ORANGE WATER AND SEWER AUTHORITY

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

AGENDA
PUBLIC HEARING AND MEETING OF THE OWASA BOARD OF DIRECTORS
THURSDAY, OCTOBER 27, 2016, 7:00 P.M.
CHAPEL HILL TOWN HALL

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. Public comment is invited either by petition upon topics not on the Board's agenda, or by comments upon items appearing on the Board's 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).

Public speakers are encouraged to organize their remarks for delivery within the four minute time frame allowed each speaker.

Announcements
1. Announcements by the Chair
   - A. 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. Special Meeting of the Board of Directors to Discuss Diversity and Inclusion will be held on Thursday, November 3, 2016, at 6:00 PM in the OWASA Community Room
2. Announcements by Board Members
3. Announcements by Staff
   - A. OWASA Employee Service Awards (Ed Kerwin)

Petitions and Requests
1. Public
2. Board
3. Staff

PUBLIC HEARING
1. Public Hearing on Proposed Change in the Water Rate for Multi-Family Master-Metered Customers (Stephen Winters)
   - A. Staff Presentation
   - B. Public Comments
   - C. Motion to Close Public Hearing
   - D. Board Discussion

CONSENT AGENDA
Information and Reports
2. Quarterly Attendance at Board and Committee Meetings (Andrea Orbich)

Action

3. Minutes of the September 8, 2016 Work Session of the Board of Directors (Andrea Orbich)
4. Minutes of the September 22, 2016 Meeting of the Board of Directors (Andrea Orbich)
5. Minutes of the September 22, 2016 Closed Session of the Board of Directors for the Purpose of Discussing a Personnel Matter (Robert Morgan)
6. Minutes of the October 13, 2016 Work Session of the Board of Directors (Andrea Orbich)
7. Minutes of the October 13, 2016 Closed Session of the Board of Directors for the Purpose of Discussing a Personnel Matter (Robert Morgan)

REGULAR AGENDA

Discussion

8. Comprehensive Annual Financial Report – Comments from the Board and Public (Stephen Winters)
9. Update to the Cross Connection Control Ordinance (Todd Taylor)
10. Annual Review and Update of Strategic Trends and Utility Planning Issues (Ruth Rouse)

Information and Reports

11. Financial Report for the Three Month Period Ended September 30, 2016 (Stephen Winters)

Summary of Board Meeting Action Items

12. Executive Director will summarize the key action items from the Board meeting and note significant items for discussion and/or action expected at the next meeting

CLOSED SESSION

13. The Board of Directors will Convene in a Closed Session for the Purpose of Discussing a Personnel Matter (Robert Morgan)

AGENDA ITEM

- Public Hearing on Proposed Change in the Water Rate for Multi-Family Master-Metered Customers

PURPOSE

- To provide the public an opportunity to comment on proposed changes to the water rate charged to multi-family master-metered (MFMM) accounts.

BACKGROUND

- MFMM customers are properties served by one (or more) meter(s) that subsequently serve more than one residence or dwelling unit.

- MFMM accountholders now pay seasonal water rates; a rate of $7.91 per 1,000 gallons is charged for water used during the peak-demand months from May through September, and $4.16 per 1,000 gallons is charged for water used during the remainder of the year.

- At its September 8, 2016 meeting, the Board voted to move forward with considering a year-round rate of $5.67 per 1,000 gallons, instead of a rate that changes seasonally.

- The proposed rate is designed to generate the same revenue as the current seasonal rates.

ACTION NEEDED

- Give the public an opportunity to comment on the proposed changes to the water rate charged to multi-family master-metered accounts.

- Provide guidance to staff regarding next steps.

ORANGE WATER AND SEWER AUTHORITY

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MEMORANDUM

TO:	Board of Directors
THROUGH:	Ed Kerwin
FROM:	Stephen Winters, CPA
DATE:	October 21, 2016
SUBJECT:	Public Hearing on Proposed Change in the Water Rate for Multi-Family Master-Metered Customers

Purpose

To provide the public an opportunity to comment on proposed changes to the water rate charged to multi-family master-metered (MFMM) accounts.

Background

For MFMM accounts, OWASA bills the property owner rather than individual residents. About one-third of the MFMM owners in OWASA's service area independently meter and bill residents for water and sewer service under rules of the North Carolina Utilities Commission.

Additional background information can be found in the agenda for the Board's September 8, 2016 meeting.

Current seasonal water rates

MFMM accountholders now pay seasonal water rates:

- $4.16 per 1,000 gallons of water use from October through April ("off-peak" demand period)
- $7.91 per 1,000 gallons of water use from May through September ("peak" demand period)

Bills also include fixed monthly service charges for water and sewer service (based on the size of the meter serving the property) and $6.48 per 1,000 gallons for sewer service. The Board is not considering changes to monthly service or sewer charges at this time.

Proposed year-round water rate

Instead of seasonal water rates, the Board of Directors is considering a year-round rate of $5.67 per 1,000 gallons.

Why is the OWASA Board considering this change?

- Water demand at MFMM locations does not have the seasonal peaking pattern that seasonal rates were originally intended to address.
- The proposed change would make bills easier to understand. Most residents in MFMM complexes do not use more water in the warmer months and many are surprised when their bills change due to seasonal rate changes, but their water use does not.

If approved, when would the year-round water rate for MFMM locations go into effect?

This has not been decided, but the OWASA Board has discussed the potential to put the year-round water rate into effect in May 2017 (when the peak seasonal rate would go into effect under current policy).

How would the proposed change affect bills to residents of MFMM complexes?

- For residents whose water use is not individually sub-metered by the property owner, there should be little to no impact.
- For residents whose water use is sub-metered and rebilled by the owner, the amounts of water and sewer bills would fluctuate based on the resident's water use rather than seasonal changes in rates.

Would the proposed year-round water rate increase OWASA's revenues?

No. The proposed rate is designed to generate the same revenue as the current seasonal rates.

Community Engagement

If implemented, the proposed water rate change will impact MFMM property owners, property managers, and residents. We took a number of steps to inform stakeholders of the change the Board is considering and to invite them to the public hearing, including:

- Issued news releases
- Published notices in local newspapers
- Sent letters and emails to property managers
- Mailed letters to residents of MFMM properties that sub-meter and rebill residents for water and sewer charges

Action Requested

- Give the public an opportunity to comment on the proposed changes to the water rate charged to multi-family master-metered accounts.
- Provide guidance to staff regarding next steps. (Currently, the Board's decision on whether to adopt the proposed change in the water rate for MFMM customers is scheduled for the December 8, 2016 Board meeting.)



Stephen Winters, CPA
Director of Finance and Customer Service

ORANGE WATER AND SEWER AUTHORITY - QUARTERLY REPORT

ATTENDANCE AT BOARD AND COMMITTEE MEETINGS

BOARD OF DIRECTORS	JULY 2016	AUGUST 2016	SEPTEMBER 2016
JOHN A. YOUNG CHAIR	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 24 NRTS (Meeting) August 25 Board (Meeting) August 31 HR (Meeting)	September 8 WS (Meeting) September 13 EC (Meeting) September 22 Board (Meeting)
JEFF DANNER, VICE CHAIR	July 14 WS (Absent) July 28 Board (Canceled)	August 11 WS (Canceled) August 25 Board (Meeting) August 31 HR (Absent)	September 8 WS (Absent) September 13 EC (Absent) September 22 Board (Absent)
BARBARA M. FOUSHEE, SECRETARY	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 25 Board (Meeting) August 31 HR (Meeting)	September 8 WS (Meeting) September 13 EC (Meeting) September 22 Board (Meeting)
YINKA AYANKOYA	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 25 Board (Meeting) August 31 HR (Meeting)	September 8 WS (Meeting) September 13 EC (Meeting) September 22 Board (Meeting)
TERRI BUCKNER	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 24 NRTS (Absent) August 25 Board (Meeting)	September 8 WS (Meeting) September 22 Board (Meeting)
DAVE MOREAU	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 24 NRTS (Meeting) August 25 Board (Meeting)	September 8 WS (Absent) September 22 Board (Meeting)
ROBERT MORGAN	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 25 Board (Meeting) August 31 HR (Meeting)	September 8 WS (Meeting) September 22 Board (Meeting)
HEATHER PAYNE	July 14 WS (Meeting) July 28 Board (Canceled)	August 11 WS (Canceled) August 24 NRTS (Meeting) August 25 Board (Meeting) August 31 HR (Absent)	September 8 WS (Meeting) September 22 Board (Meeting)

OCTOBER 27, 2016

BOARD OF DIRECTORS	JULY 2016	AUGUST 2016	SEPTEMBER 2016
RUCHIR VORA	July 14 WS (Absent) July 28 Board (Canceled)	August 11 WS (Canceled) August 24 NRTS (Absent) August 25 Board (Meeting)	September 8 WS (Meeting) September 22 Board (Meeting)
TOTAL MEETINGS HELD:	**1**	**3**	**3**

Board – Board of Directors
EC – Executive Committee
HR – Human Resources Committee
NRTS – Natural Resources and Technical Services Committee
NC – Nominating Committee
WS – Board Work Session

ORANGE WATER AND SEWER AUTHORITY

WORK SESSION OF THE BOARD OF DIRECTORS

SEPTEMBER 8, 2016

The Board of Directors of the Orange Water and Sewer Authority (OWASA) held a Work Session on Thursday, September 8, 2016, at 6:00 P.M. in OWASA's Community Room in the Administration Building, 400 Jones Ferry Road, Carrboro.

Board Members present: John A. Young (Chair), Barbara Foushee (Secretary), Yinka Ayankoya, Terri Buckner, Robert Morgan, Heather Payne and Ruchir Vora. Board Members absent: Jeff Danner (Vice Chair) and David Moreau.

OWASA staff present: Ed Kerwin, Denise Battle, Mary Darr, Greg Feller, Vishnu Gangadharan, Stephanie Glasgow, Adam Haggerty, Andrea Orbich, Mary Tiger, Stephen Winters, Todd Taylor and Robert Epting (Epting and Hackney).

Public present: John Silva, Christine Silva, James O'Connor and Maureen O'Connor, owners of property in the Cane Creek Reservoir area; Lynda Hill of Blue Ridge Properties; Margaret Holton, Water, Sewer and Stormwater Coordinator, University of North Carolina at Chapel Hill.

MOTIONS ACTED UPON

1. Terri Buckner made a motion to consider a uniform commodity rate for multi-family master-metered customers with no change in monthly service charges in a public hearing on October 27, 2016; second by Robert Morgan and the motion passed with a vote of five to two with Heather Payne and John Young opposed.

2. Terri Buckner made a motion to approve OWASA's Energy Management Program and Stakeholder Engagement Plan dated September 2016; second by Barbara Foushee and unanimously approved.

3. Terri Buckner made a motion to approve use and separate identification of a social cost of carbon set at the central value identified by the Federal Interagency Working Group on Social Cost of Carbon in the business case evaluation of clean energy projects at OWASA; second by Heather Payne and unanimously approved.

4. Robert Morgan made a motion to defer Item Six, Discussion of OWASA's Capital Improvements Program Investment Practices, to the October 13, 2016 meeting; second by Yinka Ayankoya and unanimously approved.

ANNOUNCEMENTS

John Young said 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; none were disclosed.

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Mr. Young said the Executive Committee will meet on Tuesday, September 13, 2016, at 5:30 P.M. He also noted that the Chapel Hill Town Council's OWASA Committee and the Chapel Hill Appointees to the OWASA Board will meet on Thursday, September 15, 2016, at 8:00 A.M. to discuss items of mutual interest.

Mr. Young said that he and Ed Kerwin will attend the Hank Anderson Breakfast Club meeting on Saturday, September 10, 2016, at 11:00 A.M. at Mama Dips in Chapel Hill.

Robert Morgan said the Human Resources Committee met on August 31, 2016, to discuss alternative employee compensation as well as planning for the Board's discussion on October 13, 2016 on the same topic.

Yinka Ayankoya said that she and Robert Morgan will give an OWASA update on rates for multi-family master-metered customers and the draft Diversity and Inclusion Plan work to the Carrboro Board of Aldermen on Tuesday, September 20, 2016, at 7:30 P.M. at Carrboro Town Hall.

ITEM ONE: PETITION FROM JOHN M. SILVA AND CHRISTINE A. SILVA ABOUT OWASA'S AUGUST 25, 2016 DECISION REGARDING MOUNTAINS-TO-SEA TRAIL

John Silva, Christine Silva, James O'Connor and Maureen O'Connor asked the Board to rescind its decision on August 25, 2016, to allow, with conditions, the Mountains-to-Sea Trail (MST) on OWASA land near the Cane Creek Reservoir.

Board Members declined to offer a Motion that the Board's previous action be rescinded, and the request was not approved.

Without objection, John Young announced that no further MST petitions would be accepted until Orange County has completed their process to determine the MST through Orange County.

The Board requested that staff consider opportunities to help the community understand the action the Board took on August 25, 2016, regarding the conditions for the MST to be located on OWASA property and the process ahead.

ITEM TWO: PRELIMINARY TWELVE MONTH FINANCIAL REPORT FOR THE PERIOD ENDED JUNE 30, 2016

The Board received this as an information item.

ITEM THREE: DISCUSS MULTI-FAMILY, MASTER-METERED RATE STRUCTURE ALTERNATIVES

Stephen Winters, Director of Finance and Customer Service, provided a presentation on this item.

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After discussion, the Board agreed to authorize staff to publicize a proposal to change the water commodity rate for multi-family master-metered customers from a seasonal rate which is higher in peak water use months and lower in off-peak water use months to a rate that remains the same year-round.

Terri Buckner made a motion to consider a uniform commodity rate for multi-family master-metered customers with no change in monthly service or sewer charges in a public hearing on October 27, 2016; second by Robert Morgan and the motion passed with a vote of five to two with Heather Payne and John Young opposed. Please see Motion No. 1 above.

ITEM FOUR: DISCUSS AND APPROVE ENERGY MANAGEMENT PROGRAM EVALUATION CRITERIA AND APPROACH, INCLUDING THE INCORPORATION OF A SOCIAL COST OF CARBON

Mary Tiger, Sustainability Manger, provided an overview of OWASA's Energy Management Program evaluation criteria and approach, including the use of a social cost of carbon in conducting business case evaluations of clean energy projects.

Terri Buckner made a motion to approve OWASA's Energy Management Program and Stakeholder Engagement Plan dated September 2016; second by Barbara Foushee and unanimously approved. Please see Motion No. 2 above.

Terri Buckner made a motion to approve the use and separate identification of a social cost of carbon set at the central value identified by the Federal Interagency Working Group on Social Cost of Carbon in the business case evaluation of clean energy projects at OWASA; second by Heather Payne and unanimously approved. Please see Motion No. 3 above.

ITEM FIVE: REVIEW FISCAL YEAR 2017 BUDGET PROCESS

The Board received this item as an information report.

ITEM SIX: DISCUSSION OF OWASA'S CAPITAL IMPROVEMENTS PROGRAM (CIP) INVESTMENT PRACTICES

Robert Morgan made a motion to defer this item until the October 13, 2016 meeting; second by Yinka Ayankoya and unanimously approved. Please see Motion No. 4 above.

ITEM SEVEN: REVIEW BOARD WORK SCHEDULE

John Young suggested and the Board agreed that a discussion of key performance indicators be scheduled at a future work session.

The Board agreed to hold a special meeting to discuss diversity and inclusion. The meeting is tentatively scheduled for November 3, 2016 at 6:00 P.M. in OWASA's Community Room. The Board requested a summary of employee feedback (including demographics) on the draft Diversity and Inclusion Plan as a result of the voluntary employee meetings. The Human

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Resources Committee will meet to provide staff feedback and guidance on staff's proposed structure/format for the Board's special work session.

The October 13, 2016, Board Work session will include a discussion of OWASA's Capital Improvements Program investment practices and alternative employee compensation strategies.

The Board requested that staff provide a copy of the existing Forestry Management Plan and schedule a Board follow-up discussion of this matter and possible future action.

ITEM EIGHT: EXECUTIVE DIRECTOR WILL SUMMARIZE THE KEY STAFF ACTION ITEMS FROM THE WORK SESSION

Ed Kerwin summarized the key action items for staff as follows:

- Consider opportunities to help the community understand the action the Board took on August 25, 2016, regarding the conditions for the MST to be located on OWASA property and the process ahead.
- Inform the public about the Board's decision to consider a uniform commodity rate for multi-family master-metered customers (no change in monthly service charges) to include a Public Hearing on same at the October 27, 2016, Board meeting.
- Schedule Board discussion of key performance indicators at a work session.
- Schedule a Human Resources Committee meeting to provide staff feedback and guidance on a staff proposed structure/format for the Board's special work session on diversity and inclusion.
- E-mail the Board to confirm Thursday, November 3, 2016, for the special meeting regarding the draft Diversity and Inclusion Plan.
- Provide the Board a summary of employee feedback, including demographics, on the draft Diversity and Inclusion Plan as a result of the voluntary employee meetings.
- Provide the Board a copy of the existing Forestry Management Plan and schedule a Board follow-up discussion about when this matter may be discussed and possible future action.

ITEM NINE: CLOSED SESSION

Without objection, the Board convened in a closed session for the purpose of discussing a personnel matter.

The meeting was adjourned at 9:32 P.M.

Respectfully submitted by:

Andrea Orbich
Executive Assistant/Clerk to the Board

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ORANGE WATER AND SEWER AUTHORITY

ANNUAL MEETING OF THE BOARD OF DIRECTORS

SEPTEMBER 22, 2016

The Board of Directors of the Orange Water and Sewer Authority (OWASA) held its annual meeting on Thursday, September 22, 2016, at 7:00 P.M. at the Chapel Hill Town Hall Council Chamber, 405 Martin Luther King Jr. Boulevard.

Board Members present: John A. Young (Chair), Barbara Foushee (Secretary), Yinka Ayankoya, Terri Buckner, David (Dave) Moreau, Robert Morgan, Heather Payne and Ruchir Vora. Board Member absent: Jeff Danner (Vice Chair).

OWASA staff present: Ed Kerwin, Mary Darr, Vishnu Gangadharan, Katie Harrold, Kenneth Loflin, Andrea Orbich, Ruth Rouse, Kelly Satterfield, Todd Taylor, Mary Tiger, Stephen Winters, Robin Jacobs (Epting and Hackney) and Robert Epting (Epting and Hackney).

Others present: Meg Holton, Water, Wastewater and Stormwater Manager at the University of North Carolina at Chapel Hill; and Meg Blue, Martin Starnes & Associates.

There being a quorum present, Chair John Young called the meeting to order.

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MOTIONS ACTED UPON

1. BE IT RESOLVED THAT the Orange Water and Sewer Authority Board of Directors adopts the Resolution Authorizing Orange Water and Sewer Authority's Executive Director to apply for Loans and Grants from the State of North Carolina. (Resolution so titled attached hereto and made a part of these Minutes. Motion by Dave Moreau, second by Robert Morgan and unanimously approved.)

2. BE IT RESOLVED THAT the Orange Water and Sewer Authority Board of Directors adopts the Resolution Reappointing the Firm of Epting and Hackney as General Counsel to the Orange Water and Sewer Authority. (Resolution so titled attached hereto and made a part of these Minutes. Motion by Dave Moreau, second by Robert Morgan and unanimously approved.)

3. Dave Moreau made a motion to approve the Minutes of the August 25, 2016 Meeting of the Board of Directors; second by Robert Morgan and unanimously approved.

4. Dave Moreau made a motion to approve the Minutes of the September 8, 2016 Closed Session of the Board of Directors; second by Robert Morgan and unanimously approved.

5. Ruchir Vora made a motion to accept the following recommendations from the Natural Resources and Technical Services Committee: 1) chloramines remain OWASA's best option as its secondary disinfectant due to the significant reductions in disinfectant byproducts they provide; 2) acknowledge that remedying the impacts of dezincification may be expensive for our

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customers and staff will encourage customers to contact Laboratory staff at the Jones Ferry Road Water Treatment Plant when customers encounter dezincification; 3) staff will inform and engage customers and other stakeholders such as plumbers, realtors, and home and plumbing inspectors about the safety of our water and our use of chloramines; and 4) staff will continue to monitor research on causes of and solutions to dezincification. Second by Heather Payne and unanimously approved.

6. Robert Morgan made a motion that the Board deny the April 14, 2016, petition from Mr. Art Belden to hire an independent party to assess the effect chloramines have had on plumbing systems in Chapel Hill and what corrective actions are required to resolve past effects and avoid future effects because peer-reviewed scientific studies are currently available on the causes of dezincification. Second by Ruchir Vora the motion passed with a vote of seven to 1 with Terri Buckner opposed.

7. Dave Moreau made a motion that the Board offer to the local elected boards a presentation in accordance with the Community Engagement Plan for the Long-Range Water Supply Plan; second by Barbara Foushee and unanimously approved.

* * * * * * * * *

ANNOUNCEMENTS

Conflict of Interest

John Young said 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 at this time; none were disclosed.

Committee Meetings

Heather Payne said that the Chapel Hill Town Council's OWASA Committee and the Chapel Hill appointees to the OWASA Board of Directors met on September 15, 2016. Ms. Payne provided a brief update on the following items: community engagement for Advanced Metering Infrastructure; chloramines and customer considerations; Mountains-to-Sea Trail; water rates for multi-family master-metered customers; and OWASA's diversity and inclusion work.

Robert Morgan said that the Human Resources Committee will meet on October 11, 2016, to discuss the structure and format for the November 3, 2016 Special Meeting of the Board to discuss diversity and inclusion.

Barbara Foushee said that the Executive Committee met on September 13, 2016, to discuss Board development and team building activities as well as how the Executive Committee envisions supporting the Board this fiscal year. John Young suggested that the Board have a discussion on the outcome of this meeting at the Board's September 8, 2016 work session.

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September 20, 2016, Carrboro Board of Aldermen Meeting

Yinka Ayankoya said that she and Robert Morgan attended the Carrboro Board of Aldermen's meeting to provide an update on water rates for multi-family master-metered (MFMM) customers and the draft diversity and inclusion plan. She said that the Aldermen expressed concern about sub-metering and third party billing but seemed to support the uniform water rates for MFMM customers. Ms. Ayankoya said that OWASA staff will follow-up with Carrboro staff to share information.

Thank You

Yinka Ayankoya thanked staff for the OWASA orientation program she received as a new Board Member.

PETITIONS AND REQUESTS

John Young asked for petitions and requests from the public, Board and staff; there were none.

ITEM ONE: PRESENTATION OF ANNUAL REPORT

In presenting OWASA's Annual Report for Fiscal Year (FY) 2016, Ed Kerwin stated that OWASA is a public, non-profit agency providing water, sewer and reclaimed water service to the Carrboro-Chapel Hill community and has operated in full compliance with Federal and State requirements for the water, wastewater and reclaimed water systems.

Mr. Kerwin said that OWASA has the responsibility to effectively manage and maintain all the resources, facilities and infrastructure that our community depends on for high-quality and reliable service including three reservoirs, two treatment plants and 800 miles of pipe. Through a team effort, OWASA is a high performing utility and has earned several national awards for excellence including: the Partnership for Safe Water – Five Years of Excellence in Water Treatment and Distribution System Directors Award; National Association of Clean Water Agencies – Platinum Performance Award for Five Years of Excellence in Permit Compliance; and NC American Water Works Association and Water Environment Association – Operations and Maintenance Excellence Award. Mr. Kerwin thanked staff for their hard work.

Mr. Kerwin said that with every investment, OWASA works to sustain our essential infrastructure by renewing and replacing existing infrastructure. Over the next five years, OWASA will invest over $87 million in the Capital Improvement Program. Some of the projects may be disruptive and we appreciate the community's patience and understanding.

