to meet the community's water and wastewater needs in the face of increasing climate variability.

Regulations

OWASA monitors the regulatory arena closely so that we proactively ensure we can meet all legal requirements applicable to the provision of water, wastewater, and reclaimed water services to our customers. Many of these potential regulations would impact our drinking water supplies and treatment facilities. Potential regulations are included for trends where they are applicable in this Strategic Trends report.

Technology and Research

OWASA strives to stay informed about advancements in technology and research, their capital and operating costs, and ability to better position us to provide services to our customers in a more sustainable manner. OWASA often partners with local university researchers, professional associations, and our consultants to obtain information on how emerging technologies may apply specifically to OWASA. Technologies that OWASA is monitoring are described in applicable sections with this Strategic Trends report. General information on our use of university research, professional associations, and consultants is provided below.

University Partnerships

OWASA often partners with our local universities to evaluate emerging technologies. We have provided water and wastewater samples to local universities to test emerging technologies. We have supported university classes by providing data. One effective use of university research is through our membership in the Urban Water Consortium, a group of twelve of the largest water utilities in the state. Together these twelve utilities pool their funds to bridge our research needs with university expertise. Some of the current research funded through this consortium is included in applicable sections of this report.

Professional Associations

OWASA is a member of various water and wastewater organizations, and our employees review their publications and attend their conferences. Staff regularly meet with other utility staff locally and throughout the southeast region through these memberships; these contacts with other utility staff enable us to stay abreast of the latest technologies that work in our region to better meet our water, wastewater, and reclaimed water needs. Some of the industry trends noted by attending these conferences and interacting with staff from other utilities are:

- Renewal and replacement of aging infrastructure
- Conservation and reclaimed water to meet the needs of growing populations with existing water resources
- Public understanding of the value of water
- The need to attract, train, and retain staff
- Excellence in customer service and public awareness of water issues

Several of the national organizations develop annual reports that often reiterate these industry trends and that we use to evaluate OWASA's practices:

- [AWWA's State of the Water Industry Report](#) – this report is based on an annual survey of utilities to identify and track challenges facing the water industry, provide data and analysis to support water professionals, and inform decision makers and the public of challenges facing the water industry
- Association of Metropolitan Water Agencies (AMWA) [Annual Report](#) - this report is focused on regulatory and security issues, but AMWA also supports scientific research, collaboration, and sustainable utility practices
- The National Association of Clean Water Agencies, Water Environment Federation and Water Environment Research Foundation [Water Resources Utility of the Future](#) – this report was first developed in 2013 to recognize that water and wastewater utilities were identifying themselves as resource managers rather than waste managers. One trend that the latest Utility of the Future (2015) recognizes is that utilities in the United States are beginning to expand their use of technologies used in other countries. This 2015 report also notes how partnerships between utilities, consulting engineers, government, and finance are used to move utilities forward. This report has been replaced by the Utility of the Future Today Recognition Program. OWASA was recognized by this program for its organizational culture and energy efficiency programs.

The American Water Works Association (AWWA) sponsors the [Partnership for Safe Water](#) and the [Partnership for Clean Water](#). The Partnership for Safe Water is a voluntary effort for water utilities to optimize their treatment and distribution system processes to help ensure the production and delivery of safe water to all users that go beyond regulatory measures. The OWASA Jones Ferry Water Plant was the ninth plant in the nation and first plant in North Carolina to achieve the highest level of recognition with the Phase IV Excellence in Water Treatment Award. This level of excellence has been maintained for seven years running. The Partnership for Clean Water is a parallel program that focuses on wastewater treatment plant optimization, effluent quality and energy savings. This program was established in 2016 and is still under development. The OWASA Mason Farm Wastewater Treatment Plant has begun the initial self-assessment phase with the goal of being one of the first plants in the nation to achieve the first level recognition with the Phase III Directors Award.

The Water Research Foundation (WRF) also maintains a [website](#) that summarizes current research on topics important to water utilities including per and poly-fluoroalkyl substances (PFAS), cyanotoxins, fluoride, and taste and odor.

The U.S. Environmental Protection Agency (EPA) and six major water and wastewater associations developed a Primer on [Effective Utility Management](#) which was written to guide utility managers to make effective changes to achieve excellence in meeting their core missions.

The [State Water Infrastructure Authority](#) was created by the North Carolina General Assembly in 2013 to assess and make recommendations about the water and wastewater infrastructure across the state. The Authority finalized the [Infrastructure Master Plan](#) in 2017. The report notes that in order for a water utility to be viable, it must exhibit best practices around infrastructure management, organizational management, and financial management. Staff regularly attend meetings with staff of the State Water Infrastructure Authority to stay updated on their recommendations.

Engineering Consultants

OWASA hires engineering firms to plan, design, and construct our infrastructure. These engineering firms design and construct similar infrastructure throughout the region and nation. We hire them for their expertise; based on our specific requirements and circumstances and their experiences with different technologies, they recommend technologies that will best meet our needs.

Other Important Utility Planning Issues

This section includes a brief overview of other utility planning issues in which OWASA is currently engaged which support our mission and the values included in the Strategic Plan. This section is not intended to be a comprehensive overview of utility planning issues.

Energy Management

Strategic Initiative Number 4 in OWASA's Strategic Plan is to implement an Energy Management Program. Our use of energy to treat and deliver drinking water, wastewater, and reclaimed water services not only has an impact on our costs and the environment, but on the resiliency of our

operations. The OWASA Board of Directors has set the following goals and objectives for energy management:

1. Reduce use of purchased electricity by 35 percent by the end of Calendar Year (CY) 2020 compared to CY 2010 baseline;
2. Reduce use of purchased natural gas by 5 percent by CY 2020 compared to CY 2010 baseline;
3. Beneficially use all wastewater treatment plant (WWTP) biogas, provided the preferred strategy is projected to have a positive payback within the expected useful life of the required equipment;
4. Formally engage local governments and partners in discussion about potential development of a biogas-to-energy project at the Mason Farm WWTP; and
5. Seek proposals for third-party development of renewable energy projects on OWASA property.

This Strategic Trends report includes information on electricity and natural gas use for OWASA's operations for trends where it is appropriate. We are not tracking vehicle fuel use by functional area and are not reporting that energy use in this Strategic Trends report. For further information on OWASA's Energy Management Program, please see our [website](#).

OWASA staff is staying abreast of changes in the marketplace and regulations that impact the financial viability of certain energy management strategies. For example, Session Law 2017-192 has changed the state regulatory environment for developing and participating in the development of solar energy projects. We are monitoring the programs that are getting developed as a result of this legislation.

Safety

Safety of our staff, our customers, and the environment is important to the OWASA Board of Directors, staff leadership, and individual staff members. Much of the information contained in this Strategic Trends report helps us make sure that we are providing the community with safe drinking water and protecting both public health and the environment through proper conveyance, treatment, and disposal of wastewater.

Staff continually evaluate methods to improve our processes. We routinely perform after action reviews following small and large events that did not go as planned. The after action review process identifies what happened, what we set out to accomplish, what worked well, and where we can improve.

Safety is the number one priority of every member of the OWASA team. We are dedicated to reducing injuries, accidents and ensuring compliance. We achieve this by fostering a culture focused on awareness and safe work methods and by providing high-quality training, comprehensive workplace evaluation and emergency response.

Source Water Protection

Description

Our community has a long history of taking progressive actions to ensure the health and safety of our drinking water supplies. Since it began operations in 1977, OWASA has understood that to protect the water source, you must protect the watershed, and we have been actively involved in a wide range of watershed protection efforts, such as:

- Limits on the extension of water/sewer service into the Cane Creek Reservoir and University Lake watersheds;
- Support for stringent zoning and land use controls;
- Restrictions on in-lake recreational activities;
- Financial support for agricultural Best Management Practices;
- Special technical studies and educational activities; and
- **Land acquisition through the strategic purchase of property or conservation easements in areas determined to be critical for water quality protection.**

It is the land acquisition effort which is the focus of this section of the report. OWASA spent \$7.8 million on land protection between 1991 and 2006 through purchase and conservation easements and grant funds covered \$3.0 million of these costs. (Note: these costs have not been adjusted for inflation and do not reflect ancillary expenses for legal, survey, appraisals, other site work, or administrative costs of OWASA staff time).

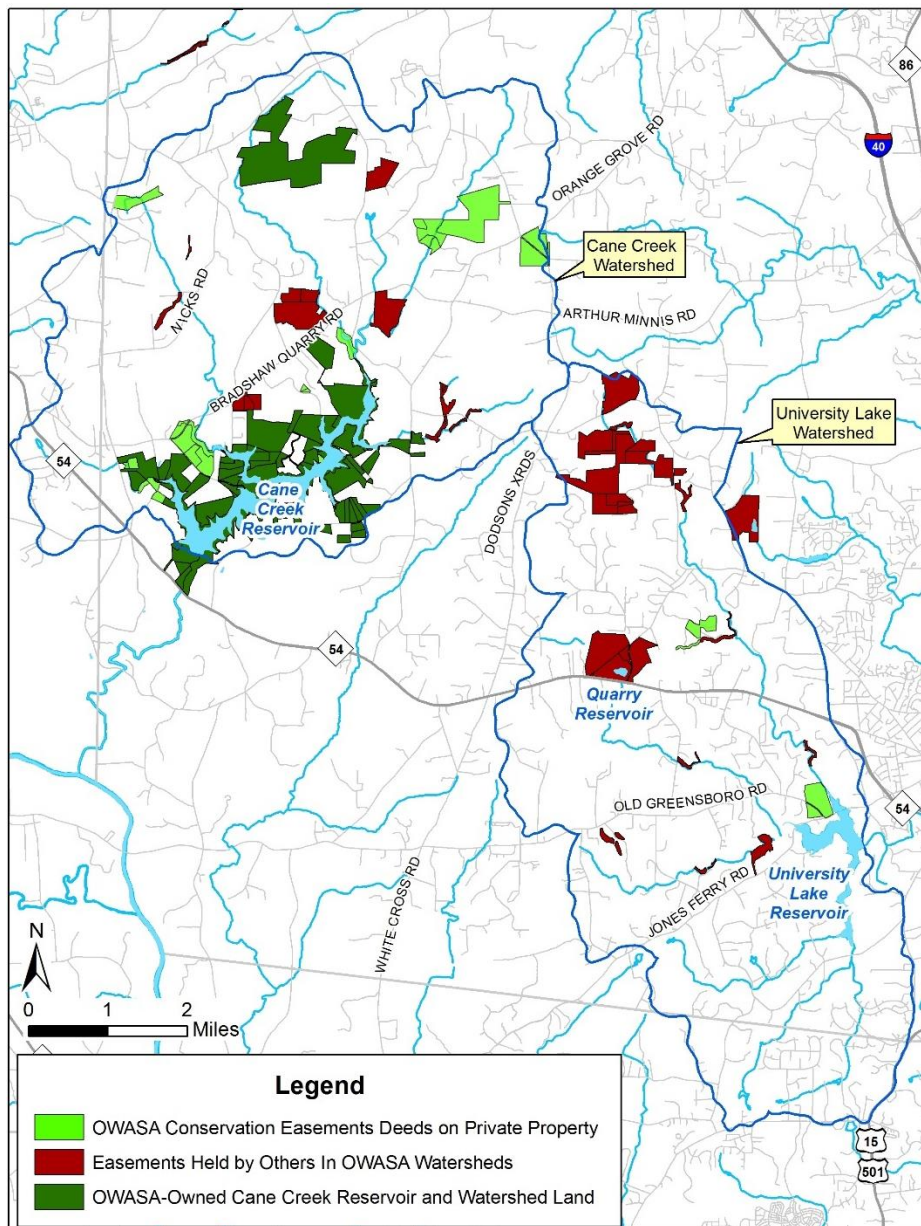
Land acquisition was among the options evaluated in the University Lake watershed management study and plan commissioned in the late 1980s. Water quality modeling indicated that permanently protecting 2,900 acres (approximately 15 percent) of the watershed would have only slight water quality benefits and not justify the multi-million-dollar cost, but that selected land acquisition in critical areas of the watershed may be appropriate. This recommendation was later confirmed in a follow-up analysis, which found that land acquisition would probably not be effective, but a possible exception may apply to undeveloped land very near the lake, and that conservation easements along stream buffers would be particularly valuable near the downstream ends of tributaries as they approach University Lake.

Based on these technical recommendations, OWASA elected not to pursue a program of land or easement acquisition in the University Lake watershed, but to consider land preservation opportunities on a case-by-case basis. In 2006, OWASA purchased a 73-acre property along Morgan Creek immediately upstream of University Lake (with the help of a \$1.2 million NC Clean Water Management Trust Fund grant). This property was placed under a permanent restrictive conservation easement that protects all riparian areas and severely restricts future development; subdivided into two large tracts; and re-sold on the open market in 2011 – with all restrictions in place.

The primary recommendations in a 1996 study of the Cane Creek Reservoir watershed included large lot (5 acres or greater) residential re-zoning and the permanent protection of 1,265 additional acres of

watershed land either through purchase or conservation easements. OWASA adopted those recommendations as goals for the protection of Cane Creek Reservoir and subsequently protected an estimated 1,075 acres of additional Cane Creek Reservoir watershed land through purchase or conservation easements. Since 1997, Orange County’s Land Legacy Program and other groups also acquired protective conservation easements on an additional 360 acres in the Cane Creek Reservoir watershed. Together, OWASA and Orange County’s land protection efforts have exceeded OWASA’s original goal. OWASA and Orange County staff continue to work closely in coordinating the needs of our respective programs as the County protects additional land in the watershed and elsewhere.

Protected Land in OWASA’s Watersheds



Water Quality Trends

OWASA actively participates in the [Triangle Area Water Supply Monitoring Project](#) (TAWSSMP). The US Geological Survey performs the sampling for this Partnership which began in 1988. The TAWSSMP samples area water supply reservoirs and tributaries to them to identify trends in water quality parameters and monitor for parameters of emerging concern. Scopes of work were developed for each phase of the TAWSSMP which include parameters which remain the same from phase to phase such as nutrients, chlorophyll *a*, major ions, and total suspended solids as well as parameters of interest for that particular phase.

The USGS published [Trends in Water Quality of Selected Streams and Reservoirs Used for Water Supply in the Triangle Area of North Carolina, 1989-2013](#) in July 2018. The USGS evaluated land cover, nutrients, and other parameters for statistical trends over the 25-year period. The data included four sites in OWASA's water supply watersheds as shown in the figure below:

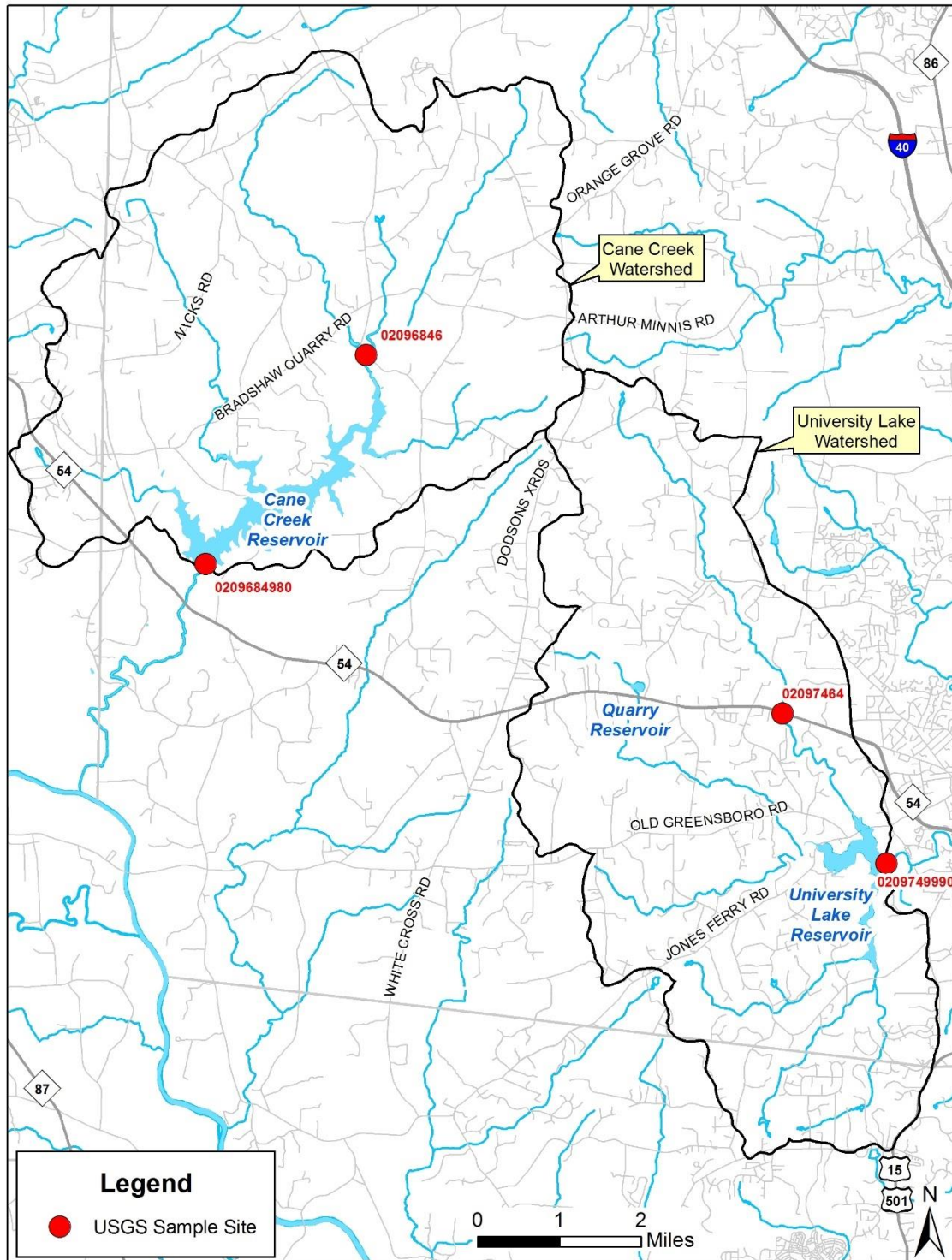
- Cane Creek upstream of Cane Creek Reservoir near Orange Grove (USGS 02096846)
- Cane Creek Reservoir at dam near White Cross (USGS 0209684980)
- Morgan Creek upstream of University Lake near White Cross (USGS 02097464)
- University Lake at intake near Chapel Hill (near dam; USGS 0209749990)

The USGS evaluated land cover, flow, and water quality in the full report. In general, they evaluated trends over the full period (1989-2013); they also evaluated 2-period trends (1989-2001 and 2002-2013), which roughly divided the study period in half. When the 2-period trend resulted in a better fit than that over the full period, they used the 2-period analysis. A better fit over 2 periods generally indicates that the trend shifted direction or the rate of the change in the trend either increased or decreased.

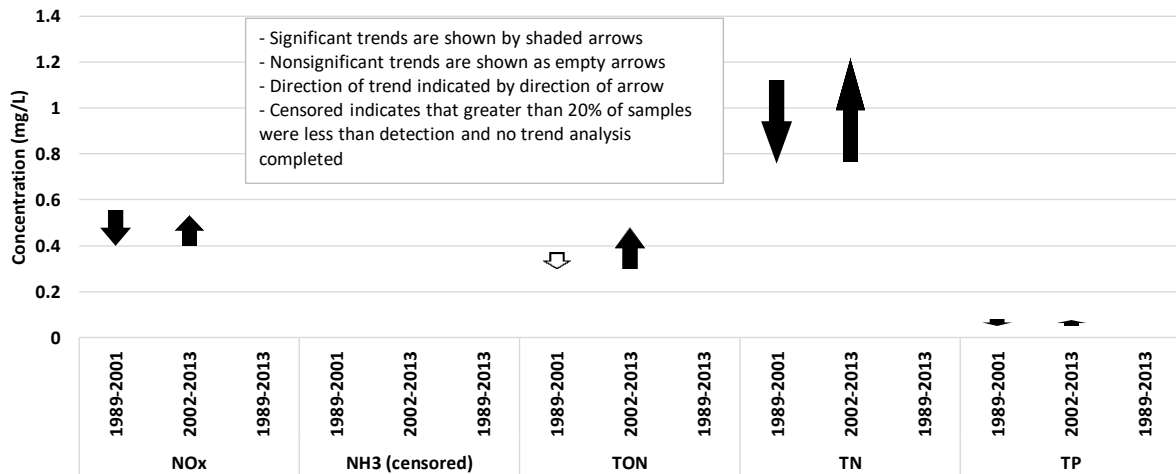
The USGS trends for nitrogen (nitrate-nitrite (NO_x), ammonia (NH_3), total organic nitrogen (TON), and total nitrogen (TN)), and total phosphorus (TP) are shown for each of the four stations in OWASA's watersheds in the following graphs. Trends for chlorophyll *a* are also shown for the two reservoir sites. Nitrogen and phosphorus are essential nutrients for plants and animals, but when too much of it is in lakes, it may cause algal blooms and create taste and odor problems or other treatment issues. Chlorophyll *a* is an indicator of the amount of algae in a lake. The narrative that follows describes key messages illustrated in the graphs.

NO_x shows minor significant changes at the Cane Creek and Morgan Creek sites; the values at these stations are low. Higher values of NO_x are often indicative of a point source discharge upstream. Too many sample results were less than the detectable level at the reservoir sites for USGS to perform a trend analysis on this parameter.

TAWSMP Sample Sites in OWASA Watersheds

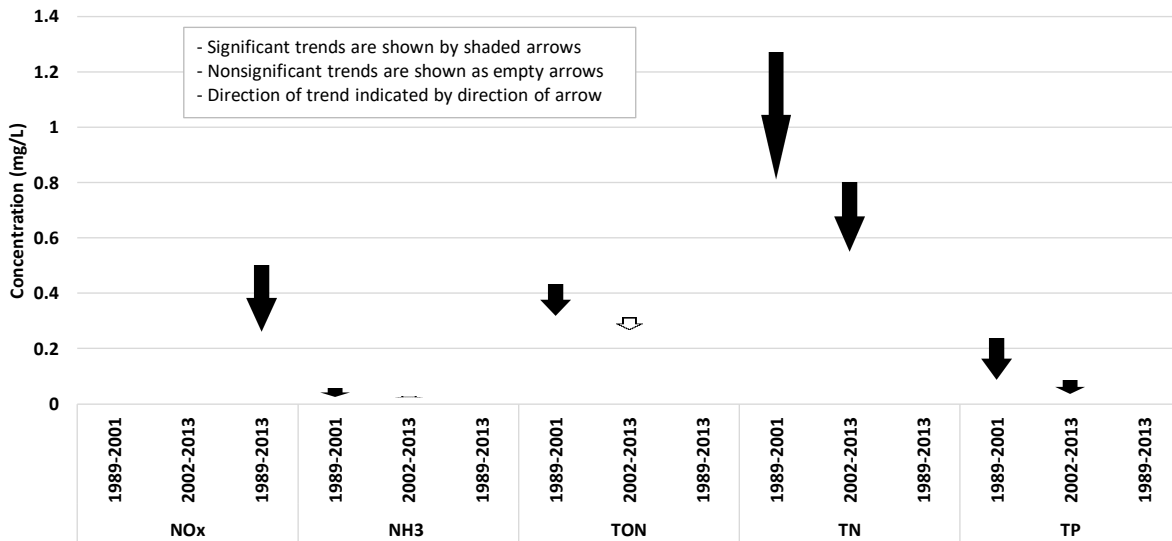


Cane Creek Near Orange Grove Water Quality Trends Using Fitted Annual Median Concentrations

