



Orange Water and Sewer Authority

OWASA is Carrboro-Chapel Hill's not-for-profit public service agency delivering high quality water, wastewater, and reclaimed water services.

Agenda

Work Session of the OWASA Board of Directors

Thursday, January 13, 2022, 6:00 P.M.

Due to COVID-19 public health concerns, the Orange Water and Sewer Authority (OWASA) Board of Directors is conducting this meeting virtually utilizing [Microsoft Teams](#) software. Board Members, General Counsel and staff will be participating in the meeting remotely.

In compliance with the "Americans with Disabilities Act," interpreter services for non-English speakers and for individuals who are deaf or hard of hearing 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 virtual meetings online. Public comment is invited via written materials, ideally submitted at least two days in advance of the meeting to the Board of Directors by sending an email to board_and_leadership@owasa.org or via US Postal Service (Clerk to the Board, 400 Jones Ferry Road, Carrboro, NC 27510). Public comments are also invited during the Board Meeting via telephone, and you will need to be available to call-in during the meeting. Please contact the Clerk to the Board at aorbich@owasa.org or 919-537-4217 to make arrangements by 3:00 p.m. the day of the meeting.

The Board may take action on any item on the agenda. Public speakers are encouraged to organize their remarks for delivery within a four-minute time frame allowed each speaker, unless otherwise determined by the Board of Directors. The Board may take action on any item on the agenda.

Announcements

- a. Announcements by the Chair
 - Any Board Member who knows of a conflict of interest or potential conflict of interest with respect to any item on the agenda tonight is asked to disclose the same at this time.
 - Update on the December 16, 2021 Orange County Climate Committee
 - January 19, 2022 Meeting Between Members of the Orange County Board of County Commissioners and Orange County Appointees to the OWASA Board
- b. Announcements by Board Members
- c. Announcements by Staff
 - January 26, 2022 OWASA Board Strategic Planning Work Session (Mary Tiger)
 - Update on the Selection of OWASA's Audit Firm (Stephen Winters)

Consent Agenda

Information and Reports

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

Action

2. Draft Minutes of the December 9, 2021 Work Session of the Board of Directors (Andrea Orbich)
3. Draft Minutes of the December 9, 2021 Closed Session for the Purpose of Discussing a Personnel Matter in Accordance with N.C. General Statutes 143-318.11.6 (Ray DuBose)

Regular Agenda

Information and Reports

4. Update on Employee Health and Dental Insurance for Fiscal Year 2023 (Stephanie Glasgow/Ellen Tucker, Gallagher)
5. Diversity and Inclusion Update (September 2021 – December 2021) (Stephanie Glasgow)

Discussion and Action

6. Long-Range Water Supply Plan: Evaluation of Supply Alternatives (Ruth Rouse)
7. Review and Discuss Draft Water Conservation Plan Guiding Principles (Mary Tiger/Amy Armbruster)

Discussion

8. Discuss Suggested Actions OWASA Might Take to Encourage Public Interest in Service as OWASA Board Members (Jody Eimers/Robert Epting)
9. Review Board Work Schedule
 - a. Request(s) by Board Committees, Board Members, General Counsel and Staff (Jody Eimers)
 - b. January 27, 2022 Board Meeting (Todd Taylor)
 - c. February 10, 2022 Work Session (Todd Taylor)
 - d. 12 Month Board Meeting Schedule (Todd Taylor)
 - e. Pending Key Staff Action Items (Todd Taylor)

Summary of Work Session Items

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

Closed Session

11. The Board of Directors will meet in Closed Session for the Purpose of Discussing a Personnel Matter in Accordance with N.C. General Statutes 143-318.11.6 (Ray DuBose)

ORANGE WATER AND SEWER AUTHORITY - QUARTERLY REPORT

ATTENDANCE AT BOARD AND COMMITTEE MEETINGS

BOARD OF DIRECTORS	OCTOBER 2021	NOVEMBER 2021	DECEMBER 2021
JODY EIMERS, CHAIR	Oct 14 Board WS (Meeting) Oct 28 Board (Meeting)	Nov 11 Board WS (Meeting) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Meeting)
YINKA AYANKOYA, VICE CHAIR	Oct 14 Board WS (Absent) Oct 28 Board (Meeting)	Nov 11 Board WS (Meeting) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Absent)
JOHN N. MORRIS, SECRETARY	Oct 14 Board WS (Meeting) Oct 28 Board (Meeting)	Nov 11 Board WS (Meeting) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Meeting)
TODD BENDOR	Oct 14 Board WS (Meeting) Oct 28 Board (Meeting)	Nov 11 Board WS (Absent) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Absent)
BRUCE BOEHM	Oct 14 Board WS (Meeting) Oct 28 Board (Meeting)	Nov 11 Board WS (Meeting) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Meeting)
RAY DUBOSE	Oct 14 Board WS (Meeting) Oct 28 Board (Meeting)	Nov 11 Board WS (Meeting) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Meeting)
KEVIN LEIBEL	Oct 14 Board WS (Absent) Oct 28 Board (Meeting)	Nov 11 Board WS (Meeting) Nov 18 SPWS (Meeting)	Dec 9 Board WS (Meeting) Dec 16 SPWS (Meeting)
VACANT CARRBORO SEAT			
VACANT CHAPEL HILL SEAT			
TOTAL MEETINGS HELD:	2	2	2

Board – Board of Directors Meeting
Board WS – Board Work Session

SPWS – Strategic Plan Work Session

January 13, 2022

Agenda Item 2:

Orange Water and Sewer Authority
Virtual Work Session of the Board of Directors
December 9, 2021

The Board of Directors of the Orange Water and Sewer Authority (OWASA) held its duly noticed regular work session by virtual means in accordance with law, on Thursday, December 9, 2021, at 6:00 p.m. utilizing Microsoft Teams software.

Board Members attending virtually: Jody Eimers (Chair), Yinka Ayankoya (Vice Chair), John N. Morris (Secretary), Bruce Boehm, Raymond (Ray) DuBose, and Todd BenDor.

OWASA staff attending virtually: Mary Darr, Robert Epting (Epting and Hackney), Vishnu Gangadharan, Stephanie Glasgow, Andrea Orbich, Dan Przybyl, Ruth Rouse, Todd Taylor, Mary Tiger, Stephen Winters, and Richard Wyatt.

Others attending virtually: Greg Characklis (Aqua Risk Management), Monica Dodson, Margaret Holton (UNC Water Resources Manager), Reed Palmer (Hazen and Sawyer), Ben Poulson (UNC), and Ellen Tucker (Gallager).

Motions

1. BE IT RESOLVED THAT the Board of Directors of the Orange Water and Sewer Authority adopts the Resolution Awarding a Construction Contract for the East Main Street Sewer Phase 1 Project. (Motion by Ray DuBose, second by Bruce Boehm and the Motion was unanimously approved.)
2. BE IT RESOLVED THAT the Board of Directors of the Orange Water and Sewer Authority adopts the Resolution Authorizing OWASA to Engage Counsel and Participate in PFAS Remediation Cost Recovery Litigation. (Motion by Ray DuBose, second by Bruce Boehm, and the Motion was unanimously approved.)
3. Ray DuBose made a Motion to approve the Minutes of the October 28, 2021, Meeting of the Board of Directors; second by Bruce Boehm, and the Motion was unanimously approved.
4. Ray DuBose made a Motion to approve the Minutes of the November 11, 2021, Work Session of the Board of Directors; second by Bruce Boehm, and the Motion was unanimously approved.
5. Ray DuBose made a Motion to approve the Minutes of the November 11, 2021, Closed Session of the Board of Directors for the Purpose of Discussing Environmental Claims in Accordance with N.C. General Statutes 143-318.11; second by Bruce Boehm, and the Motion was unanimously approved.
6. BE IT RESOLVED THAT the Board of Directors of the Orange Water and Sewer Authority adopts the Resolution Revising the Employee Attendance Award Program. (Motion by Todd BenDor, second by John Morris, and the Motion was unanimously approved.)

7. BE IT RESOLVED THAT the Board of Directors of the Orange Water and Sewer Authority adopts the Resolution to Modify Employee Personal Leave. (Motion by Bruce Boehm, second by Todd BenDor, and the Motion was unanimously approved.)

8. John Morris made a Motion to authorize staff to evaluate Alternative 4 (Uniform Rate Capacity Sharing Agreement) and Alternative 7 (Hybrid Option between Alternatives 5 and 6) which provides an option to access our Jordan Lake allocation during droughts and operational emergencies through Phase 1 of the Western Intake Partnership and guarantees OWASA's ability to join the Partnership in Phase 2 along with other viable supply alternatives against the Guiding Principles; second by Ray DuBose and the Motion passed unanimously.

* * * * *

Announcements

Chair Jody Eimers announced that due to COVID-19 public health concerns, the OWASA Board of Directors held the meeting virtually utilizing Microsoft Teams software. Ms. Eimers stated that Board Members, General Counsel, and staff participated in the meeting remotely by virtual means.

Ms. Eimers asked if any Board Member knew of a conflict of interest or potential conflict of interest with respect to any item on the agenda tonight to disclose the same at this time. None were disclosed.

John Morris commented that he received OWASA's Care to Share flyer in his water bill and was glad the community is being reminded of this program.

Mary Tiger, Strategic Initiatives Manager, announced OWASA held its third-annual Care to Share Day was held on November 18, 2021. Over the last the three years there has been a steady increase in on-bill donations. Ms. Tiger reminded the Board on December 16, 2021, at 6:00 p.m., the Board will hold its second Strategic Plan Work Session and the discussion will be to build on the data presented in the environmental and operating scan as well as reconsider OWASA's Mission, Vision and Values. Finally, she announced the Orange County Climate Council will be held on Thursday, December 16, 2021, at 3:00 p.m. virtually.

Item One: Resolution Awarding a Construction Contract for the East Main Street Sewer Phase 1 Project

Ray DuBose made a Motion to adopt the resolution, second by Bruce Boehm, and the Motion was unanimously approved. Please see Motion 1.

Item Two: Resolution Authorizing OWASA to Engage Counsel and Participate in PFAS Remediation Cost Recovery Litigation

Ray DuBose made a Motion to approve the resolution, second by Bruce Boehm, and the Motion was unanimously approved. Please see Motion 2.

Item Three: Minutes

Ray DuBose made a Motion to approve the Minutes of the October 28, 2021, Meeting of the Board of Directors; second by Bruce Boehm, and the Motion was unanimously approved. Please see Motion 3.

Item Four: Minutes

Ray DuBose made a Motion to approve the Minutes of the November 11, 2021, Work Session of the Board of Directors; second by Bruce Boehm, and the Motion was unanimously approved. Please see Motion 4.

Item Five: Minutes

Ray DuBose made a Motion to approve the Minutes of the November 11, 2021, Closed Session of the Board of Directors for the purpose of discussing potential environmental claims in accordance with N.C. General Statutes 143-318.11; second by Bruce Boehm, and the Motion was unanimously approved. Please see Motion 5.

Item Six: Information on the Process and Timeline for Renewing Employee Medical Insurance Coverage

Stephanie Glasgow, Director of Human Resources and Safety, provided an update on the employee medical insurance renewal timeline; and Ellen Tucker, OWASA's consultant from Gallagher, provided a presentation on the process to renew.

Bruce Boehm said a decision to market other carriers should be made sooner on the timeline to avoid the risk of interference with other carriers' ability to respond for a quote. Mr. Boehm said he expects OWASA will market health insurance this year based on the Board's previous 2021 discussion on this topic, even if Blue Cross Blue Shield (BCBS) provides a reasonable quote.

Ray DuBose said he did not recall the Board agreeing to market the plan in 2022, and that the process is designed to give BCBS an opportunity to provide an opportunity to provide a fair and reasonable quote.

Ms. Tucker said OWASA can market the employee health insurance plan. She said OWASA has received four-years of decreases in premiums with BCBS, employee claims data is low, and employees are good stewards of the plan. Once there is a move to another carrier, that ability to negotiate based on the long-term relationship would be lost.

Ms. Glasgow said she would be in favor of marketing the health insurance plan if there is a trigger, such as employees are unsatisfied with the plan or there is an unreasonable increase in premiums.

After considerable discussion, the Board expressed appreciation for the presentation and agreed staff and Gallagher will proceed with BCBS negotiations and if the negotiation does not result in a favorable outcome, OWASA will market employee health insurance without seeking further approval from the Board. The proposed process will accelerate the timeline, and in May 2022, the Board will see one of two outcomes: either a favorable renewal from BCBS; or Gallagher will market the employee medical insurance plan and provide a recommendation to stay with BCBS or propose a new carrier.

Item Seven: Revision of the Employee Attendance Award Program

Todd BenDor made a Motion to approve the Resolution Revising the Employee Attendance Award Program; second by John Morris, and the Motion was unanimously approved. Please see Motion 6.

Item Eight: Modification to Employee Personal Leave

Bruce Boehm made a Motion to approve the Resolution to Modify Employee Personal Leave; second by Todd BenDor, and the Motion was unanimously approved. Please see Motion 7.

Item Nine: Long-Range Water Supply Plan – Evaluation of Alternatives to Provide Access to OWASA’s Allocation of Water in Jordan Lake

Ruth Rouse, Planning and Development Manager, provided an interactive presentation on the evaluation of alternatives to provide access to OWASA’s allocation of water in Jordan Lake as it relates to the Long-Range Water Supply Plan.

After a productive discussion, the Board expressed appreciation for the presentation, requested additional information on risk associated with an options contract, and agreed to further evaluate two of the Jordan Lake alternatives along with other viable supply alternatives at the January 13, 2022 Board meeting.

John Morris made a Motion to authorize staff to evaluate Alternative 4 (Uniform Rate Capacity Sharing Agreement) and Alternative 7 (Hybrid Option between Alternatives 5 and 6) which provides an option to access our Jordan Lake allocation during droughts and operational emergencies through Phase 1 of the Western Intake Partnership and guarantees OWASA’s ability to join the Partnership in Phase 2 along with other viable supply alternatives against the Guiding Principles; second by Ray DuBose and the Motion passed unanimously. Please see Motion No. 8.

Bruce Boehm requested an opinion on whether the option contract alternatives would give OWASA less of a guarantee to access water in comparison to the full partner alternatives; staff will follow up.

Robert Epting, General Counsel, responded that whether either alternative would provide guaranteed access to OWASA’s allocation would depend entirely on the language of the

contracts, which are yet to be drafted, as well as the parties' willingness and ability to comply with those terms.

Item Ten: Review Board Work Schedule

Todd Taylor said the January 13, 2022, agenda will include two additional items: Review Water Conservation Plan Draft Guiding Principles and Discuss Various Factors to Encourage Applications to the OWASA Board of Directors.

Item Eleven: Summary of Work Session Items

Todd Taylor said staff will revise the health insurance timeline to reflect the Board's discussion regarding whether to market medical insurance for employees if it is determined necessary.

Item Twelve: Closed Session

Without objection, the Board of Directors convened in a Closed Session for the purpose of discussing a personnel matter in accordance with N.C. General Statutes 143.318.11.6.

Following the Closed Session, the Board reconvened in open session, reported no action was taken in the closed session, and the meeting was adjourned at 8:46 p.m.

Respectfully submitted by:

Andrea Orbich
Executive Assistant/Clerk to the Board

Attachments

Agenda Item 3:

Orange Water and Sewer Authority

Closed Session of the Board of Directors

December 9, 2021

The Board of Directors of Orange Water and Sewer Authority met virtually in Closed Session on Thursday, December 9, 2021, following the Board meeting.

Board Members attending virtually: Jody Eimers (Chair), Yinka Ayankoya (Vice Chair), John Morris (Secretary), Todd BenDor, Bruce Boehm, Ray DuBose, and Kevin Leibel.

Staff present: None.

Item One

The Board of Directors met in Closed Session without the Executive Director to evaluate the interim Progress Report of the Executive Director's Key Focus Areas for the period of June to December 2021.

No official action was taken at the meeting.

The meeting was adjourned at 8:46 p.m.

Raymond E. DuBose, P.E., Chair
Human Resources Committee

Agenda Item 4:

Update on Employee Health and Dental Insurance for Fiscal Year 2023

Purpose:

Information and presentation by Ellen Tucker, Area Vice President, with Gallagher to generate Board discussion and guidance to staff regarding renewal of employee Health and Dental Insurance policies effective July 1, 2022.

Background:

The Orange Water and Sewer Authority began using Gallagher in April 2014 to manage benefit plans and negotiate premiums for employee Health, Dental, Life, Dependent Life, Accidental Death and Dismemberment (AD&D) and Long-Term Disability (LTD) Insurance.

The current Health and Dental contracts expire on June 30, 2022 with the Life, Dependent Life, Accidental Death and Dismemberment and Long-Term Disability contracts expiring on June 30, 2023.

Information:

Ellen Tucker will be presenting the following information on January 13, 2022:

- Financial Performance of Health Insurance Plan
- Overview of Claims Data
- Renewal Considerations
- Renewal Timeline

A timeline of events is attached.