Mr. Kerwin said that progress has been made to further reduce energy use and work will continue. He said that OWASA's Strategic Plan includes projects to help prepare the organization for the future including updating the Long-Range Water Supply Plan and engaging the community regarding strategic initiatives such as Advanced Metering Infrastructure.

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Stephen Winters, Director of Finance and Customer Service, said that OWASA's customer assistance program, Care to Share, helps low-income customers when they have difficulty paying for OWASA services. OWASA partners with the Inter-Faith Council (IFC), which administers Care to Share funds at no cost to OWASA. Mr. Winters thanked customers who donate to Care to Share and invited other customers to give directly to the IFC, or to contact OWASA about contributing an amount of the customer's choice with monthly bill payments.

Mr. Winters said that the independent audit of OWASA's FY 2016 financial statements was performed by Martin, Starnes & Associates. The success of this audit is a testament to the entire OWASA team and is a positive reflection on the Finance and Customer Service staff. He thanked his staff for all their hard work and a job well done. Mr. Winters said that agenda information was updated to include a draft of OWASA's Comprehensive Annual Financial Report (CAFR). The CAFR will be finalized within the next few weeks.

Mr. Winters said OWASA is sustainable and well positioned for the future and OWASA's water supply is sufficient to meet the community's needs for the next 50 years under most circumstances. He said the community continues to do a great job of conserving, which enhances our sustainability. Mr. Winters said OWASA's financial condition is very good; there are sufficient reserves; we are meeting our financial performance goals; our bond rating is double-A plus from the top three ratings agencies; and for the fifth year in a row, the annual budget was approved without an increase in monthly water and sewer rates.

Meg Blue, Audit Manager with Martin, Starnes & Associates, said OWASA received an unmodified opinion that the financial statements fairly present OWASA's financial position and results from operations. OWASA's CAFR can be relied upon by third parties, citizens, underwriters and bond holders. Ms. Blue stated that no significant deficiencies in internal control were identified.

The Board requested that the final CAFR be placed on a future agenda for public comment and additional Board discussion; staff will follow up.

ITEM TWO: RESOLUTION AUTHORIZING ORANGE WATER AND SEWER AUTHORITY'S EXECUTIVE DIRECTOR TO APPLY FOR LOANS AND GRANTS FROM THE STATE OF NORTH CAROLINA

Dave Moreau made a motion to approve the resolution; second by Robert Morgan and unanimously approved. Please see Motion No. 1 above.

ITEM THREE: RESOLUTION REAPPOINTING THE FIRM OF EPTING AND HACKNEY AS GENERAL COUNSEL TO THE ORANGE WATER AND SEWER AUTHORITY

Dave Moreau made a motion to approve the resolution; second by Robert Morgan and unanimously approved. Please see Motion No. 2 above.

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ITEM FOUR: MINUTES

Dave Moreau made a motion to approve the Minutes of the August 25, 2016 Meeting of the Board of Directors; second by Robert Morgan and unanimously approved. Please see Motion No. 3 above.

ITEM FIVE: MINUTES

Dave Moreau made a motion to approve the Minutes of the September 8, 2016 Closed Session of the Board of Directors; second by Robert Morgan and unanimously approved. Please see Motion No. 4 above.

ITEM SIX: CHLORAMINE USE AND CUSTOMER CONSIDERATIONS

Ken Loflin, Water Supply and Treatment Manager, Katie Harrold, Laboratory Supervisor (Water Treatment Plant), and Todd Taylor, General Manager of Operations provided a presentation on OWASA's use of chloramines to treat drinking water and to address customer concerns about how private plumbing is and is not impacted by water disinfection.

The Board requested that staff provide a copy of the presentation to the Board and the public.

Ruchir Vora made a motion to accept the following recommendations from the Natural Resources and Technical Services Committee: 1) acknowledge that remedying the impacts of dezincification may be expensive for our customers and staff will encourage customers to contact Laboratory staff at the Jones Ferry Road Water Treatment Plant when customers encounter dezincification; 2) acknowledge that remedying the impacts of dezincification may be expensive for our customers and staff will encourage customers to contact staff when they encounter dezincification; 3) staff will inform and engage customers and other stakeholders such as plumbers, realtors, and home and plumbing inspectors about the safety of our water and our use of chloramines; and 4) staff will continue to monitor research on causes of and solutions to dezincification. Second by Heather Payne and unanimously approved. Please see Motion No. 5 above.

Robert Morgan made a motion that the Board deny the April 14, 2016, petition from Mr. Art Belden to hire an independent party to assess the effect chloramines have had on plumbing systems in Chapel Hill and what corrective actions are required to resolve past effects and avoid future effects because peer-reviewed scientific studies are currently available on the causes of dezincification. Second by Ruchir Vora the motion passed with a vote of seven to one with Terri Buckner opposed. Please see Motion No. 6 above.

The Board expressed appreciation to Mr. Art Belden for his petition and requested that staff inform him that his petition was denied.

ITEM SEVEN: CAPITAL IMPROVEMENTS PROGRAM SEMIANNUAL STATUS REPORT

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The Board received this as an information item.

ITEM EIGHT: OVERVIEW OF LONG-RANGE WATER SUPPLY PLAN AND BRIEFING FOR LOCAL GOVERNMENTS

Ruth Rouse, Planning and Development Manager, provided a presentation on updating OWASA's Long-Range Water Supply Plan.

Dave Moreau made a motion that the Board offer to the local elected boards a presentation in accordance with the Community Engagement Plan for the Long-Range Water Supply Plan; second by Barbara Foushee and unanimously approved. Please see Motion No. 7 above.

ITEM NINE: EXECUTIVE DIRECTOR WILL SUMMARIZE THE KEY ACTION ITEMS FROM THE BOARD MEETING AND NOTE SIGNIFICANT ITEMS FOR DISCUSSION AND/OR ACTION EXPECTED AT THE NEXT BOARD MEETING

Ed Kerwin summarized the meeting as follows:

- Staff will place the final Comprehensive Annual Financial Report (CAFR) on a future agenda for Board and public comment and possible discussion about the timing of the annual meeting;
- Staff will proceed with community engagement tasks pertaining to chloramine use and customer considerations about private plumbing systems and thank Art Belden for his petition;
- Staff will make the presentation on chloramine use and customer considerations available to the public and the Board;
- Staff will take "rough cut" at additional information about chromium 6 to include regional information and mitigation alternatives; and
- The October 13, 2016 Work Session will include the following;
    - Discussion of OWASA's Capital Improvements Program Investment Practices; and
    - Discussion of Alternative Employee Compensation Strategies

ITEM TEN: CLOSED SESSION

Without objection, the Board of Directors convened in a Closed Session in the First Floor Conference Room for the purpose of discussing a personnel matter.

The meeting was adjourned at 9:14 P.M.

Respectfully submitted,

Andrea Orbich
Executive Assistant/Clerk to the Board

Attachments

DRAFT

ORANGE WATER AND SEWER AUTHORITY

CLOSED SESSION OF THE BOARD OF DIRECTORS

SEPTEMBER 22, 2016

The Board of Directors of Orange Water and Sewer Authority met in Closed Session on Thursday, September 22, 2016, following the Board meeting.

Board Members present: John A. Young, Chair; Barbara M. Foushee, Secretary; Yinka Ayankoya; David (Dave) Moreau; Robert Morgan; Heather Payne; and Ruchir Vora. Board Members absent: Jeff Danner, Vice Chair, and Terri Buckner.

Staff present: Robert Epting and Robin Jacobs, Epting and Hackney.

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ITEM ONE

The Board of Directors met in Closed Session to discuss the annual performance review of General Counsel.

No official action was taken at the meeting.

The meeting was adjourned at 9:14 P.M.

DRAFT

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Robert Morgan, Chair
Human Resources Committee

ORANGE WATER AND SEWER AUTHORITY

WORK SESSION OF THE BOARD OF DIRECTORS

OCTOBER 13, 2016

The Board of Directors of the Orange Water and Sewer Authority (OWASA) held a Work Session on Thursday, October 13, 2016 at 6:00 P.M. in OWASA's Community Room in the Administration Building, 400 Jones Ferry Road, Carrboro.

Board Members present: John A. Young (Chair), Jeff Danner (Vice Chair), Barbara Foushee (Secretary), Yinka Ayankoya, Terri Buckner, David Moreau, Robert Morgan and Ruchir Vora. Board Member absent: Heather Payne.

OWASA staff present: Ed Kerwin, Mary Darr, Greg Feller, Vishnu Gangadharan, Stephanie Glasgow, Adam Haggerty, Andrea Orbich, Dan Przybyl, Stephen Winters, Todd Taylor and Robert Epting (Epting and Hackney).

Public present: Braxton Foushee and Margaret Holton (Water, Sewer and Stormwater Coordinator, University of North Carolina at Chapel Hill).

MOTIONS ACTED UPON

1. Robert Morgan made a motion approving the process of OWASA's Capital Improvement Program Investment Practices; second by Yinka Ayankoya and unanimously approved.

ANNOUNCEMENTS

John Young said 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; none were disclosed.

Robert Morgan reported that the Human Resources Committee met on October 11, 2016, to plan for the special meeting on November 3, 2016, regarding diversity and inclusion.

Terri Buckner reported she attended the October 12, 2016, Orange County Intergovernmental Parks Work Group and that there was discussion of establishing "mile markers" on the Mountains-to-Sea Trail (MST) to help locate hikers who may need assistance. She also noted that the work group received positive comments/feedback regarding how the OWASA Board and staff thoughtfully handled the OWASA meetings with respect to the MST.

ITEM ONE: DISCUSSION OF OWASA'S CAPITAL IMPROVEMENTS PROGRAM (CIP) INVESTMENT PRACTICES

Mary Darr, Director of Engineering and Planning, presented information on OWASA's Capital Improvement Program development process and investment practices.

Ruchir Vora arrived at the meeting at 6:30 P.M.

DRAFT

Robert Morgan made a motion approving the process of OWASA's Capital Improvement Program Investment Practices; second by Yinka Ayankoya and unanimously approved. Please see Motion 1 above.

ITEM TWO: DISCUSSION OF ALTERNATIVE EMPLOYEE COMPENSATION STRATEGIES

Robert Morgan, Human Resources Chair, introduced this item and Stephanie Glasgow, Director Human Resources and Safety, provided a brief overview of Board action since January 2013 to present.

After discussion, the Board agreed that staff will prepare an employee total benefit comparison data with other benchmark organizations. The Board also agreed that staff will propose a process/approach for the Board's review as it pertains to a majority of our employees being below their pay range mid-point.

ITEM THREE: REVIEW BOARD WORK SCHEDULE

Barbara Foushee reported on the September 13, 2016 Executive Committee meeting regarding a future Board team-building event and how the Executive Committee could support the Board in the current fiscal year. The Board agreed that the Executive Committee would develop a proposal for a team-building exercise.

The Board agreed to add a discussion item on the November 10, 2016 agenda regarding OWASA turning 40 and to defer the discussion item on key performance indicators from November 10, 2016 meeting to December 8, 2016.

ITEM FOUR: EXECUTIVE DIRECTOR WILL SUMMARIZE THE KEY STAFF ACTION ITEMS FROM THE WORK SESSION

Ed Kerwin summarized the key action items for staff as follows:

- Prepare an employee total benefit comparison data with other benchmark organizations; and
- Propose a process/approach for the Board's review as it pertains to a majority of our employees being below their pay range mid-point.

ITEM NINE: CLOSED SESSION

Without objection, the Board convened in a closed session for the purpose of discussing a personnel matter.

The work session was adjourned at 9:05 P.M.

Respectfully submitted by:

Andrea Orbich
Executive Assistant/Clerk to the Board

DRAFT

ORANGE WATER AND SEWER AUTHORITY

CLOSED SESSION OF THE BOARD OF DIRECTORS

OCTOBER 13, 2016

The Board of Directors of Orange Water and Sewer Authority met in Closed Session on Thursday, October 13, 2016, following the Board meeting.

Board Members present: John A. Young, Chair; Jeff Danner, Vice Chair; Barbara M. Foushee, Secretary; Yinka Ayankoya; Terri Buckner; David (Dave) Moreau; Robert Morgan; and Ruchir Vora. Board Member absent: Heather Payne.

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ITEM ONE

The Board of Directors met in Closed Session without staff to evaluate the annual performance review of OWASA's Executive Director.

No official action was taken at the meeting.

The meeting was adjourned at 9:05 P.M.

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Robert Morgan, Chair
Human Resources Committee

DRAFT

AGENDA ITEM

- Comprehensive Annual Financial Report – Comments from the Board and Public

PURPOSE

- To give the OWASA Board of Directors and the public an opportunity to review and comment on the Comprehensive Annual Financial Report (CAFR) for Fiscal Year (FY) 2016.

ACTION REQUESTED

- Give the public an opportunity to comment on the FY 2016 CAFR and provide feedback to staff regarding any comments the Board has about the report.

ORANGE WATER AND SEWER AUTHORITY

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

MEMORANDUM

TO: Board of Directors

THROUGH: Ed Kerwin

FROM: Stephen Winters, CPA

DATE: October 21, 2016

SUBJECT: Comprehensive Annual Financial Report – Comments from the Board and Public

Purpose

To give the OWASA Board of Directors and the public an opportunity to review and comment on the Comprehensive Annual Financial Report (CAFR) for Fiscal Year (FY) 2016.

Background

OWASA's annual meeting is held on the fourth Thursday of September each year. The annual independent audit of OWASA's financial statements typically concludes in mid-September and there is just enough time to prepare a draft of the CAFR for the annual meeting.

At OWASA's annual meeting on September 22, 2016, the Board was presented a draft of our FY 2016 CAFR.
As indicated at the meeting, staff and our audit firm have made several edits, and added the statistical section to the report.

The FY 2016 CAFR has been posted to owasa.org and has been forwarded to the North Carolina Local Government Commission for review.

Action Requested

Give the Board and public an opportunity to comment on the FY 2016 CAFR and provide feedback to staff regarding any comments the Board has about the report.

Stephen Winters, CPA
Director of Finance and Customer Service

AGENDA ITEM

- Update to the Cross Connection Control Ordinance

PURPOSE

- Discuss proposed changes to and active enforcement of the ordinance.
- Discuss informing affected customers about the proposed changes and active enforcement.
- Discuss adding the approval of the proposed changes and active enforcement to the December 8, 2016 agenda.

BACKGROUND

- The current ordinance has been in place since 1999.
- Staff proposes changes to reflect current practices.
- The proposed change with the most significant impact to the customers who are required to have these devices will be the standardization to a reduced pressure principle device.
- Staff proposes to begin actively enforcing the provisions of the ordinance, particularly the requirement for annual testing.

STAFF RECOMMENDATION

- Incorporate the Board's feedback into the proposed changes.
- Inform and solicit feedback from affected customers about the proposed changes and active enforcement prior to the Board's approval.
- Add the approval of the proposed changes and active enforcement to the December 8, 2016 agenda.

ORANGE WATER AND SEWER AUTHORITY

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

MEMORANDUM

TO: Board of Directors

THROUGH: Ed Kerwin

FROM: Todd Taylor, P.E.

DATE: October 20, 2016

SUBJECT: Update to Cross Connection Control Ordinance

Summary:

The Orange Water and Sewer Authority's (OWASA) Ordinance for the Control of Backflow and Cross-Connections was adopted in, and has remained in place since 1999. Staff is proposing changes to reflect current practices (see Attachment A). Two proposed changes regarding backflow prevention devices and enforcement will have the most significant impact on our customers. Staff is proposing to standardize to a reduced pressure principle backflow assembly (commonly referred to as a Reduced Pressure Zone or RPZ) to ensure the drinking water distribution system is highly protected from potential backflow contamination. In addition, staff is proposing to initiate and maintain active enforcement of the ordinance in accordance with the provisions outlined in the document, particularly in regards to the annual testing requirements. These changes warrant considerable effort in informing and engaging our affected customers.

Action Requested:

Staff requests the Board's concurrence with placing approval of the ordinance revisions on the Board's December 8, 2016 Work Session agenda and to move ahead with notifying and informing our affected customers prior to the Board's decision.

Background:

In 1999, the OWASA Board of Directors adopted an Ordinance for the Control of Backflow and Cross-Connections to "…prevent the community drinking water from being contaminated by a polluting substance caused by a back siphonage, back pressure, or a direct connection…" In general, this ordinance ensures that certain connections to the drinking water distribution system are either prohibited or, at a minimum, have a testable device (i.e. backflow prevention assembly) installed on the connection to reduce the potential for contaminants being drawn back into the drinking water distribution system.

The ordinance provides guidance on:

- The various duties and responsibilities of the North Carolina Department of Environmental Quality (NCDEQ), OWASA, plumbing inspectors, consumers, and certified testers.
- Facilities that require protection
- Connections with unapproved supplies (e.g. private wells, cisterns, etc.)
- Installation, testing and repair of backflow prevention assemblies
- Enforcement

The ordinance has not been updated since 1999 and staff is proposing numerous administrative changes to update the ordinance to reflect current practices (see Attachment A). While most of the changes are minor, staff's proposal to standardize to a RPZ may have significant impacts on a select group of our customers.

As the ordinance is currently written, certain facilities may only be required to install a double-check valve assembly (DCVA) because they are not considered to be a health hazard whereas facilities considered health hazards are required to install a RPZ. (Please note that current practice is to designate these as "moderate" or "severe" hazards respectively and these changes in terminology are reflected in staff's proposed revsions.) However, it can be difficult to distiguish between health and non-health hazards during construction plan review, when properties change hands, or when property uses change. Therefore, staff proposes to require a RPZ at all facilities regardless of the degree of hazard to ensure the drinking water distribution system is highly protected from potential contamination.

Current records indicate that of the 1,520 known devices in our service area, there are 776 DCVAs installed. Staff proposes that these existing devices be "grandfathered" until such time as they require replacement. The cost to replace a DCVA with an RPZ is estimated to be $120 to $1,000 depending on the size of the device (please note that this cost does not include labor, materials and testing). A variance process is also proposed to accommodate extreme hardships with regards to replacements and new construction.

Another opportunity to improve is in the enforcement of certain provisions of the ordinance, particularly with regards to the routinue testing and repair of assemblies to ensure these devices are functioning properly. Annually, OWASA notifies customers when their device needs to be tested by a certified tester. A number of customers receive a third and final notice each year, however, compliance is not currently being enforced. Accepting this risk to avoid upsetting customers has been a long-standing practice, but is not in keeping with industry best practices or the ordinance. Per the ordinance, non-compliance should result in a notice of violation (NOV) being issued which explains the violation and gives a time-period for corrective action. If the customer fails to correct the violation in a timely manner, civil penalties may be administered and/or water service terminated until corrective action is taken.

Staff explored the idea of shifting the responsibility for testing and repairing these devices to OWASA. While the cost of a program such as this is considerable (estimated at >$600,000 per year) other issues such as access to private property, responsibility for damages while performing work on private property, and coordination of service interruptions would be very problematic to implementation.

Staff proposes to begin actively enforcing the ordinance provisions, on a limited basis, by beginning to issue NOVs, when warranted, in January 2017.

These changes will impact approximately 700 unique customers. Therefore, staff recommends that we begin notifying and informing our affected customers about these proposed changes to solicit their participation in the discussion of these revisions.

We look forward to discussing these important changes with the Board of Directors at the October 27, 2016 Business Meeting. Please let me know if you have any questions.

Sincerely,

Todd Taylor, P.E.
General Manager of Operations

Attachment A: Revised Ordinance for the Control of Backflow and Cross Connection

ORANGE WATER & SEWER AUTHORITY
ORDINANCE FOR THE CONTROL OF
BACKFLOW AND CROSS-CONNECTIONS

SECTION 1. CROSS-CONNECTION CONTROL - GENERAL POLICY

1.1 INTRODUCTION

The purpose of this Cross-Connection Control Ordinance is to define Orange Water and Sewer Authority (OWASA) as the water purveyor in the elimination of all cross-connections within its public potable water supply.

This Ordinance shall apply to all consumers connected to OWASA's public potable water supply.

This Ordinance ~~will comply~~complies with the Federal Safe Drinking Water Act (P.L. 93-523), the North Carolina ~~State~~ Administrative Code (Title 15A, Subchapter ~~8C~~18C), and the North Carolina ~~State Building~~Plumbing Code ~~(Volume II)~~ as they pertain to cross-connections with the public water supply.

In accordance with General Statute 162A-9.1, OWASA is authorized and empowered to adopt this ordinance.

1.2 OBJECTIVE OF ORDINANCE

The specific objectives of the Cross-Connection Control Ordinance are as follows:

1.2.1 To protect the public potable water supply of OWASA from the possibility of contamination or pollution by isolating within the consumer's water system such contaminants, waterborne health hazards and other significant pollutants which could backflow into the public water systems.

1.2.2 To eliminate or control existing cross-connections, actual or potential, direct or indirect, between the consumer's potable water system(s) and nonpotable water system(s), plumbing fixtures and industrial piping systems.

1.2.3 To provide a continuing inspection program of cross-connection control; which will systematically and effectively ~~control all actual~~prevent contamination or ~~potential cross-connections which may be installed in~~pollution of the ~~future.~~public water system.

1.3 DESIGNATION OF RESPONSIBILITY

1.3.1 Health Agency's Responsibility

The North Carolina Department of ~~Environment and Natural Resources (Division of~~ Environmental ~~Health)~~Quality has the responsibility for promulgating and enforcing

laws, rules, regulations, and policies applicable to all water purveyors in the State of North Carolina in carrying out an effective Cross-Connection Control Program.

The Division of ~~Environmental~~Public Health also has ~~the~~ primary responsibility of ensuring that the water purveyor operates a public potable water system free of actual or potential sanitary hazards including unprotected cross-connections. The Division of ~~Environmental~~Public Health also has the responsibility of ensuring that the water purveyor provides an approved water supply at the service connection to the consumer's water system and, further, that the purveyor requires the installation, testing, and maintenance of an approved backflow prevention assembly on the service connection when required.

1.3.2. OWASA's Responsibility

Except as otherwise provided herein, OWASA is the water purveyor and is responsible for ensuring a safe water supply begins at the source and includes all of the public water distribution system, including the service connection, and ends at the point of delivery to the consumer's water systems. In addition, OWASA shall exercise reasonable vigilance to ensure that the consumer has taken the proper steps to protect the public potable water system. OWASA will determine the degree of hazard or potential hazard to the public potable water system, the degree of protection required, and will ensure proper containment protection through an ongoing inspection program. OWASA will identify all facilities where approved backflow prevention assemblies are required to be installed.

When it is determined that a backflow prevention assembly is required for the protection of the public system, OWASA shall require the consumer, at the consumer's expense, to install an approved backflow prevention assembly at service connection, to test immediately upon installation and thereafter at frequency as determined by OWASA, to properly repair and maintain assembly or assemblies and to keep adequate records of each test and subsequent maintenance and repair, including materials and/or replacement parts(s) on his/her premises. If the assembly(s) is not installed as required by OWASA, the water service may be disconnected until such assembly(s) has been properly installed.

1.3.3. Plumbing Inspectors Responsibility

The plumbing inspection departments of the Town of Chapel Hill, Town of Carrboro, University of North Carolina, and Orange County have the responsibility to not only review building plans and inspect plumbing as it is installed but, they have the explicit responsibility of preventing cross-connections from being designed and built into the plumbing system within its jurisdiction. Where the review of building plans suggests or detects the potential for cross-connections being made an integral part of the

plumbing system, the plumbing inspector has the responsibility, under the North Carolina Building Code, for requiring that such cross-connections be either eliminated or provided with backflow prevention equipment approved by the North Carolina State Building Code.