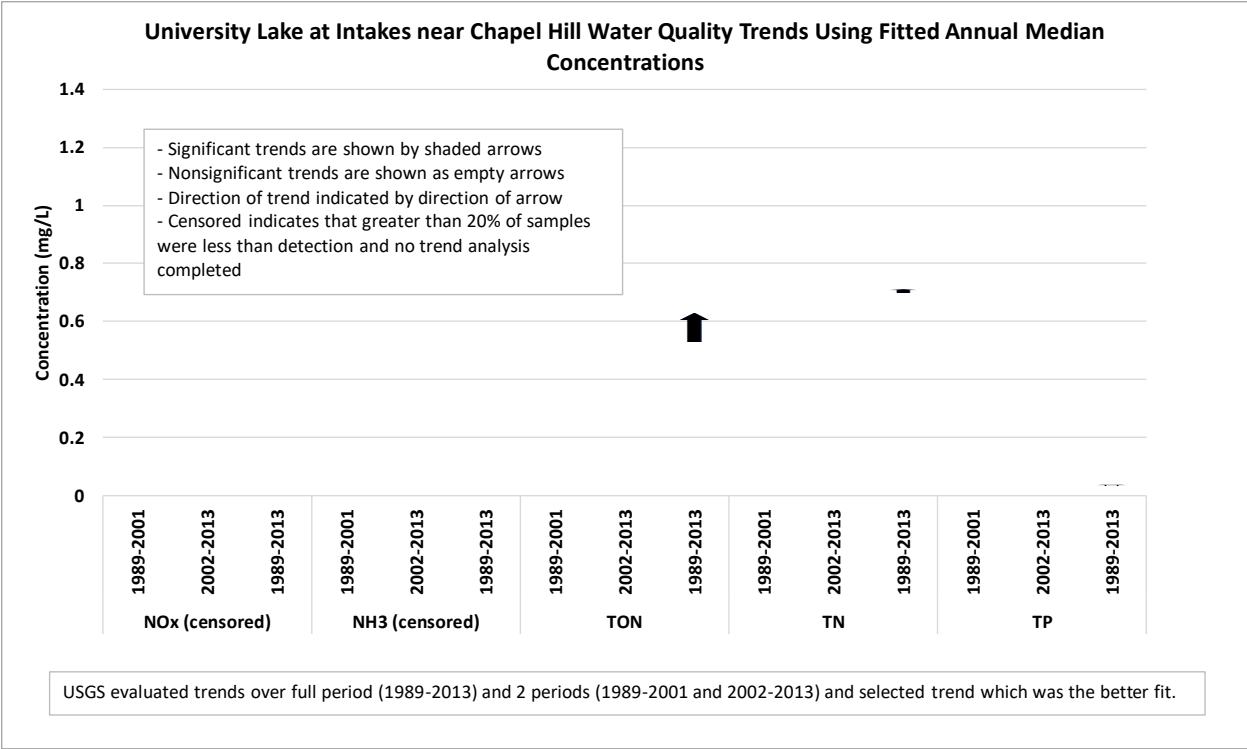
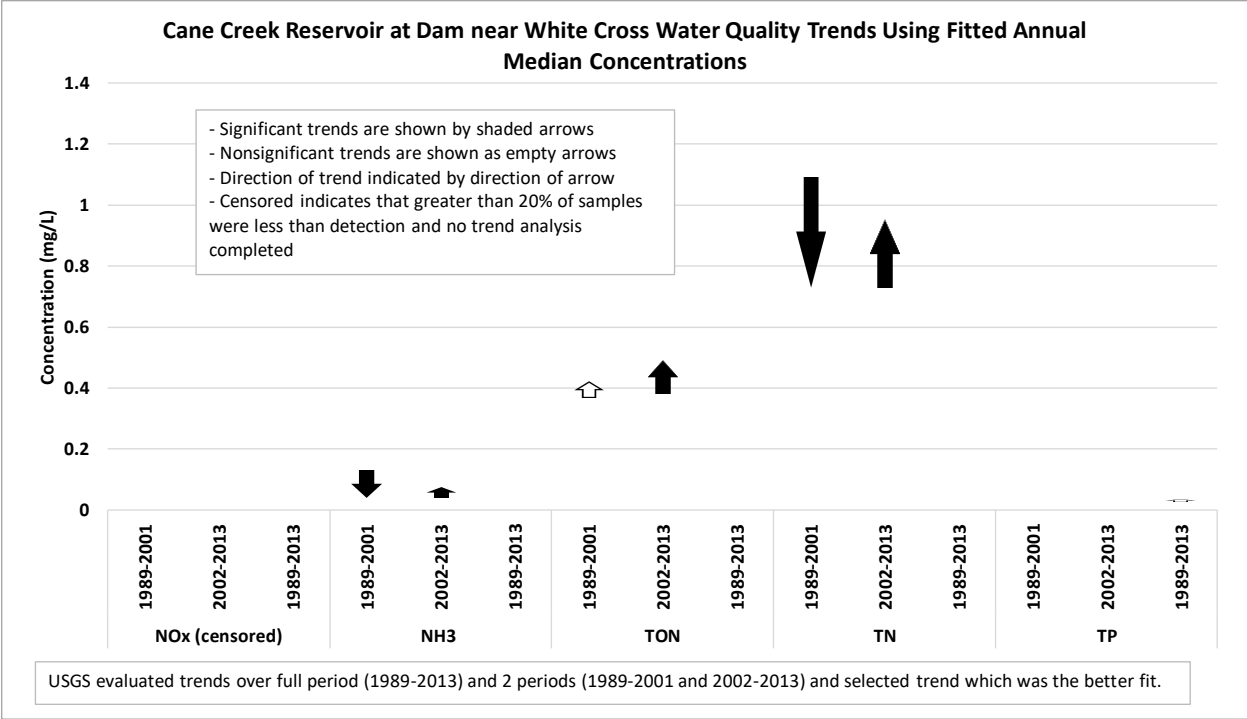


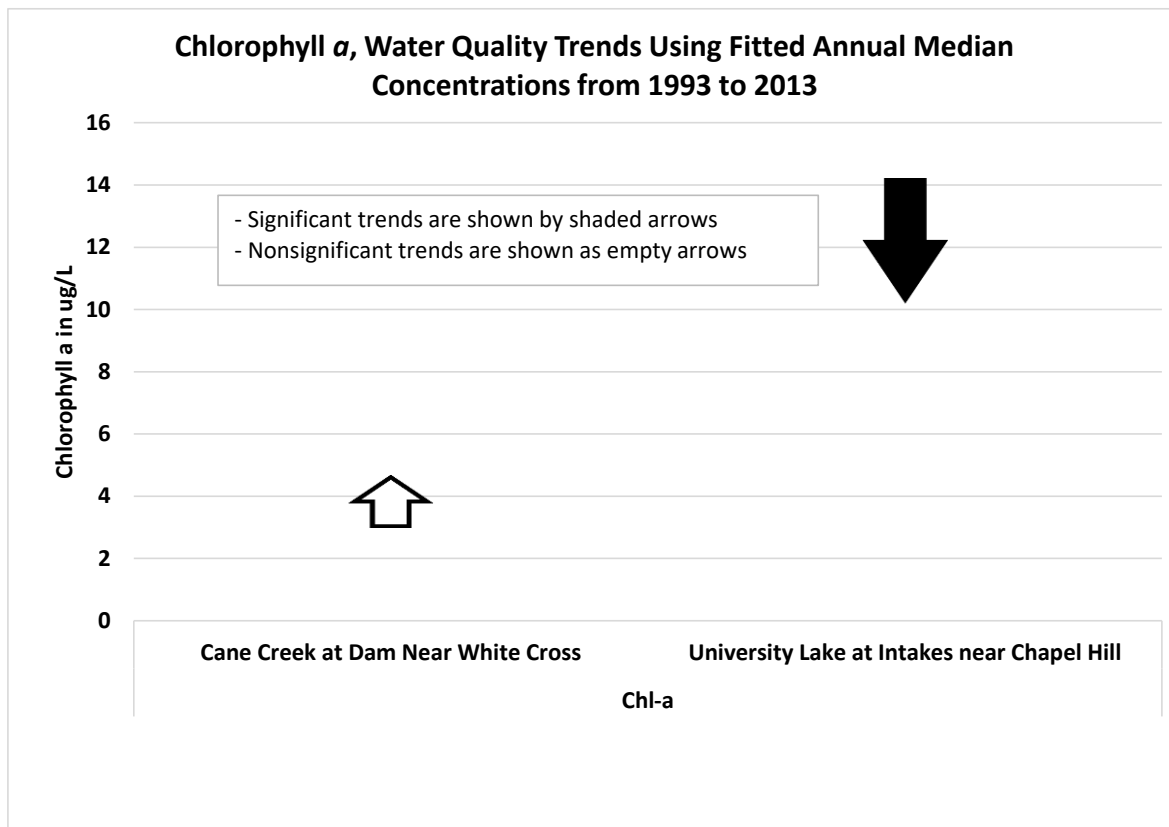
USGS evaluated trends over full period (1989-2013) and 2 periods (1989-2001 and 2002-2013) and selected trend which was the better fit.

Morgan Creek Near White Cross Water Quality Trends Using Fitted Annual Median Concentrations



USGS evaluated trends over full period (1989-2013) and 2 periods (1989-2001 and 2002-2013) and selected trend which was the better fit.





Ammonia typically quickly changes form to other forms of nitrogen. The Cane Creek and University Lake sites had too many data less than detection to perform a trend analysis. Very small changing trends (decreasing in first period; increasing in second period) were exhibited at the Morgan Creek and Cane Creek Reservoir sites.

TON increased at each site other than Morgan Creek where downward trends were observed. A farmer in that watershed fenced cows out of a tributary to Morgan Creek and riparian buffers were protected through a conservation easement which may account for some of that downward trend.

TN in Cane Creek and Cane Creek Reservoir significantly increased for the second period (2002-2013) in the 2-period trend analysis. The TN levels are relatively small in the system. TN decreased in Morgan Creek and University Lake, indicative of the downward trends in all forms of nitrogen where there were sufficient data for analysis.

There were very minor changes in TP in Cane Creek and Cane Creek Reservoir. There was a larger significant downward trend in TP at Morgan Creek. This may also be related to fencing cattle out of the stream and protective riparian buffers through conservation easements.

USGS changed their lake sampling methods in 1992 for chlorophyll *a*; thus the trend period for that parameter is from 1993-2013. It is also important to note that USGS changed their analytical method for chlorophyll *a* in 2005. Pre-2005, the analytical method only measured chlorophyll *a*, and beginning

in October 2005, the method measures chlorophyll *a* and some other pigments. Thus, USGS 2-period trends evaluated the period prior to and after the analytical method change. For the entire period (1993-2013), Cane Creek Reservoir shows an insignificant increase in chlorophyll *a*, and University Lake showed a statistically significant decrease in chlorophyll *a*. These results should be interpreted with caution; chlorophyll *a* varies seasonally, and evaluating annual median concentrations as done in the USGS report may not be very meaningful.

Regulations

- There is ongoing research at the federal and state level regarding per and poly-fluoroalkyl substances (PFAS) in drinking water. PFAS are man-made chemicals that are used in non-stick products, water and stain retardant fabrics, food packaging, fire fighting foams and other items. GenX is one of the PFAS compounds that was found in the City of Wilmington's water supply. EPA is exploring options to address PFAS, and the North Carolina General Assembly appropriated \$5 million in summer 2018 to test drinking water at public water supplies across the state for PFAS and included air quality sampling since air emissions can transport PFAS in the environment. OWASA completed special monitoring for PFAS in our raw water, drinking water, Morgan Creek, and in our wastewater treatment plant effluent when researchers from Duke University found some of those substances in our drinking water. Further [information](#) was provided to the Board of Directors on February 22 and March 8, 2018. OWASA's Natural Resources and Technical Services Committee discussed PFAS and source water protection in November 2018 and recommended that staff monitor PFAS at our raw water intake at Cane Creek Reservoir and in the drinking water leaving our Jones Ferry road WTP quarterly for one year.
- The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) builds upon the 1996 amendment to the federal Safe Drinking Water Act to strengthen protection against microbial contaminants, especially *Cryptosporidium*. OWASA completed the first round of monitoring for *Cryptosporidium* and *E. coli* in our source waters in 2009. As a result of this monitoring, OWASA was placed in the lowest treatment category, which requires no additional treatment. Staff completed the second round of two years of monthly monitoring of Cane Creek Reservoir and University Lake in August 2017. Based on the round 2 results, OWASA remains in the lowest treatment category and will not be required to provide additional filtration treatment. Staff are in the process of conducting a round of monthly sampling of the Quarry Reservoir; this round will be completed December 2019.
- OWASA follows developments regarding pharmaceuticals and personal care products in drinking water, wastewater, and reclaimed water. These products enter wastewater systems through excretion, disposal of unused medicine in sinks or toilets, and personal care products washed from skin and hair. They can also be present in runoff from livestock operations. Cane Creek Reservoir and University Lake watersheds are highly protected, and no treated municipal or industrial wastewater is discharged within our local water supply watersheds. However, there are livestock operations and private septic systems in both watersheds. A [2007 study](#) by the U.S. Geological Survey of local untreated (or raw) water sources including Cane Creek Reservoir and University Lake tested for pharmaceuticals. In this study, one pharmaceutical (acetaminophen) was detected in one sample from Cane Creek Reservoir; all other results from OWASA reservoirs were below the

detectable levels. OWASA does participate in EPA monitoring efforts of unregulated contaminants. This tool is used to improve drinking water quality standards by collecting data on compounds that are suspected to be present in drinking water, but do not have health-based standards set under the Safe Drinking Water Act. Pharmaceuticals and personal care products have not been included in this program to date, and there are no federal requirements for them.

- In accordance with direction from EPA, the North Carolina Department of Environmental Quality (DEQ) is developing draft nutrient criteria for surface waters in the state. If nutrient levels in one or more of our water supply reservoirs, Morgan Creek, and/or other surface waters in our area exceed future nutrient-related water quality limits, we and/or other parties could be required to take action to reduce the discharge of nutrients into those water bodies. The technical, economic, and environmental feasibility of complying with such requirements can only be determined once proposed criteria are issued.
- The North Carolina General Assembly ratified House Bill 894 to improve Source Water Protection in August 2014 in response to the accidental release of 4-methylcyclohexanemethanol in West Virginia and the coal ash spills in North Carolina. Under this bill, the North Carolina Environmental Management Commission (EMC) must adopt rules that will require all public water supplies which use surface water to develop a source water protection plan. DEQ drafted rules which were out for public comment through July 2018. OWASA has participated in meetings the Department held prior to drafting the rules and we are well positioned to develop the plan.

Technology and Research

- The City of High Point employs artificial mixing in its two water supply reservoirs City Lake and Oak Hollow Lake to improve treatability of their drinking water. The Town of Cary recently began mixing Jordan Lake water near its intake. Current research suggests this technology may work well for some smaller reservoirs and lake areas near intake structure. Researchers at North Carolina State University (NCSU) are evaluating the effectiveness of artificial mixing in Piedmont reservoirs accounting for factors such as depth, temperature, wind, and nutrient concentrations. OWASA supports this research and is providing data from University Lake as a control (do not employ artificial mixing) for the study. This study will help staff evaluate whether in-lake mixing may reduce algal blooms and the resulting increases in taste and odor events and cyanotoxin concentrations.
- OWASA is working with researchers at NCSU to monitor cyanotoxin trends in both reservoirs using a method that integrates cyanotoxin levels over two to four week periods of time. This method allows for constant monitoring of cyanotoxin trends at the intake structures and will provide valuable baseline data on the cyanotoxin concentrations coming into the plant. This work is being coordinated with the mixing research in University Lake described above. Together these efforts will provide OWASA with valuable information about the frequency and concentration of cyanotoxins and potentially the conditions in our lake where they may be a concern. Occurrence and abundance data for algae and cyanobacteria, paired with grab sample data for cyanotoxins and removal through the treatment process will inform future treatment technology enhancements.
- The 2016 General Assembly directed the UNC Collaboratory to evaluate water quality and nutrient management strategies in the Jordan and Falls Lake watersheds. These studies could result in new

management strategies in the Jordan Lake watershed which could impact OWASA operations. Staff stay updated on the work of the Collaboratory and have provided data to some of the researchers.

Energy Management

Energy use to manage OWASA’s lands is minimal and consists of fuel needed for travel and equipment to manage the land.

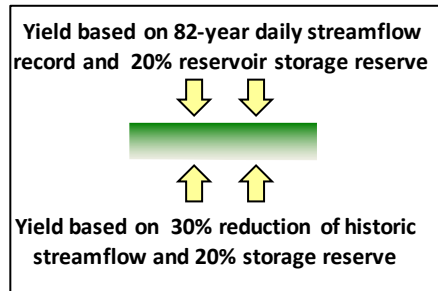
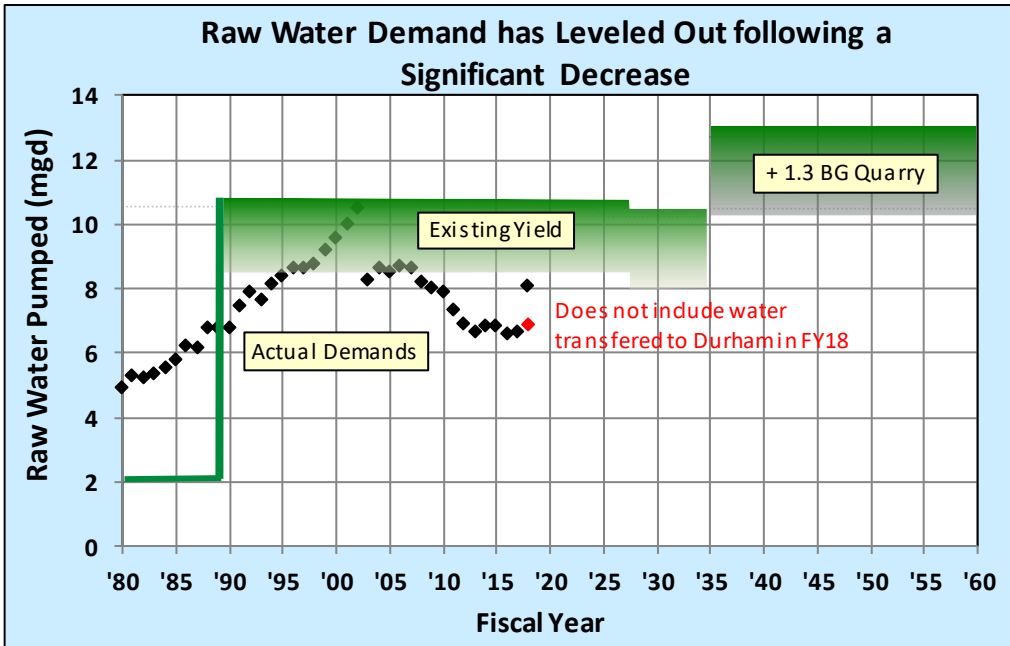
Strategic Plan Elements

Strategic Initiative 6 includes a goal that states “Land assets provide the expected value to fulfill OWASA’s mission and the assets are effectively managed”. Forest lands owned by OWASA in our water supply watersheds could be managed in the future to protect water quality and meet other objectives.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Since OWASA met its watershed protection goals, it will not seek additional land conservation. However, it will continue to evaluate cost-effective land acquisition opportunities through conservation easements or purchase when available.	Ongoing	X	
2. Inspect conservation easements on private land to make sure owners are following the terms of the easement	Annually		X
3. Develop Source Water Protection Plan when required	Currently due 1/1/2022	X	
4. Evaluate data from NCSU studies when completed and identify any follow up steps or recommendations for future.	CY 2019		X
5. Begin quarterly sampling for PFAS at Cane Creek Reservoir intake and in drinking water leaving plant	CY 2019		X

Raw Water Supply and Long-Range Water Supply Plan



Future demands are shown per LRWSP Appendix II, Attachment 4, rev 8/30/2011; these demands are being reassessed as part of the ongoing LRWSP update.

Description: This trend evaluates the supply (reliable yield) of our locally-owned upland water sources – Cane Creek Reservoir, University Lake, and the Quarry Reservoir – and historic raw water demands. (Since we do not have permanent facilities and/or agreements in place to access Jordan Lake, the above graph does not include our Level I Jordan Lake water storage allocation of about 5 million gallons per day (mgd). We can access this allocation through Town of Cary and City of Durham on a limited, emergency basis.

Key Observations:

- Raw water demand increased in 2018, but we provided water to the City of Durham while they were working on their WTPs. If we had not transferred this water, our average raw water demand would have been approximately 6.9 mgd, the same level it was in FY 15.
- When accounting for the water transfers to the City of Durham, the annual average-day amount of water we pumped from reservoirs has declined substantially since peaking in FY 2002.

- Annual average-day raw water demands are now at the same level they were in the early-1990s, shortly after Cane Creek Reservoir was placed into service. This has occurred despite over a 60 percent increase in the number of customer accounts during that period.
- Key factors in the reduction in water withdrawal rates include:
 - Increased water use efficiency and conservation by our customers;
 - Conservation pricing and conservation ordinances, including year-round restrictions;
 - Implementation of a process water recycling system at the drinking water treatment plant (2002), which reduced annual average-day raw water withdrawals by about seven percent;
 - Implementation of the reclaimed water system in partnership with UNC (2009), which now meets about ten percent of the community’s annual average-day water needs.
 - Higher density development which typically results in lower per capita demands.
- OWASA is beginning the process to update the LRWSP. One of the first tasks will be to develop future raw water demand projections. We anticipate that OWASA’s current and planned locally-controlled water supply sources will meet most customer demands through the next thirty to forty years. However, we will face an increasing risk of shortfall, particularly during extended droughts, between now and the time the expanded Quarry Reservoir is online around 2035.
- We anticipate that Jordan Lake, an alternative source, and/or additional demand management measures are expected to be needed to reduce risk to acceptable levels, particularly between now and the time the expanded Quarry Reservoir is placed into service.

Regulations

Regulations concerning our raw water supply are described in the Source Water Protection section.

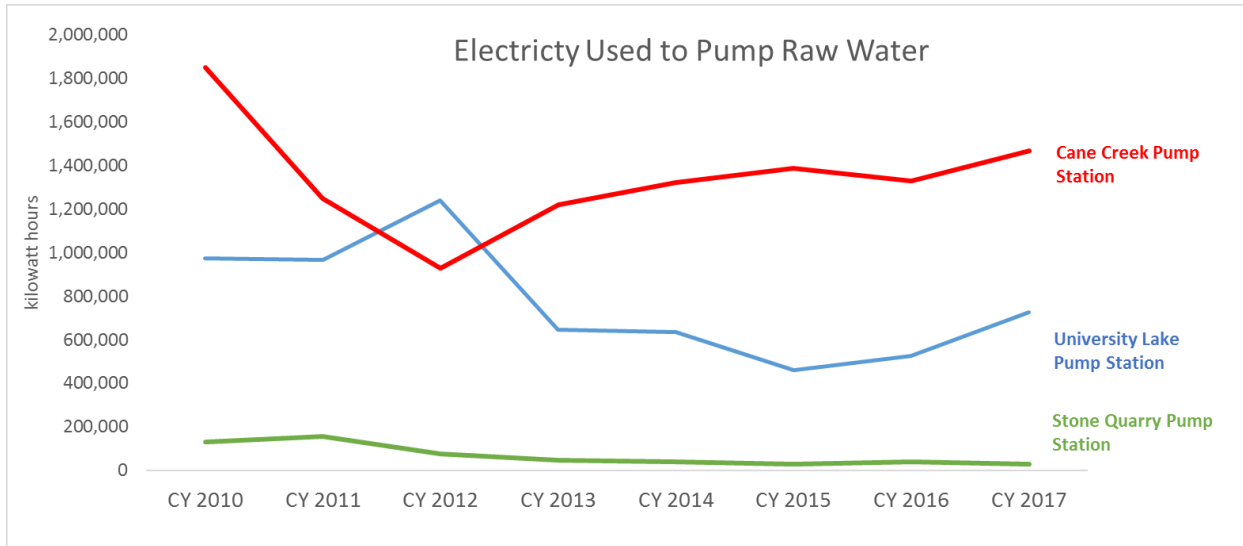
Technology and Research

Information on technology and research concerning our raw water supply is included in the Source Water Protection section of this report.

Energy Management

As shown in the graphic below, total kilowatt-hours (kWh) of electricity used to pump our raw water to the treatment plant was 25 percent less in 2017 than in 2010. This long-term decrease is due to lower water demands and the installation of a low-flow pump and variable speed drive at the University Lake Pump Station which enables us to better optimize system-wide pumping across a wide range of demand conditions.

Despite the long-term trends, energy use for raw water pumping increased between 2016 and 2017. This increase is related to the increase in raw water demands needed to transfer water to the City of Durham. This trend will likely be echoed in 2018, given that the transfers continued through July 2018.



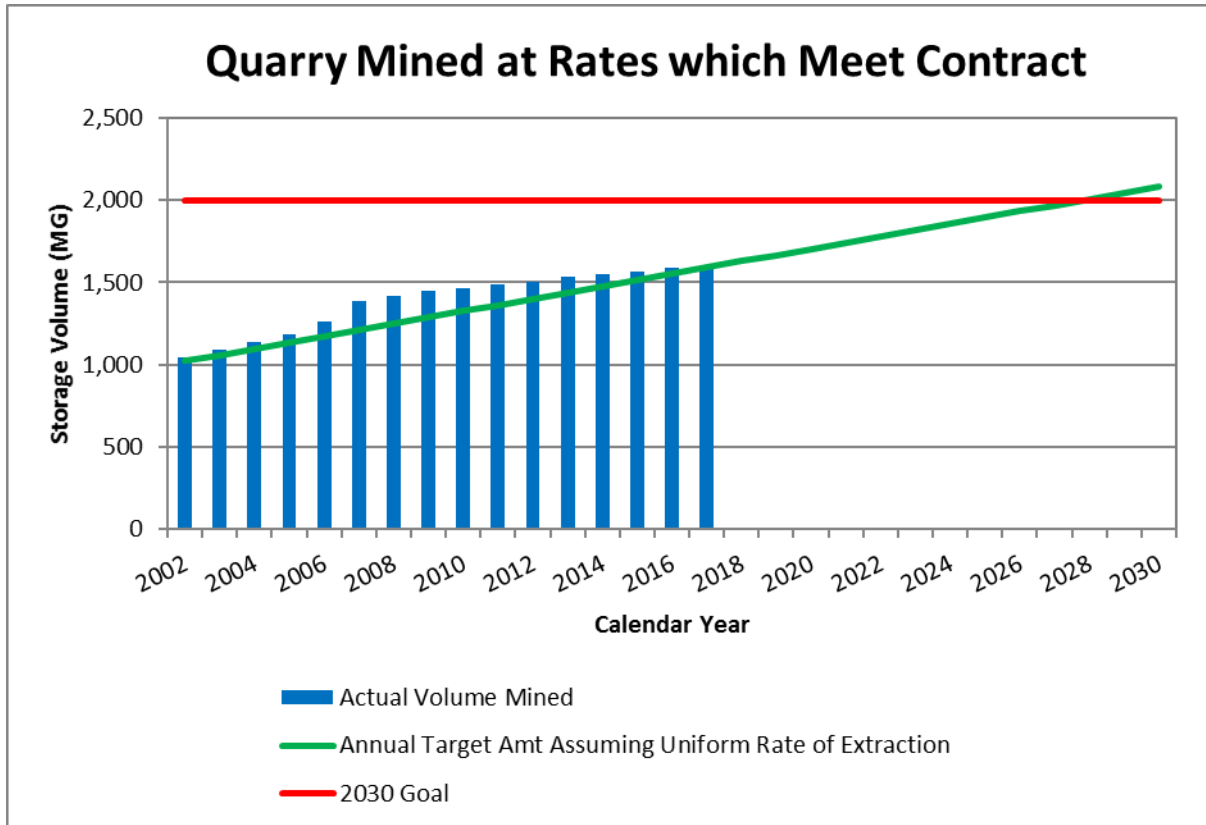
Strategic Plan Elements

This trend is directly related to updating the LRWSP, Strategic Initiative 1. One of the first steps to update the LRWSP will be to project future water demands. The projected future demands will be compared to OWASA’s estimated reliable yield to determine if any new sources of water are required for our long-term needs. Updating the LRWSP will also engage the community (Strategic Initiative 2), and the technology of advanced metering infrastructure (AMI, Strategic Initiative 5) may help detect and address leaks sooner which would reduce raw water demand. It also is related to Strategic Initiative 3 in that we want to invest in any new water supply at the right time to sustain the community’s drinking water supply.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Evaluate assumptions used to estimate reservoir yield and projected demands during the planned update of the LRWSP, which is scheduled to be completed in CY 2019. In future years, update calculations when warranted (e.g., when new drought of record occurs [impacts yield], service area boundaries change, local governments or UNC revise growth projections).	Fall CY 2018 and review when warranted thereafter	X <small>(as part of LRWSP update)</small>	
2. Continue to proactively plan and account for uncertainty, including increasing climate variability, through a diversified water supply and demand management portfolio.	Ongoing <small>(Climate change assessment for OWASA now underway by U. of South Carolina PhD student and advisor)</small>	X <small>(as part of LRWSP update)</small>	
3. Continue to pursue cost-effective ways to access OWASA’s Jordan Lake allocation in partnership with neighboring utilities.	Ongoing <small>(Participated in Jordan Lake West Facilities Feasibility Study in 2015 and Economic Feasibility Study in 2018)</small>	X	
4. Once we have a better understanding of the potential cost to ensure access to our Jordan Lake water allocation, review and reconsider the advantages and disadvantages of other feasible supply and demand management alternatives as part of update of the LRWSP.	CY 2019	X <small>(as part of LRWSP update)</small>	
5. Evaluate data from NCSU studies when completed and identify any follow up steps or recommendations.	CY 2019		X
6. Identify potential energy savings opportunities for raw water pumping in Energy Management Program.	Ongoing	X <small>(as part of Energy Mgmt Plan)</small>	

Quarry Reservoir Storage Volume



Description: In accordance with an agreement with OWASA, Martin Marietta (formerly American Stone Company) is mining rock from OWASA-owned land adjacent to our Quarry Reservoir. Per that agreement and the requirements of Orange County’s Special Use Permit that authorized expansion of the quarry, mining operations must cease by 2030, after which OWASA will begin to fill the expanded quarry with water. Martin Marietta is required to remove enough stone to ensure that the expanded quarry (including OWASA’s existing Quarry Reservoir at 0.2 billion gallons (BG)) will store at least 2.2 BG of water. This trend evaluates whether the quarry is being mined at rates which will meet that minimum water storage capacity requirement.