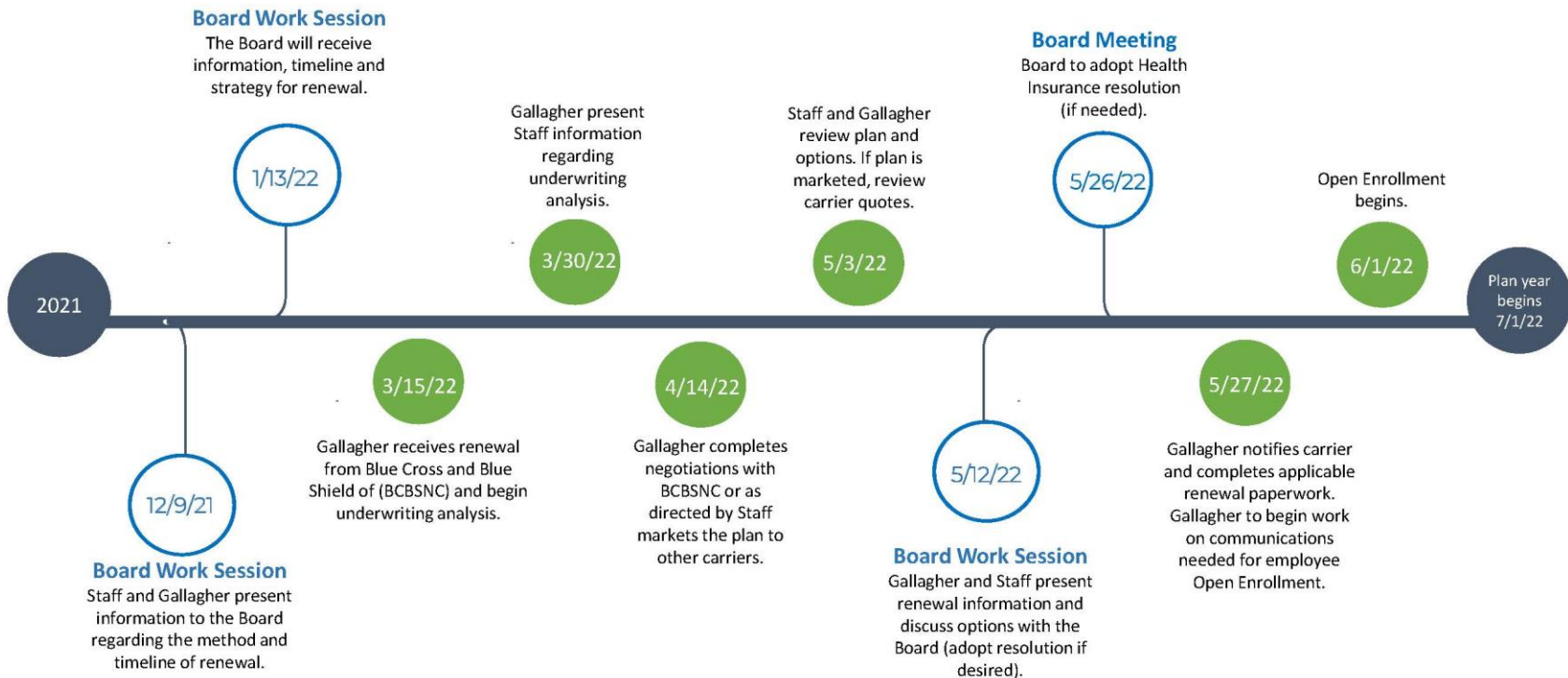
Action Requested

No action needed at this time.

January 13, 2022

Health Insurance Renewal for FY 2023

December 1, 2021 – June 30, 2022



Agenda Item 5:

Diversity and Inclusion Program Update (September 2021 – December 2021)

Purpose:

To provide an update on the upcoming Diversity and Inclusion Organizational Assessment.

Diversity and Inclusion updates are provided to the Board three times per year. The annual September update is a comprehensive program progress report and contains the annual Equal Employment Opportunity report. Abbreviated updates are provided in January and July.

Background:

In March 2017, OWASA implemented an Employee Diversity and Inclusion (D&I) program.

The D&I program goals are:

- *The diversity of OWASA's workforce reflects the communities we serve.*
- *Providing an inclusive work environment that encourages and supports each team member to contribute to their full ability towards OWASA's mission.*

One key action item with the plan was to conduct an Organizational Assessment using employee focus groups which took place in 2017. Upon analyzing the results of the Organizational Assessment, specific recommendations were provided by the consultant to further improve our D&I processes moving forward. OWASA formed three Diversity groups to work independently and collectively to address the recommendations.

We will never see our D&I work as being complete as many of the items are ongoing and we consider D&I to be ingrained in our culture. We strive for continuous improvement and a second Organizational Assessment is planned in 2022 to guide our work forward.

Information

At the January 13, 2022 Work Session, Stephanie Glasgow will provide an update on work done from September through December of 2021 which includes information on the upcoming Organizational Assessment.

Updated Item 6, Attachment 3 - February 24, 2022

Agenda Item 6:

Long-Range Water Supply Plan (LRWSP): Evaluation of Supply Alternatives

Purpose:

To discuss and receive feedback from the Board of Directors on a preferred supply alternative to meet OWASA’s water supply needs through 2070.

Summary:

Staff evaluated the following supply alternatives against one another using the [guiding principles](#) established by the Board of Directors in July 2021 and other important factors:

- **SQ: Status Quo** - Continue with mutual aid agreements and plans to access expanded Quarry Reservoir with existing pumping infrastructure (down 100 feet).
- **JL-P: Partner in new intake and WTP on Jordan Lake** at Phase 1 capacity of 0.5 mgd and Phase 2 capacity of 2 mgd.
- **JL-A: Agreement with Western Intake Partners (WIP)** to invest in a long-term option to join the WIP as a partner in Phase 2 with payments also serving as an option fee that would give OWASA the right to request water transfers from the WIP during Phase 1 under specified conditions such as drought. (Phase 1 facilities will be online in about 2031 and Phase 2 facilities will be available in about 2050).
- **DQ: Deep Quarry** - access deeper depths of expanded Quarry Reservoir with new pumping and transmission infrastructure.
- **DPR: Direct Potable Reuse** returning additionally treated wastewater from Mason Farm WWTP to the drinking water distribution system.

Staff ranked each of these alternatives against the guiding principles; weights were then assigned based on the priority of each guiding principle. Highest priority guiding principles were assigned a weight of 3, high priority guiding principles were assigned a weight of 2, and other considerations were assigned a weight of 1.

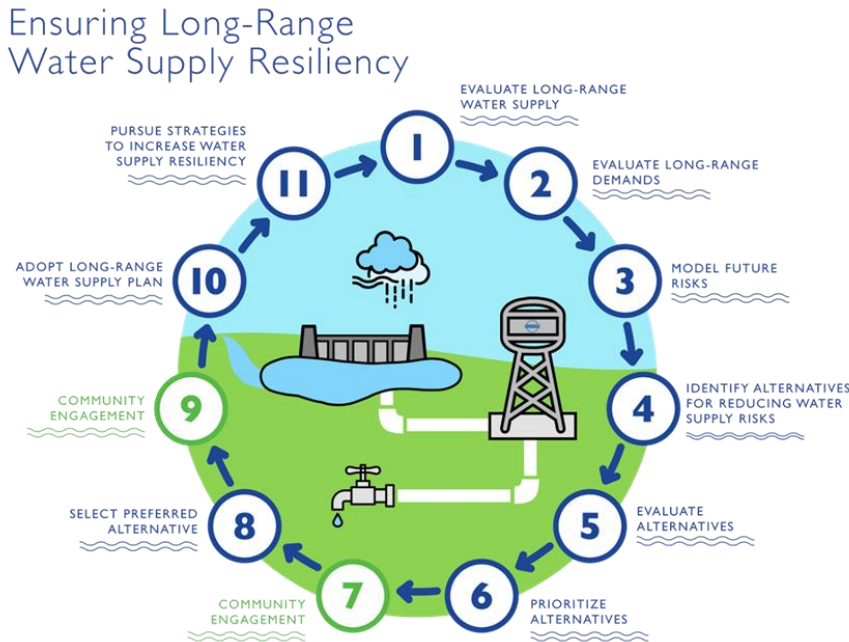
Based on this evaluation, the two Jordan Lake alternatives ranked highest with alternative JL-P ranking slightly higher than JL-A. Thus, staff recommends that Jordan Lake be the supply alternative. Ultimately, the Board’s decision needs to weigh the ability to access our Jordan Lake allocation any time we need it with the near-term impact on rates that would occur with the full partnership alternative.

Background:

OWASA is updating our LRWSP to ensure that we have an adequate supply of water for our community through 2070. OWASA has updated our projections of water supply needs, estimated the yield of our planned supplies, evaluated demand management and supply alternatives to meet

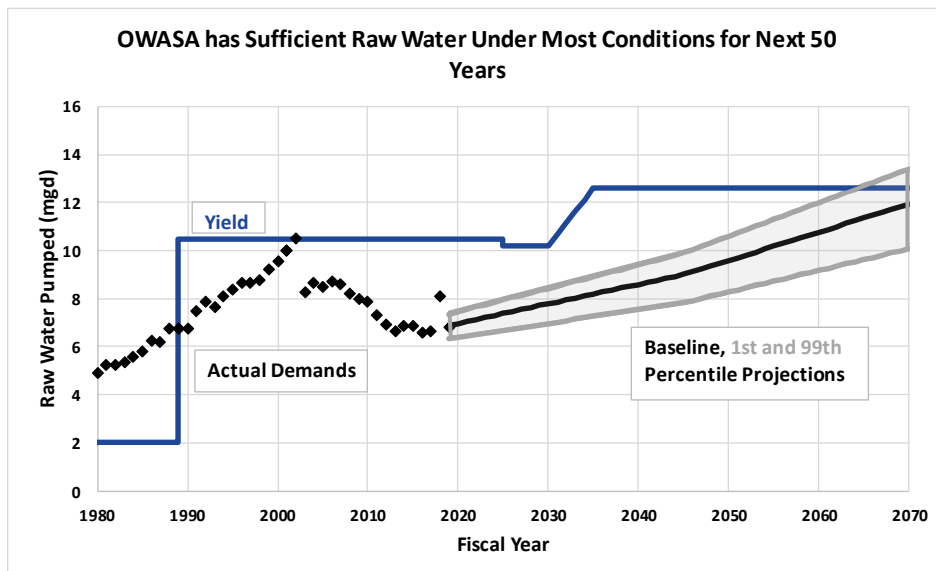
our long-term needs, and completed an initial round of community engagement. Figure 1 illustrates the LRWSP process; we are currently on Step 8: Select Preferred Alternative.

Figure 1: Long-Range Water Supply Planning Process



At its March 14, 2019 meeting, the Board of Directors reviewed and approved a set of long-range (through 2070) water demand projections for the update of the LRWSP that account for the uncertainty in those projections (Figure 2).

Figure 2: Water Demand Projections and Estimated Yield



As illustrated in Figure 2, OWASA has sufficient water under most circumstances for the next several decades. However, it should be noted that a new drought of record would shift the yield line shown in blue in Figure 2 down. While climate change models indicate that our region will receive higher levels of precipitation on average, it will come in the form of more frequent, high intensity storms and may have more frequent periods of drought or higher intensity drought. In addition, Cane Creek Reservoir has a small drainage area for a relatively high amount of storage. While this large amount of storage is generally advantageous, the small drainage area leaves us vulnerable during a drought (this small drainage area results in longer refill times once the reservoir is drawn down). Thus, OWASA needs to identify cost-effective ways to improve the reliability and resilience of its raw water supply.

At its [August 13, 2020 meeting](#), the Board of Directors discussed various supply and demand management alternatives. A group of alternatives that provide reliable access to OWASA's existing allocation of water in Jordan Lake appear to be the most viable candidates to meet future needs following the addition of the Shallow Quarry Reservoir to our water supply portfolio in 2035 (responsible for the increase in yield shown in the 2030s on Figure 2). The Board agreed with staff's recommendation to further evaluate this group of Jordan Lake alternatives and to move forward with the initial community engagement phase of the LRWSP. After reviewing feedback from the community, the Board requested that guiding principles be developed to steer and frame the evaluation of the suite of alternatives. At its July 8, 2021 meeting, the Board approved a set of [guiding principles](#) (Attachment 1) to evaluate alternatives.

At its [December 9, 2021 meeting](#), the Board discussed seven different methods to access our Jordan Lake allocation. Ultimately, the Board of Directors eliminated five of the alternatives and requested that the following two alternatives be evaluated against other viable supply alternatives using the guiding principles:

- JL-P – Uniform Rate Capacity Sharing Agreement – OWASA owns an initial share of a new intake and treatment facility on the western shore of Jordan Lake with other Partners (City of Durham, Town of Pittsboro, and Chatham County; Attachment 4 includes additional information on the Western Intake Partnership (WIP)). For purposes of analysis, it is assumed that OWASA's initial share is based on a flow of 0.5 mgd in Phase 1 of the facility (approximately 2031) and 2 mgd in Phase 2 (approximately 2050). Annual costs for the facility are allocated on the proportionate amount of water actually used by each Partner (i.e., the capacity assigned to each Partner changes over time as the amount of water used by each Partner changes).
- JL-A – Agreement Option – under this alternative OWASA would invest in an option to join the WIP in Phase 2 with payments serving as the option fee in an option contract that would also give OWASA the right to request water transfers from the WIP during Phase 1 under specified conditions such as drought.

The purpose of the next step is to select one supply alternative to include in a draft LRWSP. The community would then have an opportunity to provide feedback on the selected alternative. An update to the Community Engagement Plan will be provided to the Board of Directors, tentatively scheduled for February 10, 2022.

Supply Alternatives:

Staff evaluated the following supply alternatives against one another using the guiding principles and other important factors:

- **SQ: Status Quo** - Continue with mutual aid agreements and plans to access expanded Quarry Reservoir with existing pumping infrastructure (down 100 feet).
- **JL-P: Partner in new intake and WTP on Jordan Lake** at Phase 1 capacity of 0.5 mgd and Phase 2 capacity of 2 mgd (note: this was Alternative 4 in the December 9, 2021 agenda package).
- **JL-A: Agreement with Western Intake Partners (WIP)** to invest in a long-term option to join the WIP as a partner in Phase 2 with payments also serving as an option fee that would give OWASA the right to request water transfers from the WIP during Phase 1 under specified conditions such as drought (note: this was Alternative 7 in the December 9, 2021 agenda package).
- **DQ: Deep Quarry** - access deeper depths of expanded Quarry Reservoir with new pumping and transmission infrastructure.
- **DPR: Direct Potable Reuse** returning additionally treated wastewater from Mason Farm WWTP to the drinking water distribution system.

Supply alternatives eliminated from further analysis are described in Attachment 2.

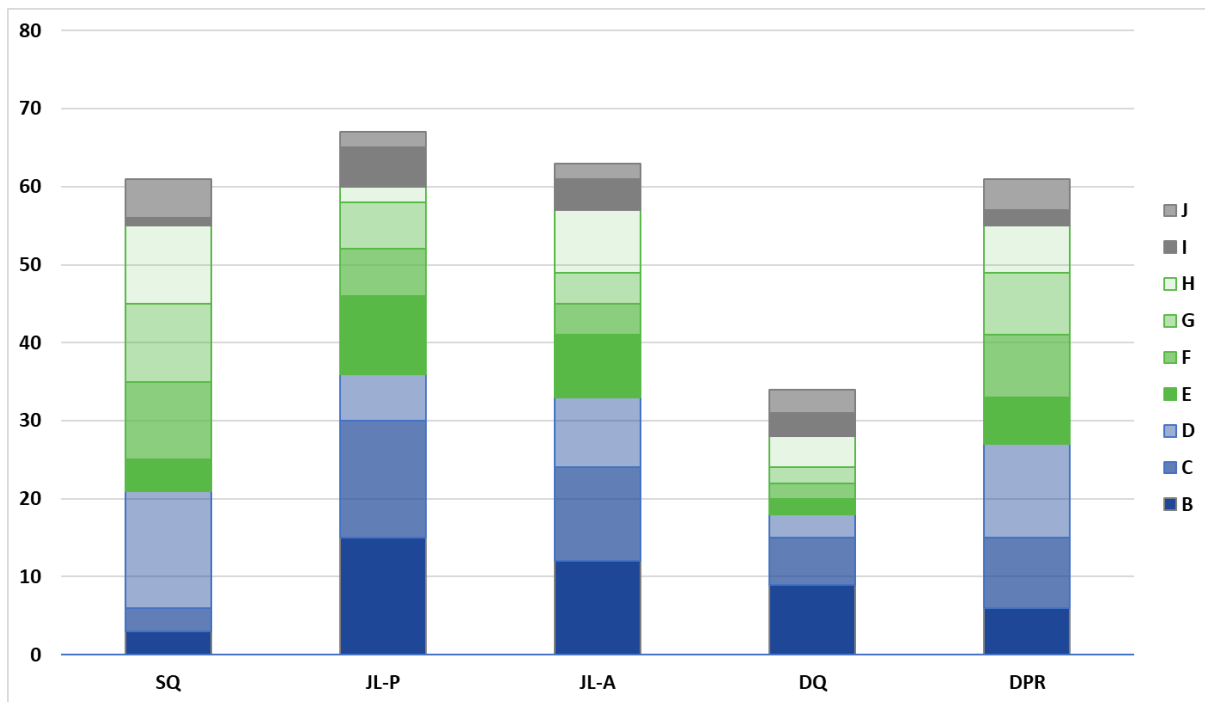
Alternatives Analysis:

Staff ranked each of the supply alternatives against the guiding principles – the alternative which best met the criteria received a score of 5, and the alternative which was worst at meeting the criteria received a score of 1. Since the Board of Directors had ranked the guiding principles as highest, high, and other considerations, staff weighted the guiding principles (GPs) as follows:

- Highest – GPs “reduce vulnerability to extended drought”, “improve water supply reliability and resiliency” and “minimize impacts on current rates” were assigned a weight of 3.
- High – GPs “minimize impacts on future rates”, “minimize long-term impacts on environment”, “minimize impacts on community”, and “maintain flexibility to change course” were assigned a weight of 2.
- Other considerations – GPs “support regional water supply planning” and “minimize short-term impacts on the environment” were assigned a weight of 1.