The plumbing inspector's responsibility begins at the point of delivery downstream of the first installed backflow prevention assembly and continues throughout the entire length of the consumer's water system. The inspector should inquire about the intended use of water at any point where it is suspected that a cross-connection might be made or where one is actually called for by the plans. When such is discovered it shall be mandatory that a suitable, approved backflow prevention assembly approved by the North Carolina Building Code, North Carolina Department of ~~Environment and Natural Resources~~Environmental Quality and OWASA be required by the plans and be properly installed.

1.3.4. Consumer Responsibility

The consumer has the primary responsibility of preventing pollutants and contaminants from entering his/her potable water system or the public potable water system. The consumer's responsibility starts at the point of delivery from the public potable water system and includes all of his/her water system. ~~The consumer, at his/her expense, shall~~When it is determined by OWASA that a backflow prevention assembly(s) is required for the protection of the public system, OWASA shall require the consumer, at the consumer's expense to install, operate, test, and maintain approved backflow prevention assemblies as directed by OWASA. The consumer shall maintain accurate records of tests and repairs made to backflow prevention assemblies and shall maintain such records for a minimum period of three (3) years. The records shall be on forms approved by OWASA and shall include the list of materials or replacement parts used.

Prior to any repair, overhaul, re-piping, or relocation of assembly(s), the consumer shall contact OWASA to determine if the device is still appropriate ~~device~~ and obtain approval for use of such device. Following any repair, overhaul, re-piping, or relocation of an assembly, the consumer shall have it tested to ensure that it is in good operating condition and will prevent backflow. Tests, maintenance and repairs of backflow prevention assemblies shall be made by a Certified Backflow Prevention Assembly Tester.

It shall be the Consumer's responsibility to notify OWASA immediately if the customer's water system becomes contaminated or polluted or if there is reason to believe that a backflow incident has occurred from the customer's water system into the public water system.

1.3.5. Certified Backflow Prevention Assembly Tester Responsibility

When employed by the consumer to test, repair, overhaul, or maintain backflow prevention assemblies, a Certified Backflow Prevention Assembly Tester (Tester) will have the following responsibilities:

The Tester will be responsible for making competent inspections and for repairing, or overhauling backflow prevention assemblies and making reports of such repair to the consumer and OWASA on forms approved by OWASA. The Tester shall include the list of materials or replacement parts used. The Tester shall be equipped with and be competent to use all the necessary tools, gauges, manometers and other equipment necessary to properly test, repair, and maintain backflow prevention assemblies. It will be the Tester's responsibility to ensure that original manufactured parts are used in the repair of or replacement of parts in a backflow prevention assembly. It will be the Tester's further responsibility not to change the design, material or operational characteristics of an assembly during repair or maintenance without prior approval of OWASA. A Tester shall perform the work and be responsible for the competency and accuracy of all tests and reports. The Tester shall provide a copy of all test and repair reports to the consumer and to OWASA within ten (10) business days of any completed test or repair work. A Tester shall maintain such records for a minimum period of three (3) years.

All Certified Backflow Prevention Assembly Testers must obtain and employ backflow prevention assembly test equipment which has been evaluated and/or approved by OWASA. All test equipment shall be registered with OWASA. All test equipment shall be checked for accuracy annually (at a minimum), calibrated, if necessary, and certified to OWASA as to such calibration, employing an accuracy/calibration method acceptable to OWASA.

SECTION 2. DEFINITIONS

2.1 Air gap. The term "air gap" shall mean a physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An "approved air gap" shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel - in no case less than 1 inch (2.54 cm).

~~**2.2 Atmospheric Type Vacuum Breaker**. The term "atmospheric type vacuum breaker" (also known as the "nonpressure type vacuum breaker") shall mean a device containing a float-check, a check seat, and an air inlet port. The flow of water into the body causes the float to close the air inlet port. When the flow of water stops the float falls and forms a check valve against back-siphonage and at the same time opens the air inlet port to allow air to enter and satisfy the vacuum. A shutoff valve immediately~~

~~upstream may be an integral part of the device. An atmospheric vacuum breaker is designed to protect against a nonhealth hazard (isolation protection only) under a back-siphonage condition only.~~**2.2 Approved.** Accepted by OWASA as meeting an applicable specification stated or cited in this ordinance or as suitable for the proposed use.

2.3 Auxiliary Water Supply. Any water supply on or available to the premises other than the purveyor's approved public water supply will be considered as an auxiliary water supply. These waters may be contaminated or polluted or they may be objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

2.4 Backflow. The term "backflow" shall mean the undesirable reversal of flow of water or mixtures of water and other liquids, gases or other substances into the distribution pipes of the potable supply of water from any source or sources. See terms Backpressure (2.7) and Backsiphonage (2.8).

2.5 Backflow Prevention Assembly - Type

A "backflow prevention assembly" shall mean an assembly used to prevent backflow into a consumer or public potable water system. The type of assembly used should be based on the degree of hazard either existing or potential (as defined herein). The types are:

~~a. Double Check Valve Assembly (DCVA)~~
~~b. Double Check Detector Assembly (Fire System) (DCDA)~~
~~c. Pressure Vacuum Breaker (PVB)~~
~~d.~~a.~~d.~~ Reduced Pressure Principle Assembly (RP)
~~e.~~b.~~e.~~ Reduced Pressure Principle-Detector Assembly (Fire System) (RPDA)

Backflow prevention assemblies to be connected to OWASA's public water system are limited to those assemblies approved by the Foundation for Cross Connection Control and Hydraulic Research, University of Southern California, American Society of Sanitary Engineers (ASSE) and FM Approvals (for fire line installations)

2.6 Certified Backflow Prevention Assembly Tester. The term "Certified Backflow Prevention Assembly Tester" (Tester) shall mean a person who has proven their competency to the satisfaction of OWASA. Each person who is certified to make competent tests, or to repair, overhaul, and make reports on backflow prevention assemblies shall be knowledgeable of applicable laws, rules, and regulations, shall be a licensed plumber or have at least two (2) years experience under and be employed by a North Carolina licensed plumber or plumbing contractor, or have equivalent

qualifications acceptable to OWASA, and must hold a certificate of completion from an approved training program in the testing and repair of backflow prevention assemblies.

2.7 Backpressure. The term "backpressure" shall mean any elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam and/or air pressure) above the supply pressure at the point of consideration which would cause, or tend to cause, a reversal of the normal direction of flow.

2.8 Backsiphonage. The term "backsiphonage" shall mean a form of backflow due to a reduction in system pressure which causes a sub atmospheric pressure to exist at a site ~~in theater system.~~.

2.9 Approved Check Valve. The term "approved check valve" shall mean a check valve that is drip-tight in the normal direction of flow when the inlet pressure is at least one (1) psi and the outlet pressure is zero. The check valve shall permit no leakage in a direction reversed to the normal flow. The closure element (e.g. clapper, poppet, or other design) shall be internally loaded to promote rapid and positive closure. An approved check valve is only one component of an approved backflow prevention assembly - i.e., ~~pressure vacuum breaker, double-check valve assembly, double-check detector assembly,~~ reduced pressure principle assembly~~,~~ or reduced pressure detector assembly.

2.10 Consumer. The term "consumer" shall mean any person, firm, or corporation using or receiving water from OWASA water system.

2.11 Consumer's Water System. The term "consumer's water system" shall include any water system commencing at the point of delivery and continuing throughout the consumer's plumbing system located on the consumer's premises, whether supplied by a public potable water or an auxiliary water supply. The systems may be either a potable water system or an industrial piping system.

2.12 Consumer's Potable Water System. The term "consumer's potable water system" shall mean that portion of the privately owned potable water system lying between the point of delivery and point of use and/or isolation protection. This system will include all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, store, or use potable water.

2.13 Containment. The term "containment" shall mean preventing the impairment of the public potable water supply by installing an approved backflow prevention assembly at the service connection.

2.14 Contamination. The term "contamination" shall mean an impairment of the

quality of the water which creates a potential or actual hazard to the public health through the introduction of hazardous or toxic substances or waterborne health hazards in the form of physical or chemical contaminants or biological organisms and pathogens.

2.15 Cross-Connection. A "cross-connection" shall mean any unprotected actual or potential connection or structural arrangement between a public or a consumer's water system and any other source or system through which it is possible to introduce any contamination or pollution, other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, and other temporary or permanent devices through which or because of which "backflow" can or may occur are considered to be cross-connections.

~~**2.16 Double-Check Valve Assembly.** The term "double-check valve assembly" shall mean an assembly composed of two (2) independently acting, approved check valves, including tightly closing shut-off valves attached at each end of the assembly and fitted with properly located test cocks. This assembly shall only be used to protect against a nonhealth hazard (i.e., pollutant). Device must be approved by Foundation for Cross-Connection Control and Hydraulic Research.~~

~~**2.17 Double-Check-Detector Assembly.** The term "double-check-detector assembly" shall mean a specially designed assembly composed of a line-size approved double-check valve assembly with a specific bypass water meter and a meter-sized approved double-check valve assembly. The meter shall register (in U.S. gallons) accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall only be used to protect against a nonhealth hazard (i.e., pollutant). Device must be approved by Foundation for Cross-connection Control and Hydraulic Research~~
2.16~~.~~

~~2.~~**18** **Degree of Hazard.** The term "degree of hazard" shall be derived from the evaluation of conditions within a private water system which can be classified ~~as~~ either a ~~"pollutional" (nonhealth)~~moderate or a ~~contaminations (health)~~severe hazard.

2.~~19 Health~~17 Severe Hazard. The term "~~health~~severe hazard" shall mean an actual or potential threat of contamination of a physical, chemical, biological, pathogenic or toxic nature to the public or consumer's potable water system to such a degree or intensity that there would be a danger to health. ~~Examples of waterborne health hazards include but are not limited to:~~

~~***Physical*** radioisotopes/radionuclides;~~
~~***Chemical*** lead, mercury and other heavy metals, organic compounds, other toxics and hazardous substances;~~

~~***Biological*** — microorganisms and pathogens like cryptosporidium, typhoid, cholera and E. Coli.~~

2.~~20 Nonhealth~~19 Moderate Hazard. The term "~~nonhealth~~moderate hazard" shall mean an actual or potential threat to the quality of the public or the consumer's potable water system. A ~~nonhealth~~moderate hazard is one that, if introduced into the public water supply system could be a nuisance to water customers but would not adversely affect human health.

~~**2.21 Pollutional Hazard.** The term "pollutional hazard" shall mean an actual or potential threat to the quality or the potability of the public or the consumer's potable water system but which would not constitute a health or a system hazard, as defined. The maximum degree or intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.~~

~~2.22~~2.20 **Health Agency.** The term "health agency" shall mean the North Carolina Department of Environment and Natural Resources.

2.~~23~~21 Industrial Fluids. The term "industrial fluids" shall mean any fluid or solution which may be chemically, biologically, or otherwise contaminated or polluted in a form or concentration such as would constitute a ~~health, or nonhealth~~moderate or severe hazard if introduced into a public or consumer potable water system. Such fluids may include, but are not limited to: process waters; chemicals in fluid form; acids and alkalis; oils, gases; etc.

2.~~24~~22 Industrial Piping System. The term "industrial piping system" shall mean a system used by the consumer for transmission, conveyance or storage of any fluid, solid or gaseous substance other than an approved water supply. Such a system would include all pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, or store substances which are or may be polluted or contaminated.

2.~~25~~23 Isolation. "Isolation" is the act of confining a localized hazard within a consumer's water system by installing approved backflow prevention assemblies. Disclaimer: OWASA may make recommendations, upon facility inspection, as to the usages of isolation devices/assemblies, but does not assume or have responsibility whatsoever for such installations.

2.24 Non-Potable Water. Water that has not been approved for human consumption by the appropriate agency of the State of North Carolina.

2.~~2.26~~25 **Point Of Delivery.** "Point of delivery" shall generally be at the ~~back~~ consumer's side of the meter, which are located adjacent to the public street where the

OWASA's water distribution mains are located. The consumer shall be responsible for all water piping and control devices located on the consumer's side of the point of delivery.

2.~~27~~ 26 Pollution. The term "pollution" shall mean an impairment of the quality of the water to a degree which does not create an actual hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.

2.~~28~~27 Potable Water. The term "potable water" shall mean water from any source which has been approved for human consumption by the North Carolina Department of Environmental Quality ~~and Natural Resources~~ (~~NCDENR~~NCDEQ).

2.~~29~~28 Public Potable Water System. The term "public potable water system" shall mean any publicly or privately owned water system operated as a public utility, under a current ~~NCDENR~~ NCDEQ permit, to supply water for public consumption or use. This system will include all sources, facilities, and appurtenances between the source and the point of delivery such as valves, pumps, pipes, conduits, tanks, receptacles, fixtures, equipment, and appurtenances used to produce, convey, ~~—~~ treat, or store potable water for public consumption or use.

2.~~30~~29 Reduced Pressure Principle Backflow Prevention Assembly. The term "reduced pressure principle backflow prevention assembly" shall mean ~~–~~an approved assembly containing within its structure a minimum of two (2) independently acting, approved check valves, together with a hydraulically operating, mechanically independent, pressure differential relief valve located between the check valves and at the same time below the first check valve. The ~~first check valve reduces the supply pressure to a predetermined amount so that during normal flow and at~~assembly shall operate to maintain the pressure in the zone between the two (2) check valves at an acceptable pressure level less than the pressure on OWASA's side of the assembly. At cessation of normal flow, the pressure between the ~~checks~~two (2) check valves shall be less than ~~the supply~~ pressure on OWASA's distribution supply side of the assembly. In case of leakage of either of the check ~~valve~~valves, the ~~pressure~~ differential relief valve~~, by discharge~~ shall operate to maintain the reduce pressure in the zone between the check valves by discharging to the atmosphere~~, shall operate to maintain~~. When the differential pressure ~~between~~in the ~~checks~~zone is two pounds per square inch or less than the supply pressure~~.~~, the relief valve shall open to the atmosphere.

~~The~~This unit ~~shall include~~ is located between two tightly closing resilient-seated shutoff valves ~~located at each end of the~~as an assembly and ~~each assembly shall be fitted~~equipped with properly located resilient-seated test cocks. The assembly shall include four (4) properly located resilient seated test cocks and full flow characteristic

resilient seated shut-off valves at each end of the assembly. The ~~assembly is designed to protect against a health hazard (i.e., contaminant). Device must be approved~~entire assembly shall meet the design and performance specifications as determined by the Foundation for Cross~~-~~ Connection Control and Hydraulic Research~~.~~, University of Southern California, ASSE, and FM Approvals (if on a fire line).

2.~~31~~30 Reduced Pressure Principle-Detector Assembly. The term "reduced pressure principle-detector assembly" shall mean a specially designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter-sized approved reduced pressure principle backflow prevention assembly. The meter shall register (in U.S. gallons) accurately for only very low rates of flow and shall show a registration for all rates of flow. ~~This~~The entire assembly shall ~~be used to protect against health hazard (i.e., contaminant). Device must be approved~~meet the design and performance specifications as determined by the Foundation for Cross~~-~~ Connection Control and Hydraulic Research~~.~~, University of Southern California, ASSE, and FM Approvals (if on a fire line).

2.~~32~~31 Service Connections. The term "service connection" shall mean the terminal end of a service connection from the public potable water system, i.e., where OWASA loses jurisdiction and control over the water at its point of delivery to the consumer's water system.

~~**2.33 Pressure Type Vacuum Breaker.** The term "pressure type vacuum breaker" shall mean an assembly containing an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located test cocks and tightly closing shutoff valves attached at each end of the assembly. This assembly is designed to protect against a health hazard (i.e., contaminant) under a back-siphonage condition only.~~

~~2.34~~ 32 **Water Purveyor.** The term "water purveyor" shall mean the ~~consumer or~~ operator of a public potable water system providing an approved water supply to the public.

2.~~35~~ 33 Unapproved Water Supply. The term "unapproved water supply" shall mean a water supply which has not been approved for human consumption by the ~~NCDENR~~NCDEQ.

2.~~36~~34 Used Water. The term "used water" shall mean any water supplied by a water purveyor from a public water system to a consumer's water system after it has passed through the point of delivery and is no longer under the control of the water purveyor.

SECTION 3. RIGHT OF ENTRY

3.1 Upon presentation of proper credentials and identification, authorized representatives from OWASA shall have the right to enter any building, structure, or premises during normal business hours, or at any time during the event of an emergency to perform any duty imposed by this Ordinance. Those duties may include sampling and testing of water, or inspections and observations of all piping systems connected to the public water supply. Where a consumer has security measures in force which would require proper identification and clearance before entry into their premises, the consumer shall make necessary arrangements with the security guards so that upon presentation of suitable identification, OWASA personnel will be permitted to enter without delay for the purpose of performing their specific responsibilities. Refusal to allow entry for these purposes may result in discontinuance of water service.

3.2 On request, the consumer shall furnish to OWASA any pertinent information regarding the water supply system on such property where cross-connections and backflow are deemed possible.

SECTION 4. ELIMINATION OF CROSS-CONNECTIONS: DEGREE OF HAZARD

4.1 When cross-connections are found to exist, the owner, his/her agent, occupant, or tenant will be notified in writing to disconnect the same within the time limit established by OWASA. The degree of protection required and maximum time allowed for compliance will be based upon the degree of potential ~~degree of~~ hazard to the public water supply system. If, in the judgment of OWASA, an imminent ~~health~~ hazard exists water service to the building or premises where a cross-connection exists may be terminated unless an air gap is immediately provided, or the cross-connection is immediately eliminated. The maximum time limits are as follows:

4.2 Cross-connections with private wells or other auxiliary water supplies require immediate disconnection.

4.3 All facilities which pose a severe potential ~~health~~ hazard to the potable water system must have a reduced pressure principle backflow prevention assembly installed within 30 days of notification by OWASA.

4.4 All industrial and commercial facilities not identified as a "severe hazard" shall be considered moderate hazard facilities. All moderate hazard facilities must install a reduced pressure principle backflow prevention assembly within 60 days of notification by OWASA.

~~**4.4** All industrial and commercial facilities not identified as a "health hazard" shall be considered nonhealth hazard facilities. All nonhealth hazard facilities must install a~~

~~double-check valve assembly within 90 days of notification by OWASA.~~

4.5 Water mains served by OWASA but not maintained by ~~the~~ OWASA shall be considered cross-connections, with degree of hazard to be determined by OWASA. Degree of protection and maximum time limit for installation shall be based upon the degrees of hazard, as determined by OWASA.

4.6 In the event that OWASA personnel do not have sufficient access to every portion of a private water system (i.e., classified research and development facilities; Federal government property) to allow a complete evaluation of the degree of hazard associated with such private water systems, an approved reduced pressure principle backflow prevention assembly shall be ~~required as a minimum of protection~~installed within 60 days of notification by OWASA.

4.7 No person shall fill special use tanks or tankers containing pesticides, fertilizers, other toxic chemicals or their residues from the public water system except at an OWASA-approved location equipped with an air gap ~~or an approved reduced pressure principle backflow prevention assembly properly installed~~between the tank and the fill hose on the public water supply.

4.8 No person shall connect to a fire hydrant for any purpose, unless approved by OWASA.

SECTION 5. INSTALLATION OF ASSEMBLIES

5.1 All backflow prevention assemblies shall be installed in accordance with the specifications furnished by OWASA and/or in the latest edition of the North Carolina Building Code, whichever is most restrictive.

~~**5.2** All new construction plans and specifications, when required by the North Carolina Building Code and the North Carolina Division of Environment Health, shall be made available to OWASA for review and approval and to determine the degree of hazard.~~

~~**5.3** Ownership, testing, and maintenance of the assembly shall be the responsibility of the consumer~~**5.2** When it has been determined by OWASA, that a requested service requires the installation of a backflow prevention assembly, the consumer shall, prior to receiving such service, submit for review and approval, plans and specifications of the proposed facilities. The submittal shall include a description of proposed processes, operations, etc., in such detail as needed to evaluate potential effects on OWASA's system. Proposed assemblies shall be identified by size, manufacturer and model number or by specification.

5.3 Upon notification to the consumer by OWASA that a backflow prevention assembly(s) is necessary, the consumer shall install or cause to~~.~~

~~**5.4 All double check valve assemblies must**~~ be installed ~~in drainable pits wherever below ground installation is~~entirely at the consumer's expense such assembly(s) as may be necessary.

5.4 When required, an approved backflow prevention assembly shall be installed on each service line to a customer's water system in accordance with the requirements of OWASA.

5.5 Backflow prevention assemblies shall be located downstream of the meter, in accordance with detailed specifications provided ~~by OWASA. Double-check valve assemblies may be installed in a vertical position with prior approval from OWASA, provided the flow of water is in an upward direction~~in OWASA's Cross Connection Control Manual.

~~Reduced~~**5.6** All reduced pressure principle backflow prevention assemblies must be installed in a horizontal position and in a location in which no portion of the assembly can become submerged in any substance under any circumstance~~.~~ or be subjected to temperatures below freezing, in accordance with detailed specifications provided in OWASA's Cross Connection Control Manual. Pit and/or below grade installations are prohibited.

~~**5.6**~~ **5.7** Backflow prevention assemblies shall be installed in such a manner that inspections, periodic testing and necessary repairs can be conveniently performed.

5.8 The installation of any backflow prevention assembly which is not approved by OWASA must be replaced by one which is approved by OWASA.

5.9 Removal of an approved backflow prevention assembly from a service connection that has been deemed a hazard by OWASA may result in immediate disconnection from OWASA's public water system.

5.10 **5.7** The consumer is responsible to make sure a backflow prevention assembly is working properly upon installation and is required to furnish the following information to OWASA within fifteen ~~–~~(15) days after a ~~reduced pressure principle~~ backflow ~~preventer (RP), double-check valve~~prevention assembly ~~(DCVA), pressure vacuum breaker (PVB), double-check detector assembly (DCDA), or reduced pressure principle detector assembly (RPDA)~~ is installed:

5.~~7~~10.1~~—~~ Service address where assembly is located

5.~~7~~10.2 -____Owner (and address, if different from service address)
5.~~7~~10.3 -____Description of assembly's location
5.~~7~~10.4 -____Date of installation
5.~~7~~10.5—____Installer (include name, plumbing company represented, plumber's
———license number).
5.~~7~~10.6 -____Type of assembly and size of assembly
5.10.7.~~7~~ ____Manufacturer, model number, serial number
5.~~7~~10.8 -____Test results/report

5.~~8~~11 When it is not possible to interrupt water service, provisions shall be made for a "parallel installation" of backflow prevention assemblies. OWASA will not accept an unprotected bypass around a backflow preventer.

~~**5.9 Upon notification by OWASA, the consumer shall install the appropriate containment assembly not to exceed the following time frame:**~~

~~Health Hazard.....60 days~~
~~Nonhealth Hazard..... 90 days~~

12
~~**5.10**~~ Following installation, all ~~RP, DCVA, PVB, DCDA, and RPDA~~backflow prevention assemblies are required to be tested by a ~~certified backflow prevention assembly tester~~Certified Backflow Prevention Assembly Tester within ten (10) days.

SECTION 6. TESTING AND REPAIR OF ASSEMBLIES

~~6.1~~6.1 No water service shall be provided to any facility or service that requires the installation of a backflow prevention assembly until the installed assembly has been tested by a Certified Backflow Prevention Assembly Tester, and the test results have been received by OWASA.

6.2 Testing of backflow prevention assemblies shall be made by a ~~certified backflow prevention assembly tester~~Certified Backflow Prevention Assembly Tester approved by OWASA. Such tests are to be conducted upon installation, prior to receiving service and annually thereafter ~~or at a frequency established by OWASA.~~. A record of all testing and repairs is to be retained by the consumer. Copies of the records must be provided to OWASA within ten (10) business days after the completion of any testing, and/or repair work.