Key Observations:

- The quarry is being mined at rates which meet the contractual requirements.

Regulations

There are no regulations to report for the quarry. However, OWASA will perform microbial monitoring on the expanded Quarry Reservoir as soon as it is put into service, and DEQ may need to approve it as a water supply source. As mentioned in the Raw Water Supply section above, staff is in the process of conducting LT2 monitoring of the Quarry Reservoir.

Technology and Research

There are no updates in technology to report for the quarry.

Energy Management

The existing Quarry Reservoir is used only during extreme droughts or other emergencies. We periodically test the pumps to ensure they are ready in time of need. As a result, our energy use at the Quarry Reservoir is negligible (see Raw Water Supply and Long-Range Water Supply Plan trend).

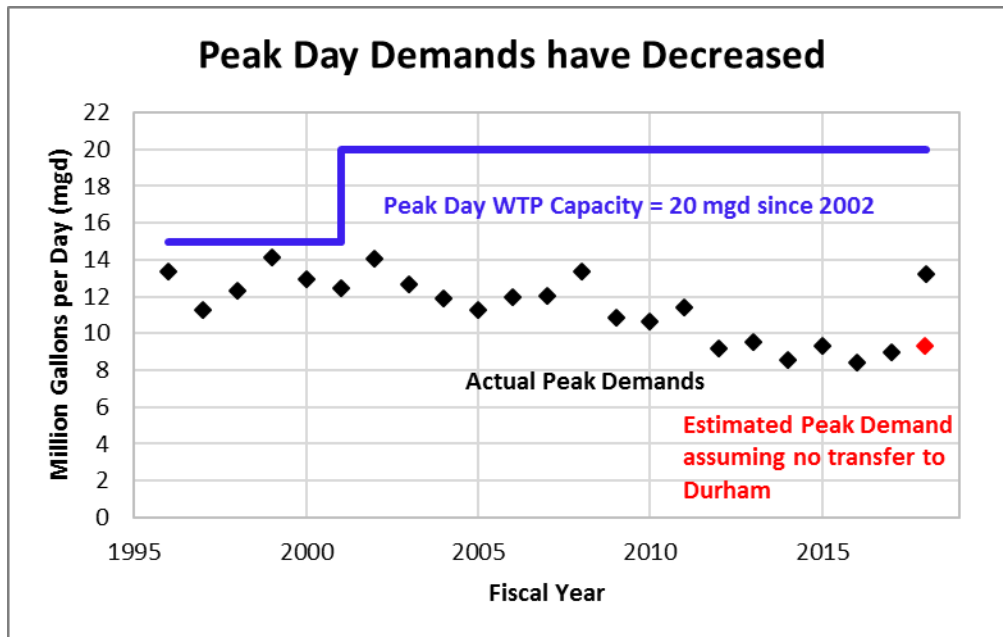
Strategic Plan Elements

The Quarry Reservoir is an essential part of OWASA's water supply portfolio and is tied to Strategic Initiative 1, "Provide reliable and high quality supply of water for the next 50 years".

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to monitor the annual rate of rock excavation at the quarry to ensure contractual requirements are met.	Annual		X
2. Maintain and follow the Quarry Reservoir implementation checklist in order to ensure timely implementation of the Quarry Reservoir water storage project once mining ceases in 2030.	Ongoing		X
3. As part of LRWSP update, evaluate the benefits and costs of various Quarry Reservoir alternatives (e.g., developing permanent pump station to withdraw deeper water).	CY 2019	X (as part of LRWSP update)	

Water Treatment Plant: Peak-Day Drinking Water Demands and LRWSP



Description: This trend evaluates peak-day drinking water demands and compares those demands to the 20 mgd rated capacity of the Jones Ferry Road Water Treatment Plant (WTP).

Key Observations:

- There was a significant increase in peak day drinking water demands in FY 2018 compared to the recent past. OWASA provided drinking water to Durham while they had one WTP offline in FY 2018 and were making improvements at their second WTP. If OWASA had not transferred this water, our peak day demand would have been approximately 9.3 mgd, the same level as in FY 2015.
- Since FY 1999, the year with the highest peak-day demand, peak-day drinking water demands have declined by 34 percent (when accounting for transfers of water to Durham) despite a 30 percent increase in customer accounts over that same period. (Based on raw data (not factoring in transfers to Durham), peak day demands decreased 6 percent since FY 1999).
- This decline has resulted from the following primary factors: (1) our customers are using water more efficiently, (2) we have adopted conservation pricing and conservation ordinances including year-round water use restrictions, and (3) since March 2009, reclaimed water has been used instead of drinking water to meet certain non-drinking water needs at several UNC facilities that have high summer season demands (cooling towers and irrigation).
- OWASA is beginning the process to update the LRWSP. One of the first tasks will be to develop future raw water demand projections which will be used to estimate future drinking water demands and treatment capacity requirements. We anticipate that the Jones Ferry Road WTP has adequate capacity to meet projected peak-day drinking water demands for at least the next 20 years.

(NOTE: The observations presented above assume that the reclaimed water system is in service throughout the peak-day demand season. Peak-day drinking water demands would be considerably greater if the reclaimed water system is out-of-service.)

Regulations

- The 1996 amendments to the federal Safe Drinking Water Act require that monitoring be completed for a list of unregulated contaminants every five years. EPA will use the data collected to determine if any of these contaminants should be regulated. In May 2012, EPA published the rule to complete the third round of this monitoring (UCMR3); monitoring was staggered among facilities and all monitoring was completed by December 2015 with all results reported to EPA by summer 2016. OWASA participated in the Assessment Monitoring of 21 contaminants under the UCMR3 and completed monitoring in August 2014. Some larger utilities also monitored other emerging contaminants such as human and veterinary hormones. [OWASA UCMR3](#) monitoring results consistently detected the following three unregulated contaminants: Chromium-6, Strontium, and Chlorate (see next bullets). In December, 2016 the EPA published the rule for the 4th round of this monitoring (UCMR4) and will require monitoring for 30 parameters including cyanotoxins, pesticides, and disinfection by-products. UCMR4 monitoring will occur between 2018 and 2020. OWASA will begin monitoring in August 2019.
- EPA has set the maximum contaminant level (MCL) of total chromium (i.e., all forms of chromium) at 100 µg/L but has not yet published a drinking water standard for Chromium-6. The State of California adopted a Chromium-6 MCL of 10 µg/L, which became effective on July 1, 2014; but on May 31, 2017 the Superior Court of Sacramento County issued a judgment invalidating the MCL and ordering the State to adopt a new MCL. During the UCMR3, OWASA's monitoring for Chromium-6 detected levels between < 0.03 - 0.06 µg/L, which are well below the now invalid California standard. OWASA and other members of the TAWSMP identified Chromium-6 as a focus area for the current phase of water supply monitoring (see Source Water Protection section for a brief overview of the TAWSMP). As such, the US Geological Survey collected bi-monthly samples in our raw water supply beginning in August 2017; analysis of samples and data are ongoing.
- EPA has not yet published a drinking water standard for Strontium, but has established a health advisory level of 1,500 µg/L. A health advisory level is a non-enforceable, non-regulatory federal guidance which describes the concentration which can be consumed with little or no risk to health. OWASA's monitoring for Strontium detected levels between 53 - 75 µg/L, well under the health advisory level.
- EPA has not yet published a drinking water standard for Chlorate. The health advisory level for Chlorate is 210 µg/L. OWASA's monitoring for Chlorate during UCMR3 detected levels between 160 – 650 µg/L. The State of California has not set an MCL for Chlorate but has set a notification level of 800 µg/L. The World Health Organization (WHO) guideline for Chlorate is 700 µg/L. Chlorate is known to occur in drinking water as a result of the disinfection process and as a result of sodium hypochlorite (bleach) degradation. Concentration, long storage times, and temperature all contribute to the degradation of sodium hypochlorite. Following UCMR3, OWASA changed the concentration and reduced storage times of our bulk sodium hypochlorite. OWASA completed a

two-year study to test the Chlorate levels of our treated drinking water leaving the WTP and in the distribution system quarterly since implementing these changes and Chlorate levels have decreased by an average of 64 percent compared to levels measured as part of UCMR3. OWASA will continue to follow this issue to ensure its drinking water continues to be safe for its customers.

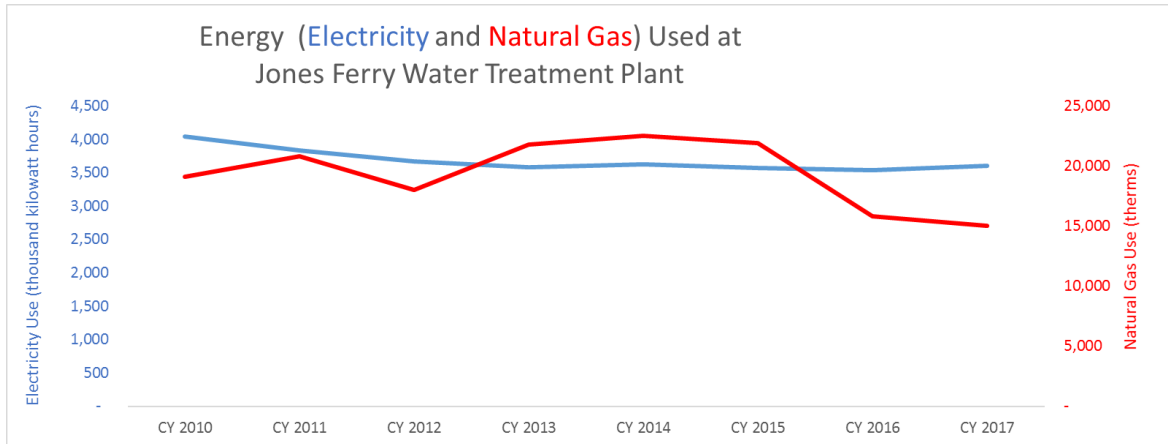
- EPA has not yet published a drinking water standard for Perchlorate, but published a notice of a draft approach document to establish a standard in September 2017; based on litigation involving the Natural Resources Defense Council, there is a court-ordered deadline to have a standard by December 2019; EPA recently filed a motion seeking a six month extension of that deadline. The EPA health advisory for Perchlorate is 15 µg/L, effective October 2008, and California adopted a standard of 6 µg/L, effective October 2007. Massachusetts adopted a drinking water standard of 2 µg/L. OWASA's monitoring detected Perchlorate at a concentration of 0.33 µg/L in the finished water, well below the advisory level and California and Massachusetts standards.
- In 2016, EPA published new health advisories for Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS) of 0.07 µg/L as a lifetime concentration for a combined concentration of PFOA and PFOS. This level of 0.07 µg/L was set to protect the most sensitive populations over a life time of exposure to the two contaminants. OWASA monitored for these substances as part of UCMR3; PFOA concentrations ranged from <0.02 µg/L to 0.03 µg/L, and PFOS was not detected.
- OWASA has historically met all disinfection by-product criteria applicable to finished drinking water provided to our customers. Monitoring data indicates that we should continue to meet any criteria developed for disinfection by-products. Additionally, currently unregulated disinfection by-products will be included in UCMR4.
- Cyanotoxins are toxins produced by blue-green algae (i.e., cyanobacteria) under certain conditions. These toxins can be harmful to the environment, animals, and human health; one was responsible for the City of Toledo's "Do Not Use" warning in summer 2014. In June 2015, EPA issued health advisories for two cyanotoxins: microcystin (1.6 micrograms per liter [µg/L] for children 6 and up and adults and 0.3 µg/L for children less than 6 years old) and cylindrospermopsin (3.0 µg/L for children 6 and up and adults and 0.7 µg/L for children less than 6 years old). Establishing a monitoring program and benchmarks for when source and/or finished water should be analyzed for toxins provides a solid foundation for a cyanotoxin management approach. OWASA has proactively been monitoring algal cyanotoxins since 2007 in our finished drinking water using a contract laboratory when our blue-green algal counts rise above 100,000 units/mL in University Lake or Cane Creek Reservoir. Additionally, beginning in the summer of 2016 staff began monitoring cyanotoxin levels at the intakes and through the treatment process on a weekly basis to gather baseline data on occurrence and removal. To date, OWASA has not exceeded the health advisory levels in our finished drinking water. In addition to microcystin and cylindrospermopsin, OWASA also monitors for anatoxin-a. Staff will continue to evaluate algal toxins (additional information provided in Treatment Technology section). OWASA will be required to monitor for some cyanotoxins as part of UCMR4.

Technology and Research

- In 2017, there were several incidents where OWASA's drinking water had taste and odor issues. While taste and odor compounds in the drinking water are not harmful, they are not pleasant. OWASA currently uses a contract laboratory to analyze our water for taste and odor compounds, and it takes 3 to 4 days to receive the results which are not actionable. The Board of Directors approved the purchase of gas chromatograph/mass spectrometer that will enable staff to test for the compounds in-house and receive results the same day or next morning which guides treatment for removal of the compounds. This equipment will also be useful for screening for other compounds of emerging concern.
- OWASA evaluates the treatment technologies we have at our water plant to ensure we can meet any potential upcoming standards with current treatment technologies. OWASA can meet most of the potential standards discussed in the Regulations section above. Activated carbon, ozone, and membrane technologies have been found effective at removing cyanotoxins, and we currently use activated carbon in our treatment process, which is currently effective at removing our cyanotoxins. Since summer 2016, staff has been performing in-house monitoring for cyanotoxin levels in the raw water and throughout the treatment process; eliminating the 1-week lag between collection and results when using a contract laboratory. Staff continues to follow on-going research on this topic to ensure safe drinking water for our customers.
- Staff at the WTP periodically evaluate the chemicals we use at the plant to ensure we are using the best available in terms of meeting our treatment goals in the most sustainable manner as well as to ensure that we do not foresee shortages in chemicals we use which could impact treatment or their price. At this time, staff believe we are using the correct blend of chemicals and no shortages are foreseen in their supply.

Energy Management

In 2017, we used 11 percent less electricity at the Jones Ferry Road Water Treatment Plant (WTP) than we did in 2010. This is in large part due to the conservation and efficiency of our customers, as well as UNC's use of reclaimed water. Our use of electricity was slightly higher in 2017 than we would have anticipated due to the transfer of water to the City of Durham. Natural gas is used at the WTP to heat buildings, and our use of natural gas is largely driven by weather. The use of natural gas (therms) was about 21 percent lower in 2017 than it was in 2010, largely attributable to weather and operational changes.



In 2017, OWASA installed power monitors on the finished water pumps. Finished water pumping accounts for 50-60% of the energy used at the WTP.

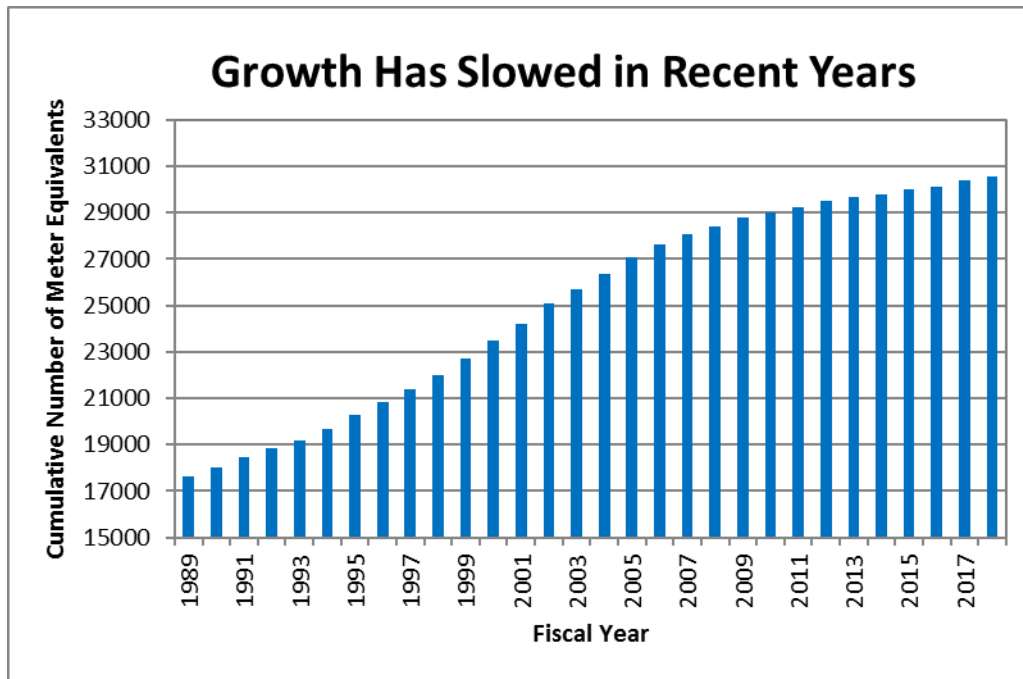
Strategic Plan Elements

Strategic Initiative 1 includes preparing a Water Conservation Plan. Conserving water will help reduce peak day and average day demands. In addition, Strategic Initiative 3 includes a goal to invest at the right time in our community’s water assets. Understanding the capacity of our WTP, the demands placed on it, and the potential implications of future treatment requirements will inform our CIP.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to monitor peak-day demands at the Jones Ferry Road WTP and identify cost-effective practices that could be implemented to further reduce peak-day demands.	Ongoing		X
2. Continue to identify and pursue cost-effective opportunities for additional conservation or reclaimed water use, which help reduce peak demands.	Ongoing		X
3. Continue to monitor potential growth in our service area by working closely with Carrboro, Chapel Hill, and UNC to ensure we have sufficient drinking water treatment, pumping and storage capacity.	Ongoing		X
4. Continue to monitor our water and stay current with the potential new drinking water standards to ensure we can meet future requirements. Identify any studies or technologies needed to ensure we provide safe, high quality drinking water to our customers.	Ongoing		X
5. Continue to monitor treatment technologies and chemical use for potential to improve our level of service.	Ongoing		X
6. Identify potential energy savings opportunities for water treatment and pumping in Energy Management Program.	Ongoing	X (as part of Energy Mgmt Plan)	
7. Maintain certification by Partnership for Safe Water (see chapter on "OWASA's Planning Environment") for Phase IV Excellence in Water Treatment	Ongoing		X

Cumulative Number of Water Meter Equivalents (MEs)



Description: This trend evaluates the number of meter equivalents (MEs) served by OWASA. The smallest meters (5/8-inch) serve single family homes and small non-residential customers, while larger meters are used to serve locations with larger water demands. The capacities of larger meters are expressed in hydraulic capacity proportional equivalents of a 5/8-inch meter, or “meter equivalent”. (For example, a 2-inch meter has a meter hydraulic capacity ratio of 8 MEs, and a 6-inch meter has an equivalency of 50 MEs.) The number of meter equivalents is an indicator of the potential rate of growth in customer demands the service area.

Key Observations

- Growth in the service area is slower in recent years than in past.
- The number of meter equivalents has grown 35 percent since FY 1999, the year with our highest peak-day drinking water demands (see Peak-Day Drinking Water Demands Trend).

Regulations

There are no regulations to report for meter equivalents.

Technology and Research

There are no updates in technology to report for meter equivalents.

Energy Management

There is no energy use to report for meter equivalents.

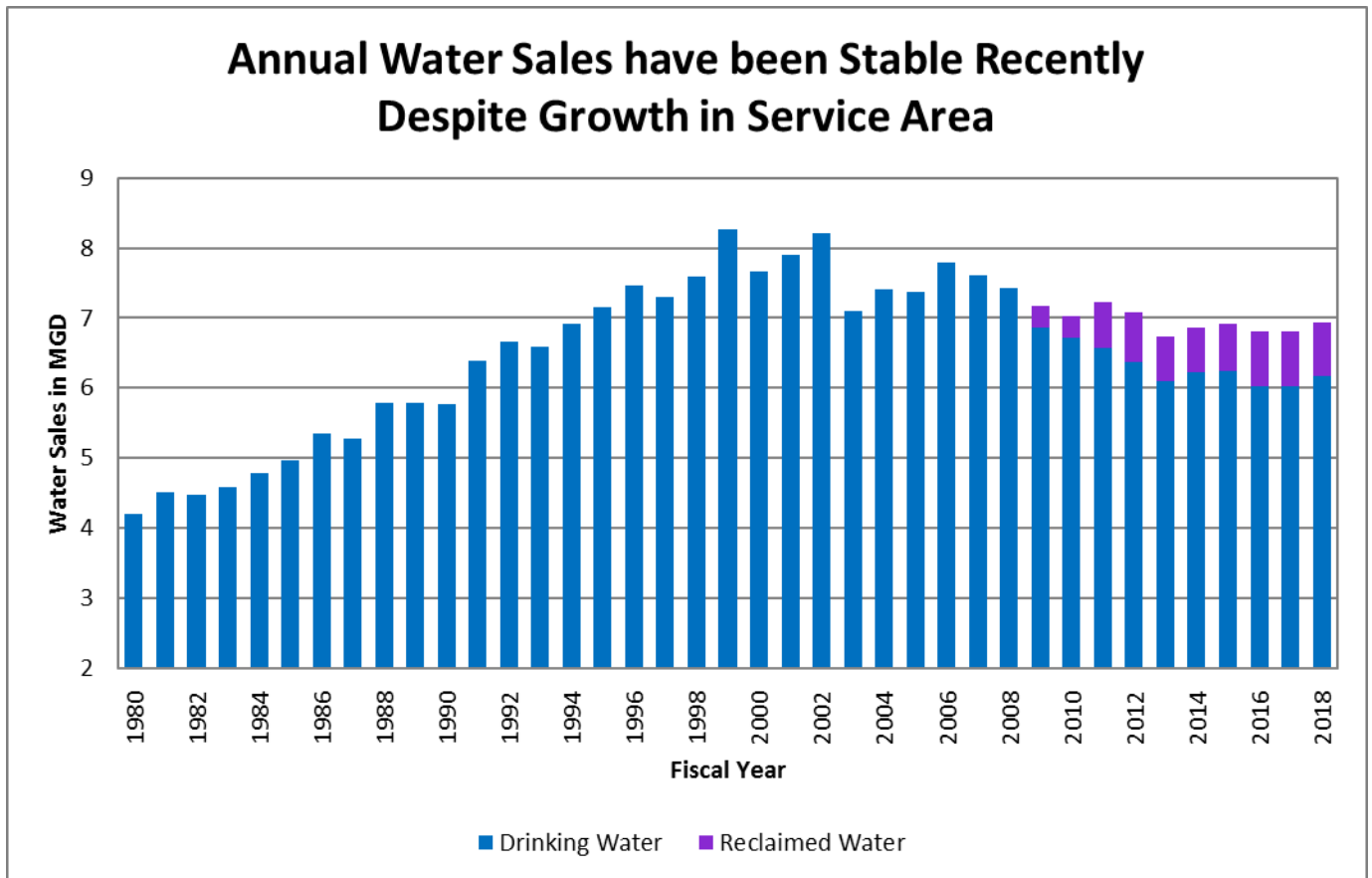
Strategic Plan Elements

Understanding how growth is occurring in our service area allows us to plan for our water supply needs and treatment and conveyance capacity needs (as well as our wastewater collection and treatment capacity needs). These are related to Strategic Initiatives 1 (provide reliable and high quality supply of water for next 50 years) and 3 (adopt budget decision processes to ensure affordable services).

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to monitor growth in service area by tracking new meter equivalents.	Monthly (for Dashboard report)		X

Drinking Water and Reclaimed Water Sales



Description: This trend evaluates average-day sales of drinking water and reclaimed water (in mgd) since 1980. (The reclaimed water system began operating in March 2009.)

Key Observations:

- OWASA’s annual average drinking water sales have declined despite growth in the service area as shown in the Meter Equivalents trend. Drinking water sales are currently at about the same level they were 25 years ago.
- Total annual water sales (including reclaimed water) are 16 percent less from when they peaked in FY 1999, despite a 30 percent increase in customer accounts during that same time period. Drinking water sales declined 26 percent over that same period.
- Reclaimed water sales meet over 10 percent of the community’s water needs.