The weighted results are illustrated in Figure 3, and Attachment 1 includes a summary table of the rankings against the guiding principles and a narrative description of the rankings.

Figure 3: Results of Alternatives Evaluated Against Guiding Principles Using Weighted Scoring (Blue – Highest GPs, Green – High GPs, Grey – Other Considerations)



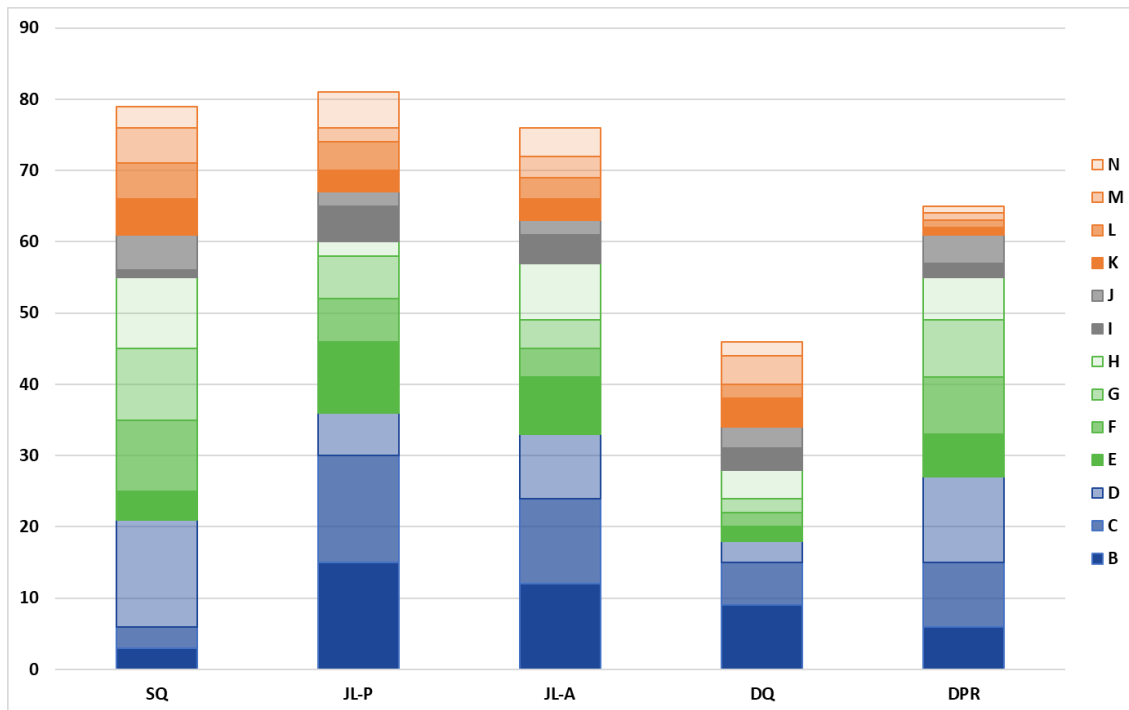
As illustrated in Figure 3, the two Jordan Lake alternatives scored highest overall and when looking only at the highest priority guiding principles. Being a full Partner (alt JL-P) was rated slightly higher than the alternative in which OWASA would develop an agreement with the WIP to guarantee access to its allocation of water during Phase 1 and would become a full partner in the WIP in Phase 2 (approximately 2050).

Staff thought there may be some additional factors the Board may wish to consider as it evaluates alternatives. These include the following:

- Water quality of raw water supply – One of the comments heard during the first public engagement process was concerns about Jordan Lake water quality. Based on data collected in Jordan Lake, University Lake, and Cane Creek Reservoir, water quality in our local supplies is not that different from water quality in Jordan Lake (Attachment 3). However, staff acknowledges that there are fewer pollutant sources in our locally controlled reservoirs.
- Legality, permitting, and partnership issues – Some of the alternatives are not legal in North Carolina, and others have higher uncertainty in the permitting process or in our ability to negotiate a contract which meets OWASA and WIP partner needs.
- Community engagement effort – Alternatives which rely on our local supplies would likely have a lower community engagement effort.
- Ability to maintain our Jordan Lake allocation – While the North Carolina Environmental Management Commission looks at the need for the allocation, they also consider the investments that have been made by utilities to secure access to their allocation.

Staff weighted these additional factors with a 1, the same as the “other considerations” guiding principles. Figure 4 illustrates the weighted results when combined with the approved guiding principles; Attachment 1 includes details on the rankings.

Figure 4: Results of Alternatives Evaluated Against Guiding Principles and Staff’s Other Considerations Using Weighted Scoring (Blue – Highest GPs, Green – High GPs, Grey – Other Considerations, Staff’s Other Considerations)



When staff’s other considerations are included in the evaluation, the two Jordan Lake alternatives and status quo alternative are similarly rated. Being a full partner in the new WIP facilities in Phase 1 is ranked highest, maintaining the status quo second highest, and developing an agreement with the WIP being 3rd highest.

Based on the analyses, staff recommends the following:

- The deep quarry alternative consistently ranks lower than other alternatives and should be eliminated from consideration.
- Direct potable reuse also ranks lower than other alternatives and should be eliminated from further consideration. Staff notes that this alternative is currently not legal in North Carolina.
- While the status quo alternative ranks well when staff’s other considerations are included, staff recommends eliminating this alternative. It does not rate well when evaluated against the Board’s guiding principles and does not rate well when only considering the highest priority guiding principles.

- The two Jordan Lake alternatives rank similarly with being a full Partner in Phase 1 receiving the highest ranking.

Key questions that the Board should consider include:

- Do you agree with staff's recommendation to eliminate the deep quarry and direct potable reuse from further evaluation?
- Do you agree that given the poor ranking of the status quo alternative against the highest ranking guiding principles that it should be eliminated from further evaluation?
- To evaluate the Jordan Lake alternatives against one another the Board should consider the near-term cost to guarantee access to our allocation of water at any time given the risk of needing that water at any time between now and 2050. These two guiding principles are each in the highest category. Another way to think about this is does the Board want to start investing in Jordan Lake infrastructure in fiscal year 2023?
- Is there other information you need to select a preferred alternative?

Next Steps:

The following steps are planned to complete the LRWSP:

1. We will select a preferred supply alternative, which may be a Jordan Lake alternative or one of the other viable supply options (we are on this step).
2. Staff will modify the community engagement plan (CEP) to align with the communication and outreach required for the selected alternative and present it to the Board of Directors (tentatively scheduled for February 10, 2022).
3. Staff will implement the CEP.
4. Staff will summarize the feedback from the community and present the final draft of LRWSP to the Board of Directors for review.
5. Staff will incorporate feedback from the Board of Directors, finalize the LRWSP, and commence implementation.

Staff Recommendation and Action Needed:

Staff recommends that Jordan Lake be the supply alternative included in the LRWSP. We believe that Jordan Lake ranks high against the guiding principles. The Board can weigh the two Jordan Lake alternatives at its January 27, 2022 meeting. If the Board agrees, we suggest a motion along the following lines:

Motion to authorize staff to include Jordan Lake as the preferred supply alternative in the draft LRWSP. Staff will continue to work with the Board of Directors and the Western Intake Partners to identify the preferred alternative to access our allocation of water in Jordan Lake.

Information:

Attachment 1: Guiding Principles

- Summary Table Ranking Alternatives Against Guiding Principles and Other Factors
- Narrative Explanation of Ranking Alternatives Against Guiding Principles
- Staff Definitions of Guiding Principles *Reduce Vulnerability to Drought* and *Ability to Improve Reliability and Resiliency of our Water Supply*
- Guiding Principles - Evaluating Water Supply Alternatives to Access Jordan Lake

Attachment 2: Supply Alternatives

- Financial Summary of Supply Alternatives
- Narrative Description of Supply Alternatives
- Supply Alternatives Eliminated from Further Consideration

Attachment 3: Water Quality Information

Attachment 4: Background Information on Western Intake Partnership and Jordan Lake

Attachment 1: Guiding Principles

Summary Table Ranking Alternatives Analysis Against Guiding Principles and Other Factors

Summary of Supply Alternatives Against the Guiding Principles

Alternative		Required	Highest			High				Other		Non Guiding Principle Considerations			
		A Produce high quality drinking water	B Reduce vulnerability to extended drought	C Improve water supply reliability and resiliency	D Minimize impact on current rates	E Minimize impact on future rates	F Minimize long-term impacts on environment	G Minimize impacts on community	H Maintain flexibility to change course	I Support regional water supply planning	J Minimize short-term impacts on environment	K Water Quality of Raw Water Supply	L Legality, Permitting, and Partnership Issues	M Community Engagement Effort	N Maintain JL allocation
SQ	Status Quo - Continue with Mutual Aid and Plans for Shallow Quarry Reservoir	<input checked="" type="checkbox"/>	1	1	5	2	5	5	5	1	5	5	5	5	3
JL-P	Jordan Lake Partner: Uniform Capacity	<input checked="" type="checkbox"/>	5	5	2	5	3	3	1	5	2	3	4	2	5
JL-A	Jordan Lake: Options Agreement in Phase 1 with Partner in Phase 2	<input checked="" type="checkbox"/>	4	4	3	4	2	2	4	4	2	3	3	3	4
DQ	Deep Quarry Reservoir	<input checked="" type="checkbox"/>	3	2	1	1	1	1	2	3	3	4	2	4	2
DPR	Direct Potable Reuse	<input checked="" type="checkbox"/>	2	3	4	3	4	4	3	2	4	1	1	1	1

Attachment 1: Guiding Principles

Narrative Explanation of Ranking Alternatives Against Guiding Principles

Staff ranked each of the alternatives against the guiding principles. A ranking of 5 was assigned to the alternative which best met the guiding principle, and a ranking of 1 was assigned to the alternative that was worst in achieving the guiding principle.

Required:

GP A: Produce high quality drinking water – each of the alternatives meets this guiding principle; each of these water sources can be treated to meet or exceed all federal and state public health requirements. The alternatives were not ranked against this guiding principle.

Highest Priority: weighted highest with a value of 3

GP B: Ability to reduce our vulnerability to extended drought conditions

- 5 – JL-P - the Jordan Lake alternatives diversify our water supply; the Partner alternative provides access to the supply whenever we want it and was ranked highest.
- 4 – JL-A
- 3 – DQ - the deep quarry reservoir increases our yield beginning in about 2035 but does not diversify our water supply.
- 2 – DPR - direct potable reuse does increase the diversity of our supply and increases yield, but it is not legal. Until it is legal and operational, it does nothing to reduce our vulnerability to droughts.
- 1 – SQ - the status quo alternative does not improve our vulnerability to extended drought and was ranked lowest.

GP C: Ability to improve the reliability and resiliency of our water supply including addressing single points of failure

- 5 – JL-P - the Jordan Lake alternatives provide for OWASA ownership in a second water treatment facility; the full Partner alternative does this sooner and was ranked highest. The Jordan Lake alternatives also provide access to a supply alternative that will meet our raw water supply needs through 2070 and beyond.
- 4 – JL-A
- 3 – DPR - direct potable reuse also provides OWASA with another treatment facility but would not be available for a longer period of time; effluent could also meet our supply needs beyond 2070, but there are uncertainties about whether it would be legal in North Carolina in the time frame of the LRWSP.
- 2 – DQ - the deep quarry reservoir provides additional yield but would not meet needs beyond 2070.
- 1 – SQ - the status quo alternative would not meet needs through 2070 and was ranked lowest.

GP D: Impact on current rates – the total net present cost through 2050 was used to rank the facilities against this guiding principle. See summary cost table in Attachment 2.

- 5 – SQ
- 4 – DPR
- 3 – JL-A
- 2 – JL-P
- 1 - DQ

High Priority: assigned a weight of 2

GP E: Impact on future rates – the total net present cost through 2070 per 1,000 gallons of water projected to be consumed was used to rank this guiding principle. See summary cost table in Attachment 2.

- 5 – JL-P
- 4 – JL-A
- 3 – DPR
- 2 – SQ
- 1 - DQ

GP F: Incremental long-term impacts on the environment from operation of the infrastructure needed to support the water supply – the long-term impacts on the environment are considered to be mainly from the electricity used to produce and pump the water and the additional infrastructure required for the alternative to account for embedded carbon in new infrastructure. Analyses of pumping use have not been completed, but staff made some assumptions.

- 5 – SQ - the status quo alternative would have the lowest long-term impact on the environment as no new infrastructure is needed and was ranked highest.
- 4- DPR - direct potable reuse would pump water directly into our distribution system and thus it has the shortest distance and least elevation change to pump water. It would also require new treatment facilities, but staff felt that the much lower transmission infrastructure made up for that impact.
- 3 – JL-P - most of the water produced by the proposed new intake and plant on the west side of Jordan Lake would already be pumped along the transmission route to meet City of Durham and Chatham County needs; the incremental increase in pumping and other infrastructure to meet OWASA’s needs would be small. These two alternatives were based on assumptions that resulted in equivalent amounts of water being pumped through 2070 under both alternatives, but the full partner alternative was ranked higher since additional resources available to the Partnership could result in more sustainability features included in the facility design (though this difference would likely be small).
- 2 – JL-A

- 1 – DQ - pumping from the deep quarry would need to overcome a large change in elevation along with new transmission infrastructure required to achieve the estimated yield – this new pumping is not offset by other utilities reaping the benefit of these new facilities therefore this alternative was ranked lowest.

GP G: Incremental impacts on the community from OWASA’s participation in the construction and operation of the water supply source including impacts to landowner, recreation, and transportation – this guiding principle includes noise and traffic impacts from construction of the infrastructure and impacts to private landowners who may need to provide easements. The length of transmission infrastructure was a key component of this ranking. Staff also considered whether OWASA was the only utility causing impacts or whether other utilities were involved.

- 5 – SQ - the status quo alternative was rated highest since minimal construction is included with this alternative.
- 4 - DPR - direct potable reuse rated second highest given its short transmission infrastructure. Direct potable reuse would likely require OWASA to obtain 2 acres of land near the Mason Farm WWTP to implement this alternative so there would be some impacts on private landowner(s).
- 3 – JL-P - the Jordan Lake alternatives were rated next highest since all infrastructure is shared with other partners and impacts will occur regardless of OWASA’s participation. The partner alternative was ranked higher than the agreement alternative since additional funds available to the Partnership during planning of the facilities could result in more sustainable practices or public facilities near the new infrastructure (the difference between the Jordan lake alternatives is likely small).
- 2 – JL-A
- 1 – DQ - the deep quarry option has long transmission infrastructure not shared with other parties.

GP H: flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties –

- 5 – SQ - the status quo alternative provides the highest flexibility to change course.
- 4 – JL-A - the agreement option to access our Jordan Lake allocation provides the second most flexibility. This alternative results in a relatively low near-term investment while protecting our allocation of water in Jordan Lake.
- 3- DPR - direct potable reuse also has high flexibility, but it could be much more expensive to join the Western Intake Partnership later if direct potable reuse is not made legal.
- 2 – DQ - the deep quarry alternative results in OWASA investing a lot of capital funds in the near term into infrastructure to access the deep quarry which results in limited flexibility.

- 1 – JL-P - The full partnership in the Jordan Lake alternative provides the least flexibility; however, if we found a new water supply that better met our needs, we could choose to maintain our capacity at 0.5 mgd.

Other Considerations: assigned weight of 1

GP I: Support for regional water supply planning efforts, recognizing that we rely on neighboring water utilities to supply water during our occasional planned and unplanned interruptions to water supply

- 5 – JL-P - investing in Jordan Lake alternatives best helps our utility neighbors, with being a full Partner in Phase 1 of the proposed infrastructure providing the most assistance to them in the near future.
- 4 – JL-A
- 3 – DQ – the deep quarry option could result in OWASA sharing infrastructure with neighboring utilities in the more distant future as our demands continue to increase.
- 2 - DPR – OWASA would likely never share in accessing new infrastructure with our regional partners if this alternative were selected and implemented.
- 1 - SQ - the status quo alternative supports regional planning the least and leaves OWASA counting on our utility neighbors to meet our long-term needs.

GP J: Incremental short-term impacts on the environment from development of the water supply and construction of the associated infrastructure including temporary impacts to streams, wetlands, aquatic and terrestrial habitat, and other environmental considerations – for this guiding principle, staff looked solely at the amount of land likely to be disturbed from constructing the required infrastructure. For this guiding principle, staff did not consider whether the infrastructure would be shared with other utilities; just the likely total disturbance. Note that these calculations have not been completed but are based on best professional judgment.