~~6.2~~ 6.3 All Certified Backflow Prevention Assembly Testers shall submit a copy of their certification to OWASA prior to testing any backflow prevention assembly(s) connected to OWASA public water system. The Tester is responsible for notifying

OWASA within ten (10) days if their certification status or contact information changes.

6.4 Any time that repairs to backflow prevention assemblies are deemed necessary, whether through annual or required testing, or routine inspection by the consumer or by OWASA, these repairs must be completed within a specified time in accordance with the degree of hazard. In no case shall this time period exceed:

1. ~~Health~~Severe Hazard Facilities - ~~7~~10 days
2. ~~Non-Health~~Moderate Hazard Facilities - ~~21~~15 days

6.~~3~~5 All backflow prevention assemblies with test cocks are required to be tested annually or at a frequency established by OWASA.

6.~~4~~6 All certified backflow prevention assembly testers must obtain and employ backflow prevention assembly test equipment which has been evaluated and/or approved by OWASA. All test equipment shall be registered with OWASA and shall be checked for accuracy annually (at a minimum), calibrated if necessary, and certified to OWASA as to such accuracy/calibration, employing a calibration method acceptable to OWASA (See Section 1.3.5).

6.~~5~~ 7 It shall be unlawful for any consumer or ~~certified backflow prevention assembly tester~~Certified Backflow Prevention Assembly Tester to submit any record to OWASA which is false or incomplete in any material respect. It shall be unlawful for any ~~consumer~~Consumer or ~~certified tester~~Certified Tester to fail to submit to OWASA any record which is required by this Ordinance. Such violations may result in any of the enforcement actions outlined in Section ~~10~~8 of this Ordinance.

SECTION 7. FACILITIES REQUIRING PROTECTION

~~Approved backflow prevention assemblies shall be installed on the service line to any facility that OWASA has identified as having a potential for backflow.~~

~~The following types of~~ All facilities or services, with the exception of domestic services to single family residences, have been identified by OWASA as having a significant potential for backflow of nonpotable water into the public water supply system. Therefore, an approved backflow prevention assembly ~~may~~shall be required on all such services~~ according to the degree of hazard present. Other types of facilities or~~. Domestic services ~~not listed below~~to single family residences may also be required to install approved backflow prevention assemblies if determined necessary by OWASA. ~~As a minimum requirement, all commercial services will be required to install a double check valve assembly, unless otherwise listed below.~~

~~Abbreviations:~~

~~DCVA = Double-Check Valve Assembly~~

~~RP~~ = Approved backflow prevention assemblies, as defined in Section 2 of this Ordinance, are:

a. Reduced ~~Pressure Principle Assembly~~pressure principle backflow prevention assembly

~~DCDA = Double-Check Detector Assembly~~

~~c.~~b. ~~RPDA =~~ Reduced ~~Pressure Detector Assembly~~pressure principle-detector assembly

~~AG = Air Gap~~

~~PVB = Pressure Vacuum Breaker~~

~~7.1 Automotive Services Stations, Dealerships, etc.~~

~~a. No Health Hazard: DCVA~~

~~b. Health Hazard: RP~~

~~7.2 Auxiliary Water Systems:~~

~~a. Approved Public/Private Water Supply: DCVA~~

~~b. Unapproved Public/Private Water Supply: AG~~

~~c. Used Water and Industrial Fluids: RP~~

~~7.3 Bakeries~~

~~a. No Health Hazard: DCVA~~

~~b. Health Hazard: RP~~

~~7.4 Beauty Shops/Barber Shops~~

~~a. No Health Hazard: DCVA~~

~~b. Health Hazard: RP~~

~~7.5 Beverage Bottling Plants: RP~~

~~7.6 Breweries: RP~~

~~7.7 Buildings - Hotels, apartment houses, public and private buildings, or other structures having unprotected cross-connections.~~

~~a. (Under five stories) No Health Hazard: DCVA~~

~~b. (Under five stories) Health Hazard: RP~~

~~c. (Over five stories) All: RP~~

~~7.8 Canneries, packing houses, and rendering plants: RP~~

~~7.9 Commercial carwash facilities: RP~~

~~7.10 Commercial greenhouses: RP~~

~~7.11 Commercial sales establishments (department stores, malls, etc.)~~
~~a. No Health Hazard: DCVA~~
~~b. Health Hazard: RP~~

~~7.12 Concrete/asphalt plants: RP~~

~~7.13 Dairies and cold storage plants: RP~~

~~7.14 Dye works: RP~~

~~7.15 Film laboratories: RP~~

~~7.16.1 Fire Systems 3/4"(inch) to 2"(inch)~~
~~a. No Health Hazard: DCDA~~
~~b. Health Hazard: (Booster Pumps, Foam, Antifreeze Solution, etc.): RP~~

~~7.16.2 Fire Systems 2 1/2"(Inch) to 10"(inch) (or larger)~~
~~a. No Health Hazard: DCDA~~
~~b. Health Hazard: (Booster Pumps, Foam, Antifreeze Solution,etc.): RPDA~~

~~7.16.3 Fire Trucks: RP~~

~~7.17 Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, medical clinics, and veterinary hospitals: RP~~

~~7.18 Laundries:~~
~~a. No Health Hazard: DCVA~~
~~b. Health Hazard: (i.e., Dry Cleaners): RP~~

~~7.19 Lawn irrigation systems (split taps):~~
~~a. No Health Hazard: DCVA~~
~~b. Health Hazard: (Booster Pumps, Chemical Systems): RP~~

~~7.20 Metal manufacturing, cleaning, processing, and fabricating plants: RP~~

~~7.21 Mobile home parks:~~
~~a. No Health Hazard: DCVA~~
~~b. Health Hazard: R P~~

~~7.22 Oil and gas production, storage or transmission properties: RP~~

~~7.23 Pest control (exterminating and fumigating): RP~~

~~7.24 Power plants: RP~~

~~7.25 Restaurants:~~
~~a. No Health Hazard: DCVA~~
~~b. Health Hazard: RP~~

~~7.26 Restricted, classified, or other closed facilities: RP~~

~~7.27 Sand and gravel plants: RP~~

~~7.28 Schools and colleges: RP~~

~~7.29 Sewage and storm drain facilities: RP~~

~~7.30 Swimming Pools: RP~~

~~7.31 Waterfront facilities and industries: RP~~

All assemblies and installations shall be subject to inspection and approval by OWASA.

~~SECTION 8. CONNECTIONS WITH UNAPPROVED SOURCES OF SUPPLY~~

~~**8.1** No person shall connect or cause to be connected any supply of water not approved by the NCDENR to the water system supplied by OWASA. Any connections allowed by OWASA must be in conformance with the backflow prevention requirements of this Ordinance.~~

~~**8.2** In the event of contamination or pollution of a public or consumer potable water system, the consumer shall notify OWASA immediately in order that appropriate measures may be taken to overcome and eliminate the contamination or pollution.~~

SECTION ~~9. FIRE PROTECTION SYSTEMS~~

~~**9.1** All connections for fire protection systems connected with the public water system 2" and smaller shall be protected with an approved double-check valve assembly as a minimum requirement. All fire systems using toxic additives or booster pumps shall be protected by an approved reduced pressure principle detector assembly at the main service connection.~~

~~**9.2** All connections for fire protection systems connected with the public water system greater than two 2" shall be protected with an approved double check detector assembly as a minimum requirement. All fire protection systems using toxic or hazardous additives or booster pumps shall be protected by an approved reduced pressure principle detector assembly at the main service connection.~~

~~**9.3** All existing backflow prevention assemblies 2 1/2"and larger installed on fire protection systems that were initially approved by OWASA shall be allowed to remain on the premises, as long as they are being properly maintained, tested and repaired as required by this Ordinance. However, if the existing assembly must be replaced (once it can no longer be repaired), or in the event of proven water theft through an unmetered source, the consumer shall be required to install an approved double check detector assembly or reduced pressure principle detector assembly as required by this provision.~~

~~SECTION 10~~8. ENFORCEMENT

~~10~~8.1 The consumer or person in charge of any installation found not to be in compliance with the provisions of this Ordinance shall be notified in writing with regard to the corrective action(s) to be taken.

~~10~~8.2 Such notice must explain the violation and give the time period within which the violation must be corrected. The time period set to correct a violation shall not exceed 30-days after receiving notice unless otherwise specified by Section 4. If the violation has been determined by OWASA to be an imminent hazard the consumer shall be required to correct the violation immediately.

~~10~~8.3 In the event a consumer is found in violation of this ordinance and fails to correct the violation in a timely manner or to pay any civil penalty or expense assessed under this section, water service may be terminated, and shall be reestablished when the violation is corrected and any applicable civil penalties are paid.

~~10~~8.4 The violation of any section of this ordinance may be punished by a civil penalty listed as followed:

~~10~~8.4.1 - Unprotected cross-connection involving a private water system which creates an imminent hazard - $1,000.00 per day not to exceed $10,000.00.

~~10~~8.4.2 Unprotected cross-connection involving a private water system which is of a moderate or ~~high~~severe hazard - $500.00 per day not to exceed $5,000.00.

~~10~~8.4.3 If in the judgment of OWASA, any consumer, manager, supervisor, or person in charge of any installation is found to be in

noncompliance with the provisions of this Ordinance and/or neglects their responsibility to correct a violation, water service may be discontinued until compliance is achieved.

~~10~~8.4.4 Failure of a consumer or certified tester to submit any record required by this Ordinance, or the submission of falsified reports/records may result in a civil penalty of up to $500.00 per violation. If a certified backflow prevention assembly tester submits falsified records to OWASA, OWASA shall permanently revoke that tester.

~~10~~8.4.5 Failure to test or maintain backflow prevention assemblies as required - $200.00 per day.

~~10~~8.5 Enforcement of this program shall be administered by the Executive Director of OWASA or his/her authorized representative.

SECTION 9. VARIANCES

Any customer may apply for a variance from the application of the provisions of this Ordinance, provided, such application must be made within ten days of OWASA's written demand for compliance. Such applications shall be made to OWASA's Executive Director, who may grant such a request only if the applicant is able to show that the variance requested will provide equivalent protection and presents no risk of contamination of the public water system. The determination of the Executive Director upon the variance request shall be the final agency decision.

Reviewed by General Counsel: _____ _____
Date General Counsel

Adopted by the Board: _____ _____
Date Clerk of the Board

AGENDA ITEM

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

PURPOSE

- To provide information about long-term trends and utility planning issues.

BACKGROUND

- Staff will review 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 water, wastewater, and reclaimed water services.

- This year's report follows a new format which includes background information on OWASA's Planning Environment, ties to OWASA's Strategic Plan, and includes information on regulations, technology, and energy use for each trend.

ACTION NEEDED

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

ORANGE WATER AND SEWER AUTHORITY

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

MEMORANDUM

TO: Board of Directors

THROUGH: Ed Kerwin

FROM: Ruth Rouse

DATE: October 21, 2016

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

Attached for your review and discussion is the 2016 edition of the "Annual Review and Update of Strategic Trends and Utility Planning Issues." This annual report to the Board of Directors summarizes observed trends in water treatment, wastewater treatment, the reclaimed water system, environmental regulations, and technology to ensure that OWASA continues to provide high quality water, wastewater, and reclaimed water services.

We modified this year's report to serve as a companion document to the June 9, 2016 Strategic Plan. The following changes were made to tie this report to the Strategic Plan and improve the report:

- We included a Background section which briefly introduces this Strategic Trends report and its relationship to the Strategic Plan.
- We included a new section describing OWASA's Planning Environment.
- For each trend, we included a section which describes the Strategic Plan Elements of that trend.
- We moved energy use, regulations, and technology out of their own sections and included a description of them for each trend.
- We included new trends on Source Water Protection, Reclaimed Water, and Biosolids to provide a more complete evaluation of OWASA's assets.

A couple main points from the report are:

- Our customers have reduced peak day drinking water demands by 40 percent since FY 1999 despite a 29 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 nearly 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, but the community will become increasingly vulnerable to drought before the expanded Quarry Reservoir is available until 2035. Our allocation of Jordan Lake water supply serves as an insurance policy to meet demands during extended droughts or operational emergencies. We will update projected water supply demands in calendar year 2017 as part of the update to the Long-Range Water Supply Plan.

- 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.

At the October 27, 2016 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.

Ruth C. Rouse

Ruth C. Rouse, AICP
Planning and Development Manager

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

Annual Review and Update of Strategic Trends and Utility Planning Issues

OCTOBER 2016

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.

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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 reliable and high quality 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 40 percent since Fiscal Year (FY) 1999 despite a 29 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 nearly 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 serves as an insurance policy to meet demands during extended droughts or operational emergencies. We will update projected water supply demands in calendar year (CY) 2017 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.
- Our continued commitment to maintain and renew our community's drinking water distribution system is evidenced by our decreasing number of water main breaks. However, the number of water line breaks (including small lateral lines) is above the median value included in the American Water Works Association 2012 Benchmarking report. OWASA will continue to track this metric and include funds in our annual budget to maintain and rehabilitate our lines to improve this metric.

Acronyms

AMI	advanced metering infrastructure
BG	billion gallons
CDC	Centers for Disease Control
CIP	Capital Improvements Program
CY	calendar year
DEQ	NC Department of Environmental Quality
DWR	NC Division of Water Resources
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
Mi	Miles
NCSU	North Carolina State University
NPDES	National Pollutant Discharge Elimination System
OWASA	Orange Water and Sewer Authority
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
RCW	reclaimed water
TN	total nitrogen
TP	total phosphorus
µg/l	micrograms per liter

UCMR3	Unregulated Contaminant Monitoring Rule 3
UNC	University of North Carolina at Chapel Hill
WHO	World Health Organization
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 an annual report to evaluate and update the 2001 Water and Sewer Master Plan. This annual report has been enhanced over time and now also includes summaries of energy use, potential changes in regulations, and emerging technologies that may help OWASA meet its mission of providing our customers with high quality water, wastewater, and reclaimed water services through responsible and creative stewardship of the resources we manage.

This report summarizes annually 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 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.

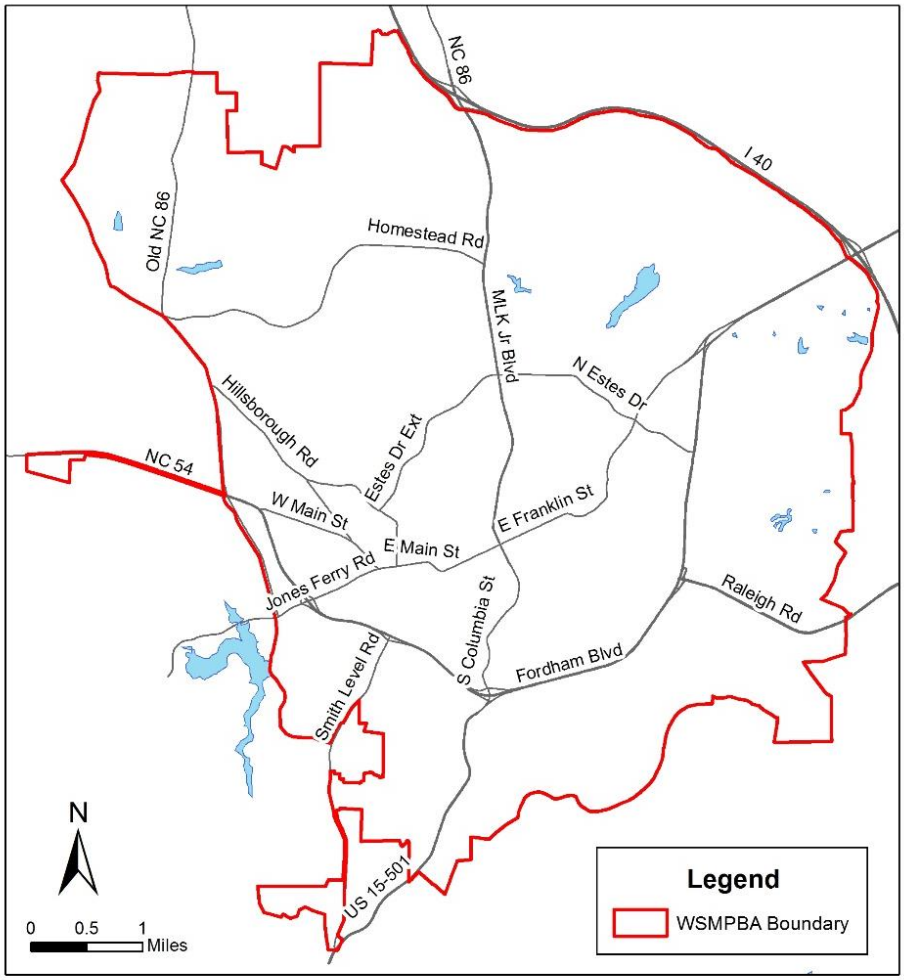
This Strategic Trends report begins with an overview of OWASA's planning environment which includes a description of those items which may impact the timing and scope of our facilities planning and investment decisions. It then includes a description of OWASA's main management areas beginning with source water protection; then raw water supply and treatment; distribution of 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.

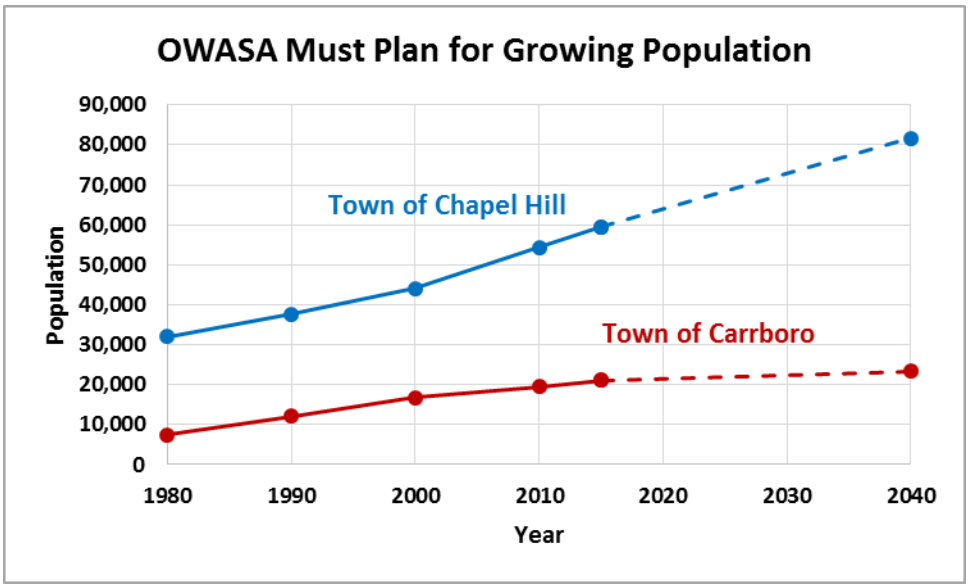
Service Area

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. 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 in our systems 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. The Towns and Orange County, along with other communities in the Triangle area, are working together to update the projected population and job growth through 2045, and new numbers will be available for the next annual update of this Strategic Trends 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 Ephesus Fordham, Carolina Square, and Shelton Station, and with new development projects such as Carraway Village (formerly The Edge) and South Creek (formerly Obey Creek). Higher density development tends to result in lower demands for a given residential account 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 has been working 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. OWASA is updating its Long-Range Water Supply Plan (LRWSP) to ensure we have water to meet our needs through 2065.

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 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 the state of the science on climate change, 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 and professional associations to obtain information on how emerging technologies may apply specifically to OWASA. Technologies that OWASA is monitoring are included for trends where they are applicable in this Strategic Trends report.

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 by 2022, 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 will include 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.

This year, as a result of a D.C. Circuit Court of Appeals ruling, the participation of emergency generators in demand response programs is no longer permitted without the enhanced pollution control required of non-emergency generators. The ruling does not impact our ability to run our backup generators for testing and maintenance purposes, nor does it impact our ability to use them in emergencies, but it does impact our ability to participate in Duke Energy's PowerShare Program and receive associated credits. After analyzing the costs and benefits of installing necessary pollution control on the generator at the Cane Creek Pump Station and at the Rogerson Drive Pump Station, we determined the investment was not worth the benefit of our continued participation in the program and withdrew for those two generators. In 2015, we received about $8,000 in credits for our participation in the program at Cane Creek Pump Station and about $3,000 in credits at Rogerson Drive. We are continuing to analyze the cost and benefits of installing the necessary pollution controls on our generators at the Water Treatment Plant (WTP) and WWTP. In 2015, we received more than $14,000 and $38,000 in credits for our participation in the program at the WTP and WWTP respectively.

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.

Safety is the number one priority of every member of the OWASA team, and we continue to improve our safety programs. In 2014 we hired an independent consultant to perform safety audits, evaluate each position for training needs, and provide training to meet those needs. We periodically perform table-top exercises and drills to ensure there are clear procedures to follow in the event of an emergency and that staff are familiar with those procedures. We will begin doing annual Safety Assessments in January 2017 to evaluate the effectiveness of our safety program and identify areas for improvement.

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 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 later of these efforts which is the focus of this section of the report.

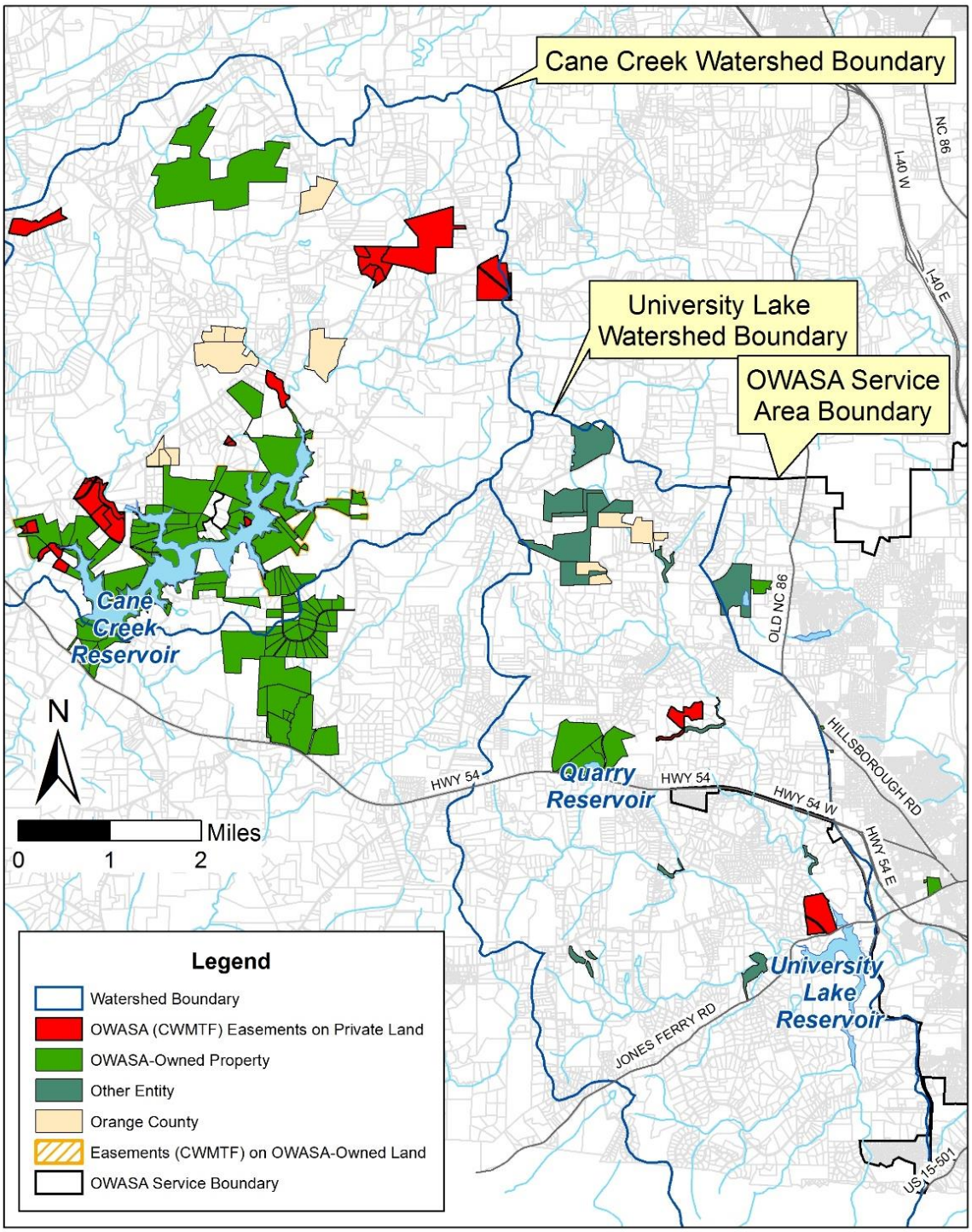
Land acquisition was among the options evaluated in the University Lake watershed management study and plan commissioned in the late 1980s. Water quality modeling indicated that permanently protecting 2,900 acres (approximately 15 percent) of the watershed would have only slight water quality benefits 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 fee simple 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 watershed land through purchase or conservation easements. Since 1997, Orange County's Land Legacy Program also acquired protective conservation

easements on an additional 678 acres in the Cane Creek 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.