Regulations

There are no regulations to report for drinking water sales. For regulations on reclaimed water, see Reclaimed Water section.

Technology and Research

In accordance with Strategic Initiative 5, OWASA began installing advanced metering infrastructure (AMI). AMI will allow OWASA and our customers to detect leaks earlier and may result in further reduced water sales.

Energy Management

Energy used to pump drinking water is shown in the Peak-Day Drinking Water Demands section.

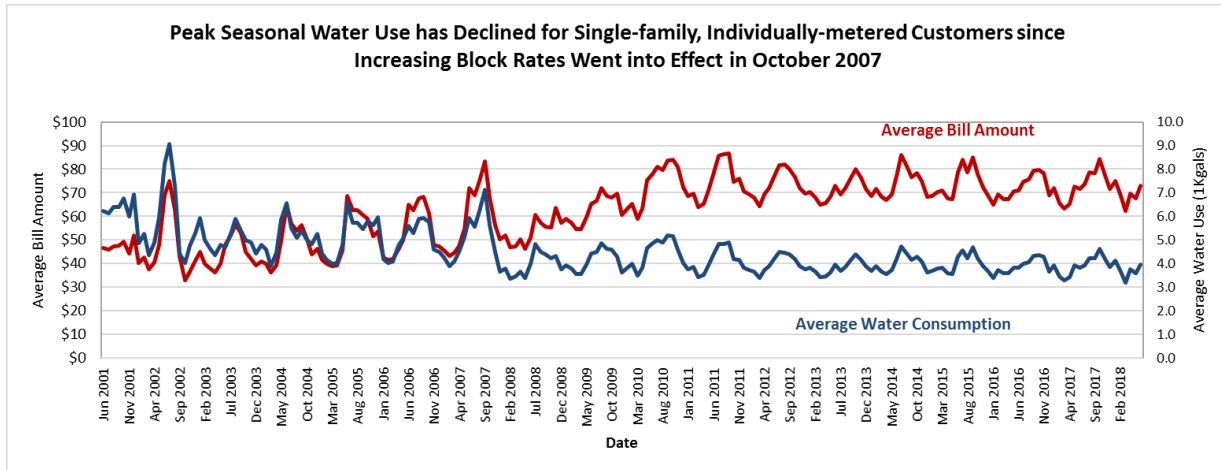
Strategic Plan Elements

The Water Conservation Plan included in Strategic Initiative 1 may result in reduced drinking water sales. This in turn would impact revenue, which would be addressed through the financial management policies included in Strategic Initiative 3. Financial reserves help OWASA meet its financial obligations during times of reduced water sales such as may occur during drought conditions.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to identify cost-effective opportunities to expand the reclaimed water system which will help reduce our community's risk to drought, extend the capacity of the WTP, and optimize the use of our locally-controlled water supplies.	As opportunities arise	X <small>(as part of LRWSP update)</small>	
2. Continue to identify cost-effective and customer-accepted opportunities for additional conservation.	Ongoing	X <small>(as part of LRWSP update)</small>	
3. Continue to monitor potential growth in our service area by working closely with Carrboro, Chapel Hill, and UNC to ensure we have adequate water treatment capacity for the future.	Annual with ongoing communication		X

Average Monthly Water Use and Billed Amount



Description: This trend evaluates average monthly water use and the average monthly water and sewer charges for single-family, individually-metered residential customers.

Key Observations:

- Peak seasonal water use by this group of customers has declined, particularly after OWASA’s increasing block rates went into effect in October 2007. This indicates that outdoor water use for single-family, individually-metered residential customers has diminished and implies a relationship with the change in our water rate structure.

Regulations

There are no regulations to report for water use.

Technology and Research

In accordance with Strategic Initiative 5, OWASA is installing advanced metering infrastructure (AMI) throughout our service area. AMI will allow OWASA and our customers to detect leaks earlier and may result in further reduced water use.

Energy Management

Energy used to pump drinking water is shown in the Peak-Day Drinking Water Demands section.

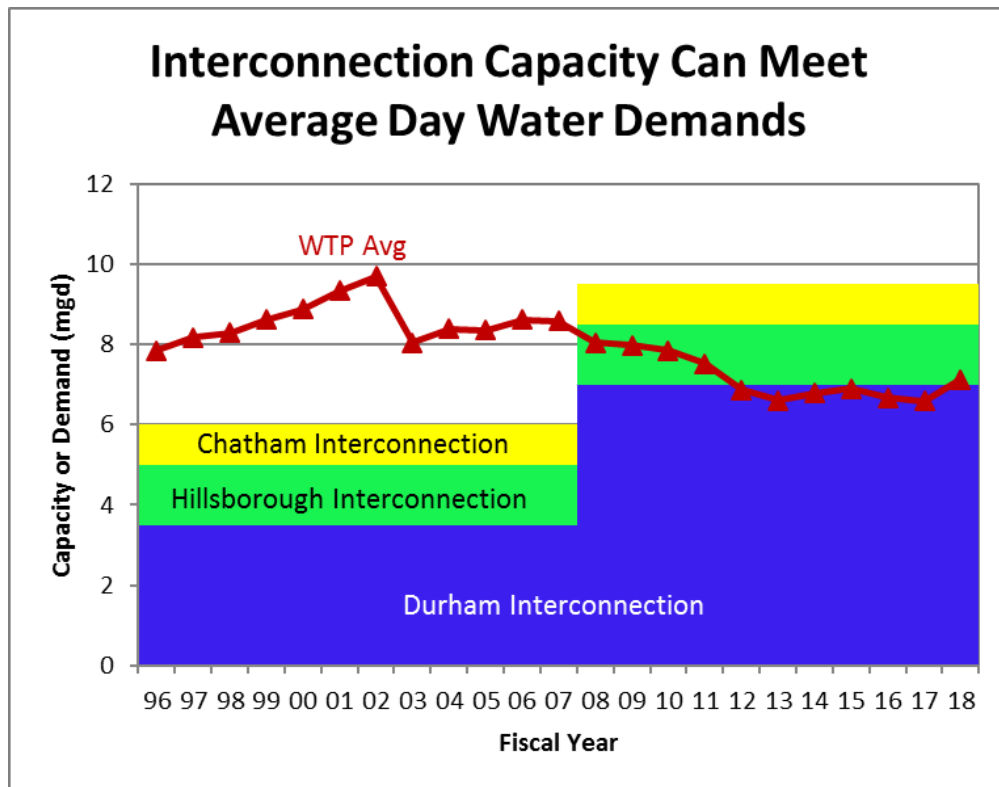
Strategic Plan Elements

The Water Conservation Plan included in Strategic Initiative 1 may result in reduced drinking water sales. This in turn would impact revenue, which would be addressed through the financial management policies included in Strategic Initiative 3. Financial reserves help OWASA meet its obligations during times of reduced water sales such as may occur during drought conditions.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to track this trend to determine whether water use is increasing.	Annual		X

Physical Interconnection Capacity and Average Annual WTP Demands



Description: This trend evaluates the ability of OWASA’s drinking water system interconnections with neighboring communities to meet average-day drinking water demands during planned or unplanned events that could affect our ability to treat and deliver water to our customers.

Key Observations:

- OWASA’s existing physical interconnections are of sufficient capacity to meet average-day drinking water demands.
- Our drinking water system interconnections with the City of Durham have a combined capacity of about 7 mgd.
- We can receive about 1.5 mgd through our interconnection with the Town of Hillsborough, which was confirmed during recent testing.
- OWASA also has an interconnection with Chatham County. OWASA can receive approximately 1 mgd through this connection based on modeling analyses, and as confirmed during the November 2018 water emergency.
- The combined capacity of our interconnections is about 9.5 mgd, which is about 130 percent of our FY 2018 average-day drinking water demands and about 120 percent of our FY 2018 water demands including reclaimed water.

Regulations

There are no regulations to report for interconnections.

Technology and Research

There are no updates in technology to report for interconnections.

Energy Management

Energy used to pump water at our interconnections is negligible under most conditions; however, it would increase considerably if, when, and in what amounts we are obtaining drinking water from (or supplying water to) a neighboring utility.

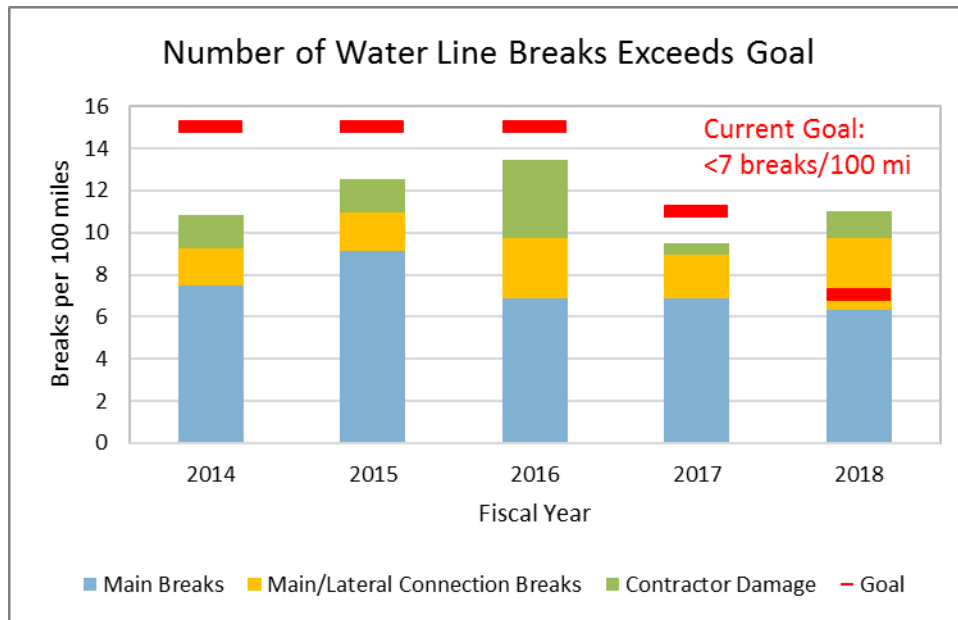
Strategic Plan Elements

While Strategic Initiative 1 does not directly include operational emergencies, our interconnections help us meet our water supply needs for short periods if something happened to our raw water supply, treatment plant or distribution system.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. OWASA should continue to monitor this trend to ensure that average-day drinking water demands could be met through water system interconnections with our neighboring utilities.	Annual		X
2. Re-evaluate the capacity of system interconnections to ensure changes in system facilities and demands have not adversely affected our ability to import an adequate supply of drinking water to meet average-day demands during an emergency.	Periodically as needed		X
3. Perform field tests on all interconnections to ensure proper operation, train staff, and confirm capacity.	Routinely, in coordination with utility neighbors		X
4. Continue to work with Triangle Water Supply Partnership to use regional interconnections model for planning purposes to improve regional reliability and resiliency.	Ongoing		X

Drinking Water Distribution System Integrity



Description: This trend evaluates the number of water main breaks per 100 miles of water mains and connections with service lateral lines. These are important indicators of the integrity of our drinking water distribution system. It also includes information on lines damaged by contractors; while that metric does not impact the integrity of our water distribution system, there is an impact on our customers and thus we include contractor damage in this trend.

Key Observations:

- We have had more water main breaks than our goal of 7 main breaks or less per 100 miles of pipeline, which is based on median of value included in the most recent American Water Works Association (2016) Benchmarking report. (Note: In prior reports we used goals of 11 and 15 main breaks or less per 100 miles of pipeline based on earlier Benchmarking reports).

Regulations

Federal and State testing requirements require public water systems such as OWASA to test for lead in drinking water collected from customers' homes as part of the Lead and Copper Rule. Samples must be collected from homes that meet criteria set by the EPA; these criteria identify "high priority" homes that are most likely to have elevated lead levels. OWASA tests for lead in drinking water in 30 homes built from 1983 to 1985 that have copper pipes with lead solder every three years. In the previous four rounds of monitoring, we have had only one sample with a measurable level of lead and the result was below the regulatory limit. The most recent round of monitoring for lead and copper in the distribution system was completed September 30, 2017; only one sample had a measurable level of lead and the

result was below the regulatory limit. OWASA also provides testing of our drinking water for lead at no charge when requested by a customer.

Technology and Research

There are emerging technologies to monitor the condition of our water lines and detect leaks, but these are not cost-effective to implement throughout our distribution system at this time. State of the art non-destructive pressurized pipe condition assessment technology can broadly be categorized into the three groups:

- **Closed-Circuit Television (CCTV) Insertion:** Insertion of a camera into pipes to visually identify internal corrosion.
- **Acoustic Leak Detection:** Installation of temporary or permanent monitors into a pipe to acoustically identify leaks.
- **Electromagnetic Wall Thickness Measurement:** Using an electromagnetic measuring device to quantify the wall thickness of ferrous pipes.

All of these technologies can be used on in-service pressurized pipes. Due to the cost and complexity of performing these assessments, water main condition assessment is typically focused on pipes identified as high risk by a prioritization model.

Insertion of a camera is the simplest method; however, the resulting assessment is qualitative (i.e. good, fair, poor). Typically, a visual inspection does not provide sufficient information on pipe condition because it does not provide information on the strength of the pipe or on external conditions which may lead to pipe failure (e.g. external corrosion, bedding condition, or utility crossings). This method of assessment tends to cost more per linear foot and has a lower accuracy than other assessment methods. Until and unless these factors change, staff does not deem this technology useful for water main condition assessment.

Detecting leaks can help identify conditions that may cause breaks; however, not every leak will cause a break (i.e. complete structural failure) and not every break is caused by a leak. Furthermore, water loss is not a significant issue in our system, so identifying and repairing leaks will not appreciably reduce unaccounted for water. However, excavating and exposing a pipe to repair an identified leak can give an opportunity to visually assess the pipe's condition, and if a portion of pipe is removed its structural condition can then be evaluated. Leak detection tends to have a moderate cost and accuracy, relative to other technologies. Following the full-scale deployment of the new advanced metering infrastructure (AMI) system, we will evaluate incorporating a permanent network of acoustic leak detection monitors that will integrate with the AMI network.

Electromagnetic Wall Thickness Measurement can estimate the rate of loss of pipe wall thickness and structural integrity. However, this technology cannot be used to evaluate non-ferrous pipes such as asbestos cement (AC) and does not detect issues like deteriorated gaskets leaking or corroded bolts on a valve. In OWASA's system only about 5 miles (about 1% of the system) of pipes are classified as both

ferrous and high risk, so there are few opportunities to utilize this technology. Both cost and accuracy of this technology tends to be high, relative to other technologies.

Aside from acoustic leak detection, there are no viable non-destructive condition assessment technologies for AC pipe. However, there is significant industry demand for an accurate and cost-effective condition assessment technology for AC pipe. We will continue to monitor for new and emerging technologies that will fulfill this need.

Energy Management

As reported in the Peak-Day Drinking Water Demands section, over half of the energy used at the WTP is actually for pumping drinking water into the distribution system and for maintaining system storage levels to maintain pressure and meet peak demands. In addition, we use energy to pump finished drinking water into a higher pressure zone. Combined, these two uses of energy account for approximately 13% (2 million kWh) of the energy we used in 2017. Other energy is fuel for vehicles and equipment used to maintain our drinking water distribution system.

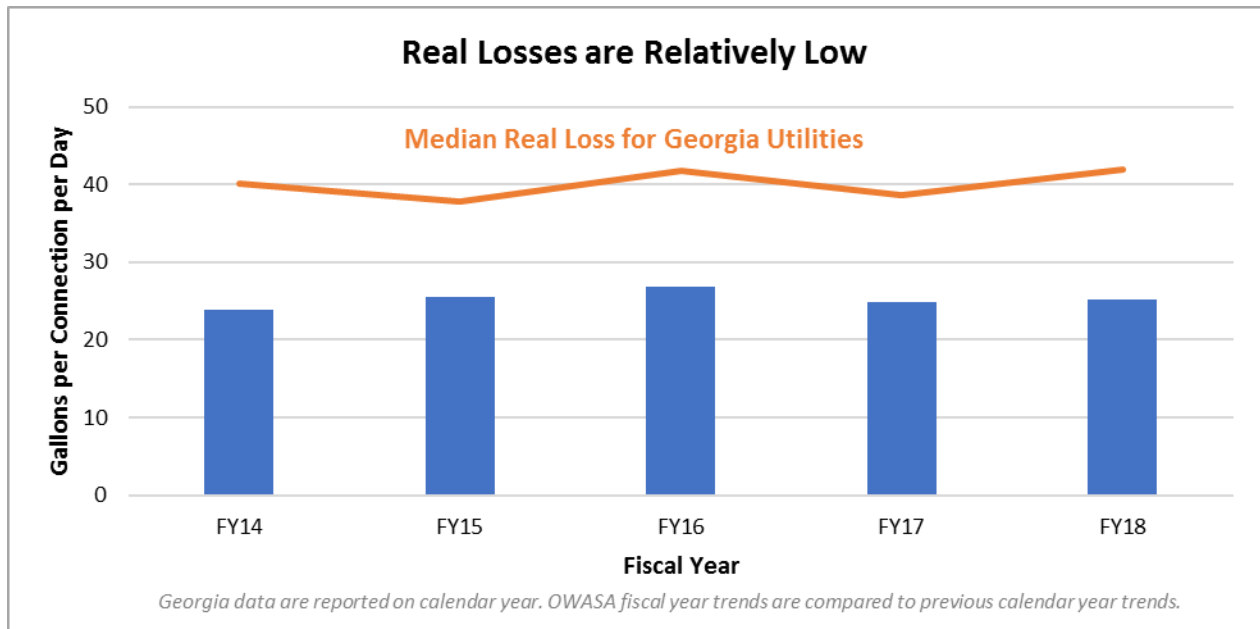
Strategic Plan Elements

Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Maintaining and replacing our infrastructure when needed enables us to maintain high levels of service to our customers over the long-term.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to use OWASA’s water main prioritization model to inform decisions and investments for the rehabilitation and replacement of the drinking water distribution system. OWASA plans to update this model beginning in FY 2019.	Annual		X
2. Continue the programmatic replacement of aging galvanized water mains throughout the distribution system.	Through FY 2022		X
3. Update the prioritization model’s risk framework to account for current data sources.	Through FY 2020		X
4. Integrate the results of the water main prioritization model into the comprehensive asset management program framework so that the trade-offs of different capital improvements investment decisions can be consistently evaluated and prioritized to ensure reliability and resilience.	Annual		X
5. Continue to fund our water main renewal/replacement program to ensure system sustainability.	Annual	X	
6. Maintain Presidents Award status by the Partnership for Safe Water (see chapter on “OWASA’s Planning Environment”) for Distribution System Operation.	Ongoing		X

Water System Audit



Description: This trend evaluates the annual volume of water lost through leaks in the distribution system. Real loss is the difference between water supplied and authorized consumption; utilities also subtract out apparent losses associated with inaccuracies in metering, data errors, and estimated water theft.

Key Observations:

- Over the past five years, OWASA has consistently had lower real losses than approximately 160 utilities in Georgia, for which the median has averaged around 40 gallons per connection per day. (The State of Georgia requires that all water providers that serve a population of 3,300 or more conduct an annual, validated water system audit.)

Regulations

There are no regulations to report for real water loss.

Technology and Research

The Drinking Water Distribution System Integrity trend includes information on acoustic leak detection.

Energy Management

Energy used to pump drinking water is shown in the Peak-Day Drinking Water Demands section.

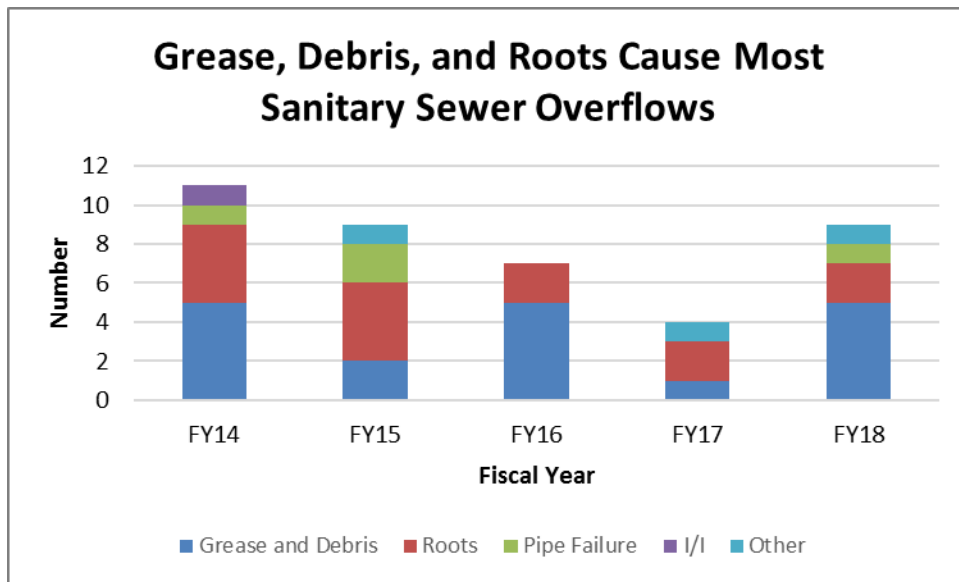
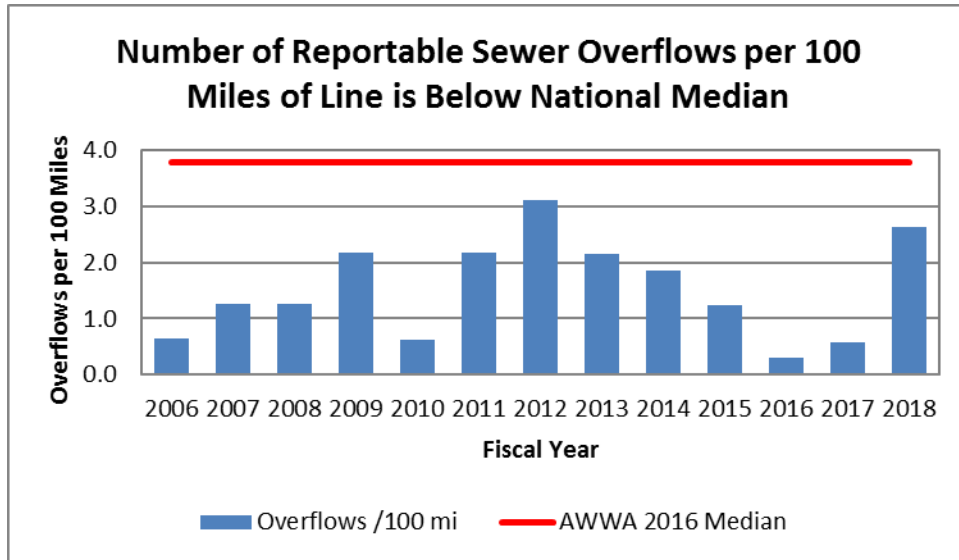
Strategic Plan Elements

Strategic Initiative 1 includes the development of a Water Conservation Plan, an important element of our updated Long-Range Water Supply Plan. Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Understanding the amount of water loss in our system helps make investment decisions. Maintaining and replacing our infrastructure when needed enables us to maintain high levels of service to our customers over the long-term.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Update water audit information	Annual		X

Wastewater Collection System Integrity



Description: This trend evaluates the number of reportable sewer overflows, which is an important indicator of the integrity of our wastewater collection system.

Key Observations:

- The number of overflows is consistently less than 3.8 per 100 miles of pipeline, which is the national median per the American Water Works Association 2016 Benchmarking report. The 25th percentile in that report was 1.1 overflows per 100 miles of pipeline. Per DEQ guidance, OWASA strives to have no overflows. (Note: We used the median value of 2.7 per 100 miles of pipeline from the 2012 Benchmarking report in 2016 and prior Strategic Trends reports).

- Grease, debris, and roots are the primary causes of overflows. Reducing grease will require proactive, recurring education of our customers – especially those in the food service sector. Customers can also help minimize potential root intrusion by not planting trees near our sewer lines.

Regulations

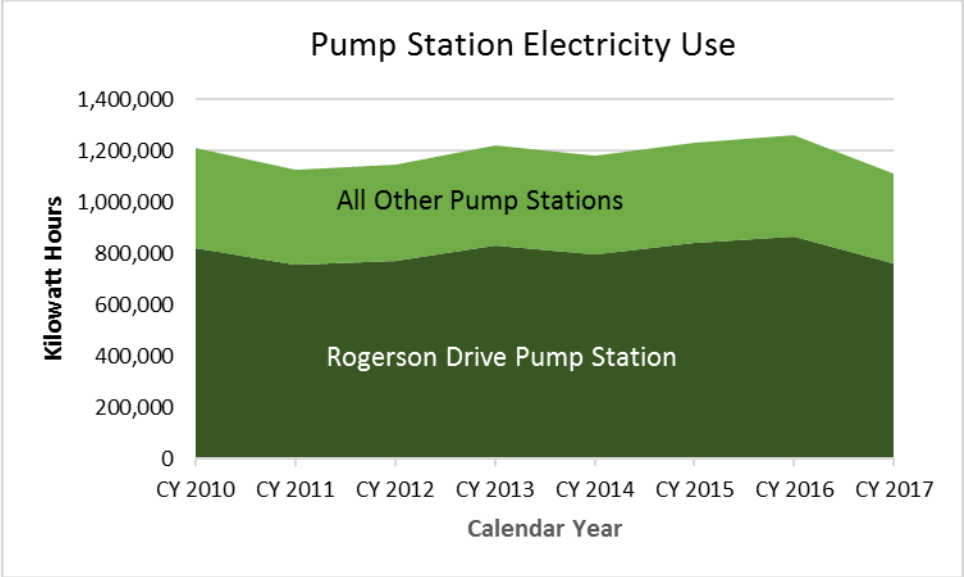
There are no upcoming regulations to report for our wastewater collection system.