- 5 – SQ – no major infrastructure is required for this alternative.
- 4 – DPR – this alternative would mainly be sited on OWASA’s Mason Farm WWTP land and has the shortest transmission infrastructure.
- 3 – DQ – this alternative has lengthy transmission infrastructure associated with it.
- 2 – JL-P and JL-A – these two alternatives have the same required infrastructure including a new intake, WTP, and transmission facilities.

Staff Considerations: assigned weight of 1

NGP K: Quality of the raw water supply

- 5 – SQ - Our local water supplies have fewer potential contaminant sources in them and thus the status quo and deep quarry alternatives were ranked highest. OWASA needs to blend the Quarry Reservoir water with water from Cane Creek Reservoir or University Lake in order to have adequate solids in it for our treatment processes to work properly.

The status quo alternative was rated higher since the relative amount of Quarry Reservoir water used over time would likely be lower.

- 4 – DQ
- 3 – JL-P and JL-A – each of these alternatives uses the same raw water source and were ranked equally. Data collected on Jordan Lake (Attachment 3) indicate that it has very similar water quality to our local water supplies with the exception of a couple parameters (1,4-dioxane and bromide).
- 1 – DPR - while staff is proud of the quality of our effluent, direct potable reuse does not provide an environmental buffer for constituents that may be in our treated effluent.

NGP L: Legality, permitting, and partnership issues – staff considered whether OWASA would have to develop permits on its own, the uncertainty of an option being permitted, and our ability to develop an acceptable agreement.

- 5 – SQ - the status quo alternative has limited permitting associated with it and is thus ranked highest.
- 4 – JL- P - the Jordan Lake alternatives would be permitted under the partnership and OWASA staff would have limited involvement; the full Partnership alternative would have much lower uncertainty than developing an options agreement with the other WIP partners.
- 3 – JL-A –
- 2 – DQ - the deep quarry alternative would have OWASA obtaining permits on its own and includes construction and operating permits for a deep shaft to accommodate new pump station infrastructure; the process for obtaining the permit for this deep shaft is uncertain as there are few if any other intakes like this in North Carolina.
- 1- DPR - direct potable reuse is not legal in North Carolina and could not be permitted at this time and was thus ranked lowest. If it became legal, the permit process would likely be arduous.

NPG M – Community engagement effort

- 5 – SQ - the status quo alternative would have limited community engagement since OWASA is not proposing to undertake any new projects.
- 4 – DQ - using our deep quarry would likely have lower levels of engagement than the Jordan Lake alternatives since we heard some resistance to using Jordan Lake in the first round of community engagement.
- 3 - JL-A - being a full partner and investing funds now in infrastructure not needed on a regular basis would be a higher level of engagement than an options agreement alternative.
- 2 - J2 - L-P
- 1 – DPR - direct potable reuse has faced opposition in other communities where it is legal and would have the highest level of community engagement.

NPG N – Maintain Jordan Lake allocation – The North Carolina Environmental Management Commission evaluates several factors when reviewing allocations of water in Jordan Lake. These include the need for additional water, the potential to use other supplies, and investments made in Jordan Lake.

- 5 – JL-P - the two Jordan Lake alternatives received the highest rankings with being a full partner in Phase 1 being ranked highest.
- 4- JL-A
- 3 – SQ - the status quo alternative was ranked 3rd as it is the next most likely alternative in which OWASA would later invest in Jordan Lake.
- 2- DQ
- 1 – DPR - direct potable reuse was rated lowest; if OWASA invests in that infrastructure, it likely would not invest in Jordan Lake in the future.

Attachment 1: Guiding Principles

Staff Definitions of Guiding Principles *Reduce Vulnerability to Drought and Ability to Improve Reliability and Resiliency of our Water Supply*

Two of the highest priority guiding principles are:

- i. ability to reduce our vulnerability to extended drought conditions
- ii. ability to improve the reliability and resiliency of our water supply including addressing single points of failure

There could potentially be some overlap in these two guiding principles. To ensure that we are not double counting or omitting an important element of these two guiding principles, staff has provided information on what was considered in evaluating these two principles.

Reducing Vulnerability to Extended Drought Conditions

OWASA has a sufficient supply of water under most conditions for the next several decades. However, Cane Creek Reservoir has a large amount of storage for the size of its watershed as illustrated in the table below:

Lake	Drainage Area (sq mi)	Volume (MG)	Volume/DA (MG/sq mi)
University Lake	30	687	22.9
Lake Michie	168	4,121	24.5
Lake Benson	36	951	26.4
Jordan Lake	1,690	70,005	41.4
Little River Lake (Durham)	97	4,755	49.0
Falls Lake	772	42,815	55.5
Cane Creek Reservoir	31	2,906	93.7

This high ratio is normally a good thing as it provides OWASA with a greater volume of water and additional yield. However, the small drainage area results in a long refill time when the reservoir is drawn down during droughts. Thus, we are vulnerable to a potential water shortage during extended droughts or back-to-back droughts.

This guiding principle seeks to address this vulnerability. The main item considered in this guiding principle was whether the supply alternative increased the diversity of our water supplies. Staff also considered the estimated yield from the supply and the timing of the investment in the supply alternative.

Improving the Reliability and Resiliency of our Water Supply Including Addressing Single Points of Failure

Staff considered items such as OWASA's ability to access the water supply whenever it was needed and whether the alternative would reduce the vulnerability to a single point of failure. More details are provided below:

- Minimizing access restriction/impediments – Staff evaluated whether OWASA could access the water supply whenever we wanted it. For those alternatives where we may not be able to access it whenever we wanted the supply, we evaluated whether we would be able to access it whenever it was needed –could we capitalize on the storage in Cane Creek Reservoir for a short period until we had access.
- Scalability of long-term supply – OWASA has acted proactively in the past by planning for water supply many decades before it is needed, and current customers are reaping the benefits of this long-term planning. For example, OWASA's purchase of the original Quarry Reservoir 40 years ago and the land that is currently being mined thirty years ago, is providing our next supply of water very cost-effectively (the Status Quo alternative in this evaluation). Thus, we also considered the impact the selected option would have on OWASA's ability to secure additional supply if needed at the end of the LRWSP planning period (2070). We also evaluated whether the proposed supply would meet OWASA's needs through 2070.
- Vulnerability to single points of failure – OWASA has one water treatment facility and one raw water line from Cane Creek Reservoir to our Jones Ferry Road Water Treatment Plant (WTP). These single points of failure have some redundancy met through other infrastructure. For example, if we were unable to produce drinking water at our WTP, we currently have interconnection capacity that can meet our average daily needs for drinking water. We can also pump raw water from University Lake if the raw water line from Cane Creek Reservoir was out of service. However, if something happened to these single points of failure and they were not available for an extended period, it could leave OWASA vulnerable. Thus, staff also considered how the different supply alternatives address these single points of failure.

Attachment 1: Guiding Principles

Evaluating Water Supply Alternatives to Access Jordan Lake

Introduction to Guiding Principles

OWASA has developed the following guiding principles to aid in evaluating and comparing viable water supply alternatives to reliably access OWASA's allocation of water in Jordan Lake. The guiding principles include factors that staff can quantify or use to compare alternatives on a qualitative basis. While all the social, environmental, and economic factors addressed in the guiding principles are important to consider when evaluating this group of water supply alternatives, they are categorized as "Highest", "High", or as "other considerations" to assist with the evaluation. Guiding principles ranked "Highest" will be given more weight than guiding principles ranked "High" when evaluating Jordan Lake water supply alternatives.

The Board of Directors will use the guiding principles to guide their discussion but may also use other factors including their best judgment to select the most viable alternative. While these guiding principles will be used initially to evaluate Jordan Lake alternatives, OWASA has not abandoned other supply alternatives. The Western Intake Partners (City of Durham, Chatham County, Town of Pittsboro, and OWASA) have made progress in planning for a new intake on the western side of Jordan Lake since all alternatives were presented to the Board of Directors on [August 13, 2020](#), and more complete evaluations of the Jordan Lake alternatives can now be accomplished. These guiding principles will be used to narrow down the Jordan Lake alternatives to compare to other viable water supply alternatives. It is anticipated that these guiding principles and prioritization will be adapted to evaluate other viable water supply alternatives against the selected Jordan Lake alternative. OWASA is committed to hearing feedback from our customers and will consider diverse perspectives as the Board makes its decisions concerning future water supply.

OWASA's core assumptions of our Long-Range Water Supply Plan (LRWSP) will be maintained regardless of which supply alternative is ultimately selected. These assumptions include:

- OWASA's service area as defined in the Water and Sewer Management, Planning and Boundary Agreement will remain unchanged, and we will not be required to provide water service beyond the existing Urban Service Area boundary of Carrboro and Chapel Hill.
- OWASA will continue with planned activities to develop the Shallow Quarry Reservoir alternative; this additional supply will be available by approximately 2035 and is included in our estimated yield.
- OWASA will develop our water supply portfolio to meet our community's drinking water needs for the next two generations (to 2070).
- OWASA will continue to use our local water supplies in Cane Creek Reservoir, University Lake, and the Quarry Reservoir as our primary water sources to the maximum extent practicable.
- OWASA will continue to support and encourage the water conservation ethic embraced by our community, including UNC – Chapel Hill's continued use of reclaimed water. Demand management (conservation) alternatives that are financially viable will be

included in OWASA's Water Conservation Plan, which will be an appendix to the LRWSP.

- OWASA continues to support the affordability and cost management strategic theme included in the 2016 update to its [Strategic Plan](#) and will carefully weigh the cost impacts of supply alternatives on our customers before selecting a preferred alternative.
- OWASA will actively seek input from the community before it makes decisions concerning future water supply.

Guiding Principles

1. We will continue to provide the community with high-quality treated drinking water that meets or surpasses federal and state public health requirements regardless of the source(s) of supply. Any supply alternative that cannot meet this guiding principle will be eliminated from further consideration.
2. We will consider the following factors for each supply option:
 - a. Highest Priority
 - i. ability to reduce our vulnerability to extended drought conditions
 - ii. ability to improve the reliability and resiliency of our water supply including addressing single points of failure;
 - iii. impact on current rates.
 - b. High Priority
 - i. impact on future rates;
 - ii. incremental long-term impacts on the environment from operation of the infrastructure needed to support the water supply;
 - iii. incremental impacts on the community from OWASA's participation in the construction and operation of the water supply source including impacts to landowners, recreation, and transportation;
 - iv. flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties.
 - c. Other Considerations
 - i. support for regional water supply planning efforts, recognizing that we rely on neighboring water utilities to supply water during our occasional planned and unplanned interruptions to water supply;
 - ii. incremental short-term impacts on the environment from development of the water supply and construction of the associated infrastructure including temporary impacts to streams, wetlands, aquatic and terrestrial habitat, and other environmental considerations.

Attachment 2: Supply Alternatives

Financial Summary of Supply Alternatives

Alt #	Name	Assumed Estimated Yield of Project (MGD)	Capital Cost in 2021 \$ (Million \$)	Year Construction Begins	Year Initially On-Line	Net Present Cost through 2070 (Million \$)	NPC through 2070 Per 1,000 Gallons Projected to be Consumed	Net Present Cost through 2050 (Million \$)
SQ	Status Quo: Continue with Mutual Aid Agreements and Shallow Quarry Plans	2.1	\$0*	N/A	N/A	\$1.67	\$5.45	\$0.2
JL - P	Jordan Lake: Partner in New Intake and WTP with Costs Based on Uniform Rate Sharing	Phase 1: 0.5 Phase 2: 2	\$13.6 (Ph 1) \$23.7 (Ph 1,2)	2027	2031	\$14.6	\$1.55	\$10.6
JL - A	Jordan Lake: Options Agreement in Phase 1 and Partner in Phase 2	Phase 2: 2	\$13.6	2047	2051	\$14.7	\$1.55	\$2.6
DQ	Deep Quarry Reservoir	1.3**	\$88.3	2030	2033	\$76.9	\$5.73	\$75.3
DPR	Direct Potable Reuse	4	\$52.0 (carbon)	2050	2052	\$22.0	\$2.34	\$2.0
			\$68.1 (RO)			\$37.4	\$3.98	\$2.6

*SQ has minor capital costs for generator that do not impact planning level decisions

** DQ provides 3.4 mgd of water, but only 1.3 mgd above the SQ alternative (most storage accessed through existing pump station)

Attachment 2: Supply Alternatives

Narrative Description of Supply Alternatives

Alternative SQ: Status Quo - Continue with Shallow Quarry and Mutual Aid Agreements

Under this alternative, OWASA would continue with its plans to expand the Quarry Reservoir using the existing intake and pumping infrastructure and access its Jordan Lake allocation as it currently can through its mutual aid agreements.

The Shallow Quarry Reservoir portion of this alternative involves: (a) the cessation of rock quarrying by December 2030 at the existing American Stone Company/Martin Marietta rock quarry which is located on land owned by OWASA; (b) conversion of that quarry to a new water supply reservoir; (c) connection of the new quarry pit to the existing small Quarry Reservoir during the final stages of quarrying; (d) continued use of the existing raw water pumps and intake piping located at the Quarry Reservoir, and (e) no increase in the water transfer capacities of the pumps and pipeline we use to refill the Quarry Reservoir from Cane Creek Reservoir. The existing pumping facilities at the Quarry Reservoir enable withdrawal of water down to a maximum depth of 100 feet.

OWASA will continue with its plans to expand the Quarry Reservoir regardless of whether another supply alternative is selected to include in the LRWSP. The only capital improvement for this alternative is a new generator, and has minimal costs compared to other alternatives. Thus, for purposes of comparing costs, this minor cost was excluded from the analysis.

If the Board selects a supply alternative other than this Status Quo alternative, OWASA would use its mutual aid agreements on a less frequent basis. Thus, accessing our allocation of water from Jordan Lake using our mutual aid agreements was included in this analysis. Until a new treatment facility is available on the west side of Jordan Lake, OWASA would use its existing mutual aid agreements with the Town of Cary and City of Durham to access its allocation.

OWASA has been working with the City of Durham, Town of Pittsboro and Chatham County (Western Intake Partners or WIP) to evaluate options for securing access to our Jordan Lake allocations. A new intake and treatment facility is planned on the western shore of Jordan Lake that could provide access to WIP allocations. When these WIP facilities are available in approximately 2031, OWASA could also use its mutual aid agreement to access its Jordan Lake allocation from the City of Durham, which will be a partner in the new facilities. For the purposes of developing costs for this alternative, we assumed the following:

- For comparison to other alternatives, we only included potential purchases through our mutual aid agreements from 2031 to 2070, and assumed that all water from Jordan Lake would come from the new western intake and treatment plant.
- We used OWASA's water supply model to evaluate risk through 2070 and assumed we would use our mutual aid agreements to access our allocation of water when we hit a Stage 1 water shortage as described in our [Water Shortage Response Plan](#).

- When we purchase water, we purchase at a maximum rate of 4 mgd, but also maintain 4 mgd through our Jones Ferry Road WTP (i.e. we would purchase an amount lower than 4 mgd to maintain 4 mgd at our WTP).
- We would purchase water at the price outlined in our mutual aid agreement, accounting for some escalation based on estimates of the impact of the WTP on Durham's water rates, updated cost information for the western intake facilities, and inflation.

It should be noted that regardless of which alternative is ultimately selected by the Board of Directors, OWASA will continue to keep its mutual aid agreements with neighboring utilities. These provide additional resilience to our own raw water and drinking water at no capital cost.

How does this alternative reduce our vulnerability to extended drought conditions? (Guiding Principle (GP) B)

This alternative maintains the status quo and does not reduce our vulnerability to extended drought conditions. It does not address the vulnerability of Cane Creek Reservoir's small drainage area, which may result in a long refill time following drought.

How does this alternative improve the reliability and resiliency of our water supply including reducing vulnerability to a single point of failure? (GP C)

This alternative maintains the status quo and does not improve the reliability and resiliency of our water supply.

What are the incremental environmental impacts of this alternative? (GPs F and J)

No new infrastructure is needed for this alternative, therefore, the only expected environmental impact is the incremental increase in energy use (and associated carbon footprint) associated with pumping water from the proposed water treatment plant to OWASA, which would partially be offset by reductions in pumping and production from our own system.

What are the incremental social impacts of this alternative? (GP G)

Since there is no construction needed, there are no impacts to private property, traffic, noise, or recreation areas.

What flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties does this alternative provide? (GP H)

Since this alternative does not require any capital investment, OWASA can easily switch to another alternative.

How does this alternative provide support for regional water supply planning efforts? (GP I)

OWASA would not financially support the proposed intake, treatment, and transmission facilities. This alternative would result in us needing to use our mutual aid agreements more frequently and counting on our neighbors to meet our long-term needs. Thus, it provides lower

support than other alternatives. However, OWASA will support the new intake and treatment facility and other regional projects through our participation on the Triangle Water Supply Partnership recognizing that these types of projects improve the reliability and resiliency of the region.

What is the cost to implement this alternative?

There are no capital costs associated with this alternative. Operating and maintenance costs include: (a) the costs to operate and maintain our water system interconnections, and (b) the charges we must pay to Western Intake Partners to withdraw, treat, and pump our Jordan Lake water. The assumptions outlined above were used to estimate the costs to purchase water as summarized in the table below.