OWASA-Owned Land and Conservation Easements



Regulations

- In accordance with direction from the U.S. Environmental Protection Agency (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. OWASA is participating in this rule-making process, and we are well positioned to develop the plan.

Technology and Research

Some water supply systems in the state employ artificial mixing to improve treatability of their drinking water, and current findings suggest this technology may work well for some smaller reservoirs. 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 resulting cyanotoxin concentrations.

Energy Management

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

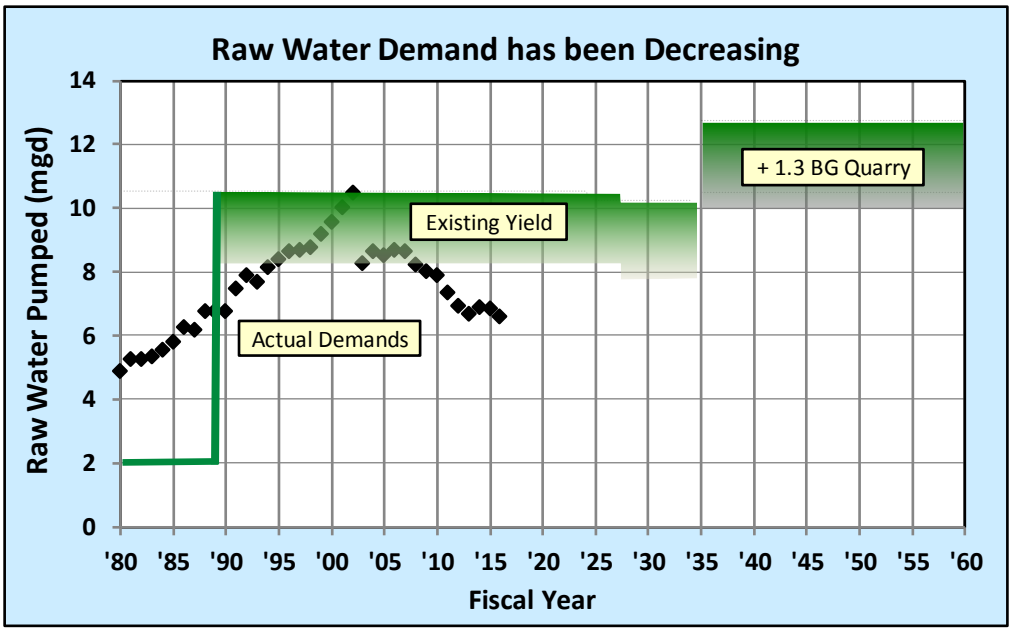
Strategic Plan Elements

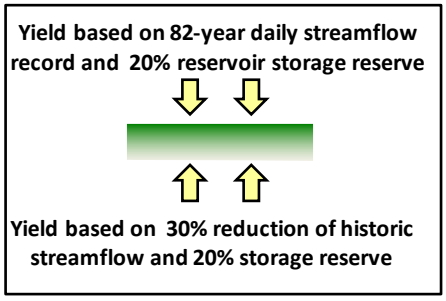
Strategic Initiative 6 includes a goal that states "Land assets provide the expected value to fulfill OWASA's mission and the assets are effectively managed". Protected forest lands owned by OWASA in our water supply watersheds could be managed in the future to protect water quality and meet other objectives.

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 1/1/2020	X	
4. Evaluate data from NCSU studies when completed and identify any follow up steps or recommendations for future.	CY 2018		X

Raw Water Supply and Long-Range Water Supply Plan





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:

- 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 nearly ten percent of the community's annual average-day water needs.

- 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

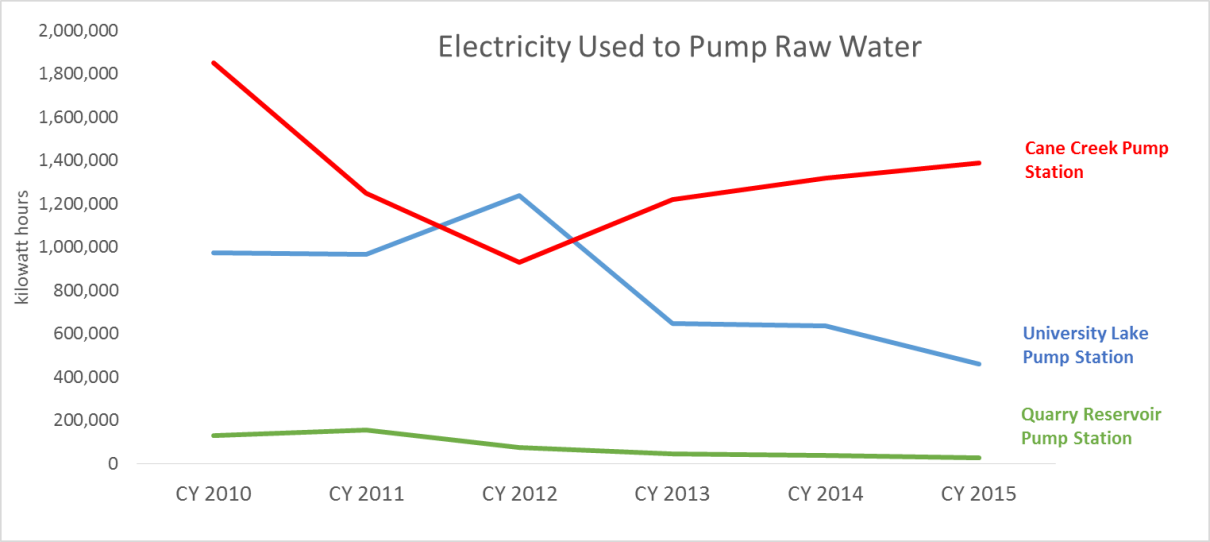
- The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) builds upon the 1996 amendment to the federal Safe Drinking Water Act to strengthen protection against microbial contaminants, especially *Cryptosporidium*. OWASA completed the first round of monitoring for *Cryptosporidium* and *E. coli* 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 began the second round of two years of monthly monitoring beginning in September 2015. Depending on the round 2 results, OWASA may be required to provide additional filtration treatment, but staff believes that the need for additional filtration is unlikely.
- 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 did test for pharmaceuticals. In this study, one pharmaceutical (acetaminophen) was detected in one sample from Cane Creek Reservoir; all other results 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.

Technology and Research

OWASA is working with researchers at NCSU to monitor cyanotoxin trends in both reservoirs using a method that integrates cyantoxin levels over two to four week periods of time. This method allows for constant monitoring of cyantoxin 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 work described in the Source Water Protection technology section 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.

Energy Use

As shown in the graphic below, total kilowatt-hours (kWh) of electricity used to pump our raw water to the treatment plant has decreased by 36 percent since 2010. As shown in the graphic at the beginning of this section, the community's raw water demand has decreased which impacts the amount of pumping and electricity required to meet water supply needs. In addition, we installed a new, low-flow pump and variable speed drive pump at the University Lake Pump Station which enables us to better optimize system-wide pumping across a wide range of demand conditions.



Strategic Plan Elements

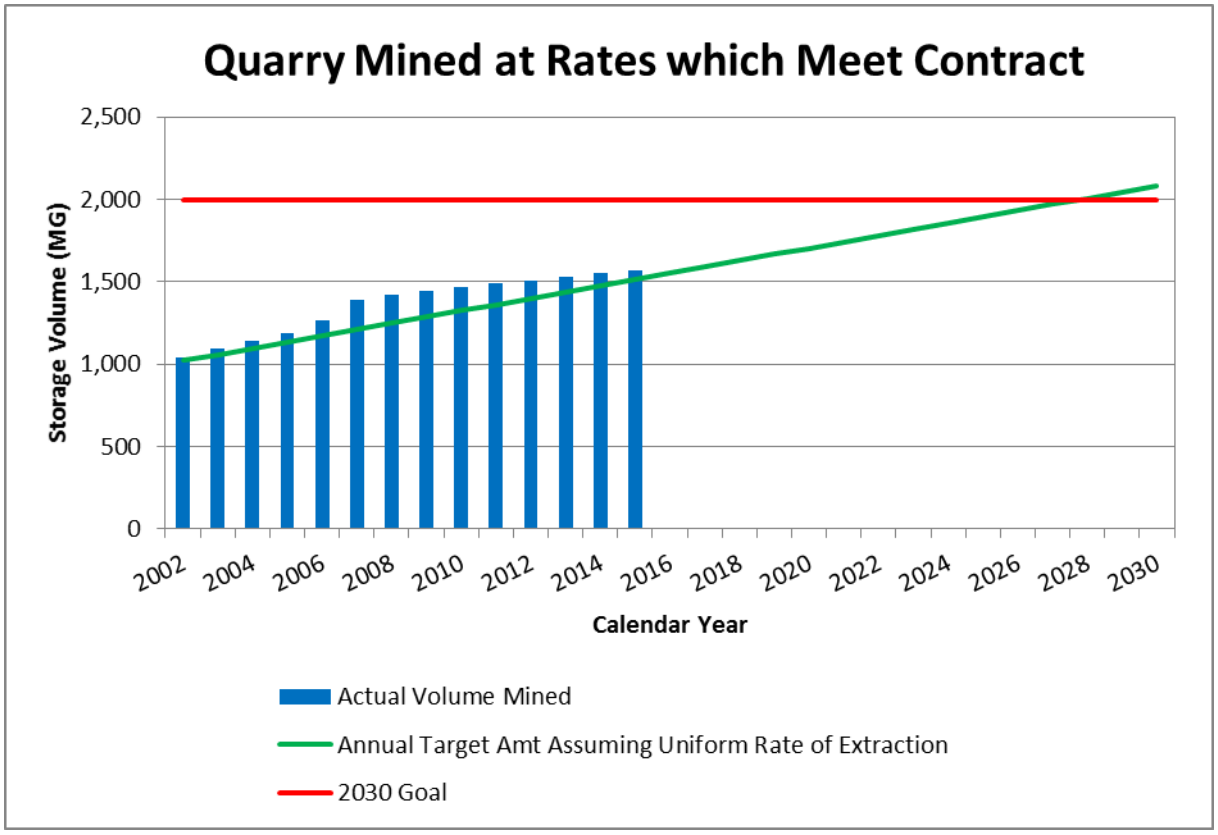
This trend is directly related to updating the LRWSP, Strategic Initiative 1. One of the first steps to update the LRWSP will be to project future water demands. The projected future demands will be compared to OWASA's estimated reliable yield to determine if any new sources of water are required for 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 2018. 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).	1st and 2nd Qtr. CY 2017 and review when warranted thereafter	X (as part of LRWSP update)	
2. Continue to proactively plan and account for uncertainty, including increasing climate variability, through a diversified water supply and demand management portfolio.	Ongoing (Climate change assessment for OWASA now underway by U. of South Carolina PHD student and advisor)	X (as part of LRWSP update)	
3. Follow NC Division of Water Resources (DWR) and EMC process to review application to retain our Level I Jordan Lake water storage allocation of about 5 mgd for use during extended droughts and water supply emergencies.	Ongoing; (Application submitted Nov 2015; expect decision early in CY 2017)		X
4. Continue to pursue cost-effective ways to access OWASA's Jordan Lake allocation in partnership with neighboring utilities.	Ongoing (Participated in Jordan Lake West Facilities Feasibility Study in 2015)	X	
5. 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.	Second Half CY 2017 to early 2018	X (as part of LRWSP update)	
6. Evaluate data from NCSU studies when completed and identify any follow up steps or recommendations for future.	CY 2018		X
7. Identify potential energy savings opportunities for raw water pumping in Energy Management Program.	Ongoing	X (as part of Energy Mgmt Plan)	

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 or exceed the contractual requirements.

Regulations

There are no regulations to report for the quarry. However, DEQ may need to approve the expanded Quarry Reservoir as a water supply source.

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.

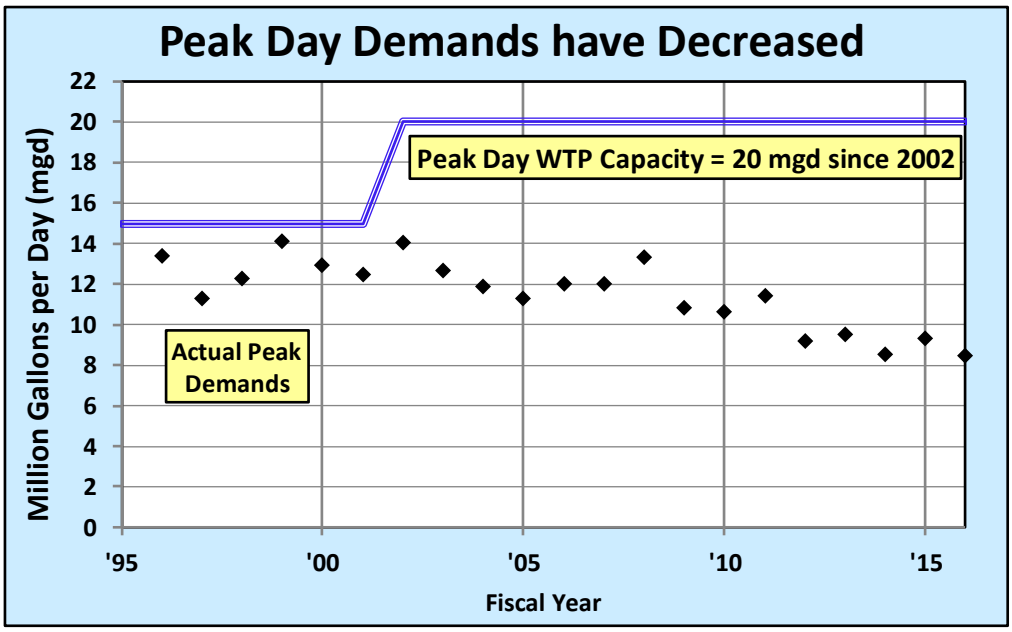
Strategic Plan Elements

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).	Late CY 2017 to 2018	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:

- Since FY 1999, the year with the highest peak-day demand, peak-day drinking water demands have declined by 40 percent despite a 29 percent increase in customer accounts over that same period.
- 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

- 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). A health advisory is a non-enforceable, non-regulatory federal guidance which describes the concentration which can be consumed with little or no risk to health. 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. OWASA has never detected cylindrospermopsin; microcystin was detected at a level of 0.2 µg/L on one occasion. In addition, OWASA also monitors for anatoxin-a (detected on two occasions) and saxitoxin (never detected). Staff will continue to evaluate algal toxins (additional information provided in Treatment Technology section).
- Legionella bacteria can cause lung infections and flu-like symptoms, and the Centers for Disease Control (CDC) has indicated that it is the leading cause of waterborne diseases in the United States. OWASA staff continues to stay informed about Legionella, and causes and consequences of Legionella outbreaks. An outbreak of Legionella in the summer of 2015 in New York City was caused by the bacteria in cooling towers. The bacteria was also found in a cooling tower in Zebulon in the summer of 2015, but no recorded cases of the disease were found. The CDC has reported that municipal treated water is not the source; improper management of plumbing in buildings causes the contamination. OWASA staff will follow updates from EPA, CDC, and water agencies and groups.
- The 1996 amendment to the federal Safe Drinking Water Act require that monitoring be completed for a list of unregulated contaminants every five years. In May 2012, EPA published the rule to complete the third round of this monitoring (UCMR3); monitoring is 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. EPA will use the data collected to determine if any of these contaminants should be regulated. OWASA UCMR3 monitoring consistently detected the following three unregulated contaminants: Chromium-6, Strontium, and Chlorate (see next bullets).
- 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. During

the UCMR3, OWASA's monitoring for Chromium-6 detected levels between < 0.03 - 0.06 µg/L, which are well below the California standard.

- EPA has not yet published a drinking water standard for Strontium, but has established a health advisory level of 1,500 µg/L. 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 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 continues to test the Chlorate levels of our treated drinking water leaving the WTP and in the distribution system quarterly and since implementing these changes, Chlorate levels have decreased 72 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. 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. OWASA's monitoring detected Perchlorate at a concentration of 0.33 µg/L in the finished water, well below the advisory level and California standard.
- 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.
- 1,4-dioxane has been detected in some North Carolina utilities' drinking water sources through the unregulated contaminants monitoring. Many of these facilities are located in the Haw or Cape Fear River watersheds. 1,4-dioxane is one of the 21 contaminants OWASA monitored under the UCMR3 and it was not detected in the drinking water. The Town of Cary, which obtains its drinking water from Jordan Lake, has detected the compound at concentrations ranging from 0.16 to 0.77 µg/L in its drinking water. The average concentration was 0.42 µg/L. EPA has not established an MCL for 1,4-dioxane, but EPA has established a screening level for tap water of 0.67 µg/L.

Technology and Research

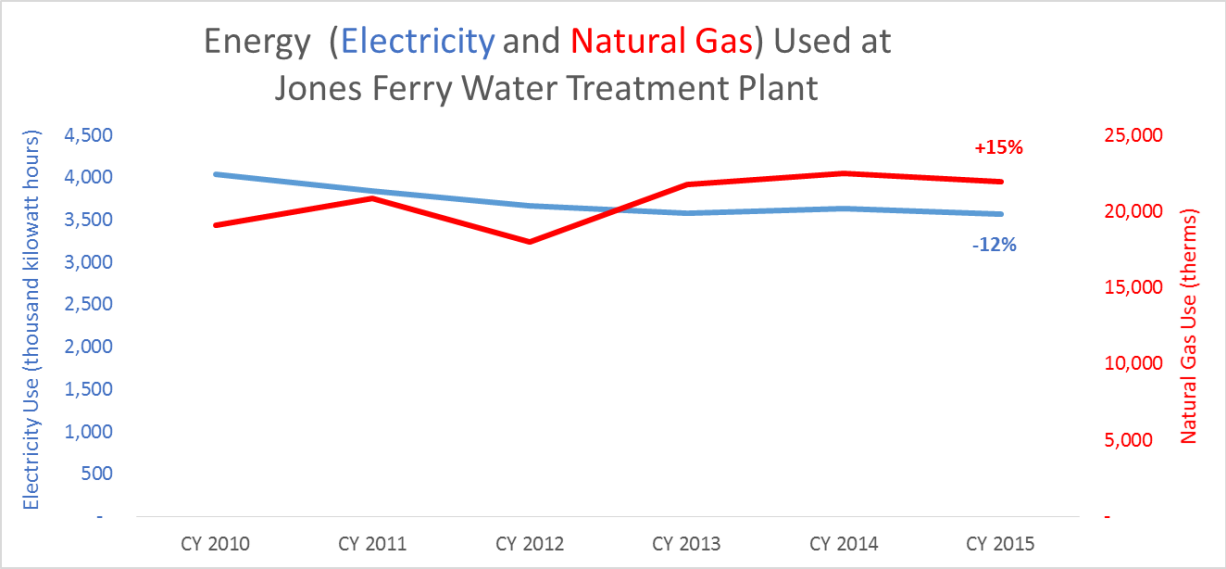
- OWASA evaluates the treatment technologies we have at our water plant to ensure we can meet any potential upcoming standards with current treatment technologies. OWASA can meet most of

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. Staff has begun 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

Since 2010, our electricity use at the Jones Ferry Water Treatment Plant (WTP) has decreased by about 12 percent. This is in large part thanks to the conservation and efficiency of our customers, as well as UNC's use of reclaimed water. 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 15 percent higher in 2015 than it was in 2010.



OWASA will be installing power monitors at several locations within the WTP to learn which processes use the most energy and identify areas where we may be able to reduce our energy use.

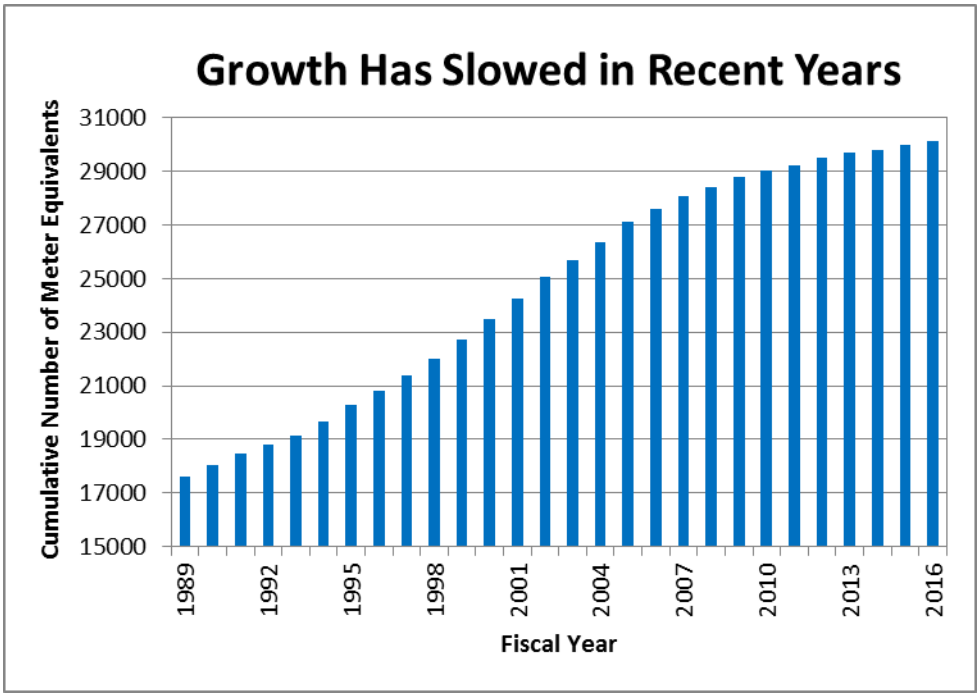
Strategic Plan Elements

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)	

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 33 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.