Technology and Research

- Advanced, automated flow measurement technologies are available for real-time monitoring and control of wastewater collection systems. Permanent flow monitors may be connected to SCADA. OWASA evaluates these technologies periodically and we have done some pilot tests with manufacturers. When monitors indicate that water levels have increased over time, it may be an indication that the line is blocked downstream. OWASA tested this technology using smart manhole covers in two locations near restaurants to determine if we could reduce the frequency of maintenance on lines; unfortunately, these devices proved to be unreliable so staff is continuing with our scheduled maintenance of the lines. We are continuing to evaluate this technology.
- Smart manhole covers measure the water levels within sewer lines. If the level gets to a pre-set level, an alert is triggered. These smart manhole covers can also be linked to rain gages set in the service area. The combined rain gage and smart manhole cover can help find areas where infiltration and inflow may be a problem. OWASA tested this technology near our Rogerson Drive Pump Station and on our Morgan Creek sewer line. Unfortunately these devices proved to be unreliable, but staff is exploring other brands to determine if the technology will help us identify areas with higher levels of infiltration and inflow.
- Acoustic monitoring to detect sewer line blockages is available. A device sends a sound down a line to help find obstructions. A pilot test of this type of technology indicated that it was not yet reliable and cost-effective.

Energy Management

Wastewater is primarily conveyed through the force of gravity; however, wastewater pumping stations are necessary to transport wastewater when gravity flow is not possible. All of our wastewater pumping stations are powered by electricity, with diesel fuel or natural gas being used to power emergency standby generators when electrical service is unavailable. Electricity use by OWASA's wastewater pumping stations has been relatively consistent over the last six years, with the Rogerson Drive Pump Station accounting for about 65 to 70 percent of the electricity used for collection system pumping.



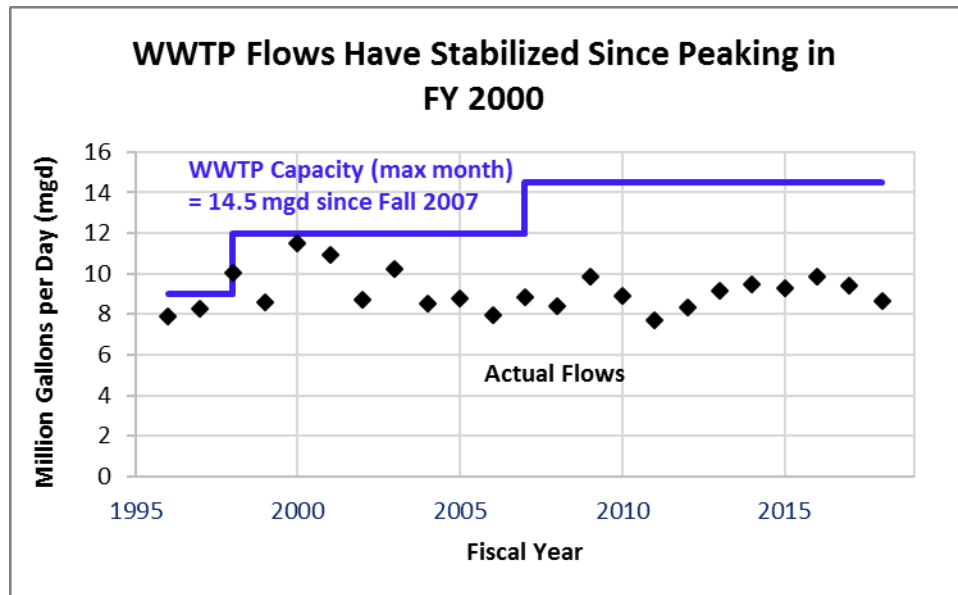
Strategic Plan Elements

Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Maintaining and replacing our infrastructure when needed helps us meet the community’s wastewater needs.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to use the findings and recommendations from the 2011 Sewer System Master Plan and subsequent Sewer Evaluation Reports as a guide for prioritizing funding for sewer system evaluation, rehabilitation and replacement. Update the Master Plan’s modeling efforts periodically as flow demand patterns change.	Ongoing		X
2. Integrate the results of the sewer system modeling and field condition assessment work into the comprehensive asset management program so that the trade-offs of different capital improvements investment decisions can be consistently evaluated and prioritized.	Annual		X
3. Continue to inspect, clean, and rehabilitate our sewer lines and wastewater pumping stations as needed to prevent overflows, reduce infiltration and inflow, and ensure adequate capacity.	Ongoing		X
4. Continue to monitor and maintain sewer easements to ensure our equipment and personnel can access the sewer system for maintenance and repair work, and to ensure tree root intrusion into sewers is minimized and corrected.	Ongoing		X
5. Continue to educate the public on the importance of not pouring fats, oils and grease, medications, etc. down the drain and not flushing items other than toilet paper.	Ongoing		X
6. Continue to fund the sewer system renewal/replacement program to ensure system sustainability.	Annual	X	
7. Identify potential energy savings opportunities for wastewater collection in Energy Management Program	Ongoing	X (as part of Energy Mgmt Plan)	

Mason Farm Wastewater Treatment Plant Maximum Month Flows



Description: The Mason Farm Wastewater Treatment Plant (WWTP) has a permitted capacity of 14.5 mgd, which is the maximum average daily flow which can be treated in any given month. This trend tracks historical annual maximum month of flow and compares those against the permitted capacity of the WWTP.

Key Observations:

- OWASA's maximum month wastewater flows have declined from a peak of 11.5 mgd in FY 2000. This corresponds to reduced drinking water demands by our customers, as well as our continuing investments in the rehabilitation and replacement of sewer lines and manholes.
- In FY 2018, the maximum month flow was 8.7 mgd, which is 60 percent of the WWTP's permitted flow capacity.
- OWASA is beginning the process to update the LRWSP. One of the first tasks will be to develop future raw water demand projections which will be used to estimate future wastewater treatment needs. We anticipate that the WWTP has adequate capacity to meet projected wastewater demands for at least the next 20 years. Although the WWTP's hydraulic capacity may be adequate, imposition of more stringent nutrient limits or other treatment requirements could require process modifications and related capital improvements. Other non-capacity improvements may include renewal and replacement in accordance with our comprehensive asset management plan and efficiency and optimization improvements.

Regulations

Important regulations pertaining to wastewater treatment are related to nutrient removal at the WWTP, which is described in the Mason Farm WWTP Nutrient Capacity section of this report.

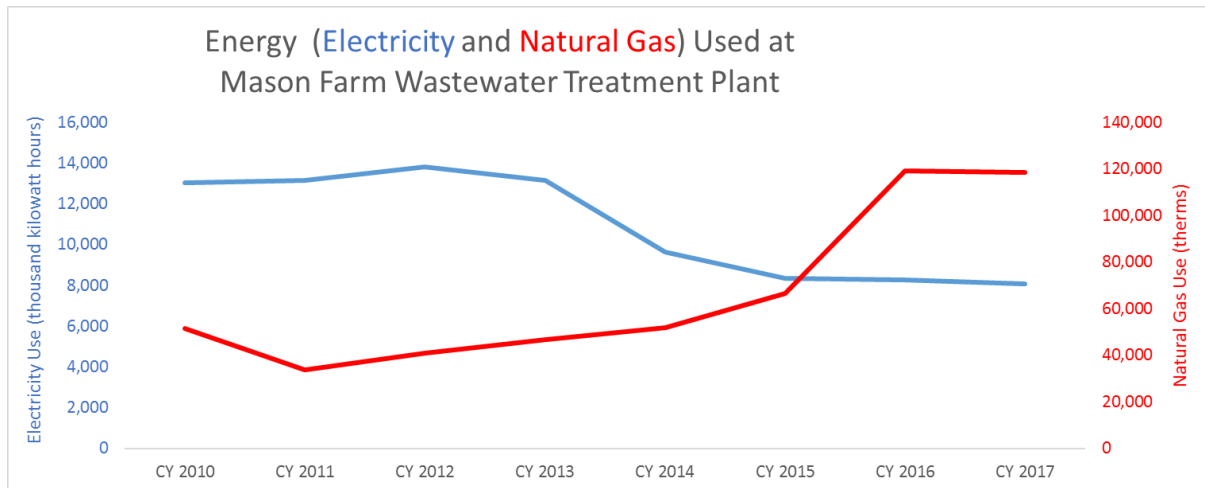
Technology and Research

- Staff is beginning a CIP project to replace our gravity belt thickeners with rotary drum thickeners which thicken solids prior to anaerobic digestion. The rotary drum thickeners have two advantages: (1) better odor control which also extends the life of equipment in the solids thickening building and (2) better control of the solids concentration and reduced operating costs.
- Staff is nearing completion of a new Supervisory Control and Data Acquisition (SCADA) system with “high performance SCADA system design”. The high performance SCADA system simplifies the graphics on-screen to improve operators’ situational awareness of plant operations. It also enables the operators to look at and evaluate data in real time for a wide variety of plant information from the operators’ terminals without requiring any specialized programming, database management or outside assistance.
- Staff at the WWTP periodically evaluate the chemicals used at the plant to ensure we are using the best available in terms of meeting our treatment goals in the most sustainable manner as well as to ensure that we do not foresee shortages in chemicals we use which could impact treatment or their price. At this time, staff believe we are using the correct blend of chemicals and no shortages are foreseen in their supply.
- Staff is closely following advancements in technology and actual industry experience for resource recovery at the wastewater treatment plant. This includes energy generation such as the biogas to energy alternatives currently being evaluated as part of the Energy Management Program, nutrient and metal mining¹, and direct and indirect potable reuse. Biogas recovery strategies are being evaluated as part of the Energy Management Plan, and opportunities for greater reuse will be evaluated as part of the Long-Range Water Supply Plan.

Energy Management

The Mason Farm WWTP is our largest energy-using facility. Since 2010, our electricity use at the WWTP has decreased by about 38 percent. This is largely attributable to a \$10.4 million capital improvement project that reduced electricity use, further reduced off-site odor releases, improved plant performance, and prepared us to meet future standards for treated wastewater quality. In 2017, our use of natural gas was 130 percent higher than it was in 2010, primarily as a result of our biogas storage and use system being out-of-service since mid-2015 due to the ongoing renovation of two of our digesters. We normally use biogas as fuel for our boilers that provide heat for the anaerobic digestion process. When biogas is unavailable, we must use natural gas. In March 2018, biogas was reutilized as the primary fuel source for our boilers.

¹ Process to recover nitrogen, phosphorus, or metals from wastewater treatment process for beneficial reuse.



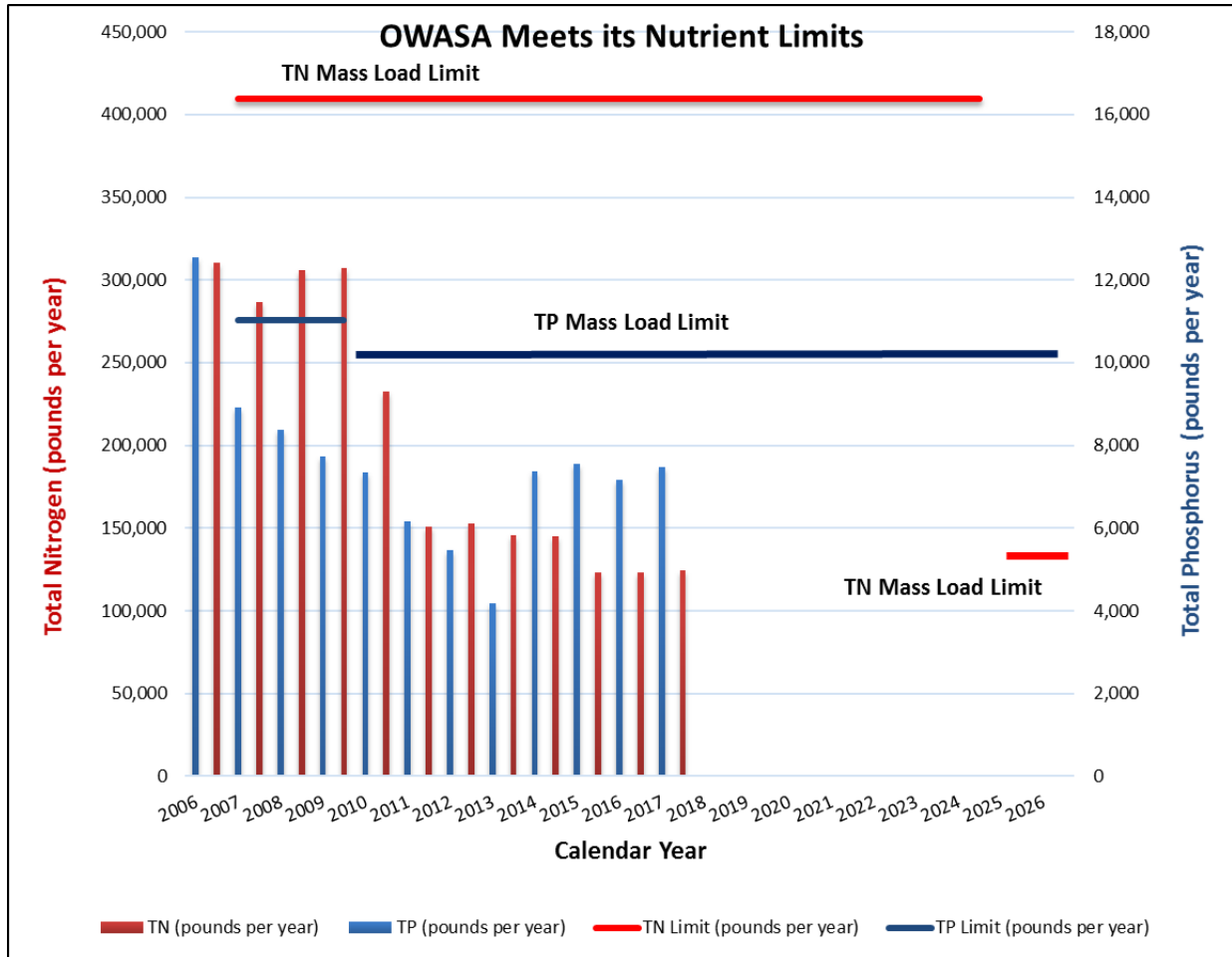
Strategic Plan Elements

Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Ensuring that our wastewater treatment capacity is adequate, and timing expansions properly, helps us meet the community’s wastewater needs.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to monitor growth and development activity and projections in our service area by working closely with the Towns of Carrboro, Chapel Hill, and UNC to ensure we have adequate wastewater treatment capacity for the future.	Annually with ongoing communication		X
2. Revisit the peaking factors used to estimate maximum month flow as part of the LRWSP update.	CY 2019		X
3. Continue to inspect, rehabilitate, and replace our sewer lines when necessary to reduce infiltration and inflow.	Ongoing		X
4. Identify potential energy savings opportunities for wastewater treatment and pumping in Energy Management Program.	Ongoing	X (as part of Energy Mgmt Plan)	
5. Initiate Partnership for Clean Water (see chapter on “OWASA’s Planning Environment”) Phase III self-assessment process pursuant to Directors Award status for Excellence in Wastewater Treatment.	Ongoing		X

Mason Farm WWTP Nutrient Capacity



Description: The State’s Jordan Lake nutrient management rules require point sources to reduce their discharge of Total Phosphorus (TP) and Total Nitrogen (TN). OWASA’s current discharge permit requires that we meet further TN load reductions by 2021; however, during the 2015 Session, the NC General Assembly enacted legislation that extends that date to at least 2024. We report nutrient loading on a calendar year basis rather than a fiscal year basis since our permit limits for TN and TP are on a calendar year.

Key Observations:

- OWASA has met its TP limit since the annual mass load limit was first incorporated into our permit in 2007. We expect to continue to meet the limit within the 20-year planning horizon without the need for additional major capital improvements for TP removal.
- OWASA has consistently met its current TN limit, but we will have to operate our filters in denitrification mode and incur considerably greater energy and chemical costs to meet the more stringent limits when those go into effect around 2024. It is possible that installation of sidestream

treatment facilities would reduce operating costs and energy use for TN compliance and have a positive payback compared to relying primarily on the denitrification in the filters at the WWTP.

Regulations

As noted previously, the NC General Assembly has enacted legislation (House Bill 97) that defers the effective date for implementation of more stringent TN mass load limits for WWTPs in the Jordan Lake watershed to at least 2024. As part of OWASA's participation in the Partnership for Clean Water, OWASA will be trying to meet 95 percent of the nutrient limits that will be in effect. Staff will continue to closely follow Jordan Lake nutrient issues, and we will inform the Board if any changes are needed in the timing or scope of major anticipated capital or operational improvements required to ensure compliance with the new limit.

Technology and Research

- OWASA evaluates the treatment technologies we have at our wastewater plant to ensure we can meet upcoming standards with current treatment technologies. OWASA can meet all applicable permit limits, but we will need to operate our filters in denitrification mode to remove nitrogen when revised limits become effective. (Based on 2015 action by the NC General Assembly, the new expected date for a much more stringent TN limit is 2024). Carbon must be added to achieve denitrification in the WWTP filters, and there are different operational, safety, financial, and environmental considerations associated with different carbon sources. We will evaluate the advantages and disadvantages of alternative carbon sources, and conduct pilot and plant-scale testing as needed, to inform our decisions regarding the preferred source.
- Sidestream treatment for greater nutrient removal is a process that may be considered for the Mason Farm WWTP if we decide to dewater a greater portion of our biosolids. Sidestream treatment would help to reduce nitrogen loading in the liquid treatment process. Modeling studies indicate that if we dewater all of our biosolids, sidestream treatment could provide annual chemical and energy cost savings of approximately \$200,000 and have a payback of less than ten years. Sidestream treatment could also provide additional process flexibility in meeting TN limits; it may also allow a rerating of the plant to a higher treatment capacity, thereby providing substantial cost savings for our customers. The City of Durham uses side stream treatment at one of its WWTPs.

Energy Management

See the section titled Mason Farm Wastewater Treatment Plant Maximum Month Flow Projections for energy use information at the WWTP. As noted above, certain advanced nutrient recovery technologies may have the potential to further reduce energy use for the liquid wastewater treatment process.

Strategic Plan Elements

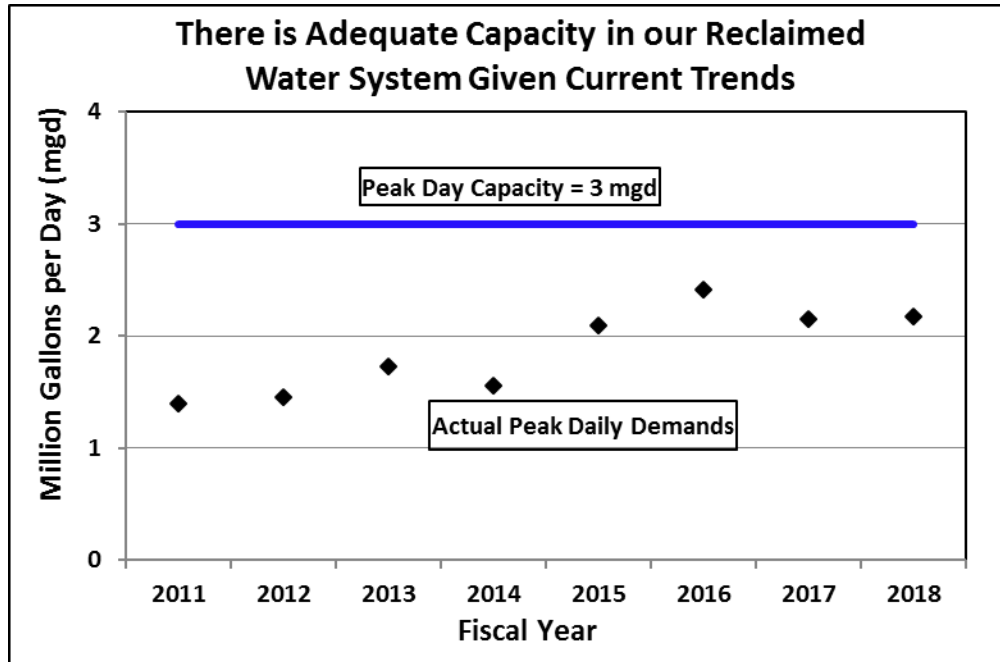
Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Ensuring that our wastewater treatment technology

can meet permit requirements and incorporating changes in operations to meet limits helps us meet the community's wastewater needs.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Continue to monitor nutrient loadings at the plant.	Monthly		X
2. Evaluate ability of existing filters (and advantages and disadvantages of alternative carbon sources) to meet TN permit limits.	2021		X
3. Evaluate benefits and costs of sidestream treatment for advanced nutrient removal.	Within 5 years of new TN limit	X	

Reclaimed Water



Description: This trend tracks historical annual peak-day reclaimed water (RCW) demands and compares those against the peak day capacity of the Mason Farm WWTP’s RCW system.

Key Observations:

- The majority of RCW is used for chilled water and irrigation of landscaping and athletic fields and these demands peak during warm months (April-October). Demands are typically lower during cold months (November-March).
- Peak daily demand of 2.4 mgd occurred in August 2016 when it was very hot and humid. The RCW system is currently configured to meet a total peak day demand of 3 MGD (average daily demand of 1.2 MGD); however, the system is designed and constructed to allow cost-effective expansion to 5.2 MGD by adding only an additional transfer pump and additional chemical feed system capacity (if that feed system is deemed necessary).
- There is no anticipated significant change in demand for the next 15 years, and therefore the RCW system can meet projected RCW demand for the foreseeable future.

Regulations

In 2014, the NC General Assembly ratified Senate Bill 163 (Session Law 2014-113) to allow for indirect potable reuse, provided that a pretreatment mixing basin is created and used to mix raw source water and reclaimed water, and that reclaimed water does not comprise more than 20% of the total combined supply. OWASA will evaluate the costs and benefits of this potential water supply source as one of the

options considered during the update of our Long-Range Water Supply Plan. More information on RCW and reuse is provided in the Technology and Research section below.

Technology and Research

One aspect of reuse is recycling water within a building, which has been done in other parts of the country. One example (Solaire) is a high rise building in New York City which uses various filtration (membranes) and disinfection (ultraviolet light) technologies to produce reclaimed water that is beneficially recycled within the building and used for flushing toilets, cooling tower make-up water, and irrigating the green roof. The WaterHub at Emory University is an onsite wastewater reclamation system which uses ecological processes and stormwater capture to meet the campus's nonpotable water demands. A similar stormwater capture and treatment system is being planned for Chatham Park in Chatham County.

Energy Management

In February 2015, we began sub-metering and monitoring the energy uses of a few specific processes at the WWTP, including the RCW system. The RCW system is not just important for its impact on our use of raw water resources, but it is a more energy-efficient way to meet demands. The energy required to treat and deliver reclaimed water is less than that is required to treat and deliver raw water to the community. In 2017, on average, we used 2.36 kWh to treat and deliver 1,000 gallons of raw water; we used 2.06 kWh to treat and deliver 1,000 gallons of reclaimed water throughout the year, a savings of 13% throughout the year.