2021 Capital Cost Estimate	\$0
Net Present Cost of Alternative through 2070	\$1.7 million
Net Present Levelized Cost of Project (\$/1,000 gallons of demand actually met over planning horizon)	\$5.45 /1,000 gallons actually supplied
Net Present Cost of Alternative through 2050	\$212,000 ¹

1 – estimated cost to maintain 5% Jordan Lake allocation through 2050 with no purchases from WIP or Cary/Apex

What impact do these costs have on current rates? (GP C)

These costs may impact current rates if we need to exercise the mutual aid agreement. We pay retail rates for water under our agreements and depending on the amount of water we needed to purchase, this could impact a given year’s budget.

What impact do these costs have on future rates? (GP D)

These costs potentially impact future rates when we use our mutual aid agreements to access our Jordan Lake allocation as demonstrated by the net present cost. In addition, selecting our mutual aid agreements could increase the cost for future customers to access additional water supply. While the costs are based on average purchases over time, the hydrologic model indicates that OWASA could spend as much as \$7.2 million in a single year if it purchased water under Stage 1 conditions which would impact that year’s budget. If the Board selects this alternative, a plan should be implemented to cover this potential budget impact.

How is the water quality of this raw water supply for water treatment purposes? (Staff GP K)

This alternative relies of OWASA’s local water supply reservoirs which are highly protected. The Quarry Reservoir has low solids and needs to be blended with water from Cane Creek Reservoir or University Lake for the settling process to work properly at the Jones Ferry Road WTP.

What permits, regulations, or partnerships are needed for this alternative? (Staff GP L)

This alternative has a fairly straight-forward permit process. The Division of Water Resources may require reclassifying the Quarry Reservoir watershed as critical area. The critical area of our watersheds is defined as any area draining to the reservoir and within ½ mile of it at full pool elevation. More stringent development standards are required in the critical area. Since OWASA owns the land draining to the Quarry Reservoir, this should be straight-forward, but would require a classification change. OWASA will perform microbial monitoring on the expanded Quarry Reservoir as soon as it is put into service; additional monitoring may be required by the North Carolina Public Water Supply Section. Orange County would also require some local construction permits for the generator including erosion and sediment control and stormwater permits.

What level of community engagement is needed for this alternative? (Staff GP M)

Since this alternative relies on supplies that we currently use, the level of community engagement for this alternative would likely be relatively low when compared to the other alternatives.

How does this alternative help us maintain our allocation of water from Jordan Lake? (Staff GP N)

The North Carolina Environmental Management Commission (EMC) evaluates several factors when reviewing applications for allocations of water in Jordan Lake. These include the need for additional water, the potential to use other supplies, and the investments made in Jordan Lake. This alternative would include no investments in Jordan Lake, but would likely result in a demonstrated need in the future assuming OWASA could maintain its allocation of water until it is needed on a regular basis.

Alternative JL-P: Partner in WIP Facilities Using Uniform Rate Capacity Sharing Agreement

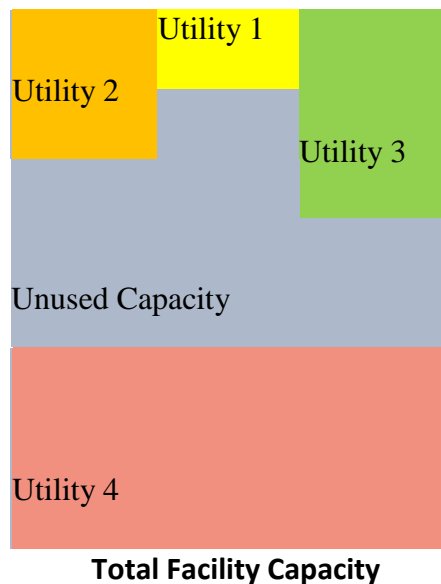
OWASA would be a full partner in the proposed intake, treatment plant, and transmission facilities on the western side of Jordan Lake. For this alternative, we assumed that the WIP facilities would have the capacities summarized in the table below:

Assumed Peak Demands for each Partner

Partner	Phase 1 (2031) Peak Flow (mgd)	Phase 2 (2050) Peak Flow (mgd)
OWASA	0.5	2
Durham	16.5	21
Pittsboro	6	14
Chatham County	3	5
Total Plant Capacity	26	42

This type of agreement involves all participants in the WIP agreeing to pay a “uniform rate” sufficient to cover the total debt service and operating costs of the WIP facility (i.e. treatment plant and intake structure) and related conveyance, regardless of the fraction of the total capacity each partner uses. No participant commits to any specific level of capacity upfront, but rather each participant agrees to pay a rate sufficient that the entire costs of the facility will be covered and that this rate will be calculated using the total costs of production (debt service + operations) and the total fraction of capacity used. Each participant has the ability to increase their use of the facility’s capacity until the unused capacity is fully utilized.

Representation of the allocation of capacity in a uniform rate capacity sharing agreement. The total facility capacity is not fully allocated amongst the four participating utilities, at least in the early years



This type of agreement can be helpful for small, fast-growing communities that need to reserve capacity, but may have trouble financing it in early years.

For the purposes of costing this alternative, we assumed that the Uniform Rate Sharing Agreement would require a minimum purchase each year; for the purposes of analysis, we assumed each Partner would need to cover at least half the costs of their planned capacity. Thus we assumed OWASA would take at least 0.25 mgd of water on an annual average basis during Phase 1, and at least 1 mgd of water in Phase 2.

We used the hydrologic model to identify when purchases may exceed the minimum required purchase. We assumed that OWASA would use water any time an advisory stage as described in its Water Shortage Response Plan (reservoir storage 10 percent above the level when mandatory restrictions would apply). If the hydrologic model indicated OWASA would need more than that in a given year, we assumed the necessary amount to address the advisory (i.e., more than 0.25 mgd or 1 mgd depending on whether it occurred during Phase 1 or 2) would be purchased.

If the Partners opt to charge each other based on fixed capacity which would be based on the capacities assigned in Partner as summarized in the table above, the costs would be similar through 2070, but a bit higher in the nearer term. Fixed capacity agreements are easier to implement and more familiar to the Partners.

How does this alternative reduce our vulnerability to extended drought conditions? (GP B)

This alternative diversifies our water supply portfolio, which mitigates the vulnerability of Cane Creek Reservoir's small watershed area which will require greater time to recover from being drawn down during drought.

How does this alternative improve the reliability and resiliency of our water supply including reducing vulnerability to a single point of failure? (GP C)

This alternative provides guaranteed access to our allocation of water in Jordan Lake which improves the reliability and resiliency of our water supply. This alternative also results in OWASA having ownership in a second water treatment plant.

What are the incremental environmental impacts of this alternative? (GPs F and J)

The proposed intake, plant, and transmission lines are shared with other partners. Thus incremental environmental impacts are low and largely limited to the increased energy use associated with treating and conveying OWASA's share of water, which would be partially offset by reductions in pumping and treatment at our local facilities.

What are the incremental social impacts of this alternative? (GP G)

The proposed intake, plant, and transmission lines are shared with other partners. Thus, there are no incremental social impacts from construction and operation of the proposed WTP and related facilities.

What flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties does this alternative provide? (GP H)

This alternative provides little flexibility since OWASA would be a full partner in the first phase of the proposed treatment facilities. However, OWASA could opt to keep its capacity at the initial 0.5 mgd capacity and not expand it if demands did not warrant a higher capacity or if other cost-effective water supply or demand management options were identified. If this occurred, and other Partner demands continued to grow, OWASA’s relative share of costs would decrease over time.

How does this alternative provide support for regional water supply planning efforts? (GP I)

This alternative results in OWASA financially supporting the proposed western intake and treatment facilities. These facilities will improve the region’s water supply resiliency and reliability by addressing the single point of failure of having only one intake on Jordan Lake, an important regional water supply resource.

What is the cost to implement this alternative?

The 2021 capital costs and net present costs factoring in current federal guidance regarding discount rates and inflation are presented in the table below.

Capital Cost Estimate (2021 dollars)	\$13.6 million (based on 0.5 mgd plant capacity and 2 mgd intake and piping capacity) ¹ \$23.7 million (for 2 mgd)
Net Present Cost of Alternative through 2070	\$14.6 million (for 2 mgd)
Net Present Levelized Cost of Project (\$/1,000 gallons of demand actually met over 50-year planning horizon)	\$1.55 /1,000 gallons actually supplied
Net Present Cost of Alternative through 2050	\$10.6 million

1- debt service payments would be adjusted each year after the facility goes into service based on usage and therefore could be very different than for Alternative JL-A.

What impact do these costs have on current rates? (GP C)

This alternative will require OWASA to participate in the planning, permitting, and preliminary design studies currently underway, and would be included in our budget for FY 2023. Thus, there is an immediate impact on our budgets and potentially the funds available for projects included in our capital improvements program in FY 2023.

What impact do these costs have on future rates? (GP D)

This alternative secures OWASA’s water supply for many decades (i.e. beyond the 2070 planning horizon of this LRWSP). Thus, it helps future generations meet water supply needs cost-effectively. However, this alternative effectively places higher priority on minimizing rate impacts in the future than it does on present rates.

How is the water quality of this raw water supply for water treatment purposes? (Staff GP K)

Jordan Lake is currently used as a water supply for about 700,000 people. Thus, the water quality can be used for water supply; since new treatment facilities will account for water quality conditions, new treatment facilities will meet drinking water standards and protect public health. Jordan Lake does have a watershed of almost 1,700 square miles and does have a higher number of potential contaminant sources within it than OWASA's local water supplies Cane Creek Reservoir, University Lake, and the Quarry Reservoir.

What permits, regulations, or partnerships are needed for this alternative? (Staff GP L)

OWASA would partner with City of Durham, Town of Pittsboro, and Chatham County on this alternative. An interlocal agreement (ILA) exists between these entities that outlines cost sharing for doing preliminary engineering, permitting and determining a governance structure. A new ILA would be needed for construction of the facilities.

Many permits would be needed to implement this alternative; these permit processes would be completed by the Partnership and OWASA would not need to develop them on its own. Major permits include:

- Easement from US Army Corps of Engineers to access Jordan Lake across their land
- Environmental assessment or environmental impact statement that complies with the National Environmental Policy Act (NEPA) and the North Carolina Environmental Policy Act (SEPA)
- USACE Section 401/404 permits for impacts to streams and wetlands
- Erosion and sediment control permits
- Stormwater permits
- Encroachment agreements with NCDOT and potentially others
- State permits for the construction and operation of the intake, treatment plant, and associated pipelines

Obtaining these permits would be a lengthy process, but a straight-forward process that has been completed on similar projects across the state.

What level of community engagement is needed for this alternative? (Staff GP M)

This alternative would likely have a higher level of community engagement than using our current local water supplies. OWASA heard some resistance to using Jordan Lake as a water supply source during the first round of community engagement, and would need to ensure that the community has correct information and that we understand their concerns and fully consider them before the LRWSP is finalized.

**How does this alternative help us maintain our allocation of water from Jordan Lake?
(Staff GP N)**

The North Carolina Environmental Management Commission (EMC) evaluates several factors when reviewing applications for allocations of water in Jordan Lake. These include the need for additional water, the potential to use other supplies, and the investments made in Jordan Lake. This alternative has us investing in being a Partner in the new western intake, treatment and transmission facilities in Phase 1 and there has the highest probability of OWASA maintaining its allocation of water in Jordan Lake.

Alternative JL-A: Agreement with Western Intake Partners

Under this alternative, OWASA would buy into a future phase of the proposed facilities on the western shore of Jordan Lake based on OWASA's future capacity and the actual cost to plan, design, and construct the intake, raw water pipeline, and transmission facilities. The option payments made would be used to secure access to OWASA's Jordan Lake allocation under specified conditions related to drought or operational emergency until it became a Partner in the facilities. For the purposes of this analysis, we made the following assumptions:

- We used OWASA's water supply model to evaluate risk through 2070 and assumed we would use our mutual aid agreements to access our allocation when we hit a water shortage advisory (10 percent above mandatory restrictions in Stage 1 water shortage) as described in our [Water Shortage Response Plan](#).
- When we purchase water, we purchase at a rate of 4 mgd, but also maintain 4 mgd through our Jones Ferry Road WTP (i.e. we would purchase a lower amount to maintain 4 mgd at our WTP).
- Assumed option payments would begin in 2031 and continue through 2050; the option fee as presented is assumed to be \$150,000 annually in 2021 dollars. OWASA would repay the WIP for the outstanding marginal capacity built into the Phase I facilities beginning in 2047. The option fee agreed upon is highly negotiable and helps pay for a portion of the marginal capacity prior to OWASA joining the WIP in Phase II.
- Assume we can purchase water at any time of year.
- From 2050 to 2070, OWASA would be a full partner at 2 mgd ownership in Phase 2 of the facility

How does this alternative reduce our vulnerability to extended drought conditions? (GP B)

This alternative guarantees us access to our Jordan lake allocation on an annual average basis until 2050, and when Phase 2 facilities are available, it provides guaranteed access on a year-round basis. Thus, this alternative diversifies our water supply portfolio and addresses our vulnerability of Cane Creek Reservoir's small watershed area which will require greater time to recover from being drawn down during drought.

How does this alternative improve the reliability and resiliency of our water supply including reducing vulnerability to a single point of failure? (GP C)

This alternative results in OWASA having ownership in a second water treatment plant in the future. It also provides guaranteed access to our Jordan Lake allocation under specified conditions, but we may not be able to access the water on any given day. Thus, this alternative provides a high level of reliability and resiliency, but not as high as being a partner in Phase 1.

What are the incremental environmental impacts of this alternative? (GPs F and J)

There would be some increased electricity use at the western intake facilities to pump and treat OWASA’s share of water in Phase 1 and 2. This increase would be partially offset by reduced pumping and treatment at our local facilities.

What are the incremental social impacts of this alternative? (GP G)

There are no incremental social impacts of constructing and operating the proposed intake, plant, and transmission lines.

What flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties does this alternative provide? (GP H)

This alternative provides flexibility. However, OWASA would likely forfeit any options payments it made during Phase 1 if it did not choose to participate in Phase 2 of the western intake facilities.

How does this alternative provide support for regional water supply planning efforts? (GP I)

This alternative results in OWASA financially supporting the proposed western intake and treatment facilities by providing an option fee during the first phase and buying into the facilities in Phase 2. These facilities will improve the region’s water supply resiliency and reliability by addressing the single point of failure of having only one intake on Jordan Lake, an important regional water supply resource.

What is the cost to implement this alternative?

The net present costs factoring in current federal guidance regarding discount rates and inflation are presented in the table below.

Capital Cost (2021 dollars)	\$13.6 million
Net Present Cost of Alternative through 2070	\$14.7 million
2070 Net Present Levelized Cost of Project (\$/1,000 gallons of demand actually met over 50-year planning horizon)	\$1.55 /1,000 gallons actually supplied
Net Present Cost of Alternative through 2050	\$2.6 million
Annual Option Fee (2021 dollars)	\$150,000

What impact do these costs have on current rates? (GP C)

This alternative postpones any investment in the western intake facilities until we have to pay an option fee in approximately 2031. This alternative also has a fairly low net present cost in 2050, and therefore should have minimal impact on rates in the near-term.

What impact do these costs have on future rates? (GP D)

This alternative balances the impact on current and future rates. By proactively planning ahead for future supply, OWASA helps manage the impact of future rate changes.

How is the water quality of this raw water supply for water treatment purposes? (Staff GP K)

Jordan Lake is currently used as a water supply for about 700,000 people. Thus, the water quality can be used for water supply; since new treatment facilities will account for water quality conditions, new treatment facilities will meet drinking water standards and protect public health. Jordan Lake has a watershed of almost 1,700 square miles and has a higher number of potential contaminant sources within it than OWASA's local water supplies Cane Creek Reservoir, University Lake, and the Quarry Reservoir.

What permits, regulations, or partnerships are needed for this alternative? (Staff GP L)

This alternative would require partnerships with the WIP. There is uncertainty in developing an agreement as described in this section that would be acceptable to OWASA and the other Partners; developing the details of an agreement would likely be a lengthy process. No state or federal permits are needed for this alternative.

What level of community engagement is needed for this alternative? (Staff GP M)

This alternative would likely have a higher level of community engagement than using our current local water supplies. OWASA heard some concerns about using Jordan Lake as a water supply source during the first round of community engagement, and would need to ensure that the community has correct information and that we understand their concerns and fully consider them before the LRWSP is finalized.