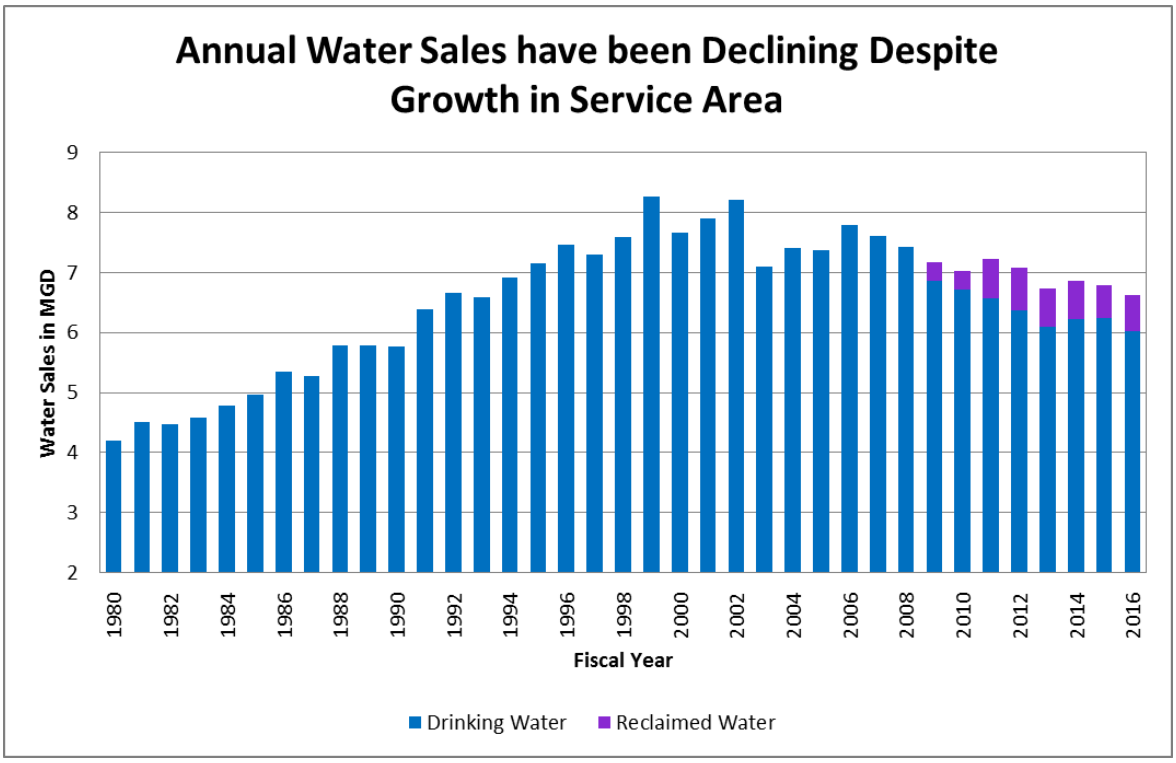
Strategic Plan Elements

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 20 percent less from when they peaked in FY 1999, despite a 29 percent increase in customer accounts during that same time period. Drinking water sales declined 27 percent over that same period.
- Reclaimed water sales meet almost 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 will be installing advanced metering infrastructure (AMI) in the next couple of years. 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.

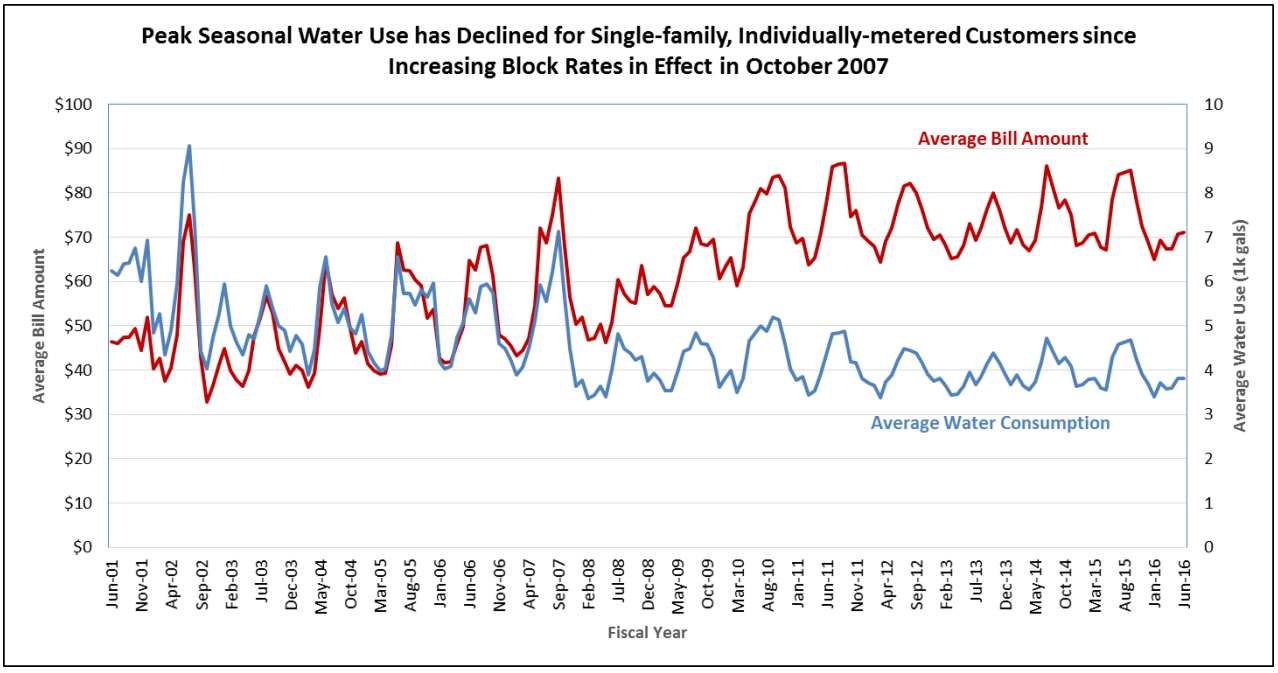
Strategic Plan Elements

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 (Rate/Revenue Stabilization Fund) 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 (as part of LRWSP update)	
2. Continue to identify cost-effective and customer-accepted opportunities for additional conservation.	Ongoing	X (as part of LRWSP update)	
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.
- Customer water use and average bill amount track as expected.

Regulations

There are no regulations to report for water use.

Technology and Research

In accordance with Strategic Initiative 5, OWASA will be installing advanced metering infrastructure (AMI) in the next couple of years. 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.

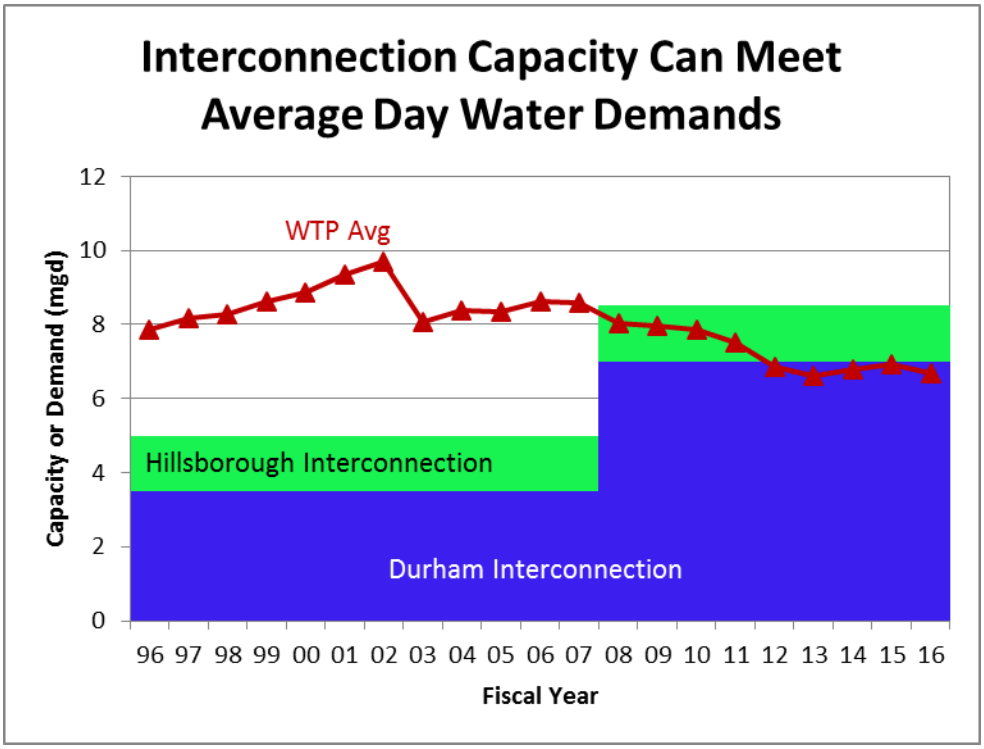
Strategic Plan Elements

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 (Rate/Revenue Stabilization Fund) 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 outdoor 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 in an emergency.
- 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.
- The combined capacity of our interconnections is about 8.5 mgd, which is over 125 percent of our FY 2016 average-day drinking water demands and over 115 percent of our FY 2016 water demands including reclaimed water.
- OWASA also has an interconnection with Chatham County that is not shown on graph. OWASA could potentially receive 1 mgd through this connection based on modeling analyses, but it has neither been tested nor used.

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.

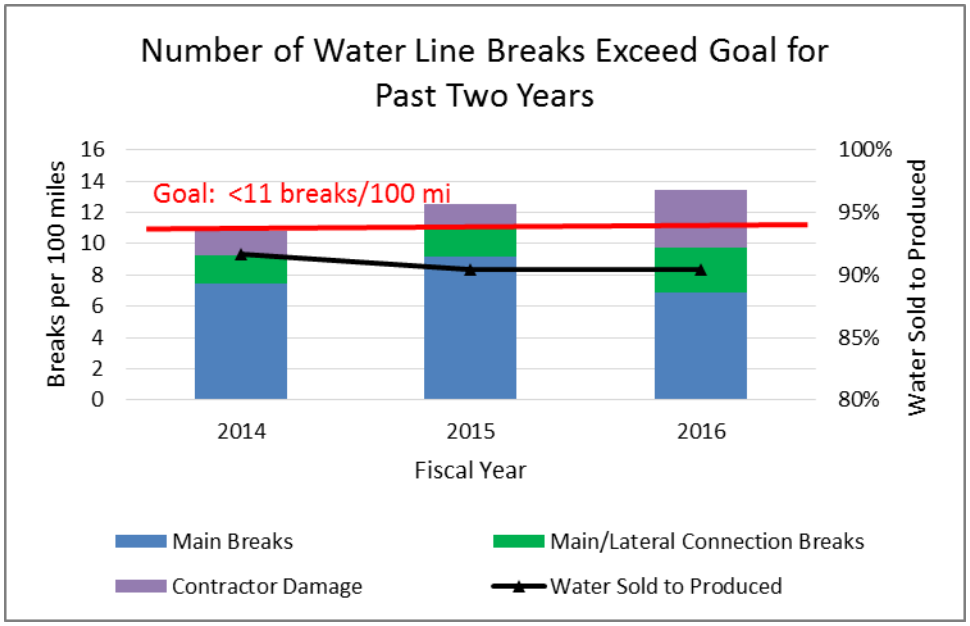
Strategic Plan Elements

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. Participate in the Jordan Lake Partnership interconnection study – Phase 2 and evaluate findings to determine if any interconnection capacity upgrades are needed.	FY 2017		X
4. Perform field test with Town of Hillsborough to evaluate transfer capacity after their improvements are completed.	Late CY 2017/ early CY 2018		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. It also includes information on the ratio of water sold to water produced over time. These are important indicators of the integrity of our drinking water distribution system.

Key Observations:

- We have had more water main breaks than our goal of 11 main breaks or less per 100 miles of pipeline, which is based on median of value included in the American Water Works Association 2012 Benchmarking report.
- If contractor damage is removed from the breaks, OWASA meets the goal of 11 main breaks or less per 100 miles of pipeline. However, we believe it is important to include contractor breaks because (1) their impacts on the customer is the same, and (2) if there is an increase in contractor breaks, that could contribute to the ratio of water sold to produced.
- We sell more than 90 percent of the water we produce, which is excellent by industry standards, but the percentage has dropped in recent years. OWASA is conducting a water audit using the American Water Works Association methodology, and the results may inform our future actions and investments regarding operation, maintenance, and rehabilitation of our water distribution and metering system infrastructure.

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 past 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 next round of testing will occur in 2017. OWASA also provides testing of our drinking water for lead at no charge when requested by a customer.

Technology and Research

Advanced, automated pressure and flow measurement technologies are available for real-time monitoring and control of water distribution systems. OWASA evaluates these technologies periodically and we have done some pilot tests with manufacturers. To date, these technologies have not yet proven to be economically feasible at our scale; however, staff will continue to evaluate the potential to integrate such technologies with our planned AMI system once it is in operation.

Energy Management

Much 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. The energy monitors that will be installed at the WTP will help us evaluate the energy used in the distribution system. Other energy is fuel for vehicles and equipment used to maintain our drinking water distribution system.

Strategic Plan Elements

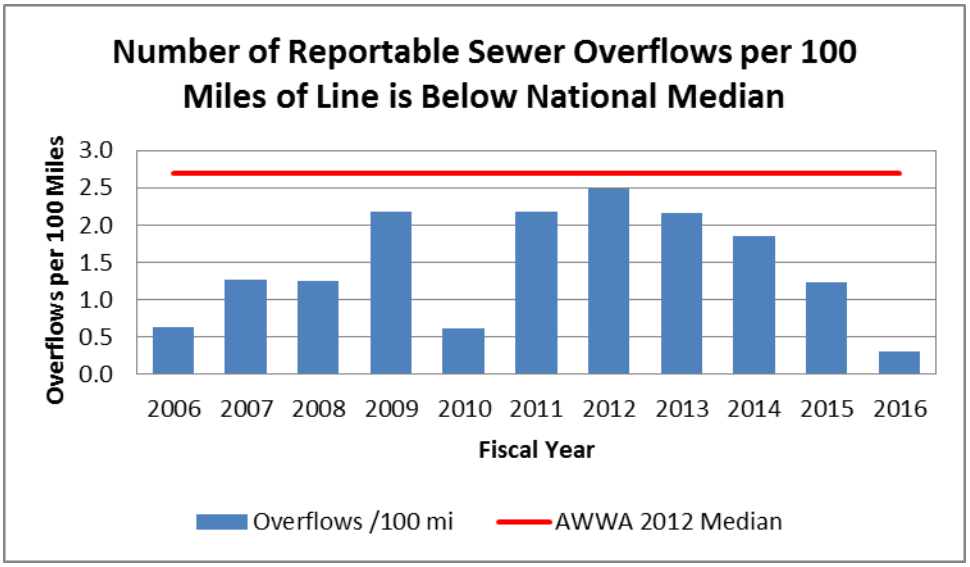
Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Maintaining and replacing our infrastructure when needed enables us to maintain high levels of service to our customers over the long-term.

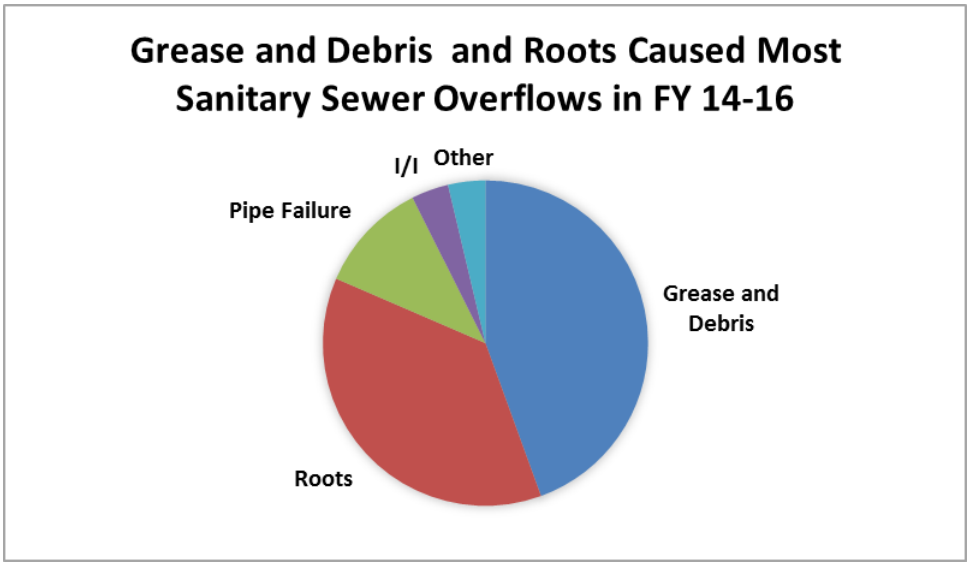
Actions Needed

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.	Annual		X
2. Continue the programmatic replacement of aging galvanized water mains throughout the distribution system.	Through FY 2019		X
3. Update the prioritization model to reflect field condition assessment and break history.	Every 3-5 years		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 cost-effectiveness.	Annual	X	

5. Continue to fund our water main renewal/replacement program to ensure system sustainability.	Annual	X	
6. Update the Water System Audit using the American Water Works Association/International Water Association's water audit software (we did our last audit in 2012).	FY 2017		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 2.7 per 100 miles of pipeline, which is the national median per the American Water Works Association 2012 Benchmarking report. The 25th percentile in that report was 0.9 overflows per 100 miles of pipeline. Per DEQ guidance, OWASA strives to have no overflows.
- The cause of overflows has been tracked electronically for three full fiscal years.

- 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

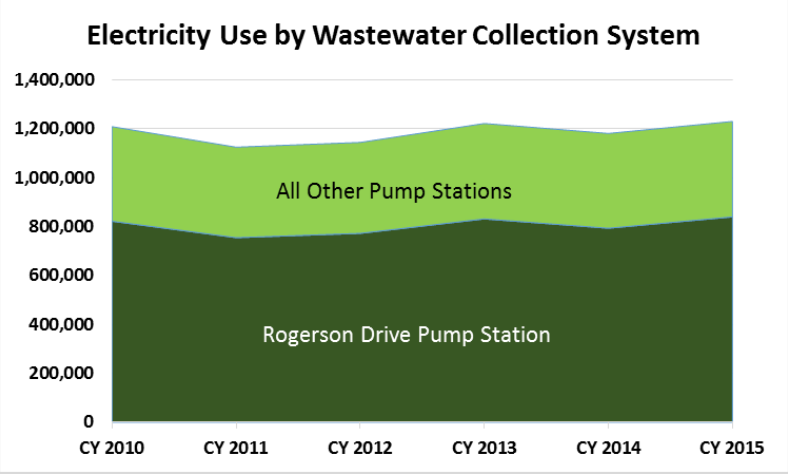
There are no upcoming regulations to report for our wastewater collection system.

Technology and Research

- Advanced, automated pressure and flow measurement technologies are available for real-time monitoring and control of wastewater collection systems. OWASA evaluates these technologies periodically and we have done some pilot tests with manufacturers. We are currently pilot testing automated flow level monitoring technology in four locations in our collection system. When monitors indicate that water levels have increased over time, it may be an indication that the line is blocked downstream.
- OWASA's maintenance on the wastewater collection system also helps reduce infiltration and inflow to the system during rain events. This helps reduce peak flows that the wastewater collection system and associated pumping stations must convey, in turn reducing the peak flows to the Mason Farm WWTP. OWASA is developing a key performance indicator to evaluate infiltration and inflow trends.

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 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.



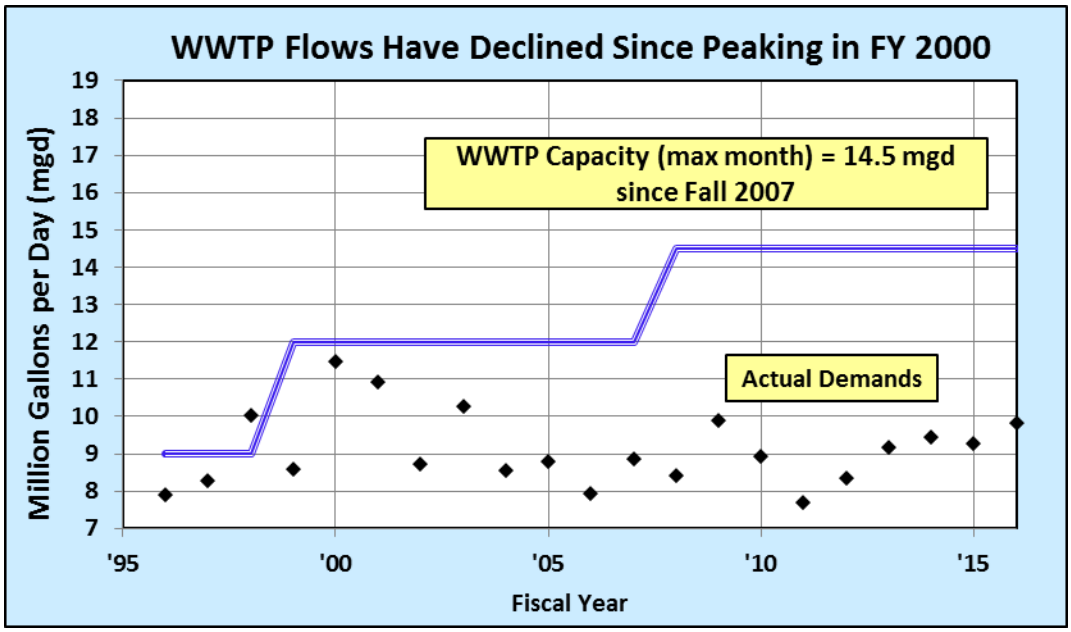
Strategic Plan Elements

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.	Annual		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)	
8. Develop a key performance indicator to evaluate infiltration and inflow to the wastewater collection system.	CY 2017		X

Mason Farm Wastewater Treatment Plant Maximum Month Flow Projections



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 2016, the maximum month flow was 9.8 mgd, which is 68 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.

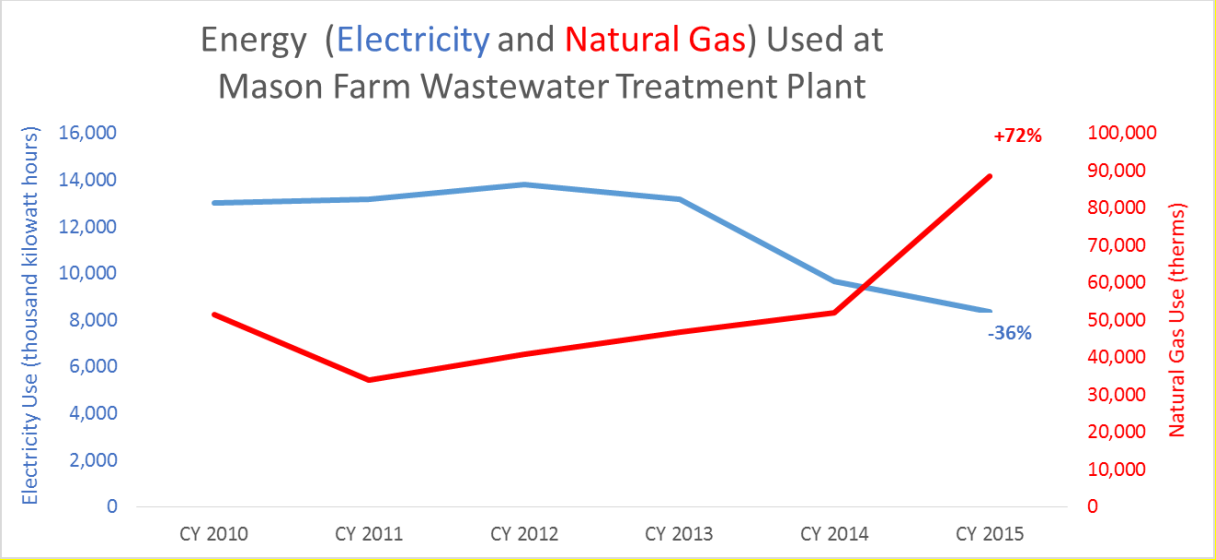
Technology and Research

- Staff at the WWTP 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.
- Staff is closely following advancements in technology and actual industry experience for resource recovery at the wastewater treatment plant. This includes energy recovery (such as biogas-powered combined heat and power systems), nutrient and metal mining[1], 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. Nutrient recovery strategies are discussed in the following section.