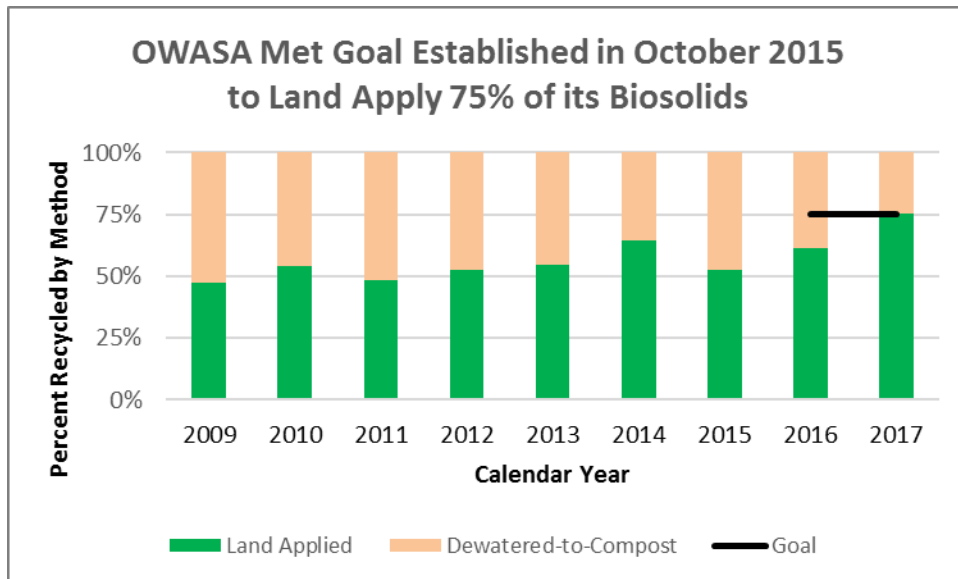
Strategic Plan Elements

Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Ensuring that our RCW system capacity is adequate will help meet the community's water needs. This also ties to Strategic Initiative 1; the use of RCW reduces the demand on our drinking water supplies which will help meet our community's long-term water supply needs. Finally, the use of RCW uses less energy than treating and delivering raw water, which ties to Energy Management Program in Strategic Initiative 4.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Verify RCW meters are properly calibrated and recording flows accurately.	Annual		X
2. Closely monitor RCW demands in order to ensure RCW system capacity expansion is planned, designed, and funded in time to meet future demands.	Ongoing		X
3. Pursue cost-effective opportunities to expand the RCW system to serve non-drinking water demands of non-UNC customers as new growth and development/redevelopment occurs.	Ongoing	X	

Biosolids

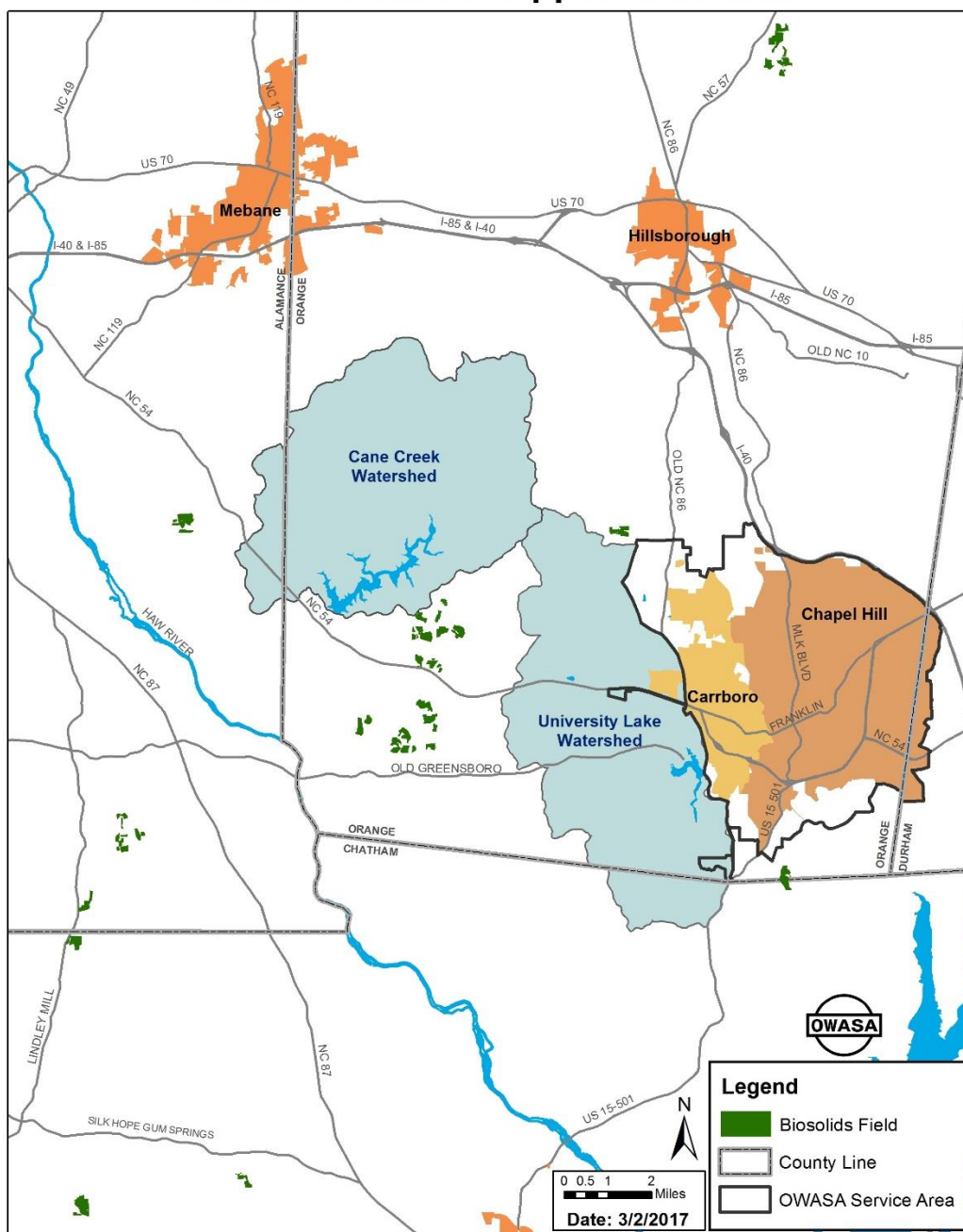


Description: This trend evaluates the amount of biosolids which OWASA applies to land and the amount it dewateres for composting. The WWTP produces about four dry tons of biosolids each day. Most of this is applied in liquid form to agricultural land and a portion is dewatered to the texture and consistency of moist soil and transported to a private composting facility in Chatham County. For the liquid form, OWASA has 885 acres of farm land in Orange, Chatham and Alamance counties available for its Class A land application program (see map below). 83 percent (731 acres) is privately owned. The remaining 154 acres are owned by OWASA as part of a 700-acre tract west of Orange Grove Road in Orange County. At its October 8, 2015 work session, the Board of Directors agreed that OWASA’s goal is to apply 75 percent of our biosolids in liquid form, and to dewater 25 percent of our biosolids. The Board of Directors understands that there are factors including weather conditions which may keep staff from meeting the goal.

Key Observations:

- Prior to CY 2014, OWASA consistently land applied about half of its biosolids and dewatered and composted the remaining half.
- In CY 2017, OWASA land applied 75 percent of its biosolids and met the goal. Our ability to meet this goal is dependent in part on weather and staffing. When our opportunities to apply liquid biosolids are limited, OWASA can dewater higher amounts of biosolids while meeting all applicable regulatory requirements for our biosolids treatment and recycling program.

OWASA Biosolids Application Sites



Regulations

Federal and state regulations specify the agronomic rates at which biosolids may be land applied for designated crops (the maximum amount of biosolids that can be applied to a given field is currently determined by the nitrogen content of the biosolids and is limited to the nitrogen requirements of the particular crop to which it is being applied). OWASA closely monitors the application rates on each individual field and historically has applied at rates well below the maximum allowed by regulation. Some states also limit land application of biosolids based on the phosphorus content of the biosolids

and the soil; however, North Carolina does not have such a loading limit. If North Carolina adopts this approach, the amount of land needed to support our land application program would increase considerably.

The NC Department of Environmental Quality’s (DEQ) modified its regulations concerning biosolids in September 2018. The modifications reduced the set back from streams for Class B biosolids from 100 feet to 32.8 feet, and Class A setbacks remained at 100 feet. The State indicated that General Statute 150B-19.3(a) prohibits agencies from adopting a rule that imposes a more restrictive standard, limitation, or requirements than those imposed by federal law or rule. There is no federal setback requirement for Class A residuals and hence the existing 100-foot State requirement remains.

Technology and Research

Information on technology concerning our solids thickening process is provided in the Mason Farm WWTP section.

Energy Management

The primary energy uses of OWASA’s biosolids management program are for vehicle fuel, biosolids loading, running the rotary press for dewatering, treating the nutrient-rich dewatering filtrate loads returned to the aeration process, and mixing the biosolids holding tanks.

Strategic Plan Elements

Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Ensuring that our biosolids program meets federal and state requirements and protects public health, helps us meet the community’s wastewater needs.

Actions Needed

Action Items	Timing	Board Action?	
		Yes	No
1. Evaluate the 75 percent liquid land application goal and report our performance to the Board	Annually as part of this report		X
2. Evaluate the amount of land in our biosolids program to ensure it is adequate to meet liquid land application goal	As needed (if farmers drop out of program)		X

Strategic Plan Progress Report

We identified six strategic initiatives with accompanying goals, actions, and measures of success. We believe that these initiatives and actions address each of our strategic themes and will result in positive change.



Strategic Initiative 1

Provide reliable and high quality supply of water for the next 50 years

GOALS	ACTIONS	MEASURES OF SUCCESS	PROGRESS
Optimum mix of technically, environmentally, economically, and socially feasible water supply and demand management alternatives that meet projected demands and level-of-service objectives under a range of future conditions and uncertainties.	<p>Update Long-Range Water Supply Plan to include:</p> <ul style="list-style-type: none"> > desired level of service and water supply resiliency. > supply and demand projections to incorporate best information from land use /growth management plans, University plans, climate change impact information, etc. > evaluation of potential supply and demand management alternatives, including but not limited to: Jordan Lake as emergency supply; conservation and water use efficiency; expanded use of reclaimed water (including direct and indirect); quarry reservoir; etc. > preferred mix of supply and demand management alternatives required to meet level-of-service objectives. 	Updated plan provides a clear and responsible path forward to ensure a reliable and high quality supply of water for the next 50 years that is supported by stakeholders.	<i>The Board agreed to goals and objectives to evaluate supply and demand management alternatives against on November 10, 2016. Staff used growth projections developed as the basis for our future demand projections and presented draft results to the Board of Directors on November 15, 2018. Staff is working with a graduate student at the University of South Carolina who is evaluating the dependability of our estimated yield under different climate change assumptions.</i>
	Adopt Long-Range Water Supply Plan and begin implementation.	Adequate supply of high-quality water which meets customer needs for next 50 years across the range of assumptions and scenarios included in the Plan.	
Enhanced water supply reliability, reduced energy use, and reduced long-term life-cycle costs of water and sewer service through cost-effective water use efficiency (WUE), conservation, and RCW strategies.	Prepare Water Conservation Plan that includes a program to educate customers on the value and importance of water, best practices for reducing water use and monthly bills through conservation, WUE practices, and collaboration with Towns, County and others on conservation and WUE standards.	<p>Reduce residential water use by X% (currently 4,000 gallons/month for individually-metered single-family residential accounts). (Target to be established)</p> <p>Establish targets for other customer classes.</p>	<i>The Water Conservation Plan will be prepared as part of the Long-Range Water Supply Plan. The water use analysis completed as part of developing the demand projections will help establish conservation targets.</i>

GOALS	ACTIONS	MEASURES OF SUCCESS	PROGRESS
Maintain our Jordan Lake water supply allocation.	Application for Jordan Lake water supply allocation (Round 4) was submitted in November 2014.	Allocation request granted to OWASA by Environmental Management Commission (EMC). (Note: Latest information from NC Division of Water Resources indicates the EMC may make decisions in January 2017.)	Complete. OWASA's Round 4 Jordan Lake water supply allocation was granted by the EMC on March 9, 2017.
New or amended water transfer agreements with Town of Cary and City of Durham for OWASA to access our Jordan Lake water supply allocation through those entities when needed.	Coordinate with staff from the Town of Cary and City of Durham to determine terms and conditions for ensuring cost-effective access to our Jordan Lake allocation.	Successful adoption of new or amended water transfer agreements for OWASA to reliably and cost-effectively access our Jordan Lake water supply allocation when needed.	As part of the update to the LRWSP, staff will evaluate the amount of water we need from Jordan Lake and the best way to cost-effectively access the allocation when needed. Staff continues to work with the City of Durham, Chatham County, and Town of Pittsboro to evaluate the feasibility and cost of constructing a new intake and water treatment plant on the west side of Jordan Lake. This information will be used as we evaluate different alternatives to access our Jordan Lake allocation.



Strategic Initiative 2 Engage the Community

GOALS

Engage stakeholders to understand their perceptions and expectations so that we make well-informed decisions about our services and so that we maintain their trust; and empower stakeholders with information so they use water wisely and protect water quality through proper use of our wastewater system; and provide stakeholders with timely information about projects, programs, and policies that are important to them and offer them meaningful opportunities to give their feedback so that we can continue to improve.

ACTIONS

Prepare and implement Community Engagement Plans (CEPs) for all capital improvement projects and key initiatives.

MEASURES OF SUCCESS

Stakeholders trust OWASA to make informed decisions about our services.

Positive feedback from customers and stakeholders about effectiveness of engagement work.

Stakeholders have the information they need regarding projects, programs and policies and they have opportunities to provide feedback on matters of importance to them.

PROGRESS

The Board accepted criteria for when they will review Community Engagement Plans (CEPs) at the February 25, 2016 Board meeting. CEPs for key initiatives have been approved by the Board including the Advanced Metering Infrastructure project (December 8, 2016), Long-Range Water Supply Plan Update (February 12, 2015 and updated in November 2016 based on Board feedback at its November 10, 2016 work session), and Energy Management Plan (September 8, 2016). A CEP will be developed for Forest Management in late 2018 to early 2019. CEPs are prepared for all capital improvement projects.

The Board will have a Work Session on December 19, 2018 to discuss future communications and community engagement work.



Strategic Initiative 3

Adopt financial management policies and budget decision processes to ensure affordable services and fiscal sustainability

GOALS	ACTIONS	MEASURES OF SUCCESS	PROGRESS
Financial reserve funds set at appropriate level.	Review reserve policies during the annual budget development process to determine the desired level of reserve funds.	New or revised policies adopted, if appropriate.	<i>The Board reviewed OWASA's reserves policies in FY 2018 and determined the current approach to be appropriate. Analyzing and projecting reserve balances is a part of the annual budget development process.</i>
Efficient process which provides opportunities for stakeholder input and allows the Board of Directors to make well-informed budget and rate decisions.	During the annual budget development process, review Capital Improvement Program (CIP) investment practices.	New or revised CIP investment practices are adopted, if appropriate.	<i>In September 2016, the Board reviewed OWASA's process for developing its annual operating budget and capital improvements program. The Board expressed satisfaction with the processes used. A Finance Committee meeting is scheduled on December 5, 2018 to discuss alternative approaches for developing the annual operating expense budget.</i>
The right investments at the right time to sustain the community's essential water, wastewater and reclaimed water assets.	Comprehensive asset management report was completed in March 2016.	Service levels are part of the asset management program report.	<i>Complete. The Asset Management Program report was updated and posted to the OWASA website in July 2017.</i>
Rates, fees and charges that meet objectives.	Evaluate possible rate structure changes for customer classes to include possible update to System Development Fees.	A rate structure that fairly and fully recovers revenues, promotes water conservation, promotes affordability, and is understood by customers.	<i>Based on results of a rate study, the Board changed the water commodity rate for the multi-family master-metered customer class from seasonal rates which are higher in the warmer months from May to September and lower the rest of the year to a year-round rate. Several alternative rate structures were considered and the Board agreed to reconsider alternatives once the AMI project is near completion. Additionally, in accord with a new North Carolina statute, the Board approved a new method for calculating System Development Fees. Application of the new method resulted in reductions in System Development Fees of between 10% and 40%</i>



Strategic Initiative 4

Implement an Energy Management Program

GOALS	ACTIONS	MEASURES OF SUCCESS	PROGRESS
<p>Cost-effective measures to reduce our use of energy, related energy costs, and associated greenhouse gas (GHG) emissions.</p>	<p>Develop an Energy Management Program that includes:</p> <ul style="list-style-type: none"> > Goals for energy reduction by 2030 against a 2010 baseline. > Ongoing assessment of energy use, costs, and GHGs. > Assessment of the energy performance of our equipment, operations, and buildings and identification of opportunities for energy savings and the associated return on investment. > Prioritized energy savings opportunities. > Implementation of selected energy management and energy efficiency projects as part of CIP and annual budget. > Evaluation and prioritization of potential renewable energy strategies. > Feedback from community stakeholders. 	<p>Program provides a clear and responsible path forward for effective energy management.</p> <p>Energy cost savings (costs avoided) achieved from energy management, energy efficiency measures and renewable energy measures. Amount of grants, rebates, incentives, etc. received to fund energy management efforts.</p> <p>Percent reduction in our GHGs compared to baseline year.</p>	<p>Complete. On September 8, 2016, the Board approved OWASA’s Energy Management Program and associated Stakeholder Engagement Plan. In addition, the Board approved using a separate social cost of carbon in the business case evaluation of clean energy projects at OWASA. OWASA’s Energy Management Program, as explained in the 2018 Energy Management Plan Update, is an iterative process of system and strategy evaluation.</p> <p>Since 2014, OWASA has received over \$237,000 in rebates to fund energy management efforts.</p> <p>In Fiscal Year 2018, OWASA spent about \$110,000 less on electricity and natural gas than in Fiscal Year 2010.</p>
	<p>Adopt Energy Management Plan and begin implementation of Energy Management Program.</p>	<p>Continued reduction in electricity use (kilowatt-hours) and natural gas use (therms).</p>	<p>Complete. On April 13, 2017, the Board approved the Energy Management Plan that identifies strategies to meet the energy management goals and objectives set by the Board. The Plan is an output of OWASA’s Energy Management Program which was established to identify cost-effective measures to reduce our use of energy, related energy costs, and associated greenhouse gas (GHG) emissions. On March 8, 2018, the Board approved an Updated Energy Management Plan.</p> <p>Since 2010, OWASA has reduced its use of purchased electricity by 22% by implementing cost-effective energy efficiency projects and conservation measures. With our biogas-to-boiler system in-service, we are on-track to reduce natural gas use below 2010 levels.</p>



Strategic Initiative 5

Implement Advanced Metering Infrastructure

GOALS	ACTIONS	MEASURES OF SUCCESS	PROGRESS
<p>Cost-effective, accurate, reliable and timely water metering information for enhanced customer service.</p>	<p>System procurement and implementation planning.</p> <p>Develop and implement Community Engagement Plan.</p>	<p>Procure a system within budget constraints that meets OWASA’s needs.</p> <p>Develop implementation plans that will effectively mitigate risks identified in the AMI Feasibility Study and will fully inform and engage customers.</p>	<p>Complete. <i>The Board awarded the contract to Mueller Systems in May 2017 following extensive procurement and contract negotiation processes conducted by OWASA staff and our consultants. The total capital outlay per this contract is \$4,903,304, which is 4.6% less than the \$5,140,000 estimated in the 2015 Feasibility Study. Annual operation and maintenance costs are \$106,500, which is 29% below the \$150,000 per year projected in the Study. The project will be financed with low-interest loans from the State of North Carolina.</i></p> <p><i>A comprehensive set of implementation performance standards were included in the contract documents to mitigate risks. Subsequent implementation planning has used these standards as the foundation and guidance for document development.</i></p> <p><i>A robust Community Engagement Plan has been developed and was approved by the Board in December 2016. The initial communications with customers began in October 2017 with the mailing of a “welcome flyer” to all accountholders. Customers also receive a notice about 30 days prior to the upgrade of their meter. Community engagement regarding the web-portal will begin once the system is completely deployed.</i></p>
	<p>System deployment.</p>	<p>Ensure the system delivers accurate, reliable and timely water use information for billing purposes.</p> <p>Processes are in place to ensure customers are provided accurate and timely information about their water use and prompt notifications about potential leaks.</p>	<p><i>Full scale deployment began in March 2018 and is currently about 84% complete. Notifications regarding potential leaks are currently being handled by staff and have been well received by customers. We have experienced a very low volume of customer complaints regarding installations.</i></p>

GOALS

ACTIONS

MEASURES OF SUCCESS

PROGRESS

Reduce energy use and carbon footprint associated with meter reading and field service functions.

Customer feedback on their experiences with the system installation, process changes and use of the portal is mostly positive.



Strategic Initiative 6

Develop a plan and policy framework for long-term management and disposition of OWASA lands

GOALS

ACTIONS

MEASURES OF SUCCESS

PROGRESS

Land assets provide the expected value to fulfill OWASA’s mission and the assets are effectively managed.

Develop a long-term plan for sustainable management of OWASA forest lands (not including Cane Creek Mitigation Tract, which is already being managed). Management options range from “no active management” to comprehensive management that includes a variety of activities such as thinning, small seed tree cuts, small area clear-cuts, etc.

Forest lands are effectively managed to meet the goals provided in the Forest Stewardship Plan.

Staff provided an overview of OWASA’s land assets and why we own them to the Board on May 25, 2017. At that meeting, the Board directed staff to develop a Community Engagement Plan for forest management by late spring 2018. Staff presented a framework for managing our forested lands and its community engagement process to the Board of Directors on May 10, 2018. The Board referred this to the Natural Resources and Technical Services (NRTS) Committee which will continue discussion on this topic on December 12, 2018.

Evaluate land assets to determine if the asset is needed, what degree of ownership is needed, and if the asset should be sold.

Land assets provide expected value to meet OWASA’s current and future needs.

At a meeting on September 26, 2017, the NRTS Committee reviewed several options to evaluate OWASA land to determine if any should be sold. The Committee unanimously agreed that the Board should wait to decide whether to do an analysis after we work through the forest management process and shared that recommendation with the Board on September 28, 2017.

Administering Our Strategic Plan

We will provide regular updates on our progress towards achieving our Strategic Plan goals, including measures of success, which can be found on our [website](#). We welcome your questions or comments about our Strategic Plan or any of our services and programs. You may contact us by:

- Phone: 919-968-4421
- E-mail: info@owasa.org
- Fax: 919-968-4464
- Address: 400 Jones Ferry, Carrboro, NC 27510

There are other high priority tasks that we will address over the next couple of years that are not included in our Strategic Plan because they do not require strategic action at this time. However, these tasks may require action by the Board in the future.

1. Continue to increase community awareness of options to manage and reduce OWASA bills and empower low-income customers and the local agencies that serve them with information and tools to manage and reduce OWASA bills through the Affordability Outreach Program.

On December 8, 2016, the Board approved Year 2 of the Affordability Outreach Plan and has been receiving periodic updates on the plan throughout 2017.

2. Evaluate alternative employee compensation strategies to encourage and reward high performance as part of a Total Compensation Study.

The Board reviewed compensation of employees and adopted a resolution in December 2017 whereby pay increases will be provided, based on performance, to 3 of the 4 performance-rating categories. Merit Increases for “Meets Expectations” ratings are to be no less than 2.9% greater than the Cost of Labor Adjustment (COLA).

3. Develop and implement an Inclusion and Diversity Plan for the organization.

Implementation of our Diversity and Inclusion plan is well underway. Three groups were formed to help guide our work: Diversity Resource Group, Diversity Recruitment Group and Diversity Leadership Group. An Organizational Assessment took place with employees and the Board. As a result of the Assessment, employees provided forty (40) general recommendations in seven (7) categories. Our consultant, VISIONS, provided additional recommendation in

four (4) categories. Employees also provided twenty-six (26) recommendations in four (4) categories for recruitment and retention. All of the recommendations have been prioritized by year and work is well underway.

Additional key activities include:

- *Staff continues to engage with agencies and organizations to seek assistance in recruitment.*
- *We continue to solicit OWASA employees for employment referrals.*
- *NEOGOV software has been implemented to include job interest feature.*
- *Recruitment Plans are prepared for each recruitment to include using local census data to develop applicant targets for under-represented groups.*
- *Additional employees have been trained on the newly developed standard processes for interview panels and making employment decisions.*
- *A Welcome Team has been developed and trained to improve the onboarding process.*
- *Mandatory training for Supervisors took place from August through November 2018.*
- *Voluntary Employee training took place in August through October 2018.*
- *Various core trainings have been offered to all employees.*
- *The Board reviewed the compensation and adopted a Resolution in December 2017.*
- *The Board of Directors has had four training sessions with VISIONS and additional training is being scheduled.*

We provide an [Annual Review and Update of Strategic Trends and Utility Planning Issues](#) to the Board. This report will be modified as a companion document to this Strategic Plan for the Board's consideration in December 2018.

We will routinely update and amend our Strategic Plan as necessary, and we will keep our customers and stakeholders informed of significant changes.

Summary

As your community-owned water utility, we are committed to providing reliable, high quality water, wastewater and reclaimed water services for our customers, now and into the future. Our Strategic Plan is one of many tools we use to effectively manage our essential responsibilities to the Carrboro-Chapel Hill community. We will continue to work hard to provide excellent service so that if our customers could choose their water utility, they would always select OWASA.

Agenda Item 8:

Discuss Water Loss and Non-Revenue Water Key Performance Indicator

Purpose:

The purpose of this memo and attachment is to provide the OWASA Board of Directors with detailed information on one of the Key Performance Indicators (KPI) reported in the monthly KPI Report: Unaccounted for Water as % of Water Pumped (otherwise known as water loss).

Background:

At the January 11, 2018 Work Session, the Board received and discussed an in-depth report on one KPI (Water Main Breaks). Generally liking the format of the discussion, the Board requested the opportunity to identify another KPI for an in-depth discussion.

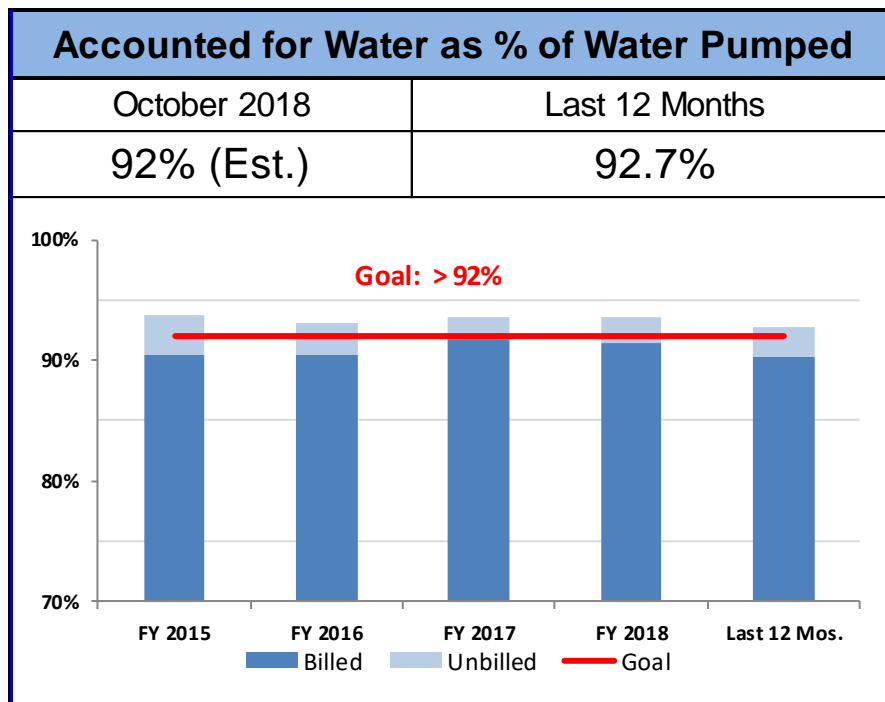
At the February 8, 2018 Work Session, the Board selected “Unaccounted for Water as a Percent of Water Pumped” as the next Key Performance Indicator for discussion.

A Closer Look at Water Loss and Non-Revenue Water:

Introduction

Each month, OWASA staff summarizes “Unaccounted for Water as % of Water Pumped” in the [Key Indicator and Performance Measurements \(KPI\) Report](#). This metric compares how much water we know was used (billed and unbilled; metered and unmetered) in a given month to how much was pumped from the Jones Ferry Road Water Treatment Plant (WTP). The difference is unaccounted for water, or water loss.

December 13, 2018



This KPI is high-level summary of a more detailed and thorough analysis conducted by staff each year using the International Water Association (IWA)/American Water Works Association (AWWA) audit methodology. This methodology is vetted and highly utilized across the industry. Key findings and historical trends from these audits, as well as industry comparisons, are provided in this memo to provide a “deep dive” look at our water loss KPI.