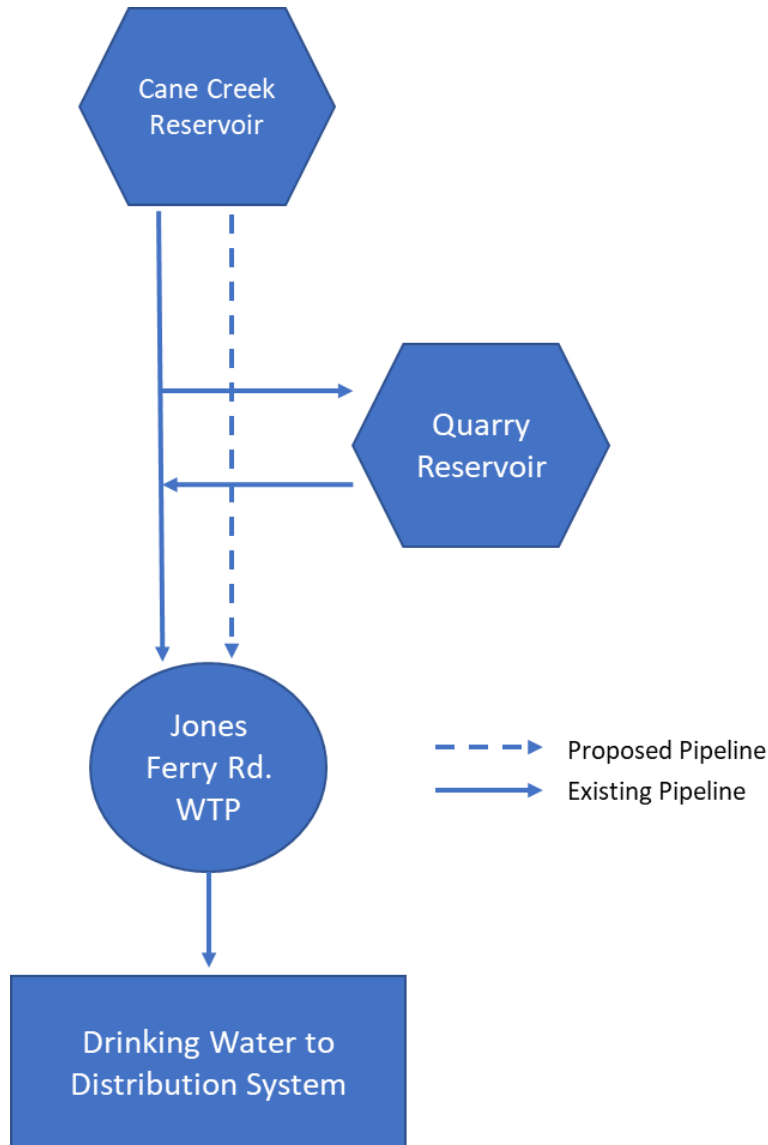
Some of the comments regarding Jordan Lake revolved around the timing of our investment. We do not need regular access to our Jordan Lake allocation for many years. This alternative recognizes this, and OWASA would be making options payments to ensure access to our water supply allocation from Jordan Lake during the next 30 years, and guaranteeing that the intake and transmission infrastructure that is hard to expand has been planned with our future needs.

How does this alternative help us maintain our allocation of water from Jordan Lake? (Staff GP N)

The North Carolina Environmental Management Commission (EMC) evaluates several factors when reviewing applications for allocations of water in Jordan Lake. These include the need for additional water, the potential to use other supplies, and the investments made in Jordan Lake. OWASA would be investing in Jordan Lake under this alternative, but not to the extent that it would be under the Partnership alternative. However, this alternative ranks high in our ability to maintain an allocation in Jordan Lake.

Alternative DQ: Deep Quarry

This alternative is similar to Alternative 5 (Shallow Quarry Reservoir), but also includes installation of: (a) a new Quarry Reservoir pump station (including standby power generation) to access water from a maximum depth of 220 feet; (b) a 30-inch parallel transmission main from Cane Creek Reservoir to the Quarry Reservoir; (c) a 24-inch parallel main from the Quarry Reservoir to the Jones Ferry Road WTP; and (d) a larger raw water pump station at Cane Creek Reservoir. The schematic below illustrates this alternative.



How does this alternative reduce our vulnerability to extended drought conditions? (GP B)

This alternative does not diversify our water supply and address the vulnerability from Cane Creek Reservoir’s small drainage area. It will require Cane Creek Reservoir water to refill it

when it is drawn down since the Quarry Reservoir does not have much drainage area. However, it does increase our anticipated yield to about 13.9 mgd in about 2035.

How does this alternative improve the reliability and resiliency of our water supply including reducing vulnerability to a single point of failure? (GP C)

This alternative likely meets our water supply needs through 2070, but it does not set us up for continued success in meeting our water supply needs. It does provide an additional pipeline from Cane Creek Reservoir to the Jones Ferry Road WTP.

What are the incremental environmental impacts of this alternative? (GPs F and J)

This alternative would have temporary adverse environmental impacts associated with construction of the new pumping and transmission facilities. A small number of stream crossings and area of wetland disturbance would need to be mitigated; however, construction would be located along roads and within the fence line of OWASA's existing Quarry Reservoir and Cane Creek Reservoir. This alternative would use greater amounts of energy for pumping from deeper depths than the planned shallow Quarry Reservoir.

What are the incremental social impacts of this alternative? (GP G)

There would be temporary construction impacts to traffic and noise. This alternative would also temporarily impact some private property parcels along the road right-of-way, as well as the Cane Creek Reservoir recreation area.

What flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties does this alternative provide? (GP H)

The Deep Quarry alternative requires a large capital investment which results in limited flexibility to change course.

How does this alternative provide support for regional water supply planning efforts? (GP I)

OWASA would not share in the planning, development, and ownership of water supply infrastructure with our utility neighbors and help finance them. Through its participation in the Triangle Regional Water Supply Partnership, OWASA would support the western intake facilities and other regional efforts.

What is the cost to implement this alternative?

The net present costs factoring in current federal guidance regarding discount rates and inflation are presented in the table below.

Capital Cost (2021 dollars)	\$88.3 million
Net Present Cost of Alternative through 2070	\$76.9 million
2070 Net Present Levelized Cost of Project (\$/1,000 gallons of demand actually met over 50-year planning horizon)	\$5.73 /1,000 gallons actually supplied
Net Present Cost of Alternative through 2050	\$75.3 million

What impact do these costs have on current rates? (GP C)

This alternative has the highest net present cost through 2050. These impacts will begin to impact rates in the next few years as OWASA would need to finance this capital project on its own. There are portions of this alternative that must be planned and constructed while the existing Quarry Reservoir is drained (beginning in about 2025).

What impact do these costs have on future rates? (GP D)

This alternative has the highest net present cost through 2070 and the highest net present cost per 1,000 gallons of water supplied.

How is the water quality of this raw water supply for water treatment purposes? (Staff GP K)

This alternative relies on OWASA’s local water supply reservoirs which are highly protected. The Quarry Reservoir has low solids and needs to be blended with water from Cane Creek Reservoir or University Lake for the settling process to work properly at the Jones Ferry Road WTP.

What permits, regulations, or partnerships are needed for this alternative? (Staff GP L)

The Deep Quarry alternative has OWASA obtaining permits on its own under this alternative. The Division of Water Resources may require reclassifying the Quarry Reservoir watershed as critical area. The critical area of our watersheds is defined as any area draining to the reservoir and within ½ mile of it at full pool elevation. More stringent development standards are required in the critical area. Since OWASA owns the land draining to the Quarry Reservoir (need to verify through site visit), this should be straight-forward, but would require a classification change. OWASA will perform microbial monitoring on the expanded Quarry Reservoir as soon as it is put into service; additional monitoring may be required by the North Carolina Public Water Supply Section. Orange County would also require some local construction permits for the generator including erosion and sediment control and stormwater permits.

This alternative also has OWASA obtaining permits for a deep shaft to accommodate the new pump station infrastructure. The process for obtaining this permit is a bit uncertain as there are few if any other intakes like this in North Carolina.

What level of community engagement is needed for this alternative? (Staff GP M)

This alternative has us relying on our local water supply sources and would likely have a lower community outreach effort. However, given its high capital cost, it may have some opposition from the community.

How does this alternative help us maintain our allocation of water from Jordan Lake? (Staff GP N)

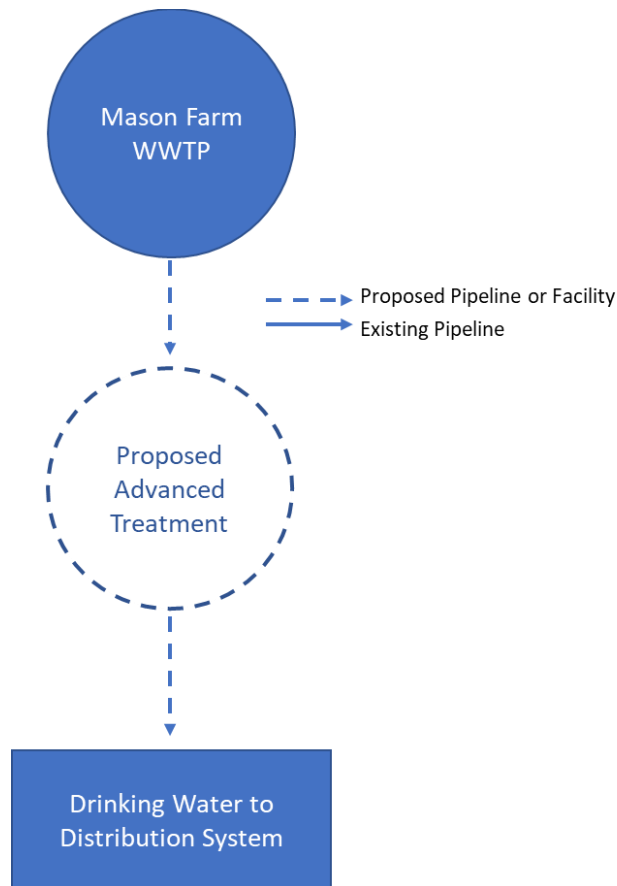
The North Carolina Environmental Management Commission (EMC) evaluates several factors when reviewing applications for allocations of water in Jordan Lake. These include the need for additional water, the potential to use other supplies, and the investments made in Jordan Lake. Since OWASA would likely use Jordan Lake infrequently over the next several decades and we will not have invested in Jordan Lake infrastructure, this alternative has a higher likelihood of having our allocation reduced or rescinded than many of the other alternatives.

Alternative DPR: Direct Potable Reuse

This alternative includes the advanced treatment of reclaimed water (RCW) at the Mason Farm WWTP so it can be directly delivered into our drinking water distribution system. To enable this, we assumed the following facilities would be required:

- Advanced treatment of OWASA’s RCW; two treatment processes were evaluated:
 - Reverse osmosis (RO) – generally required if total dissolved solids (TDS) removal is required
 - Activated carbon – generally preferred if TDS removal is not required as there are lower capital and operations and maintenance costs than RO; also has lower environmental impacts than RO;
- Purchase of approximately 2 acres of land near the WWTP to site the advanced treatment;
- 0.5 million gallon storage tank;
- New pump station at the WWTP; and
- New pipeline to connect to a water main near the WWTP

This alternative is illustrated in the schematic below.



How does this alternative reduce our vulnerability to extended drought conditions? (GP B)

Direct potable reuse increases the diversity of our water supply. However, it is not currently legal; until it is legal and operational, it does not improve our vulnerability to extended droughts.

How does this alternative improve the reliability and resiliency of our water supply including reducing vulnerability to a single point of failure? (GP C)

Direct potable reuse would meet OWASA's water supply needs beyond 2070. It also provides another water treatment facility. However, it is not legal in North Carolina and there is uncertainty on when this alternative would be available for use.

What are the incremental environmental impacts of this alternative? (GPs F and J)

This alternative involves extensive construction and depending on facility siting, it could impact some streams and wetlands. The WWTP and surrounding area are in floodplains so some impacts would occur to floodplains as well. The advanced treatment would require increased energy and result in higher carbon emissions; the pumping associated with this alternative would likely be offset by reduced pumping at the Jones Ferry Road WTP.

If RO treatment is needed for enhanced removal of TDS and/or to meet other water quality requirements, energy usage and greenhouse gas emissions will be more substantial. RO treatment generates greater volumes of more concentrated waste streams, and those will be more difficult and costly to manage. These waste streams are difficult to dispose due to high TDS content. For OWASA's situation, the most practical solution to dispose of concentrated RO waste is to discharge it to our WWTP system if the flow can be sufficiently diluted by other wastewater to avoid disruptions to the conveyance and treatment processes (e.g., corrosion, impaired wastewater treatment, surface water discharge compliance issues).

Additionally, the diversion of substantial volumes of advanced treated RCW from the Mason Farm WWTP to the distribution system would reduce or potentially eliminate surface water discharges to Morgan Creek and ultimately Jordan Lake. Reduced effluent discharge could benefit the receiving water by reducing the associated loading of nutrients. However, reduced discharges could also adversely impact downstream wildlife habitat.

What are the incremental social impacts of this alternative? (GP G)

This alternative requires OWASA to purchase approximately 2 acres of land. This alternative would result in temporary impacts from construction to traffic and noise and may impact private property owners along the pipeline.

What flexibility to change course as we learn more about future customer demands, growth, climate impacts, and other uncertainties does this alternative provide? (GP H)

This alternative provides a lot of flexibility to change course since OWASA would not be making capital investments in the near future. However, if OWASA determined that it did not want to pursue direct potable reuse, it may be much more expensive to access our Jordan lake

allocation in the future; it will also be more difficult to maintain our Jordan Lake allocation than some other alternatives.

How does this alternative provide support for regional water supply planning efforts?

(GP I)

The Direct Potable Reuse alternative would likely result in OWASA not sharing water supply infrastructure with our utility neighbors and help finance them. Through its participation in the Triangle Regional Water Supply Partnership, OWASA would support the western intake facilities and other regional efforts.

What is the cost to implement this alternative?

The net present costs factoring in current federal guidance regarding discount rates and inflation are presented in the tables below.

RO-Based Treatment

Capital Cost (2021 dollars)	\$68.1 million
Net Present Cost of Alternative through 2070	\$37.4 million
2070 Net Present Levelized Cost of Project (\$/1,000 gallons of demand actually met over 50-year planning horizon)	\$3.98 /1,000 gallons actually supplied
Net Present Cost of Alternative through 2050	\$2.6 million

Carbon-Based Treatment

Capital Cost (2021 dollars)	\$52.0 million
Net Present Cost of Alternative through 2070	\$22.0 million
2070 Net Present Levelized Cost of Project (\$/1,000 gallons of demand actually met over 50-year planning horizon)	\$2.34 /1,000 gallons actually supplied
Net Present Cost of Alternative through 2050	\$2.0 million

What impact do these costs have on current rates? (GP C)

These costs have no impact on current rates since it is assumed the Direct Potable Reuse system would not be online until around 2050. Thus the 2050 net present cost is low relative to other alternatives.

What impact do these costs have on future rates? (GP D)

OWASA would be developing new infrastructure without the benefit of pooling resources with other utilities under this alternative, and the 2070 net present cost is higher than Jordan Lake alternatives. It would have a lower impact on future rates than the Deep Quarry alternative.

How is the water quality of this raw water supply for water treatment purposes? (Staff GP K)

There is no environmental buffer provided when we directly use our treated effluent for water supply purposes. Thus, this alternative ranks lower for raw water supply quality.

What permits, regulations, or partnerships are needed for this alternative? (Staff GP L)

This alternative is not currently legal in North Carolina. However, existing and ongoing potable reuse regulations, guidelines, demonstration projects, and full-scale systems across the United States support the technical feasibility of this alternative. If and when this alternative becomes legal in North Carolina, state permits would be needed to use highly treated RCW as a new water supply source. Since this would be a new permit process, there is a high amount of uncertainty associated with it and would likely be lengthy.

Permits to address development in the floodplain would be needed along with local permits for stormwater and erosion and sediment control.

What level of community engagement is needed for this alternative? (Staff GP M)

This alternative would likely need a high level of community engagement. There is a potential negative view of customers using reclaimed water for drinking water purposes. Ongoing potable reuse projects across the United States highlight the potential for public acceptance of direct potable reuse with purposeful, proactive outreach.

How does this alternative help us maintain our allocation of water from Jordan Lake? (Staff GP N)

The North Carolina Environmental Management Commission (EMC) evaluates several factors when reviewing applications for allocations of water in Jordan Lake. These include the need for additional water, the potential to use other supplies, and the investments made in Jordan Lake. This alternative would result in a high likelihood of OWASA's Jordan Lake allocation of water being rescinded or reduced. Once the direct potable reuse facilities are online, OWASA would likely not need to use its Jordan Lake allocation; OWASA would not invest in resources to access its Jordan Lake allocation under this alternative.

Attachment 2: Supply Alternatives

Supply Alternatives Eliminated from Further Consideration

There are several supply alternatives that were evaluated in the August 13, 2020 agenda package that have been eliminated from further consideration. Each of these alternatives involves indirect potable reuse with a return to a location within the University Lake watershed. University Lake is classified as WS-II and is highly protected. State regulations do not allow wastewater dischargers in WS-II watersheds. If OWASA worked to modify state regulations, there is the potential that facilities other than OWASA's Mason Farm WWTP would be allowed to discharge their effluent into the watershed. If industrial facilities or other types of facilities were allowed to discharge wastewater, this could have long-term implications on water quality in University Lake and Cane Creek Reservoir (also classified as WS-II). Further information on these alternatives is provided below.