Energy Management

The Mason Farm WWTP is our largest energy-using facility. Since 2010, our electricity use at the WWTP has decreased by about 36 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 2015, our use of natural gas was 72 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.

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



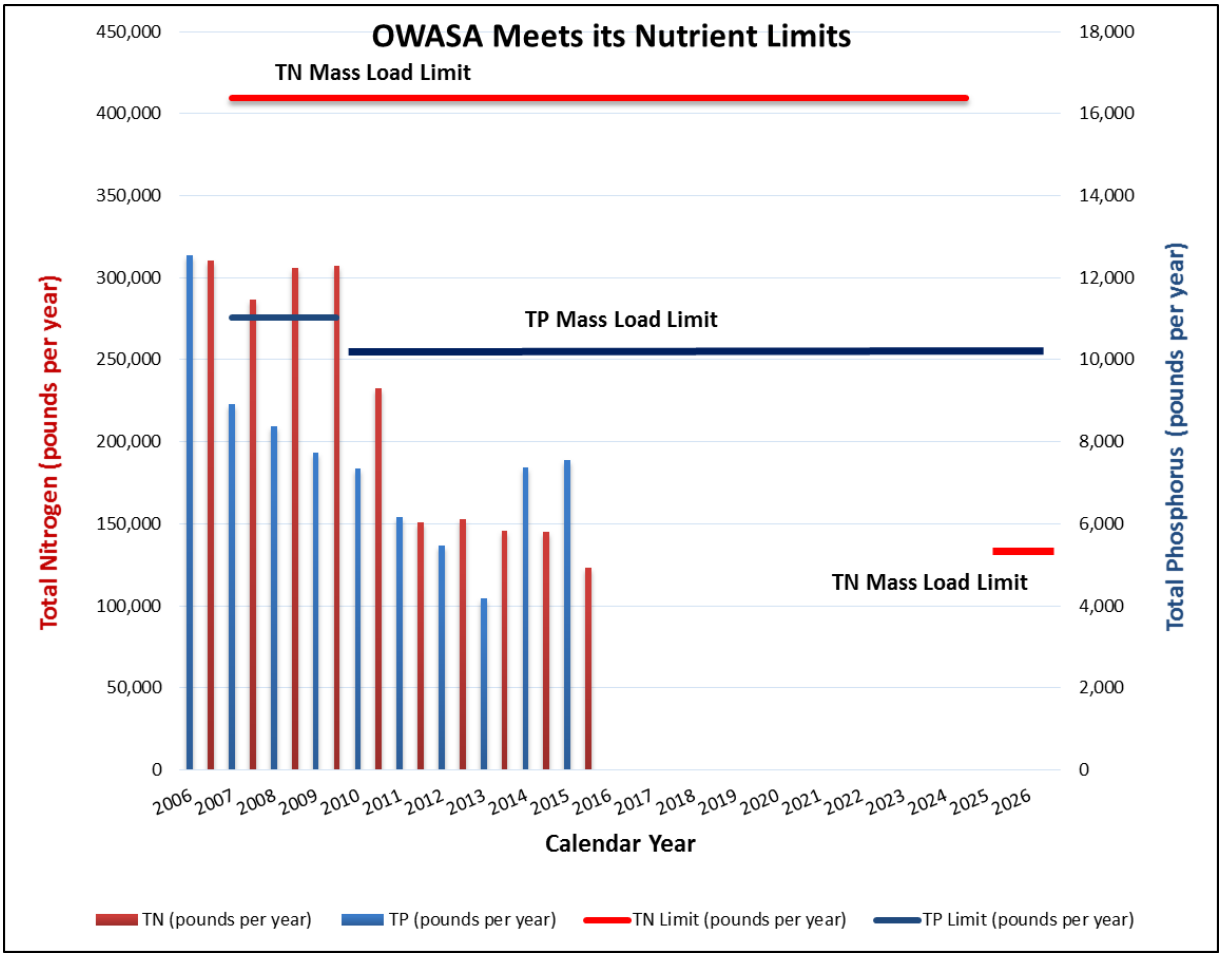
Strategic Plan Elements

Biogas recovery strategies are being evaluated as part of the Energy Management Plan, which is Strategic Initiative 4. 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 2017	X (as part of LRWSP update)	
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)	

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. Staff will continue to closely follow this issue, 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.

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.

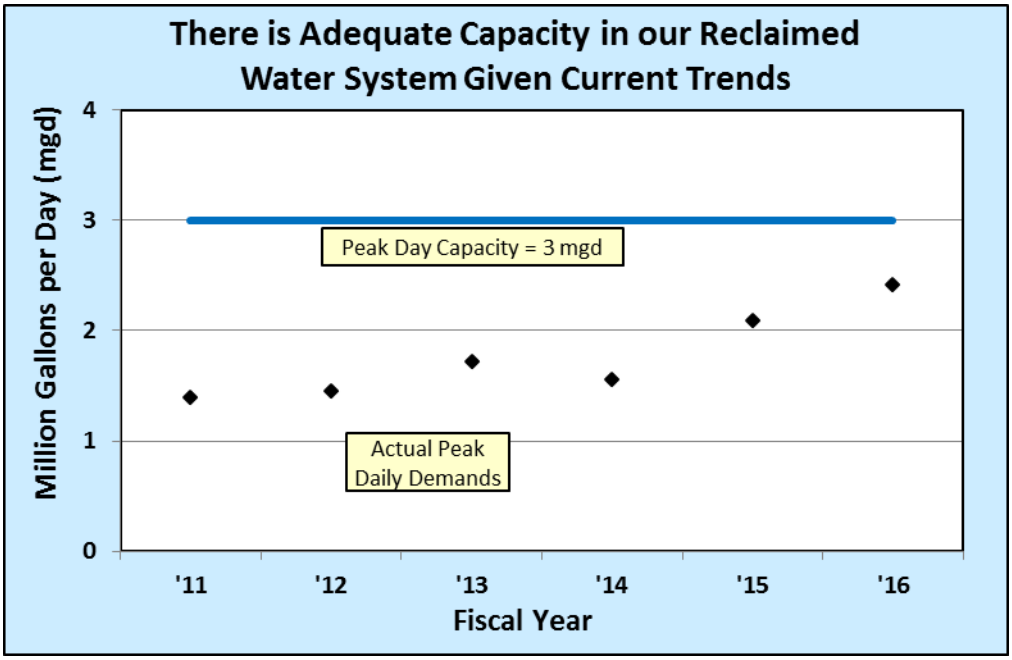
Strategic Plan Elements

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.	2022		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

The 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 RCWsystem 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 2015, on average, we used 2.29 kWh to treat and deliver 1,000 gallons of raw water. From February 2015 – January 2016, on average, we used 1.77 kWh to treat and deliver 1,000 gallons of reclaimed water, a savings of over 20 percent.

Strategic Plan Elements

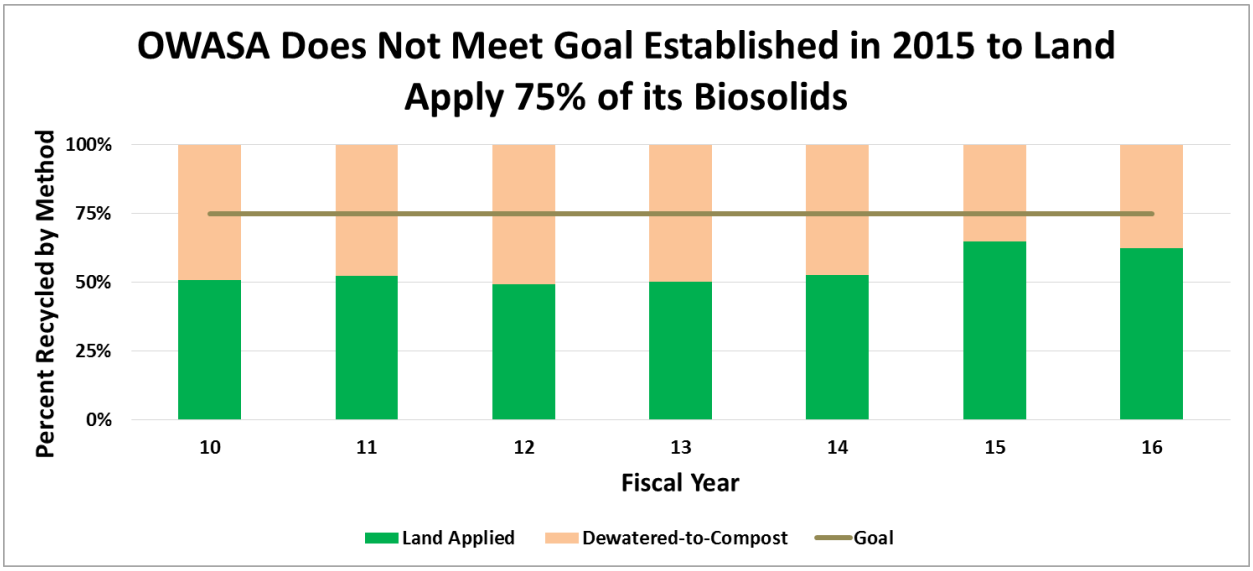
Strategic Initiative 3 includes a goal to make the right investments at the right time, and to base this information on our asset management program. Ensuring that our RCW system capacity is adequate will help meet the community's water needs. This also ties to Strategic Initiative 1; the use of RCW 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. Discuss managing peak RCW demands with UNC representatives.	CY 2017		X
2. Verify RCW meters are properly calibrated and recording flows accurately.	Ongoing		X
3. Ensure non-revenue RCW water is being properly documented.	CY 2017		X

4. 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
5. 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	

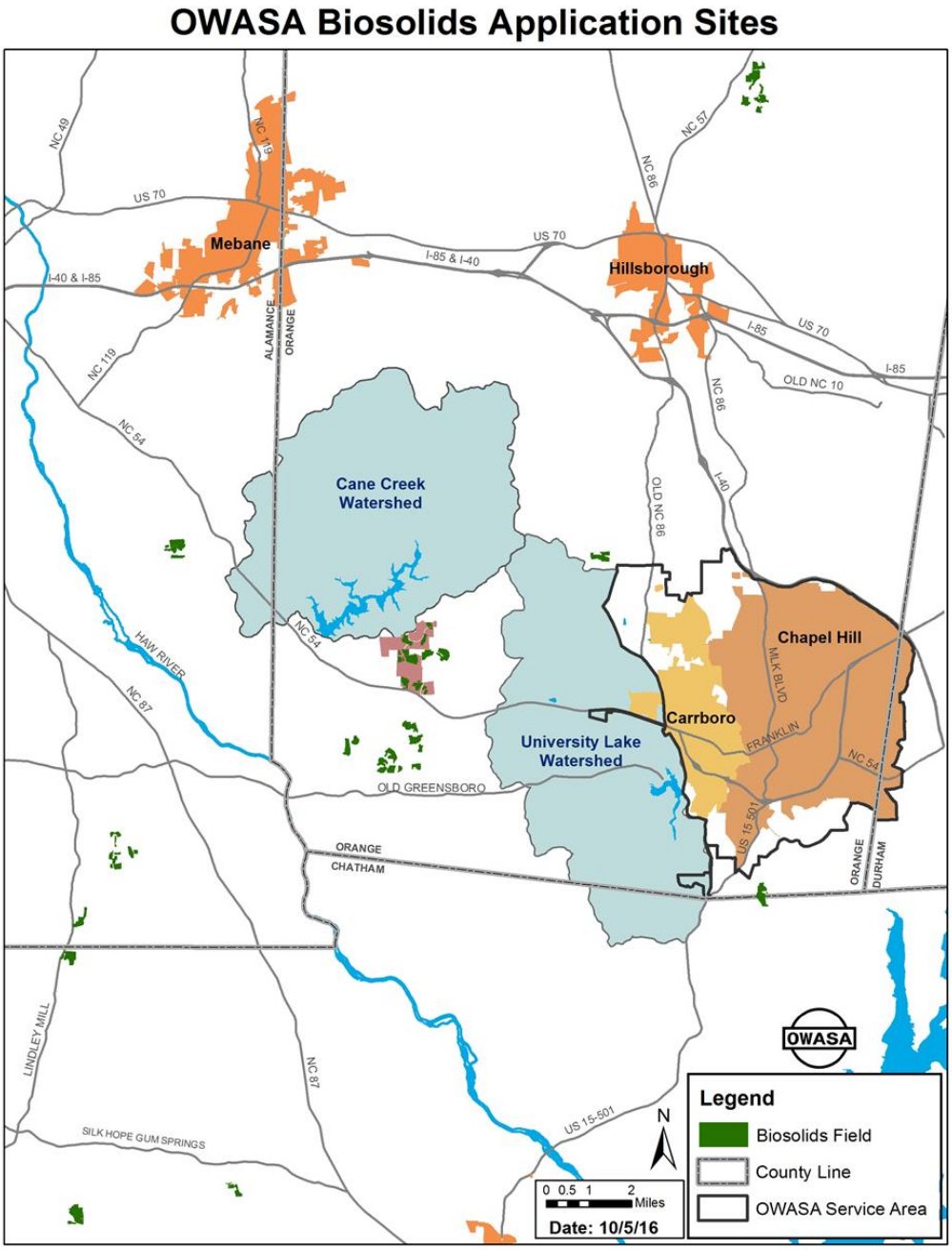
Biosolids



Description: This trend evaluates the amount of biosolids which OWASA applies to land and the amount it dewaters 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 895 acres of farm land in Orange, Chatham and Alamance counties available for its Class A land application program (see map below). Nearly 83 percent (741 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 FY 2015, OWASA consistently land applied about half of its biosolids and dewatered and composted the remaining half.
- In FY 2016, OWASA land applied 63 percent of its biosolids. While this has not met the goal, it should be noted that this was accomplished during a wet year when we had staff shortages in the biosolids management team. In addition, our biosolids tanks are empty moving into the colder, wetter winter months when there are limited opportunities to apply liquid biosolids. Thus, OWASA is well positioned to handle its solids over the next twelve months to meet the goal. It should be noted that if 2017 is wet and our opportunities to apply liquid biosolids are limited, OWASA can dewater higher amounts of biosolids while meeting all applicable regulatory requirements forour biosolids treatment and recycling program.



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.

Technology and Research

As described in the Mason Farm WWTP Nutrient Capacity section, 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. To the extent that the nutrient content of our biosolids is lower, we would need less land area for our land application program.

Energy Management

The primary energy uses of OWASA's biosolids management program are for vehicle fuel, biosolids loading, running the rotary press for dewatering, and treating the nutrient-rich dewatering filtrate loads returned to the aeration 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 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	3rd Qtr. FY 2017	X	
2. If Board decides that we should dewater a higher percentage, evaluate the advantages and disadvantages of sidestream treatment to ensure permit compliance	As needed	X	
3. 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

AGENDA ITEM

- Financial Report for the Three Month Period Ended September 30, 2016

PURPOSE

- To inform the Board of Directors of OWASA's financial performance and fiscal position.

BACKGROUND

- The financial report consists of a Statement of Net Position, an Income Statement that includes a budget to actual comparison, graphical presentations of financial performance indicators and a Financial Management Policy Report Card.

- Highlights of the report include:

  - All financial performance targets were met.

  - Operating Revenues for the period were about $92,000 or 0.9% under budget.

  - Customer Fees (Service Availability Fees) exceeded budget for the period by approximately $524,000.

  - Operating Expenses were about equal to budget.

  - Net Income less Debt Service was 12% or roughly $479,000 over budget.

  - Capital Improvement Program expenditures were about $295,000 greater than budget for the period.

  - Capital equipment expenditures were under budget for the three month period by approximately $753,000.

ACTION NEEDED

- Receive and discuss the Financial Report for the three month period ended September 30, 2016.

ORANGE WATER AND SEWER AUTHORITY

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

MEMORANDUM

TO: Board of Directors

THROUGH: Ed Kerwin

FROM: Stephen Winters, CPA

DATE: October 21, 2016

SUBJECT: Financial Report for the three month period ended September 30, 2016

Purpose

The financial report for the three month period ended September 30, 2016 is presented to inform the Board of Directors of OWASA's financial position and financial performance in relation to budget.

Contents

- Statement of Net Position
- Income Statement
- Graphs of Key Performance Indicators
- Financial Management Policy Report Card

Fiscal Performance

- As shown on page 10 of the financial report, all financial performance measurement targets were met for the period.
- Average drinking water sales for the period was 6.24 million gallons per day (MGD), 6.73 was projected. Combined drinking and reclaimed water sales for the period averaged 7.40 MGD versus a projection of 7.99.
- Total Operating Revenue was 0.9% or about $92,000 under budget. Water sales were less than projected.
- Revenue from new system connections was over budget by about $524,000. We budgeted for system growth to be 160, 5/8" meter equivalents for the year; through September, we had already set 108. Additionally, nine large meters were set for Village Plaza, Chapel Hill Housing, UNC Hospitals, Ram's Plaza, Coldwell Banker Advantage and Hill Hall; revenue from these large meters significantly exceeded the "average per-meter equivalent price" used in developing the FY 2017 budget.
- Total operating expenses for the period were roughly equal to the amount budgeted. However, the Water Supply and Treatment department was over budget by almost $160,000; the primary reasons for the department exceeding budget during the first quarter include:
    - Chemicals were over budget by about $44,000. Our raw water has been unusually anoxic (depleted of dissolved oxygen) much of the summer requiring greater use of chemicals to treat the water. Also higher than normal total organic carbon (TOC) has required higher than expected chemical use.
    - Maintenance costs were over budget by about $114,000. Several large, costly projects were

completed during the first quarter, including cleaning the solids equalizing basin, upgrading the Administration Building, and improving the supervisory control and data acquisition (SCADA) communication network.

- Net Income less Debt Service for the period was approximately $479,000 or 12% more than budget.
- Capital equipment expenditures were about $295,000 over budget for the period. As we reported in the FY 2016 financial report, delivery of two pieces of equipment (a utility truck and a truck for cleaning sewers) that were scheduled to be purchased in FY 2016 was delayed until FY 2017. At some point this fiscal year, we will most likely need to amend the FY 2017 budget to account for these funds being expended in the current budget year instead of FY 2016.
- A total of 52 CIP projects were active during the first quarter. Much of the first quarter activity involved the initiation of new FY 2017 projects, including the formal process for consultant selection on several of the major new projects.

  At the close of the first quarter, we are projecting to spend $11.3 million in FY 2017 for the Capital Improvements Program (CIP), excluding the Rogers Road Sanitary Sewer Extension Project which will be reimbursed by Orange County. This expenditure projection equates to about 83% of budget, and accounts for both the emergency repair (completed in September) and the expedited project to rehabilitate the Rogerson Drive Force Main. Along with the latter project, the CIP expenditure projection is highly dependent on the continued progress of a few other larger projects either in design (Advanced Metering Infrastructure, Administration Building HVAC) or in construction (Rosemary, Henderson, and Hillsborough Street Water Main Replacement, Little Creek Interceptor, Cane Creek Permanganate Facility, Digester Numbers 1 and 2 Rehabilitation).

  The expenditure projection is most influenced by a schedule delay on the Administration Building HVAC project, cost efficiencies realized on the Sanitary Sewer Evaluation and Rehabilitation programs, and schedule acceleration on the Rosemary Street Water Main project (i.e., some of the construction planned to occur in FY 2017 was instead completed at the end of FY 2016).

  Detailed information on FY 2016 CIP projects will be included in the Semi-annual CIP Status Report currently scheduled to be provided to the Board in January 2017.

Report Modifications

- We have changed some of the graphs included in the report. We deleted four graphs that did not seem to add much value to readers of the report. We added the following:
  - On page four of the September 2016 report, we have included graphs that show two views of costs as measured against the amount of water treated. Because costs can fluctuate month-to-month based on factors unrelated to the volume of water treated, we have elected to use a 12-month moving average of costs incurred. This approach smooths out potentially misleading month-to-month variances while providing trend information.
    - A graph that shows Operating Expenses per 1,000 gallons of water treated; Operating Expenses are shown as a 12-month moving average.
    - A graph that shows Energy Costs (electricity and natural gas) per 1,000 gallons of water treated; Energy Costs are shown as a 12-month moving average..

- On page eight:
  - A graph showing the number of *days cash on hand* we have. *Days cash on hand* indicates how many days we could cover our Operating Expenses using only the amount of cash we have "in the bank" at a given time. Users of financial statements, such as bond ratings agencies, use *days cash on hand* as an indication of an entities credit-worthiness. For example, as you may recall from discussions we have had on financial reserves, according to Fitch Ratings, "municipal utilities could be considered strong if *days cash on hand* were 365 or more, whereas one with only 180 days cash on hand would be considered midrange." However, it is important to remember that days cash on hand is just one component of an entity's financial profile

If the Board does not find these additions to be helpful, we can modify the new graphs or replace them with others.