In addition, the results from the Fiscal Year 2018 water audit are attached.

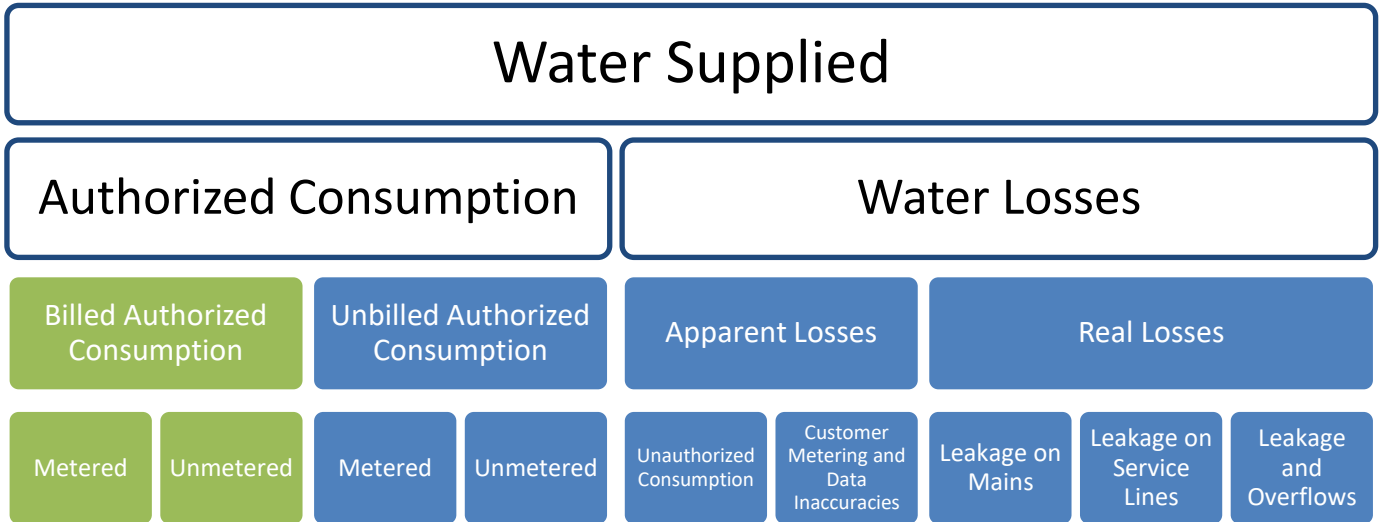
Attempting to quantify unknown water use is an important management practice for utilities. Tracking and reporting system water loss provides valuable insight on the following fronts:

- **Fiscal responsibility:** Water loss is non-revenue generating use. An annual summary of the costs associated with water loss (as is developed using the water audit methodology) helps to put into context enhanced measures to account for and reduce water loss. By limiting real water loss, we save on energy, maintenance, and treatment costs.
- **Data integrity:** Completing a water audit requires reliable performance data. Annually collecting, scrutinizing, and using this data to complete a water audit helps to ensure its integrity.
- **Water stewardship:** We are responsible stewards of the resources that we manage, and we should make sure to limit unnecessary source water withdrawals. Managing water loss is an important part of that responsibility.
- **Distribution system health:** High levels of real water loss can indicate a deteriorating distribution system and can be considered a leading indicator. Water loss amounts and percentages do include water lost during main breaks, but this makes up a relatively small portion of all water lost (i.e. Over the past 12 months, 1.1% of real water loss was lost to water main breaks.) Nonetheless, system water loss is *not* a direct indicator of system reliability. It does not capture how often customers’ service is interrupted, our responsiveness to main breaks, or the system’s ability to withstand catastrophic events. System reliability is better

captured in the “Water Main Breaks” and “Water Service Reliability” KPIs. (See [Deep Dive Report on Water Main Breaks KPI](#), January 2018).

Background

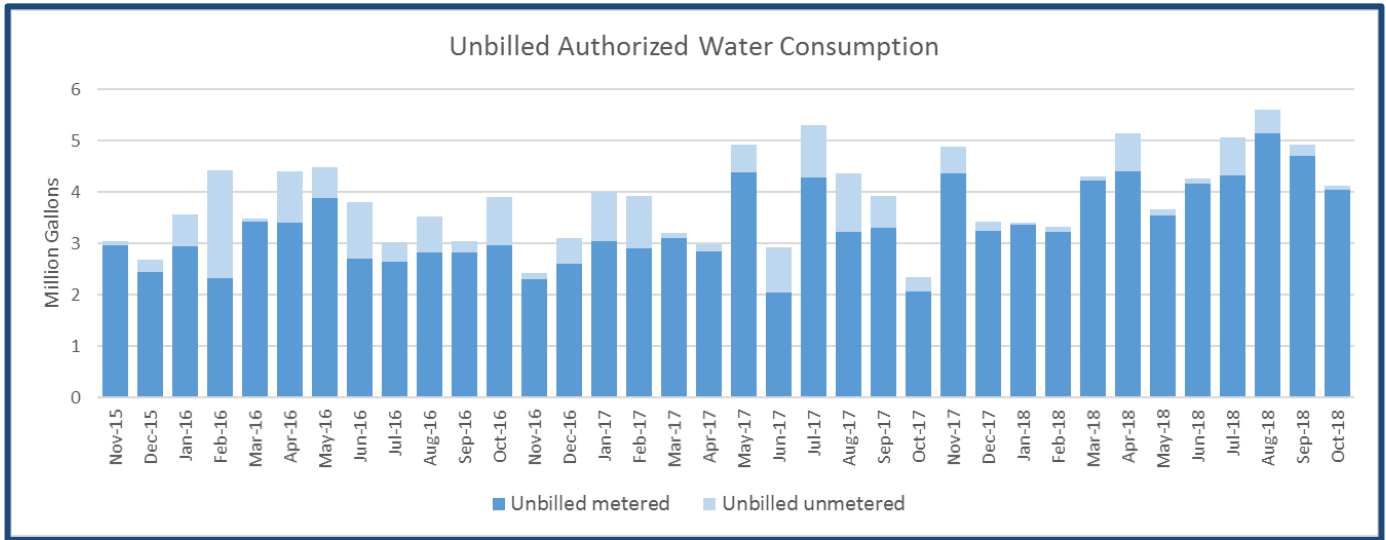
The IWA/AWWA water audit methodology is a standard and systematic way to quantify, track, and compare water loss. It is a top-down approach that utilizes “knowns” and industry assumptions to quantify the unknown. Data are organized into **revenue water** and **non-revenue water**, represented by the green and blue shapes in the chart below, respectively.



Revenue water is relatively easy to quantify. It is the water that is metered and sold to our customers (and sometimes neighboring communities). The rest of the water is **non-revenue water**, water for which we do not collect money.

A portion of non-revenue water is identifiable, authorized, and use for strategic purposes. The IWA/AWWA Methodology refers to this as “Unbilled Authorized Consumption.” This water use includes water that is metered (e.g. water used by OWASA facilities, by metered flushing devices, and for sewer cleaning) and unmetered (water used for routine flushing, our uni-directional flushing program, fire flows, system tests, Capital Improvements Program (CIP) projects, and others). Unmetered water use is based on calculations and informed estimations.

The figure below shows that, until recently, about 3 to 5 million gallons per month were used for unbilled authorized purposes. Recently, we increased use of drinking water from the distribution system at our Rogerson Drive Pump Station to ensure pump performance and reliability. Our use of water at OWASA facilities, for operational purposes, fire flow testing, CIP projects, and other authorized purposes uses between 4 and 5 million gallons per month (about 1.8% of all water pumped from the WTP).



Consumption that is not “authorized” is categorized as water loss. Water loss is divided into apparent (metering and data inaccuracies, as well as unauthorized consumption) and real losses (physical water losses from the distribution system). The current KPI metric compares authorized consumption to water losses.

The IWA/AWWA water audit methodology is also the basis for the goal that OWASA has set for our “Unaccounted for Water” KPI. Our goal is to account for 92% of all water pumped from the WTP. In other words, our goal is that at least 92% of the water used is “authorized.” This goal was set using a system-specific metric calculated within the methodology to quantify the low limit of water leakage that could be technically achieved if all of today’s best technology could be successfully applied. This metric is referred to as Unavoidable Annual Real Water Loss. In OWASA’s FY2016 and 2017 water audits, this amount equated to 8% of total water produced. In essence, this means that it would be technically difficult and costly to account for more than 92% of the water pumped from the Jones Ferry Road Water Treatment Plant.

We are currently meeting that goal. The following results provide key findings from the most recent water audit.

Summary of Results from OWASA’s Water Audits

Apparent Losses: The definition of apparent losses is the non-physical losses that occur in utility operations due to customer meter inaccuracies, systematic data handling errors in customer billing systems, and unauthorized consumption. In other words, this is water that is consumed but is not properly measured, accounted, or paid for. These losses cost utilities revenue and distort data on customer consumption patterns.

Over the past five years, we have estimated apparent losses to be between 1.54 and 1.66 gallons per connection per day. This is calculated by using industry guidance on how much is typically not properly measured and accounted for, as well as OWASA-specific results from meter accuracy testing.

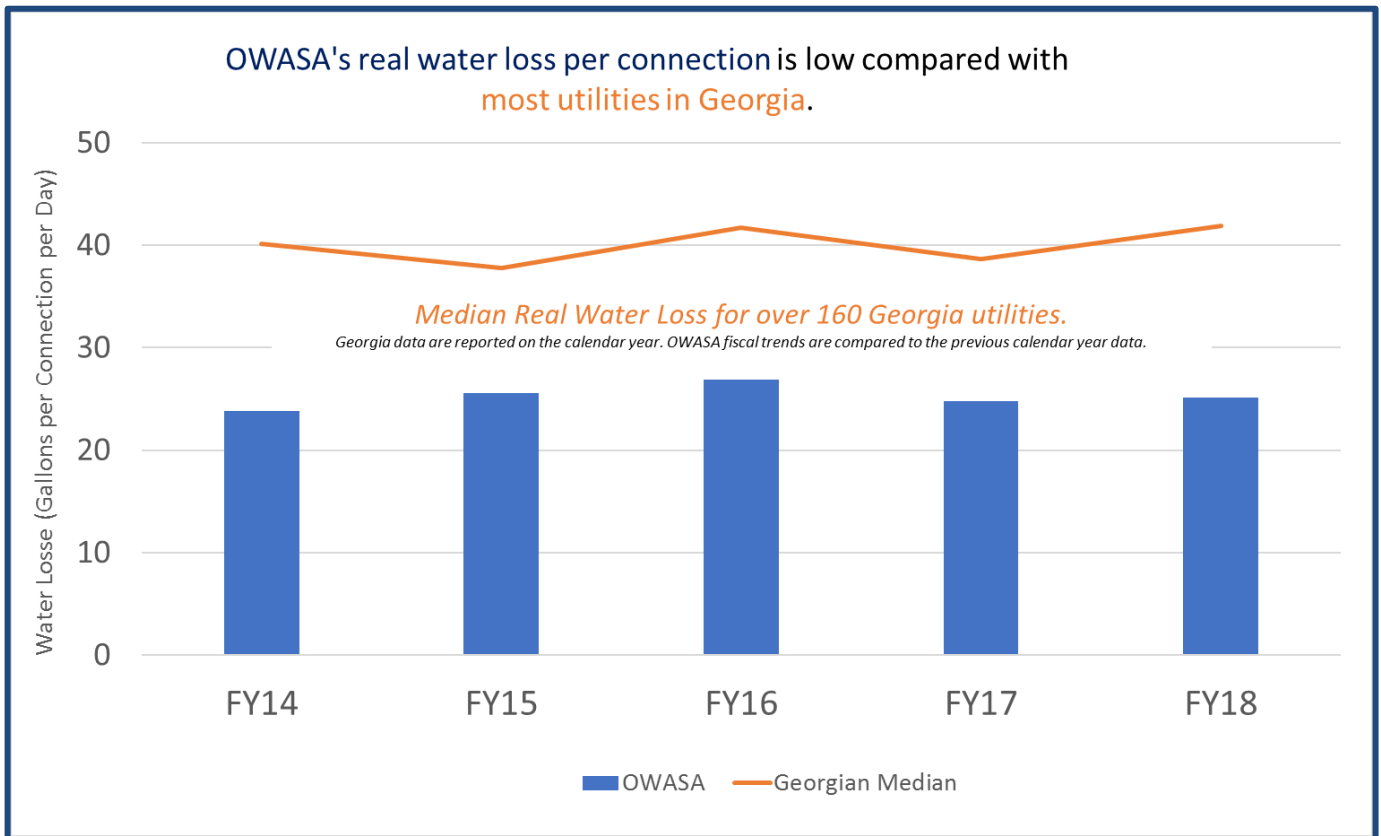
When compared to water audit results from other utilities, our rate of apparent loss is low. The median reported in the most recent AWWA benchmarking survey is 7 gallons per connection per day (with a

sample size of 41). Nonetheless, the Agua Vista metering initiative should further decrease the apparent losses in our system. Through this project, we are replacing approximately 2/3rds of all our meters which should increase billing accuracy. (The remaining 1/3rd are being upgraded.) Once complete, all OWASA meters will record hourly water use and will provide for a much more effective method for detecting unauthorized consumption.

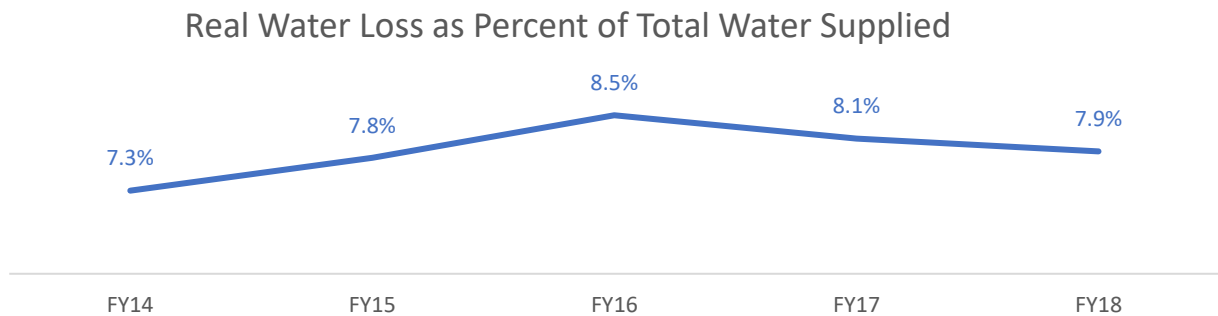
At OWASA’s retail rate, the value of this water loss is about \$180,000 per year.

Real Losses: Real losses are water lost through all types of leaks and breaks in water mains and service connections up to the point of customer metering. Real losses are what is typically thought of when talking about water loss. The top-down approach of the AWWA tool calculates real losses by subtracting apparent losses from the difference between water supplied and authorized consumption.

The following graph shows OWASA’s calculated “Real Losses per Service Connection Per Day” for the past five fiscal years. Most recently, in Fiscal Year 2018, we estimate to have lost about 25.24 gallons per customer per day. This is consistent with years past. In the graph below, these data are compared with results from over 160 utilities in Georgia. Georgia is the only state in the country that requires all larger water utilities (that serve a population of 3,300 or more) to submit water audits validated by a third party every year. As such, this makes a viable data set against which to compare. The graph below compares the past five years of OWASA real water loss to the median real water loss over the past five years in Georgia.



How does this track back to the monthly KPI report? The following graph shows how much of the total water supplied is lost to real losses or leakage.



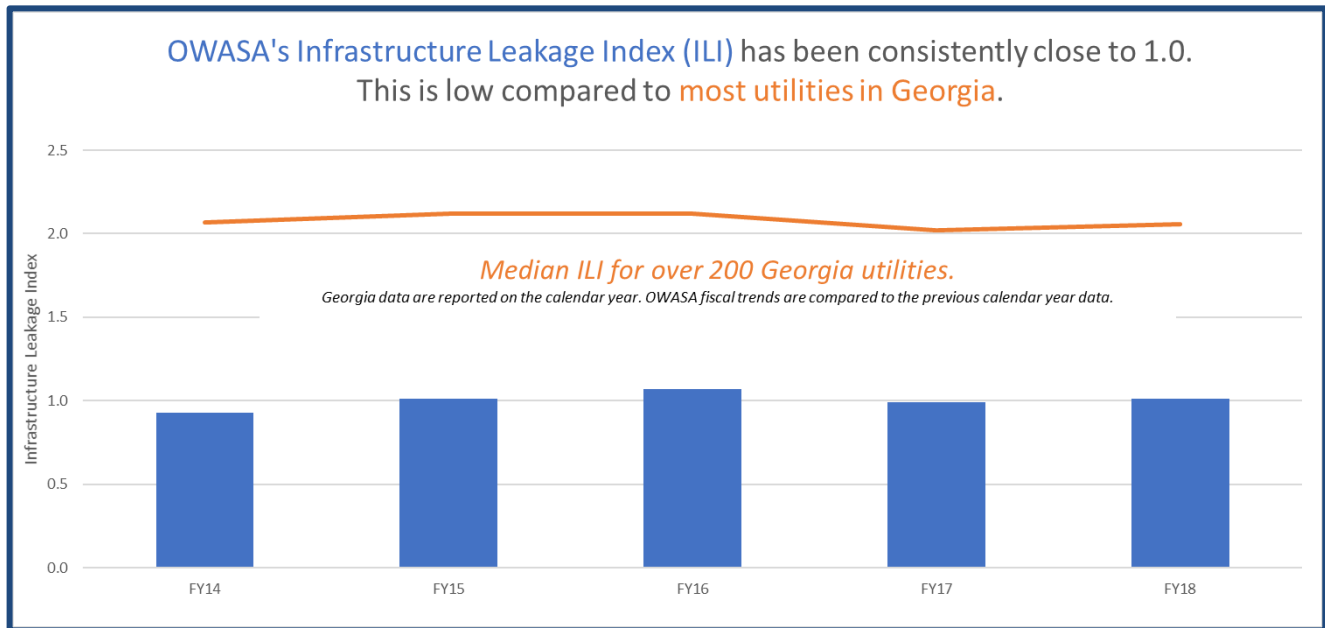
The majority of OWASA’s Unaccounted for Water goes to real losses (versus apparent losses). The graphs above show that trends in our real losses have been relatively consistent over the past five years.

The cost of this water loss to OWASA rate payers is valued at the variable costs of providing water – which include energy used to pump and the chemicals used to treat this water. In Fiscal Year 2018, the cost of this real water loss to OWASA was about \$165,000.

Infrastructure Leakage Index: It would be costly and technologically difficult to reduce real losses to 0% of water supplied. But where should we draw the line? The water audit tool calculates Unavoidable Annual Real Losses (UARL) as a function of the length of mains, number of customer service connections, the average distance of customer service connection piping, the total length of customer service connection piping, and system pressure. The ratio of real losses to the UARL is the Infrastructure Leakage Index (ILI). The ILI is simply a ratio of how much a system is leaking to a best-case scenario for a system.

An ILI close to “1” indicates that real losses are close to the unavoidable annual real loss level and therefore further reductions in real losses might not be cost-effective. The ILI is an effective performance indicator for comparing utility performance losses and for providing realistic context for real water loss.

The following graph shows the trends in OWASA’s ILI, which have been consistently close to 1.0. The graph also compares the trend in OWASA’s ILI with that of Georgia utilities. Our ILI is about half of the majority of utilities in Georgia.



Conclusion and Recommendations

Results from the water audits suggest that OWASA is not losing an excessive amount of water to apparent or real losses and that investment in water loss detection is not necessary (nor economical) at this point in time.

Nonetheless, system reliability and resiliency are top priorities for OWASA. In some cases, detecting leaks can help identify conditions that may cause breaks. Conversely, a continued and improved water main rehabilitation and replacement program will help prioritize potentially leaky pipes and reduce real water loss. Although, it is important to keep in mind that not every leak will cause a break and not every break is caused by a leak.

We recommend continuing with the following actions to manage water loss from our water system:

- Continue to evaluate the applicability and cost-effectiveness of leak detection as a method for assessing the condition of our water mains
- Develop and implement a new water main replacement/renewal prioritization model
- Continue to conduct an annual water audit and report results to the Board in Strategic Trends Report
- Consider the use of hourly customer water use data to further analyze trends in and troubleshoot water loss

Action Requested:

Staff requests no specific Board action at this time related to the KPI, but welcomes the Board of Director's questions, thoughts, and ideas on the findings of the water audit, the "Unaccounted for Water as a % of Water Pumped" KPI, and recommendations for moving forward.

Information:

- Fiscal Year 2018 Water Audit Results



AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
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? Click to access definition
+ Click to add a comment

Water Audit Report for: Orange Water and Sewer Authority
Reporting Year: 2018 7/2017 - 6/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

----- Enter grading in column 'E' and 'J' ----->

Volume from own sources:	+ ? 9	2,894.030	MG/Yr
Water imported:	+ ? 10	0.000	MG/Yr
Water exported:	+ ? 10	431.013	MG/Yr

Master Meter and Supply Error Adjustments

Pcnt:	Value:	MG/Yr
+ ? 9	-2.00%	MG/Yr
+ ?		MG/Yr
+ ? 9	-2.00%	MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: **2,513.283** MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	+ ? 7	2,254.904	MG/Yr
Billed unmetered:	+ ? n/a	0.000	MG/Yr
Unbilled metered:	+ ? 5	43.423	MG/Yr
Unbilled unmetered:	+ ? 7	4.913	MG/Yr

Click here: ?
for help using option buttons below

Pcnt: Value: MG/Yr
4.913

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: ? **2,303.240** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

210.043 MG/Yr

Apparent Losses

Unauthorized consumption: + ? **6.283** MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ? 4	0.460	MG/Yr
Systematic data handling errors:	+ ?	5.637	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? **12.380** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? **197.662** MG/Yr

WATER LOSSES: **210.043** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? **258.379** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ? 8	380.0	miles
Number of <u>active AND inactive</u> service connections:	+ ? 5	21,460	
Service connection density:	?	56	conn./mile main

Are customer meters typically located at the curbside or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 5 101.6 psi

COST DATA

Total annual cost of operating water system:	+ ? 9	\$17,180,914	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ? 8	\$16.00	\$/1000 gallons (US)
Variable production cost (applied to Real Losses):	+ ? 4	\$842.89	\$/Million gallons <input type="checkbox"/> Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Customer metering inaccuracies
- 2: Variable production cost (applied to Real Losses)
- 3: Unbilled metered



AWWA Free Water Audit Software: System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.
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Water Audit Report for:
 Reporting Year:

***** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 *****

System Attributes:

	Apparent Losses:	<input type="text" value="12.380"/>	MG/Yr
+	Real Losses:	<input type="text" value="197.662"/>	MG/Yr
=	Water Losses:	<input type="text" value="210.043"/>	MG/Yr

Unavoidable Annual Real Losses (UARL): MG/Yr

Annual cost of Apparent Losses:

Annual cost of Real Losses: Valued at **Variable Production Cost**
 Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial: { Non-revenue water as percent by volume of Water Supplied:
 Non-revenue water as percent by cost of operating system: Real Losses valued at Variable Production Cost

Operational Efficiency: { Apparent Losses per service connection per day: gallons/connection/day
 Real Losses per service connection per day: gallons/connection/day
 Real Losses per length of main per day*:
 Real Losses per service connection per day per psi pressure: gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL): million gallons/year

Infrastructure Leakage Index (ILI) [CARL/UARL]:

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline



AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.
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Water Audit Report for:	Orange Water and Sewer Authority	
Reporting Year:	2018	7/2017 - 6/2018
Data Validity Score:	72	

		Water Exported <i>439.809</i>	Billed Water Exported			Revenue Water <i>439.809</i>	
Own Sources (Adjusted for known errors) <i>2,953.092</i>	System Input <i>2,953.092</i>	Water Supplied <i>2,513.283</i>	Authorized Consumption <i>2,303.240</i>	Billed Authorized Consumption <i>2,254.904</i>	Billed Metered Consumption (water exported is removed) <i>2,254.904</i>	Revenue Water <i>2,254.904</i>	
					Billed Unmetered Consumption <i>0.000</i>		
Water Imported <i>0.000</i>			Water Losses <i>210.043</i>	Unbilled Authorized Consumption <i>48.336</i>	Unbilled Metered Consumption <i>43.423</i>	Non-Revenue Water (NRW) <i>258.379</i>	
					Unbilled Unmetered Consumption <i>4.913</i>		
				Apparent Losses <i>12.380</i>	Unauthorized Consumption <i>6.283</i>		
					Customer Metering Inaccuracies <i>0.460</i>		
				Real Losses <i>197.662</i>	Systematic Data Handling Errors <i>5.637</i>		
					Leakage on Transmission and/or Distribution Mains <i>Not broken down</i>		
					Leakage and Overflows at Utility's Storage Tanks <i>Not broken down</i>		
					Leakage on Service Connections <i>Not broken down</i>		