- Indirect potable reuse with return from Mason Farm WWTP to a new pretreatment mixing basin near the Quarry Reservoir – this alternative was evaluated in August 2020 and was eliminated from further consideration due to the cost of the alternative and the likelihood that this alternative is not legal in North Carolina. The pretreatment mixing basin would likely be constructed within the University Lake watershed. This alternative also requires much more transmission and pumping infrastructure than direct potable reuse, which has been carried forward in this agenda package. This increased pumping and transmission infrastructure has higher environmental impacts in terms of stream crossing, electricity use, and greenhouse gas emissions than direct potable reuse. This transmission infrastructure results in higher costs than direct potable reuse.
- Indirect potable reuse with return from Mason Farm WWTP to the Quarry Reservoir – this alternative was evaluated in August 2020 and was eliminated from further consideration due to the cost of the alternative and the likelihood that this alternative is not legal in North Carolina. The Quarry Reservoir is located within the University Lake watershed and is currently approved as a water supply. Similar to returning treated effluent to a new pretreatment mixing basin, this alternative requires more pumping and transmission infrastructure than direct potable reuse. The transmission infrastructure results in higher costs than direct potable reuse.
- Indirect potable reuse with return from Mason Farm WWTP to University Lake – this alternative is not legal in North Carolina as state law only allows reuse water in pretreatment mixing basins as defined in general statute. State law also does not allow wastewater discharges into WS-II watersheds. Staff did not fully evaluate the amount of water this alternative could provide for the August 2020 agenda package since it is only viable when water is not flowing over University Lake Dam. University Lake has a storage capacity of about 450 million gallons and a drainage area of about 30 square miles. This is a relatively small storage volume for the watershed size; thus University Lake fills fairly quickly after rain events. The historic record from January 2000 to

October 2019 indicates that water is flowing over the dam approximately 34 percent of the time, and this time period includes two major droughts, including the drought of record. (Note: this analysis did not include data from the period January 2018 to April 2019 since water was being pumped out of University Lake for work on the flashboards). Thus, a reclaimed water system that includes University Lake could not be used approximately 1/3 of the time.

Attachment 3: Water Quality Information

Jordan Lake provides safe and reliable drinking water to approximately 700,000 people. Several of the supply alternatives OWASA is evaluating provide access to our allocation of water from Jordan Lake's water supply pool. Jordan Lake has a watershed of approximately 1700 square miles, which results in a robust and reliable water supply source. However, its large watershed is also characterized by a variety of land uses and wastewater treatment facilities; the larger watershed results in a higher number of potential contaminant sources than in University Lake and Cane Creek Reservoir. OWASA received comments during the first round of community engagement during this update of the LRWSP regarding the water quality in Jordan Lake and its susceptibility to pollution as compared to OWASA's local water supplies which have more stringent development restrictions. In order to address these comments, OWASA evaluated drinking water quality and source water quality data.

Summary:

OWASA staff evaluated treated drinking water data for utilities who use Jordan Lake as a raw water supply and for OWASA. We also evaluated raw water data for Jordan Lake, University Lake, and Cane Creek Reservoir. We believe that water quality in Jordan Lake is acceptable for use as a water supply. Higher concentrations of disinfection byproducts were observed in the drinking water for utilities that use Jordan Lake as a raw water source, but all drinking water standards were met. University Lake and Cane Creek Reservoir had concentrations for 1,4-dioxane below detection while Jordan Lake exhibited detectable values. Jordan Lake and Cane Creek Reservoir have PFAS, but treatment facilities are effectively reducing these parameters to acceptable levels. The Western Intake Partners are collecting data on each of these parameters and will account for them when designing the proposed water treatment facility, and staff is confident that the proposed western intake facilities will meet existing and future drinking water standards.

Drinking Water Quality:

To evaluate drinking water quality, OWASA compiled data available through the annual water quality reports for the last five years for OWASA, Chatham County, and Town of Cary; both Chatham County and Town of Cary treat water from Jordan Lake. Tables 1 and 2 summarize the results for 2020. Attachment 1 includes a list of acronyms included in the tables, and Attachment 2 includes more complete data from 2016-2020.

Table 1: Summary of 2020 Maximum Water Quality Report Data for OWASA, Chatham County, and Town of Cary Drinking Water

Analyte	Units	MCL [SMCL]	Year	OWASA	Chatham	Cary
Fluoride	ppm	4 [2]	2020	0.79	2.59	0.82
HAA5 max LRAA**	ppb	60	2020	13.1	14	16
Iron	ppm	[0.3]	2020	0.09	0.14	<0.06
Manganese	ppm	[0.05]	2020	0.082	0.05	0.03
TOC*	ppm	No MCL	2020	1.51	2.3	Not reported
TTHM max LRAA**	ppb	80	2020	21.7	28	40

*TOC has no MCL; there is a removal ratio requirement included in dataset in Attachment 2 for each utility

**HAA5 and TTHM MCLs are based on highest locational running annual average; the locational running annual average is the average of sample results from a particular location during the previous four calendar quarters. The value reported is the highest LRAA of any of the monitored locations with at least one sample collected in 2020.

Table 2: Summary of 2020 Average Water Quality Report Data for OWASA, Chatham County, and Town of Cary Drinking water

Analyte	Units	MCL [SMCL]	Year	OWASA	Chatham	Cary
Bromodichloromethane	ppb	N/R*	2020	3.4	N/A**	14
Bromoform	ppb	N/R	2020	< 1.0	N/A	1.7
Chlorodibromomethane (Dibromochloromethane)	ppb	N/R	2020	1.1	N/A	10
Chloroform	ppb	N/R	2020	4.7	N/A	13
Free chlorine	ppm	4 [2]	2020	1.33	3.44	2.05
Ortho-phosphate	ppm	N/R	2020	0.59	N/A	0.62
pH	SU	No MCL	2020	8.34	7.54	7.75
Sodium	ppm	N/R	2020	36	22.8	31.7
Specific Conductance	µS/cm	N/R	2020	253	N/A	221
Sulfate	ppm	[250]	2020	56	33	37
Total chlorine	ppm	4	2020	2.81	3.62	3.05
Total Hardness	mg CaCO ₃ /L	N/R	2020	23.8	33	33
Total-Phosphorus	ppm	N/R	2020	0.73	0.929	0.23
Turbidity	NTU	≥95% of samples < 0.3 and max 1	2020	0.021	0.044	0.05

*N/R = not regulated

**N/A – data not available

The results indicate that all treatment facilities are in compliance with drinking water regulations. The Town of Cary, Chatham County and OWASA do an excellent job addressing total trihalomethanes (TTHMs) and all utilities have TTHMs concentrations well below the regulatory limit. While concentrations are higher in the Town of Cary and Chatham County's drinking water than in OWASA's, the TTHMs found in Cary's and Chatham County's drinking water are notably equal to or less than half of the allowable limit. TTHMs are a disinfection byproduct which are formed when disinfectants combine with naturally occurring materials found in source water. Several factors contribute to TTHM concentrations including precursors in the raw water, water treatment technology (coagulant, biofiltration, ozonation, disinfection), and water age in the distribution system.

Contaminants of Emerging Concern:

Per and polyfluoroalkyl substances (PFAS) and 1,4-dioxane are compounds of emerging concern that have been detected in the Haw River watershed (drains to Jordan Lake) and other areas within the Cape Fear River Basin. The Town of Cary has been proactively monitoring for each of these two categories of contaminants. Additional information about their monitoring program and laboratory results can be found on Cary's [web page](#) and their most recent annual reports ([2020 Water Quality Report](#) & [2020 Water Quality Testing Report](#)).

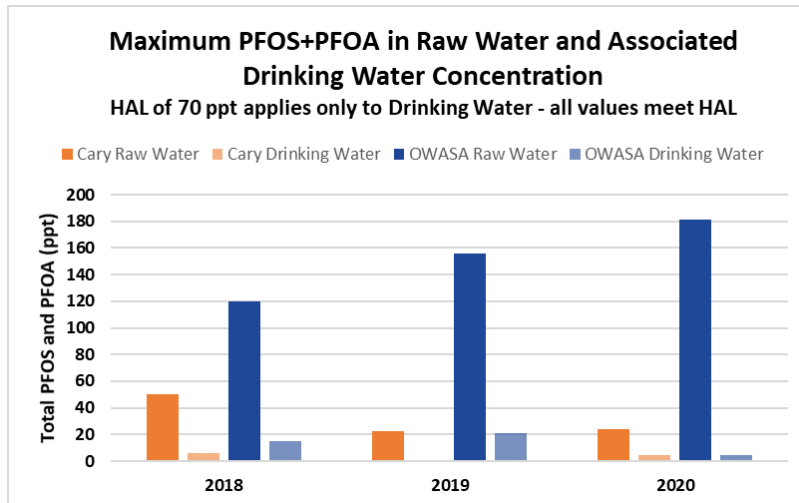
In 2018 OWASA proactively began monitoring for PFAS, and only one sample was collected from each monitoring location that year. Results indicated that Cane Creek Reservoir had elevated concentrations of PFAS, and a decision was made to continue quarterly monitoring of water from the intake on Cane Creek Reservoir and of our treated drinking water. Results of University Lake water collected in 2018 showed low concentrations of PFAS. Additional information on OWASA's PFAS monitoring is found [here](#).

PFAS

PFAS are a class of man-made chemicals used in a variety of products to increase resistance to water, grease, and stains. They are found in carpet, clothing, upholstery, food packaging, cookware and firefighting foams. EPA has not set regulatory standards for these chemicals yet, but has set a health advisory level (HAL) of 70 parts per trillion (ppt) for two of the more common PFAS substances, PFOS and PFOA, in drinking water (the HAL is for the combined amount of the two chemicals). HALs are non-enforceable, non-regulatory federal guidance which describes the concentration which can be consumed with little or no risk to health.

The Town of Cary and OWASA data for PFOS and PFOA are summarized in Figure 1.

Figure 1: OWASA and Town of Cary Water Treatment Facilities are Effective at Removing PFOS and PFOA and Drinking Water Meets EPA Health Advisory (all results in parts per trillion)



The data in Figure 1 show that the OWASA and Cary water treatment facilities remove PFOS and PFOA to levels well below the HAL. The treatment process at both facilities includes powdered activated carbon, which has been shown to effectively remove certain categories of PFAS compounds.

Table 3 summarizes the data on other PFAS compounds OWASA and Cary have collected in their raw water and treated drinking water.

Table 3: OWASA and Town of Cary PFAS Monitoring Results in Drinking Water and Raw Water (all results in parts per trillion)

Analyte	Year	OWASA Drinking Water			Cane Creek Intake			Cary Drinking Water			Cary Raw Water		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
6:2 FTS	2018	< 2.0	<2.0	<2.0	< 2.0	< 2.0	< 2.0	0.6	< 2.0	10	0.6	< 2.0	4.6
PFBS	2018	4.2	4.2	4.2	7.8	7.8	7.8	1.2	< 2.0	2.8	4.5	2.5	5.8
PFPeS	2018	< 2.0	<2.0	2.0	9.0	9.0	9.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFHxS	2018	3.5	3.5	3.5	20.0	20.0	20.0	< 2.0	< 2.0	< 2.0	4.0	2.1	7.1
PFHpS	2018	< 2.0	< 2.0	< 2.0	3.9	3.9	3.9	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFBA	2018	< 5.0	< 5.0	< 5.0	6.1	6.1	6.1	16	8.4	23	18.8	9.6	26.0
PFPeA	2018	5.1	5.1	5.1	8.7	8.7	8.7	24.1	8.3	41	32.2	12.0	55.0
PFHxA	2018	7.7	7.7	7.7	12.0	12.0	12.0	20.8	6.4	38	38.6	13.0	74.0
PFHpA	2018	7.4	7.4	7.4	16.0	16.0	16.0	9.1	3.2	17	26.6	9.6	51.0
PFNA	2018	< 2.0	< 2.0	< 2.0	2.6	2.6	2.6	< 2.0	< 2.0	< 2.0	3.1	< 2.0	5.5
PFDA	2018	< 2.0	<2.0	<2.0	< 2.0	<2.0	<2.0	< 2.0	< 2.0	< 2.0	2.7	< 2.0	5.5
6:2 FTS	2019	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFBS	2019	3.6	2.1	5.9	6.1	4.1	8.1	< 2.0	< 2.0	2.5	3.2	2.4	4.7

Analyte	Year	OWASA Drinking Water			Cane Creek Intake			Cary Drinking Water			Cary Raw Water		
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
PFPeS	2019	0.5	< 2.0	2.7	4.8	2.8	6.2	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFHxS	2019	2.2	< 2.0	4.9	15.4	10.0	20.0	< 2.0	< 2.0	< 2.0	1.4	< 2.0	3.1
PFHpS	2019	< 2.0	< 2.0	< 2.0	3.1	2.1	4.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFBA	2019	2.3	< 5.0	6.0	5.4	< 5.0	8.1	10	6.5	14	12.4	9.6	15.0
PFPeA	2019	5.0	3.5	7.3	6.1	4.2	8.8	9.7	3.9	18	12.4	5.3	24.0
PFHxA	2019	7.1	4.5	11.0	9.9	6.8	13.0	6.0	< 2.0	12	13.1	5.8	25.0
PFHpA	2019	6.2	3.6	10.0	13.4	8.9	17.0	4.5	2.7	6.6	9.2	3.8	18.0
PFNA	2019	< 2.0	< 2.0	< 2.0	1.5	< 2.0	2.8	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFDA	2019	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
6:2 FTS	2020	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFBS	2020	2.9	< 2.0	4.6	7.9	7.1	8.6	3.3	2.8	4	4.8	4.1	5.2
PFPeS	2020	1.2	< 2.0	2.4	5.3	4.4	6.3	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFHxS	2020	2.7	< 2.0	6.0	20.0	18.0	22.0	< 2.0	< 2.0	< 2.0	2.8	2.4	3.3
PFHpS	2020	< 2.0	< 2.0	< 2.0	4.2	4.1	4.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFBA	2020	< 5.0	< 5.0	< 5.0	5.3	< 5.0	8.0	9.6	8.2	11	12.1	8.5	15.0
PFPeA	2020	5.2	4.5	5.6	8.3	7.3	9.8	12.4	9.6	17	13.8	11	19
PFHxA	2020	6.2	4.0	7.8	13.3	12.0	15.0	10.9	7.8	15	14.2	9.7	21.0
PFHpA	2020	5.7	2.2	8.4	16.8	15.0	19.0	5.2	3.1	8	8.8	5.4	14.0
PFNA	2020	< 2.0	< 2.0	< 2.0	2.6	2.3	2.9	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PFDA	2020	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

OWASA had one sampling event for PFAS compounds in 2018

The data in Table 3 illustrate that for all parameters, the drinking water levels are either less than those seen in the raw water or about the same. The OWASA and Cary water treatment processes include powdered activated carbon which is effective in removing certain types of PFAS.

The US Environmental Protection Agency released a [PFAS Strategic Roadmap](#) in October 2021 that summarizes how the agency plans to address PFAS through 2024. This Roadmap is an integrated approach that is using several federal statutes to address PFAS including the Safe Drinking Water Act; Clean Water Act; Comprehensive Environmental Response, Compensation and Liability Act; and the Toxic Substances Control Act. The comprehensive plan includes strategies to address PFAS before they enter the environment, improve our understanding of PFAS and their impact on human health and the environment through monitoring, develop guidance on disposing of PFAS, and develop technologies to reduce PFAS already in the environment.

1,4-Dioxane

1,4-dioxane is a manufactured chemical that is often used as a solvent and found in paint strippers; dyes; antifreeze; personal care products such as shampoos, deodorants and cosmetics; certain plastics; and other products. EPA and the US Department of Health and Human Services

have classified 1,4-dioxane as a likely carcinogen. EPA has not established an MCL for 1,4-dioxane in drinking water, but it has established a health advisory level of 35 ppb.

The Town of Cary has been proactively monitoring for 1,4-dioxane in both its raw water and drinking water. Table 4 summarizes the results:

Table 4: Town of Cary 1,4-Dioxane Monitoring Results in Raw Water and Drinking Water (all results in parts per billion)

Year	Cary Drinking Water			Cary Raw Water		
	Avg	Min	Max	Avg	Min	Max
2018	0.16	0.07	0.24	0.27	0.13	0.38
2019	0.26	0.26	0.26	0.89	0.89	0.89
2020	0.12	< 0.07	0.71	0.26	< 0.07	1.0

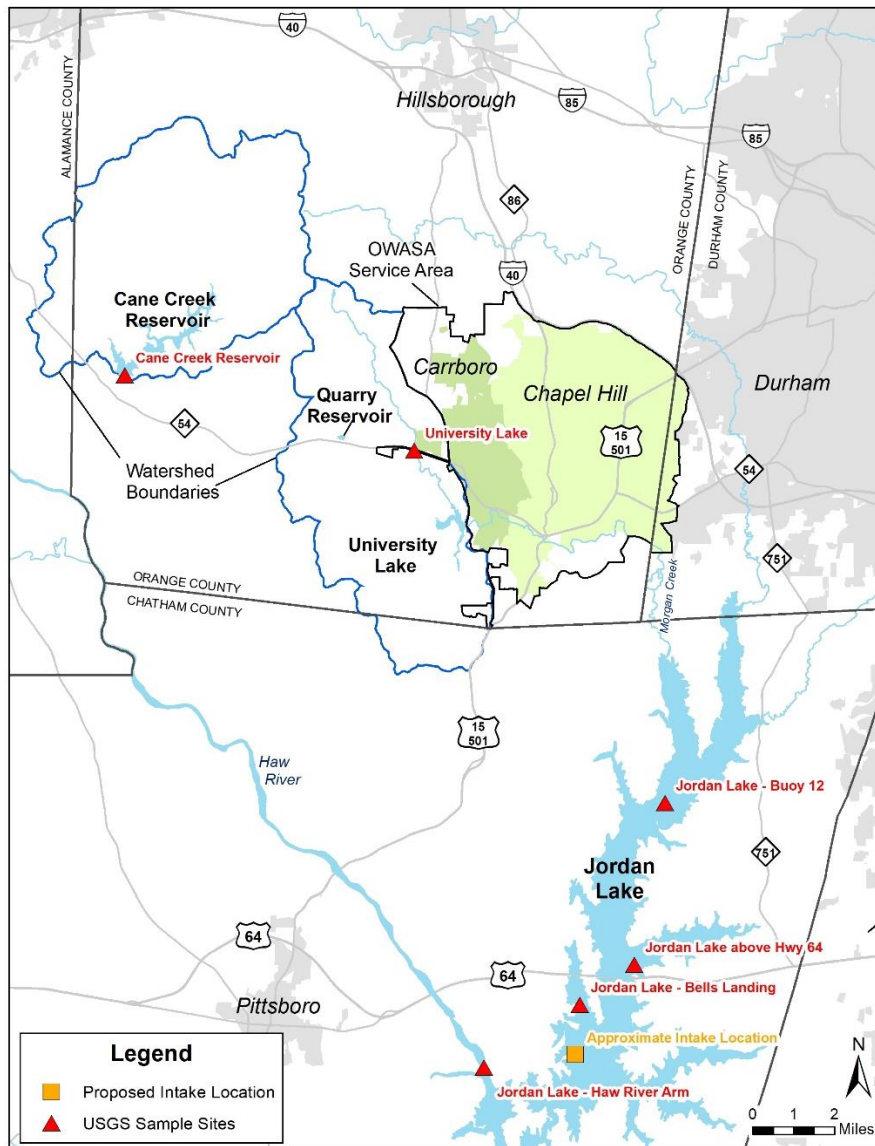
While limited data is available, results show that treated water values are below the EPA’s health advisory level of 35 ppb. The Town of Cary has noted that its ozonation process is effective at reducing 1,4-dioxane levels, and the data in Table 4 support that statement. It should be noted that Town of Cary water performs well below drinking water standard thresholds and is also within the health advisories of these unregulated chemicals.