Stephen Winters, CPA
Director of Finance and Customer Service

Orange Water and Sewer Authority

Financial Report
For the Three Month Period Ended
September 30, 2016

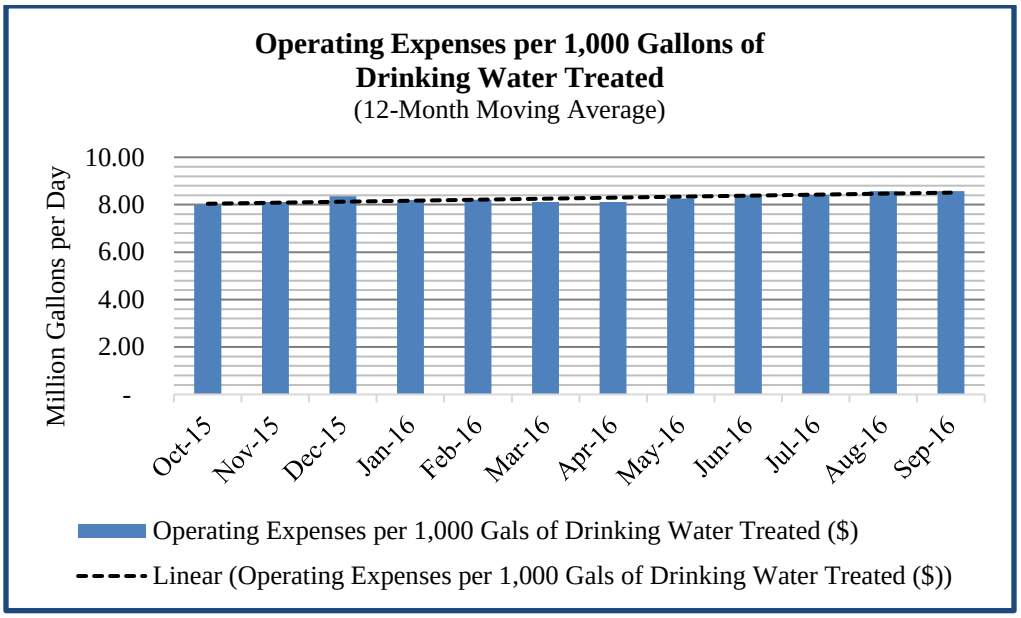
Orange Water and Sewer Authority
Statement of Net Position
September 30, 2016
(unaudited)

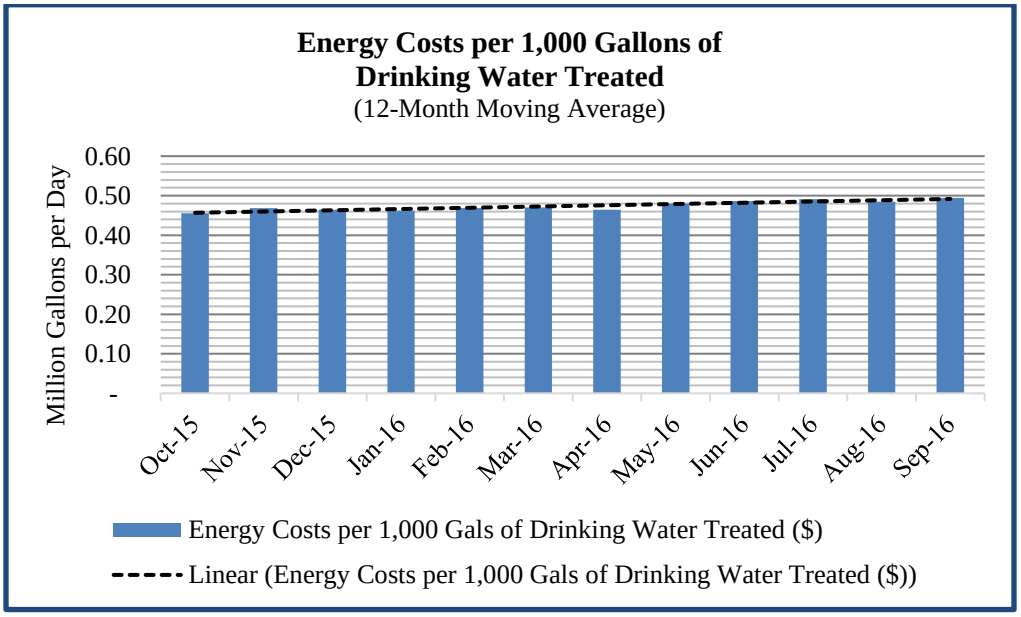
Assets	
Current Assets	
Cash	$28,813,353
Receivables	5,145,041
Inventory	952,139
Prepaid expenses	283,261
Restricted cash	1,914,691
Total Current Assets	37,108,485
Noncurrent Assets	
Capital assets (net of depreciation)	267,553,107
Other noncurrent assets	32,321,548
Total Noncurrent Assets	299,874,655
Total Assets	$336,983,140
Liabilities and Net Position	
Current Liabilities	
Accounts payable and accrued expenses	$1,158,117
Unearned income	170,831
Customer deposits	1,330,803
Total Current Liabilities	2,659,751
Noncurrent Liabilities	
Bonds payable	67,739,000
Other noncurrent liabilities	7,657,415
Total Noncurrent Liabilities	75,396,415
Net Position	
Contributed capital	114,986,539
Net position at the beginning of the year	140,328,762
Year-to-date accrual basis net income	3,611,673
Total Liabilities and Net Position	$336,983,140
Net income reconciliation:	
Accrual basis net income	$3,611,673
Depreciation, other post-employment benefits, and interest expense	2,641,803
Modified accrual basis net income	$6,253,476

Orange Water and Sewer Authority
Income Statement
For the Three Month Period Ended September 30, 2016
(unaudited)

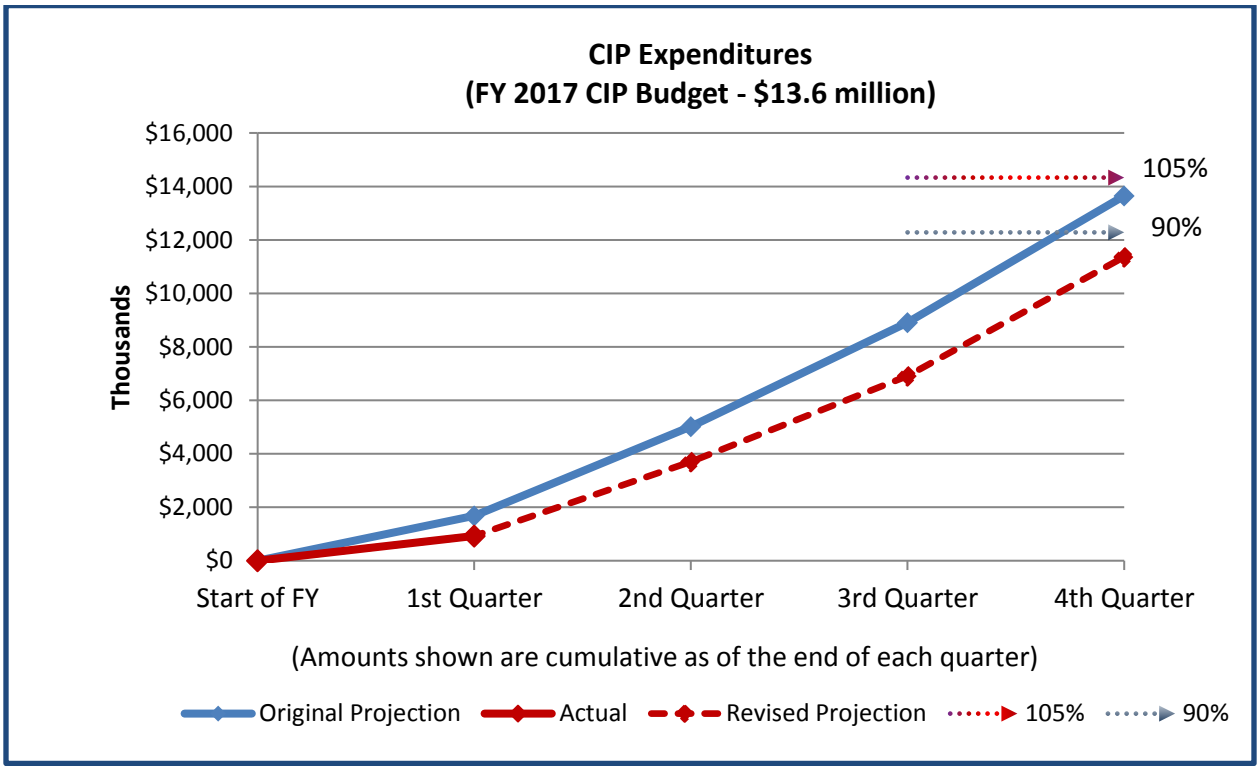
	Actual through September 30, 2016	Budget through September 30, 2016	Variance (effect on net change in Fund Balance)	Percent Variance
Operating Revenue:				
Water	$5,398,205	$5,645,767	($247,562)	(4.4%)
Sewer	4,321,490	4,177,877	143,613	3.4
Reclaimed Water	127,847	139,832	(11,985)	(8.6)
Service Initiation Fees	68,310	39,606	28,704	72.5
Other	240,124	274,926	(34,802)	(12.7)
Refunds and Allowances	(51,693)	(81,441)	29,748	36.5
Total Operating Revenue	10,104,283	10,196,567	(92,284)	(0.9)
Non-operating Income:				
Customer Fees	1,080,916	557,200	523,716	94.0
Interest	4,839	3,678	1,161	31.6
Total Non-operating Income	1,085,755	560,878	524,877	93.6
Total Income	11,190,038	10,757,445	432,593	4.0
Operating Expense:				
General and Administrative	1,483,934	1,562,904	78,970	5.1
Water Supply and Treatment	1,428,930	1,273,201	(155,729)	(12.2)
Water Distribution	679,085	691,564	12,479	1.8
Wastewater Treatment	1,125,474	1,157,417	31,943	2.8
Wastewater Collection	219,139	266,776	47,637	17.9
Total Operating Expense	4,936,562	4,951,862	15,300	0.3
Net Income (modified accrual)	6,253,476	5,805,583	447,893	7.7
Debt Service	1,620,104	1,651,015	30,911	1.9
Net Income less Debt Service	4,633,372	4,154,568	478,804	11.5
Less: CIP Expenditures	927,000	1,680,000	753,000	44.8
Capital Equipment Expenditures	751,902	456,500	(295,402)	(64.7)
Net Change in Fund Balance	$2,954,471	$2,018,068	$936,403	46.4

Orange Water and Sewer Authority
Select Financial Data
For the Three Month Period Ended September 30, 2016





Orange Water and Sewer Authority
Select Financial Data
For the Three Month Period Ended September 30, 2016

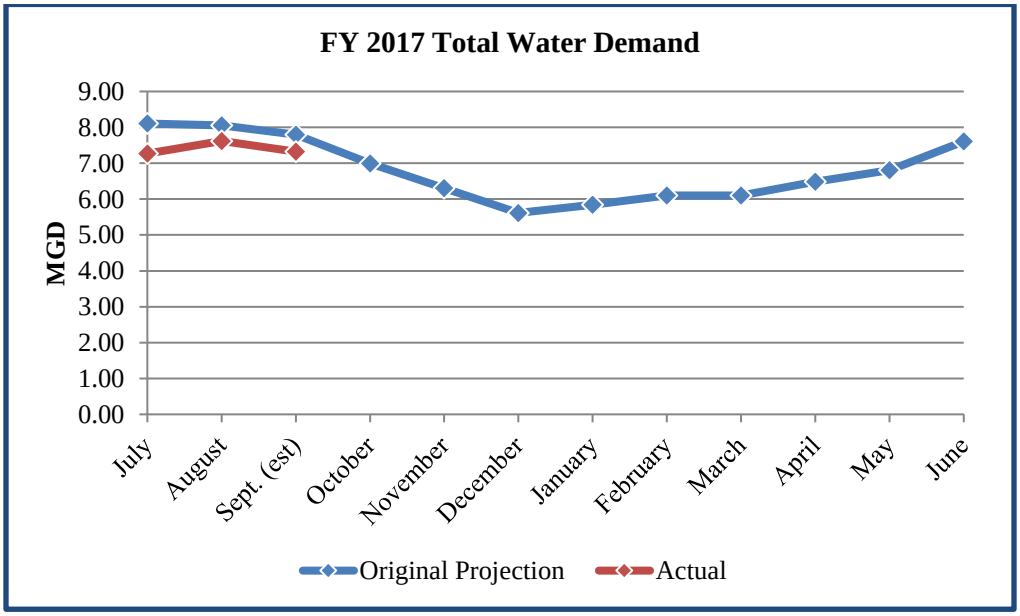


Orange Water and Sewer Authority
Select Financial Data
For the Three Month Period Ended September 30, 2016

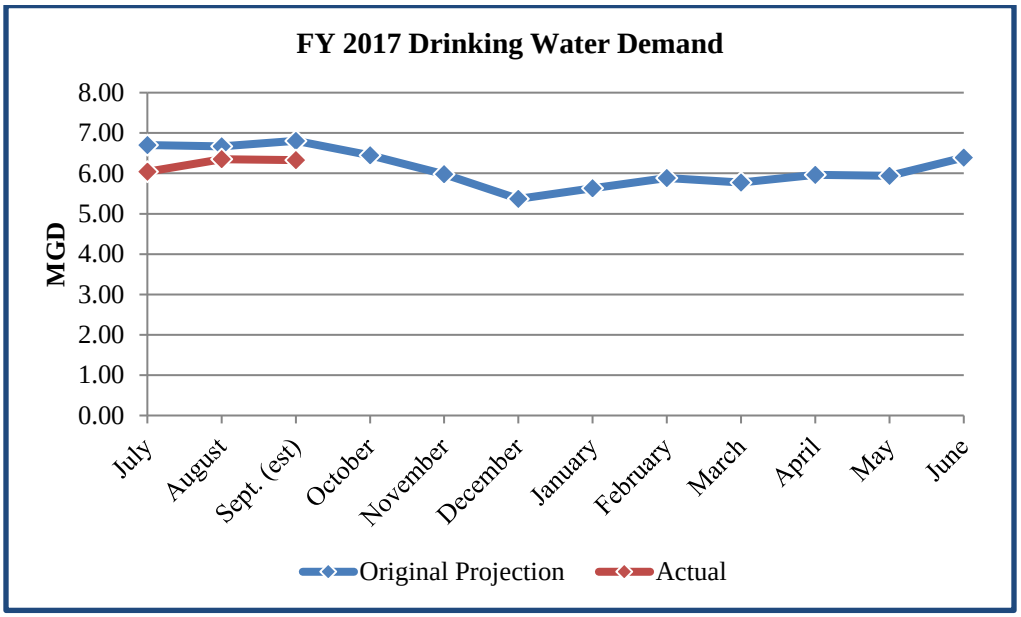
FY 2017 Water Sales Projection (Average Day)

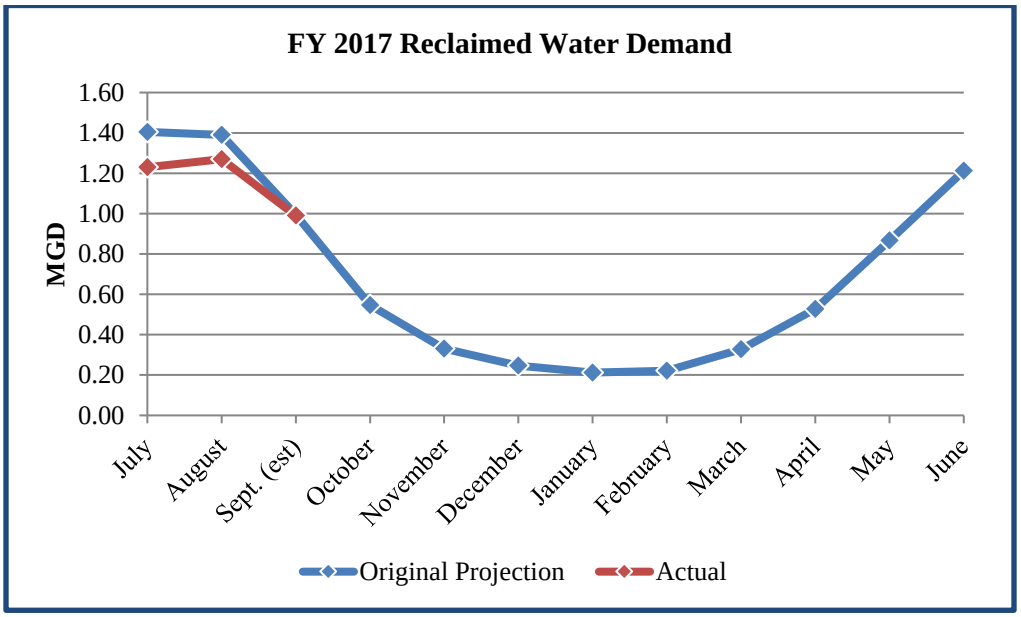
	Original FY 2017 Sales Projections		Actual FY 2017 Water Sales		Revised FY 2017 Sales Projections	
	DW	RCW	DW	RCW	DW	RCW
July	6.70	1.40	6.04	1.23	6.04	1.23
August	6.67	1.39	6.35	1.27	6.35	1.27
September	6.81	0.99	6.33	0.99	6.81	0.99
October	6.45	0.55			6.45	0.55
November	5.98	0.33			5.98	0.33
December	5.37	0.25			5.37	0.25
January	5.63	0.21			5.63	0.21
February	5.88	0.22			5.88	0.22
March	5.77	0.33			5.77	0.33
April	5.96	0.53			5.96	0.53
May	5.94	0.87			5.94	0.87
June	6.39	1.21			6.39	1.21
Average	6.13	0.69	6.24	1.16	6.05	0.67

Estimates shown in red

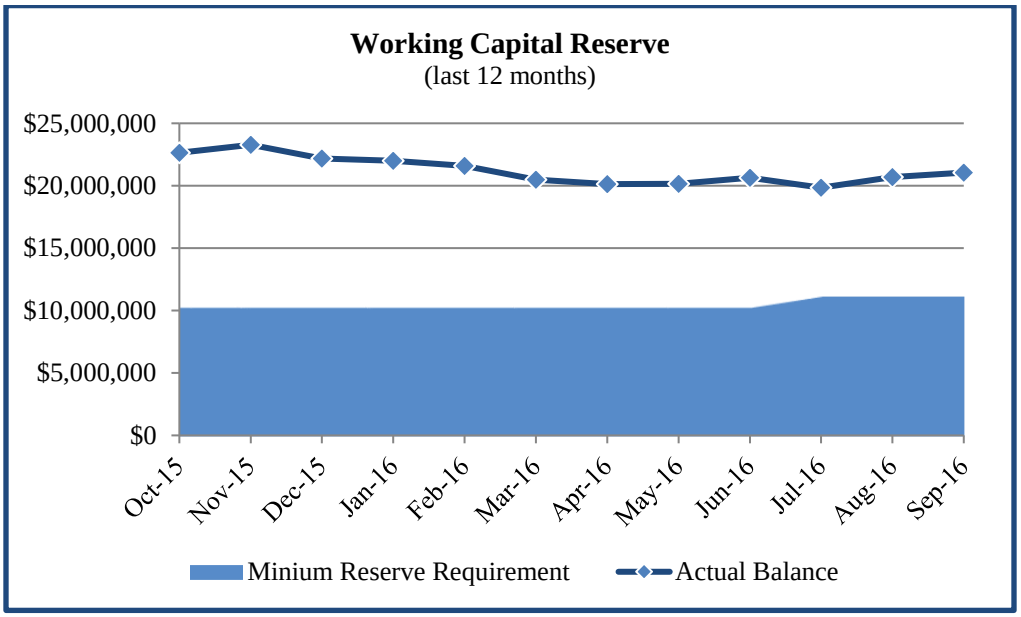


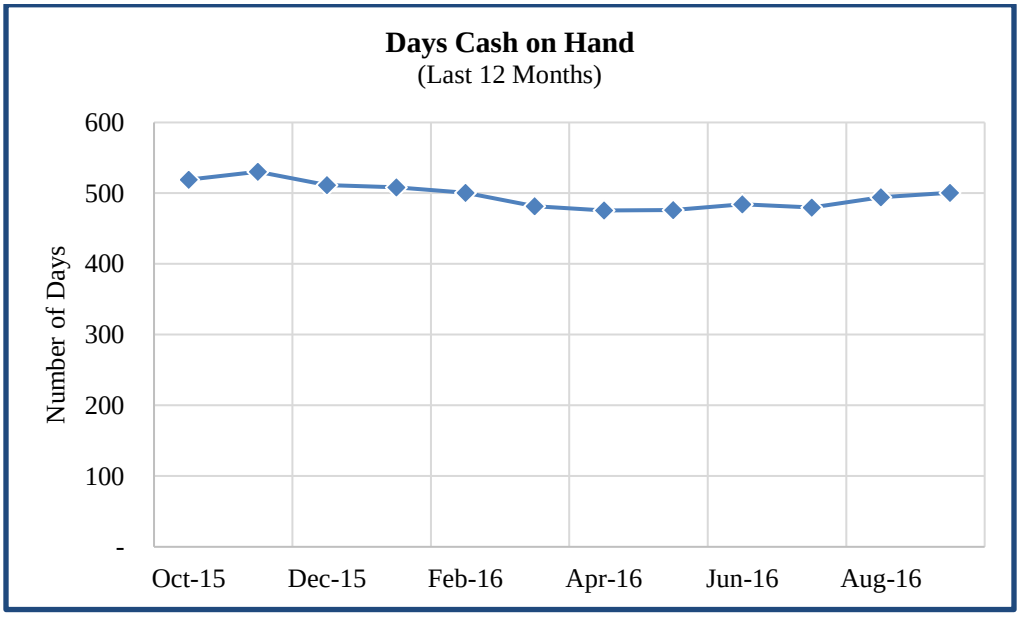
Orange Water and Sewer Authority
Select Financial Data
For the Three Month Period Ended September 30, 2016



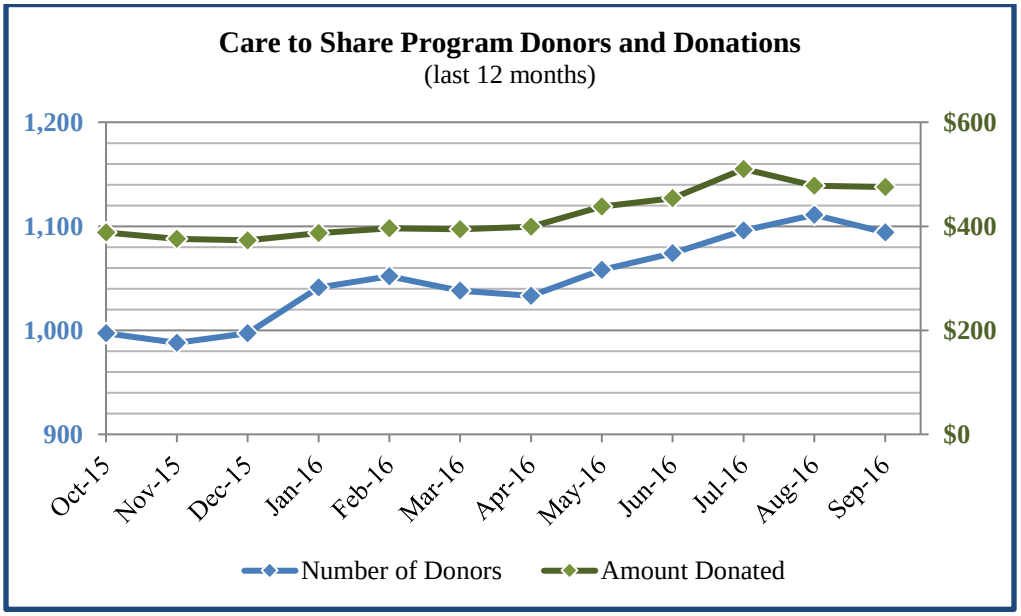


Orange Water and Sewer Authority
Select Financial Data
For the Three Month Period Ended September 30, 2016





Orange Water and Sewer Authority
Financial Management Policy Report Card
For the Three Month Period Ended September 30, 2016



Orange Water and Sewer Authority
Financial Management Policy Report Card
For the Three Month Period Ended September 30, 2016

Measurement	Objective	FY16 Results	FY17 Goal	YTD FY17 Results
Working Capital Reserves	Greater of four months Operating expenses or 20% of succeeding three years CIP	$20.6M	$11.1M	$20.6M
Capital Improvements Reserve	2% of Net Capital Assets (Funding $400,000 per year until reach goal of approximately $6M)	$2.8M	$3.2M	$3.2M
Rate / Revenue Stabilization Reserve	5% of annual Water and Sewer Revenue	$1.7M	$1.7M	$1.7M
Debt Burden to Asset Value	Total Debt not more than 50% of Total Assets	25%	≤ 50%	23%
Sufficiency of Revenues above Debt Requirements [1]	Annual Debt Service no more than 35% of Gross Revenue	23%	≤ 35%	19%
Cash Financing of Capital [3]	Annual revenues and reserves provide at least 30% of CIP funding	77%	≥ 30%	54%
Debt Service Coverage Ratio [1]	Annual Net Income not less than two times Annual Debt Service	2.3	2.0	2.2
Service Affordability Ratio [2]	Average annual OWASA bill not more than 1.5% of area median household income	1.42%	1.5%	1.35%

M = million

[1] Calculation based on the FY 2017 Annual Budget until full-year results are available.
[2] FY 2017 Calculation based on median household income of $62,620 (per 2015 U.S. Census Bureau, American Community Survey, 5-Year Estimates) and average monthly household water use of 4,000 gallons.
[3] Cash Financing of Capital based on 5-Year CIP Budget and potential borrowing during the same period.