AWWA Free Water Audit Software: Dashboard

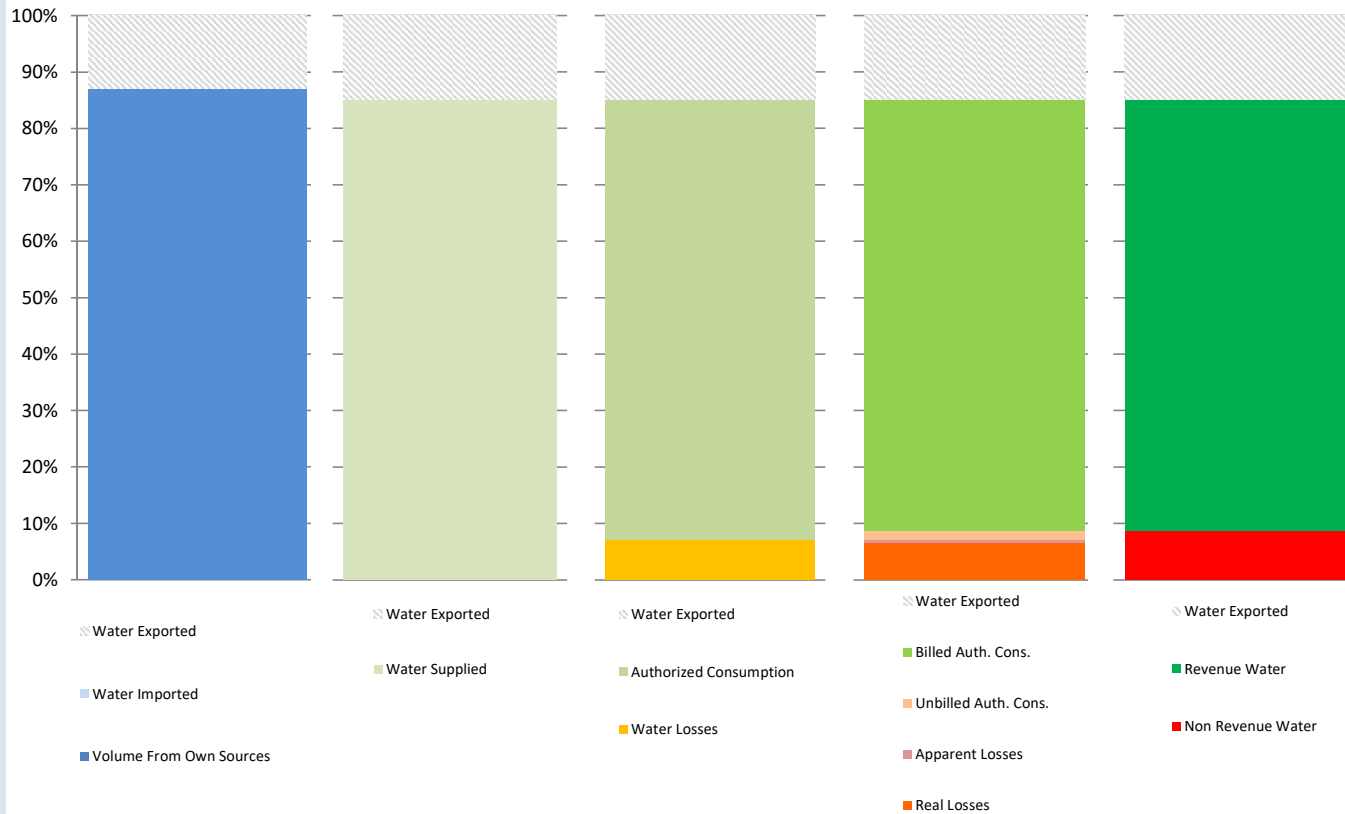
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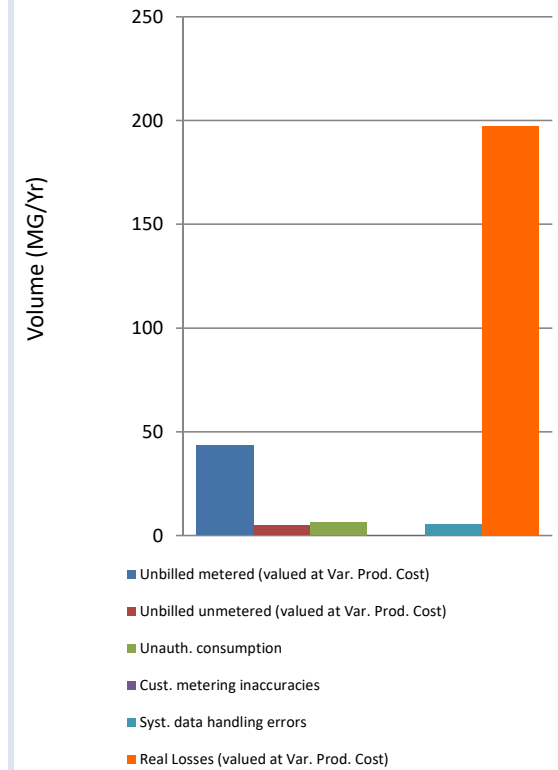
The graphic below is a visual representation of the Water Balance with bar heights proportional to the volume of the audit components

Water Audit Report for: **Orange Water and Sewer Authority**
 Reporting Year: **2018** **7/2017 - 6/2018**
 Data Validity Score: **72**

- Show me the VOLUME of Non-Revenue Water
- Show me the COST of Non-Revenue Water



Total Volume of NRW = 258 MG/Yr





AWWA Free Water Audit Software: Definitions

WAS v5.0

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Item Name	Description
<p>Apparent Losses</p> <p style="text-align: center;">Find</p>	<p>= unauthorized consumption + customer metering inaccuracies + systematic data handling errors</p> <p>Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use).</p> <p>NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.</p>
<p>AUTHORIZED CONSUMPTION</p> <p style="text-align: center;">Find</p>	<p>= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption</p> <p>The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes.</p> <p>Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.</p> <p>Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)</p>
<p style="text-align: center;">View Service Connection Diagram</p> <p>Average length of customer service line</p> <p style="text-align: center;">Find</p>	<p>This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UJARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping.</p> <p>If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10.</p> <p>If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system.</p> <p>Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.</p>
<p>Average operating pressure</p> <p style="text-align: center;">Find</p>	<p>This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.</p>
<p>Billed Authorized Consumption</p>	<p>All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.</p>
<p>Billed metered consumption</p> <p style="text-align: center;">Find</p>	<p>All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component. The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.</p>
<p>Billed unmetered consumption</p> <p style="text-align: center;">Find</p>	<p>All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined by utility policy to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.</p>

Item Name	Description
<p>Customer metering inaccuracies</p> <p>Find</p>	<p>Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger.</p> <p>The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for <u>all</u> customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly.</p> <p>Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.</p>
<p>Customer retail unit cost</p> <p>Find</p>	<p>The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, <u>but only if</u> these charges are based upon the volume of potable water consumed.</p> <p>For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer.</p> <p>Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either \$/1,000 gallons, \$/hundred cubic feet, or \$/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, \$.</p>
<p>Infrastructure Leakage Index (ILI)</p> <p>Find</p>	<p>The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.</p>
<p>Length of mains</p> <p>Find</p>	<p>Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as:</p> <p>Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]</p>
<p>NON-REVENUE WATER</p> <p>Find</p>	<p>= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.</p>
<p>Number of active AND inactive service connections</p> <p>Find</p>	<p>Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hydrants should be included in the "Length of mains" parameter.</p>
<p>Real Losses</p> <p>Find</p>	<p>Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.</p>
<p>Revenue Water</p>	<p>Those components of System Input Volume that are billed and have the potential to produce revenue.</p>
<p>Service Connection Density</p> <p>Find</p>	<p>=number of customer service connections / length of mains</p>

Item Name	Description
<p>Systematic data handling errors</p> <p>Find</p>	<p>Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports.</p> <p>Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.</p> <p>Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. <u>Data Transfer Errors</u> result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors.</p> <p>Apparent losses also occur from <u>Data Analysis Errors</u> in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system.</p> <p>Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors.</p> <p>If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the the Billed Authorized Consumption volume. However, if the auditor <u>has</u> investigated the billing system and its controls, and <u>has</u> well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. <u>Note:</u> negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.</p>
<p>Total annual cost of operating the water system</p> <p>Find</p>	<p>These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.</p>
<p>Unauthorized consumption</p> <p>Find</p>	<p>Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system.</p> <p>Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.</p>
<p>Unavoidable Annual Real Losses (UARL)</p> <p>Find</p>	<p>UARL (gallons)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres)=(18.0Lm + 0.8Nc + 25.0Lc) xP</p> <p>where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres)</p> <p>The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both.</p> <p>NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If,</p> <p><u>in gallons:</u> (Lm x 32) + Nc < 3000 P < 35psi</p> <p><u>in litres:</u> (Lm x 20) + Nc < 3000 or P < 25m</p> <p>then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.</p>

Item Name	Description								
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.								
Unbilled metered consumption <input type="button" value="Find"/>	Metered consumption which is authorized by the water utility, but, for any reason, is <u>deemed by utility policy</u> to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. It does not include water supplied to neighboring utilities (water exported) which may be metered but not billed.								
Unbilled unmetered consumption <input type="button" value="Find"/>	<p>Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case. This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value.</p> <p>If the water utility <u>has</u> carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities.</p> <p>Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.</p>								
Units and Conversions	<p>The user may develop an audit based on one of three unit selections:</p> <ol style="list-style-type: none"> 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet <p>Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes):</p> <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">Enter Units:</td> <td style="padding: 5px;">Convert From...</td> <td style="padding: 5px;">=</td> <td style="padding: 5px;">Converts to.....</td> </tr> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="text-align: center; padding: 5px;">Million Gallons (US)</td> <td></td> <td style="text-align: center; padding: 5px;">3.06888329 Acre-feet</td> </tr> </table> <p>(conversion factor = 3.06888328973723)</p> </div>	Enter Units:	Convert From...	=	Converts to.....	1	Million Gallons (US)		3.06888329 Acre-feet
Enter Units:	Convert From...	=	Converts to.....						
1	Million Gallons (US)		3.06888329 Acre-feet						
Use of Option Buttons	<p>To use the default percent value choose this button</p> <p>To enter a value choose this button and enter the value in the cell to the right</p> <div style="text-align: center;"> </div> <p>NOTE: For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above.</p> <p>If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (however, this grade will not be displayed).</p>								
Variable production cost (applied to Real Losses) <input type="button" value="Find"/>	<p>The cost to produce and supply the next unit of water (e.g., \$/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable.</p> <p>It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost.</p> <p>The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.</p>								
Volume from own sources <input type="button" value="Find"/>	<p>The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of <u>treated</u> drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.</p>								

Item Name	Description
Volume from own sources: Master meter and supply error adjustment <input type="button" value="Find"/>	<p>An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.</p>
Water exported <input type="button" value="Find"/>	<p>The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water.</p> <p>Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.</p>
Water exported: Master meter and supply error adjustment <input type="button" value="Find"/>	<p>An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.</p>
Water imported <input type="button" value="Find"/>	<p>The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.</p>
Water imported: Master meter and supply error adjustment <input type="button" value="Find"/>	<p>An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should <u>not</u> be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.</p>
WATER LOSSES <input type="button" value="Find"/>	<p>= apparent losses + real losses</p> <p>Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.</p>

Agenda Item 9:

Discuss Priorities for Natural Resources and Technical Services Committee

Purpose:

To receive the OWASA Board of Directors' guidance on priorities for discussion by the Natural Resources and Technical Services (NRTS) Committee.

Background:

The OWASA Board of Directors requested that the NRTS Committee discuss the following items:

1. Forest Management – Staff presented a draft approach to manage OWASA's forested watershed lands to the Board of Directors on May 10, 2018. The Board requested that staff work with the NRTS Committee to develop a draft process for OWASA's forest management program. A meeting is scheduled for December 12, 2018.
2. Source Water Protection and Sampling for Per- and Polyfluoroalkyl Substances (PFAS) – The NRTS Committee and staff recommend that staff sample for PFAS for one year on a quarterly basis at our Cane Creek Reservoir water supply intake and in the finished drinking water leaving the Jones Ferry Road Water Treatment Plant. Staff will provide the data to review after the year's sampling is completed and will also continue to stay updated on the state of the science and regulations concerning PFAS. There is nothing further for NRTS to discuss at this time, but the full Board could discuss the proposed PFAS sampling plan.
3. Drought Response Operating Protocol (DROP) - The OWASA Board of Directors adopted the [DROP](#) on January 10, 2013. The DROP includes a Water Shortage Advisory prior to mandatory Stage 1 conservation and thereby provides the community with timely notice of potential water shortages and an opportunity to reduce demands on a voluntary basis before mandatory conservation measures are initiated. However, the DROP prohibits OWASA from proactively purchasing water from neighboring utilities or from using water originating from our Jordan Lake water supply allocation before a Stage 1 water shortage. The NRTS Committee discussed this topic in February 2018 when OWASA's water levels were decreasing and the long-term forecast was for continued dry weather. The NRTS Committee requested that staff develop some further information and provide that to the Board and Committee to further discuss this topic at a future date, potentially in conjunction with the Long-Range Water Supply Plan. Because our reservoirs have been full, this topic has been lower priority than other items.

Staff Comments:

In addition to these three initiatives, the Board and staff are working on high priority projects to include:

December 13, 2018

- Reliability and Resiliency improvements
- Completion of Agua Vista (Advanced Metering Infrastructure) to include customer portal
- Long-Range Water Supply Plan
- Communications and Community Engagement
- Employee Diversity and Inclusion

Staff looks forward to working closely with the Board to make sure we are clear on priorities and that we manage our time and resources wisely.

Action Needed:

No action is needed; discussion as desired by the Board.

Agenda Item 10:

Review Board Work Schedule

Purpose:

- a) Request(s) by Board Committees, Board Members and Staff
- b) December 19, 2018 Special Work Session
- c) January 10, 2019 Work Session
- d) Review and update the 12 Month Board Meeting Schedule
- e) Review Pending Key Staff Action Items

Information:

- Draft agenda for the December 19, 2018 meeting
- Draft agenda for the January 10, 2019 meeting
- 12 Month Board Meeting Schedule
- Pending Key Staff Action Items from Board Meetings

December 13, 2018

Agenda
Special Work Session of the OWASA Board of Directors
Wednesday, December 19, 2018, 6:00 P.M.
OWASA Board Room

A Special Work Session of the Board of Directors of Orange Water and Sewer Authority is hereby called and will be held on Wednesday, December 19, 2018, at 6:00 PM, in the OWASA Board Room, 400 Jones Ferry Road, Carrboro, to Discuss Communications and Community Engagement.

In compliance with the "Americans with Disabilities Act," interpreter services are available with five days prior notice. If you need this assistance, please contact the Clerk to the Board at 919-537-4217 or aorbich@owasa.org.

The Board of Directors appreciates and invites the public to attend and observe its meetings. For this Special Meeting, public comments are invited only on items appearing on this agenda. Speakers are invited to submit more detailed comments via written materials, ideally submitted at least three days in advance of the meeting to the Clerk to the Board via e-mail or US Postal Service (aorbich@owasa.org/400 Jones Ferry Road, Carrboro, NC 27510).

Public speakers are encouraged to organize their remarks for delivery within a four minute timeframe allowed each speaker.

Announcements

Announcements by the Chair

- Any Board Member who knows of a conflict of interest or potential conflict of interest with respect to any item on the agenda tonight is asked to disclose the same at this time.

Discussion

1. Discuss Communications and Community Engagement (Linda Low)

Dated this 19th day of December 2018.

Yinka Ayankoya, Chair of the Board

Agenda
Work Session of the OWASA Board of Directors
Thursday, January 10, 2019, 6:00 P.M.
OWASA Community Room

The Board of Directors appreciates and invites the public to attend and observe its meetings. For the Board's Work Session, public comments are invited on only items appearing on this agenda. Speakers are invited to submit more detailed comments via written materials, ideally submitted at least three days in advance of the meeting to the Clerk to the Board via email or US Postal Service (aorbich@owasa.org/400 Jones Ferry Road, Carrboro, NC 27510).

For items on the agenda, public speakers are encouraged to organize their remarks for delivery within a four-minute time frame allowed each speaker, unless otherwise determined by the Board of Directors.

The Board may take action on any item on the agenda.

Announcements

- a. Announcements by the Chair
 - Any Board Member who knows of a conflict of interest or potential conflict of interest with respect to any item on the agenda tonight is asked to disclose the same at this time.
- b. Announcements by Board Members
- c. Announcements by Staff
- d. Additional Comments, Suggestions, and Information Items by Board Members (Yinka Ayankoya)

Consent Agenda

Information and Reports

1. Quarterly Report on Attendance at Board and Committee Meetings (Andrea Orbich)

Action

2. Appoint Audit Firm (Kelly Satterfield)

Regular Agenda

Discussion

3. Update on Employee Health and Dental Insurance for Next Fiscal Year (Stephanie Glasgow/Ellen Tucker, Hill Chesson & Woody)

Discussion and Action

4. (Tentative) Budget Amendment for Fiscal Year 2019 (Stephen Winters)

Discussion

5. Affordability Outreach Program Plan Update (Mary Tiger)
6. (Tentative) Forestry Management Framework (Ruth Rouse)
7. Review Board Work Schedule (Yinka Ayankoya/Ed Kerwin)
 - a. Request(s) by Board Committees, Board Members and Staff
 - b. January 24, 2019 Board Meeting

- c. February 14, 2019 Work Session
- d. 12 Month Board Meeting Schedule
- e. Pending Key Staff Action Items

Summary of Work Session Items

- 8. Executive Director will summarize the key staff action items from the Work Session

Closed Session

- 9. The Board of Directors will convene in a Closed Session to Discuss Confidential Information Regarding Security Measures in Place to Protect OWASA Customers, Personnel and Assets (Dan Przybyl)

DRAFT

OWASA Board of Directors – 12 Month Board Meeting Schedule (December 7, 2018)

Month	Board Meetings		Committee & Other Meetings
	Work Session	Business Meeting	
December 2018	Award the Gravity Sewer Rehabilitation Contract Discuss KPI Deep Dive on Water Loss and Non-Revenue Water Discuss Priorities for NRTS Committee Strategic Trends Report and Strategic Plan Update (C) Approve ED Key Focus Areas Position Reclassification for Maintenance Coordinator Resources for CIP and Water Distribution System Maintenance Improvements Review Status of FY19 Budget 12/13/2018	Special Work Session Discuss Communications and Community Engagement 12/19/2018	<i>Finance Committee Meeting (12/5/2018)</i> <i>NRTS Committee Meeting to discuss overall approach for managing forested watershed lands (12/12/2018)</i> <i>NRTS Committee Meeting, if needed (12/20/2018)</i>
January 2019	Employee Health and Dental Insurance Update for FY20 (C) Appoint Audit Firm (C) Affordability Outreach Program Plan Update (Tentative) Forestry Management Framework (Tentative) Approve Budget Amendment CS – Discuss Confidential Information Regarding Security Measures in Place to Protect OWASA Customers, Personnel and Assets 1/10/2019	Annual Lakes Recreation Report (C) CIP Semiannual Report (C) Q2 Financial Report (C) FY 20 Budget Calendar and Assumptions (C) (Tentative) Authorize Applying for SRF Loans 1/24/2019	<i>OC Appointees to the OWASA Board meet with Members of Orange County BOCC (1/30/2019)</i> <i>HR Committee Meeting to discuss retiree health and 457 deferred compensation (TBD)</i>
February 2019	(Tentative) LRWSP Final Demands and Yield Award the WWTP Solids Thickening Improvements and Headworks Rehabilitation Construction Contract Award the University Lake Raw Water Pump Station Improvements Construction Contract CS – Prepare for General Counsel Interim Review (C) 2/14/2019	CS – General Counsel Interim Review (C) 2/28/2019	<i>OWASA's Annual Update to the Orange County BOCC (2/19/2019)</i> <i>Chatham-Orange Joint Planning Task Force Meeting (2/21/2019)</i>
March 2019	FY 20 Draft Budget & Rates (C) Review AMI Manual Read (Tentative) LRWSP – Discuss Water Supply and Demand Management Alternatives CS – Prepare for ED Interim Review (C) 3/14/2019	Annual Update of the Energy Management Plan (C) FY 20 Draft Budget & Rates and Proposed Staff Rate Adjustment Recommendation (C) Set date for Public Hearings – FY 20 Budget & Rates (C) CS – ED Interim Review (C) 3/28/2019	
April 2019	Review Employee Health and Dental Insurance Renewals (C) FY 20 Draft Budget and Rate Adjustment Information (C) Appointment of the Nominating Committee (C) 4/11/2019	Q3 Financial Report (C) FY 20 Budget and Rates Discussion and Authorize Staff to Publish Proposed Rates 4/25/2019	
May 2019	Approve Employee Health and Dental Insurance Renewals (C) Discuss Employee Merit Pay for FY 2020 (C) 5/9/2019	Public Hearings – FY 20 Budget and Rates (C) (Tentative) Approve New Banking Services Provider Approve Employee Health and Dental Insurance Renewals (if needed) 5/23/2019	

OWASA Board of Directors – 12 Month Board Meeting Schedule (December 7, 2018)

Month	Board Meetings		Committee & Other Meetings
	Work Session	Business Meeting	
June 2019	Approve FY 20 Budget and Rates, including merit pay decision (Tentative) LRWSP – Final Water Supply and Demand Management Alternatives Election of Officers 6/13/2019	TBD 6/27/2019	
July 2019	TBD 7/11/2019	TBD 7/25/2019	
August 2019	TBD 8/8/2019	Preliminary 12 Month Financial Report CIP Semiannual Report CS – Prepare for General Counsel Review 8/22/2019	
September 2019	EEO/Affirmative Action Report Annual Report on Disposal of Surplus Personal Property CS – General Counsel Review 9/12/2019	Annual Report and Financial Audit Approve General Counsel Engagement Strategic Trends Report and Strategic Plan Update CS – Prepare for ED Review 9/26/2019	
October 2019	CS – ED Review 10/10/2019	Q1 Financial Report 10/24/2019	
November 2019	TBD 11/14/2019	<i>Holiday – no meeting</i>	

Note: Additional Board Meetings will include matters related to improving reliability and resiliency on OWASA’s services.

The 12 Month Board Meeting Schedule shows Strategic Plan initiatives and other priority efforts that the Board and staff plan to give greatest consideration to during the next twelve months. The schedule also shows major recurring agenda items that require Board action, or items that have been scheduled in response to the Board's prior standing request. This schedule does not show all the items the Board may consider in a work session or business meeting. It also does not reflect meetings at which the Board will discuss and act on the update of the Strategic Plan.

The 12 Month Board Meeting Schedule will be reviewed and updated at each monthly work session and may also be discussed and updated at the Board’s business meetings.

In addition to the initiatives shown in this schedule, staff will be working on other Strategic Plan and organizational priorities that are not expected to require major additional discussion with the Board except as part of budget deliberations.

The schedule implies that the following Strategic Plan initiatives would be addressed beyond the 12-month period. The Board may conclude that one or more of the following initiatives are higher priority. The schedule will be revised as needed to reflect the Board's priorities, and any additional initiatives that the Board may decide to address.

- Development of a plan and policy framework for OWASA lands is considered a longer-term priority. The NRTS Committee discussed this issue in September 2017 and determined it was lower priority than Forestry Management.
- Water Conservation Plan will be prepared concurrent with update of the Long-Range Water Supply Plan.
- Update of Strategic Plan. On November 15, 2018, the Board and staff agreed to defer update of the Strategic Plan to a date to be determined.

OWASA Board of Directors – 12 Month Board Meeting Schedule (December 7, 2018)

The OWASA Board determines which topics it wants to explore as a full Board (potentially in a work session format) and which topics it wants to assign to Board committees or committee chairs for further analysis and development of recommendations. Board also determines priorities and desired timeframes for addressing topics. Committee meetings will be updated on the schedule routinely.

Abbreviations Used in Draft Schedule:

☺	Recurring agenda item (generally these are “required” items)	JLP	Jordan Lake Partnership
AMI	Advanced Metering Infrastructure	KPI	Key Performance Indicator
BOCC	Board of County Commissioners	LRWSP	Long-Range Water Supply Plan
CBOA	Carrboro Board of Aldermen	MOA	Memorandum of Agreement
CE	Community Engagement	MST	Mountains-to-Sea Trail
CEP	Community Engagement Plan	MFMM	Multi-Family Master Meter
CHTC	Chapel Hill Town Council	NCDOT	North Carolina Department of Transportation
CIP	Capital Improvements Program	NRTS	Natural Resources and Technical Services
COLA	Cost of Labor Adjustment	OC	Orange County
CS	Closed Session of the Board	Q	Quarter
CY	Calendar Year	RFP	Request for Proposals
D&I	Diversity and Inclusion	SRF	State Revolving Fund
ED	Executive Director	SOW	Scope of Work
EEO	Equal Employment Opportunity	TBD	To Be Determined
FY	Fiscal Year	WTP	Water Treatment Plant
HR	Human Resources	WWTP	Wastewater Treatment Plant

Pending Key Staff Action Items from Board Meetings

No.	Date	Action Item	Target Board Meeting Date	Person(s) Responsible	Status
1.	11-15-2018	Update Board and seek guidance about short and longer-term plans to improve drinking water system resiliency to include initial resource needs.	12-13-2018	Taylor Darr Winters Glasgow	Complete – Short-term needs addressed on 12-13-2018. Longer term items will be addressed through the budget process and other means.
2.	11-15-2018	Incorporate the Board’s feedback on the projected demands and yield for the Long-Range Water Supply Plan and provide the additional information that was requested.	2-14-2019	Rouse	
3.	11-8-2018	Reschedule NRTS Committee meeting	NA	Orbich	Complete - rescheduled for 12-12-2018
4.	11-8-2018	Schedule special Board work session to discuss communications and community engagement.	12-19-2018	Orbich	Complete
5.	11-8-2018	Provide the Board via email the Scope of Work for the Distribution System Prioritization Model (when available).	NA	Gangadharan	Expected before end of January 2019.
6.	11-8-2018	Provide the Board via email the Scope of Work for the Independent Study on 16-inch Pipe Break (when available).	NA	Tiger	Complete - emailed on 11-15-2018
7.	11-8-2018	Considering Board feedback, refine/develop plans to address short and longer-term improvements for water distribution system resiliency for discussion and action at future Board meetings.	Ongoing	Taylor Darr	Regular Board meeting updates and discussion will be scheduled.
8.	11-8-2018	Schedule full Board discussion on PFAS sampling plan.	TBD	Kerwin	Will first follow up with Ruchir regarding this matter.
9.	10-25-2018	Incorporate Board feedback on WTP & WWTP Reliability and Risk Assessment Action Plan and provide the Board a yearly progress report via email in October 2019.	NA	Darr Taylor Loflin Dodson	
10.	7-12-2018	Address the Board’s feedback on the action plan on communications during OWASA-related emergencies.	NA	Low	
11.	10-12-2017	Schedule future Board discussion about low-flow benchmarks to be used once AMI is implemented.	TBD	Winters Taylor	