Raw Water Quality:

OWASA is a founding member of the Triangle Area Water Supply Monitoring Project (TAWSSMP), a collaborative partnership between local governments to monitor drinking water supplies in the region. The US Geological Survey (USGS) collects and analyzes data on behalf of the Partners. Having one agency collect and analyze data has resulted in a robust, quality-assured data set that enables comparison among sites.

TAWSSMP operates in multi-year phases. Scopes of work were developed for each phase; there are data common to all phases including nutrients and chlorophyll *a*. Each phase also focuses on certain parameters of interest. For example, the current phase includes monitoring for bromide and 1,4-dioxane. The TAWSSMP recently decided to add PFAS monitoring, but data for this class of compounds are not yet available. This section summarizes data collected through the TAWSSMP in Jordan Lake (4 stations), University Lake (1 station) and Cane Creek Reservoir (1 station). The monitoring locations are shown in Figure 2.

Figure 2: TAWSMP Locations in Jordan Lake, University Lake, and Cane Creek Reservoir



The USGS collected water quality samples at three different depths at each lake site: (1) surface location at one meter, (2) at twice the Secchi depth, and (3) at the bottom. To do statistics at each station, the data from one depth was used in analyses – for nutrients and chlorophyll *a*, samples at twice the Secchi depth were used as this is typically assumed to be the photic zone for algal activity. For all other parameters, the surface water samples were used to estimate statistics. Values recorded as less than detection were assumed to occur at one half the detection level for purposes of analyses in this paper.

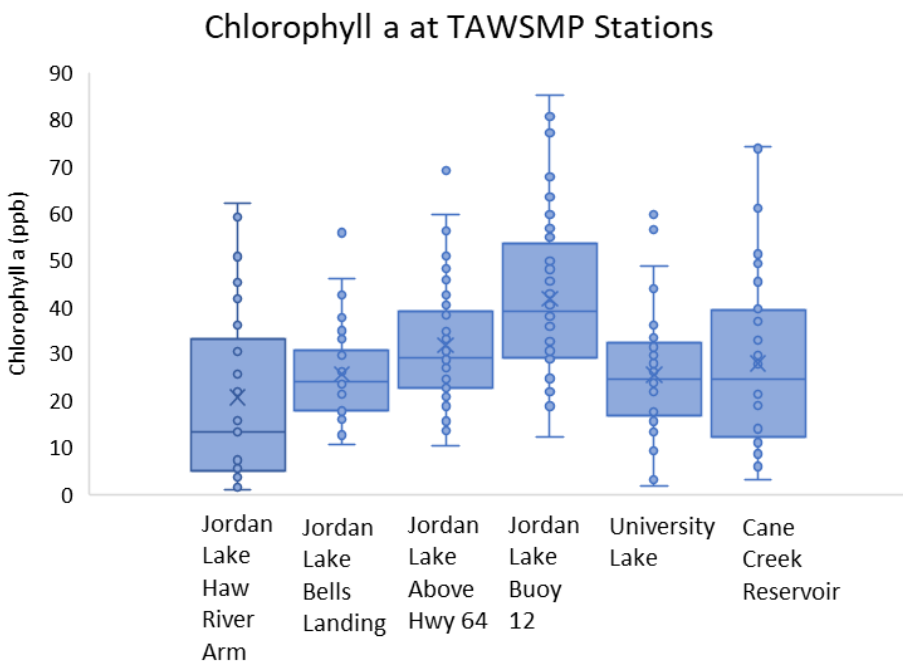
Nutrients and Chlorophyll *a*

Nitrogen and phosphorus are essential nutrients for plant and animal nutrition. Thus, a certain level of nutrients is desirable in surface waters. However, excessive concentrations of nutrients

can result in water quality problems such as algal blooms and potential algal toxins, taste and odor problems for drinking water, and recreational impairment. Jordan Lake is on North Carolina’s 303(d) list of impaired waters due to nutrient enrichment as noted through exceedances of the chlorophyll *a* standard of 40 ppb in surface waters.

The interaction of nitrogen, phosphorus, and phytoplankton is complex. For example, nitrate, the predominate form of inorganic nitrogen, is often lowest when phytoplankton are most prevalent, typically during summer months. Highest concentrations of nitrate are often observed during fall turnover, winter, and early spring. In addition, nitrogen loads also occur from atmospheric deposition, often from sources a great distance outside the watershed. To simplify the analysis, this paper focuses on chlorophyll *a* concentrations since there is a water quality standard for this parameter and is a useful indicator of algal biomass and lake productivity. Figure 3 summarizes the chlorophyll *a* data collected at the TAWSMP locations included in this document.

Figure 3: Median Concentrations of Chlorophyll *a* are similar at Cane Creek Reservoir, University Lake, Jordan Lake above Hwy 64, and Jordan Lake at Bells Landing (2016-2021)



Median concentrations are shown by the horizontal blue bar inside the box of each box and whisker plot; the interquartile range (25th and 75th percentiles) are shown by the bottom and tops of each box.

The data in Figure 3 show that Cane Creek Reservoir and University Lake have median chlorophyll *a* levels that are relatively the same as those seen on Jordan Lake at Bells Landing and near the Cary/Apex water supply intake upstream of Highway 64. The Haw River arm of Jordan Lake has a lower median concentration while Jordan Lake at Buoy 12 has higher levels of chlorophyll *a*.

DWR has established an MCL of 10 ppm for nitrate in drinking water. Concentrations above this level can cause blue baby syndrome. As summarized in Table 5, concentrations of nitrate were well below the MCL for nitrate at all stations.

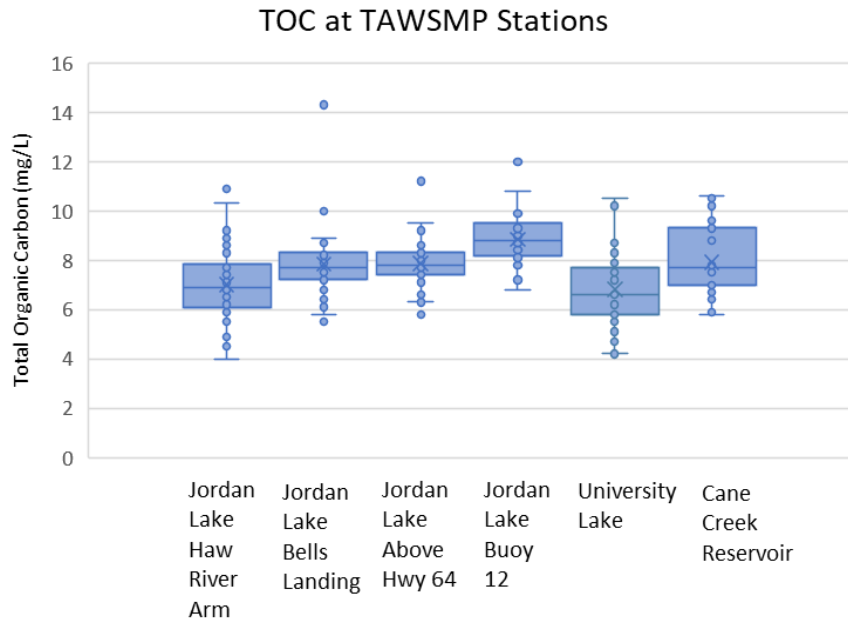
Table 5: Summary of Nitrate Data in Jordan Lake, University Lake, and Cane Creek Reservoir (all data in ppm)

	Jordan Lake, Haw River Arm	Jordan Lake at Bells Landing	Jordan Lake above US Hwy 64	Jordan Lake at Buoy 12 near Farrington	University Lake near Dam	Cane Creek Reservoir near Dam
Number samples	31	35	65	35	32	32
mean	0.58	0.13	0.06	0.06	0.09	0.10
maximum value	1.34	0.64	0.40	0.44	0.37	0.43
minimum value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
median	0.52	0.04	0.01	0.01	0.01	0.02
25th percentile	0.36	0.01	0.01	0.01	0.01	0.01
75th percentile	0.77	0.22	0.08	0.08	0.19	0.15

Total Organic Carbon and Bromide

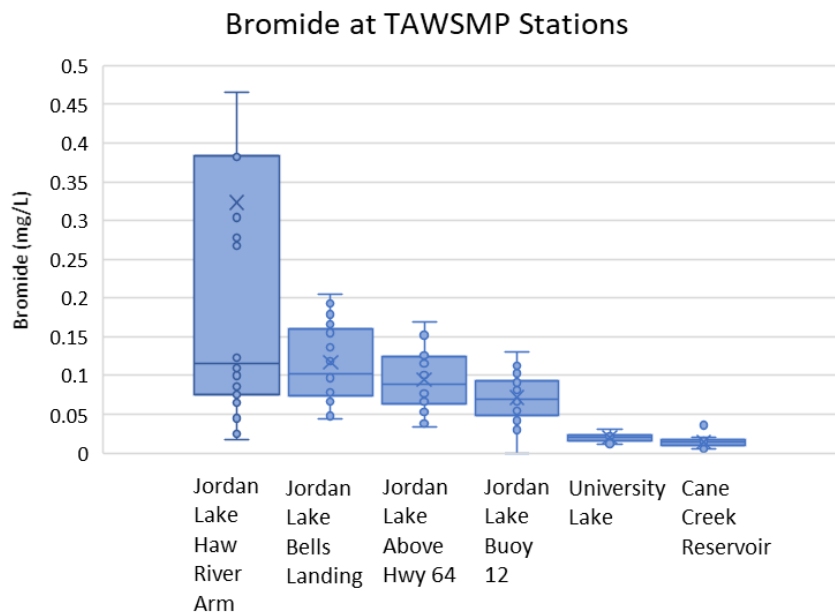
Total organic carbon (TOC) provides an estimate of the amount of organic matter in surface water. Elevated levels of TOC have been associated with an increased formation of disinfection byproducts (DBPs). Thus, it is important for treatment plant designers and operators to understand the level of TOC in the raw water. Figure 4 illustrates the concentrations of TOC at the TAWSMP sites in Jordan Lake, University Lake, and Cane Creek Reservoir.

Figure 4: TOC Concentrations in University Lake are Similar to Haw River Arm of Jordan Lake; TOC Concentrations in Cane Creek Reservoir are Similar to Other Jordan Lake Stations



Bromide in raw water can also cause higher levels of DBPs in drinking water. Figure 5 illustrates bromide concentrations from 2016-2021 for the lake locations.

Figure 5: University Lake and Cane Creek Reservoir have lower Bromide Concentrations than Jordan Lake (outliers at Haw River Arm removed)



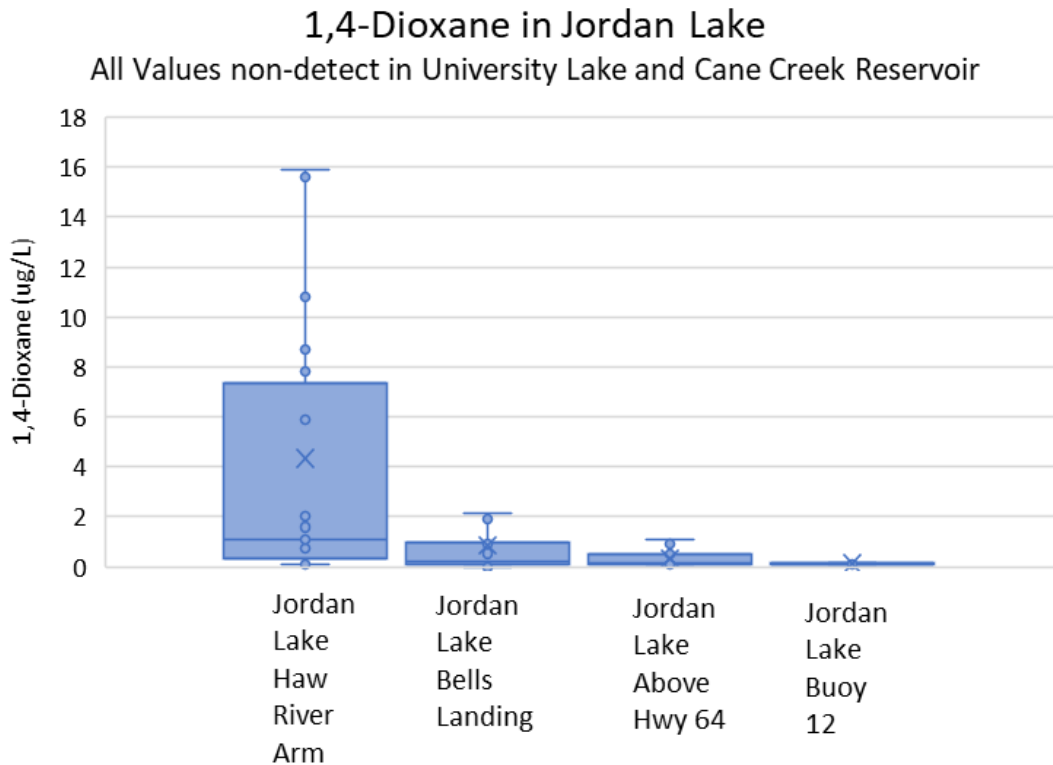
University Lake and Cane Creek Reservoir have lower concentrations of bromide than the Jordan Lake stations. Engineering consultants involved in the design of the western intake facilities have stated that when bromide concentrations get above 0.1 mg/L, they can cause issues with DBPs with conventional treatment. The median concentration of bromide near Bells Landing (approximate location of the proposed intake) is 0.1 mg/L, and the consulting engineers will account for these elevated bromide concentrations in the design of the treatment facilities.

1,4-Dioxane

1,4-dioxane has been released by industrial facilities and municipal wastewater treatment facilities in the Haw River watershed and has caused drinking water concerns at the Town of Pittsboro's water treatment facility. Concentrations of this constituent are highest in the Haw River arm of Jordan Lake and decrease in the upstream reaches of Jordan Lake (Figure 6). All concentrations of 1,4-dioxane were less than detection in University Lake and Cane Creek Reservoir.

In response to concerns about 1,4-dioxane, the North Carolina Division of Water Resources (DWR) has established an instream target value of 0.35 ug/L (ppb) for water classified as water supplies and 80 ug/L for other waters. DWR is proposing to establish these instream target values as standards as part of the 2020-2022 surface water triennial review, the process through which new water quality standards are developed. If these are approved, Jordan Lake would have a standard of 0.35 ug/L, but this would not apply to drinking water. The non-regulatory Health Advisory Level of 35 ug/L would apply to drinking water.

Figure 6: 1,4-Dioxane Concentrations are Highest in Haw River Arm of Jordan Lake and Decrease in Upstream Locations



Iron and Manganese

Iron and manganese concentrations are important to understand as they can cause aesthetic issues with drinking water. These constituents can cause metallic tasting drinking water and they can make water appear reddish brown or brown and leave deposits. Per Operations staff, water becomes hard to treat at levels above 10 mg/L (10,000 ug/L) iron and 1.0 mg/l (1,000 ug/L) manganese. All sampling locations have water generally less than these levels as illustrated in Figures 7 and 8, but outliers were removed from the analyses. Cane Creek Reservoir has highly variable manganese concentrations. In order to better see the variability in data, outliers were removed from the dataset shown in Figure 8. Cane Creek Reservoir had 6 outliers (out of 32 samples), with the highest value being 1.54 mg/L (1,540 ug/L).

Figure 7: The Haw River arm of Jordan Lake and University Lake have Similar Iron Concentrations (outliers removed)

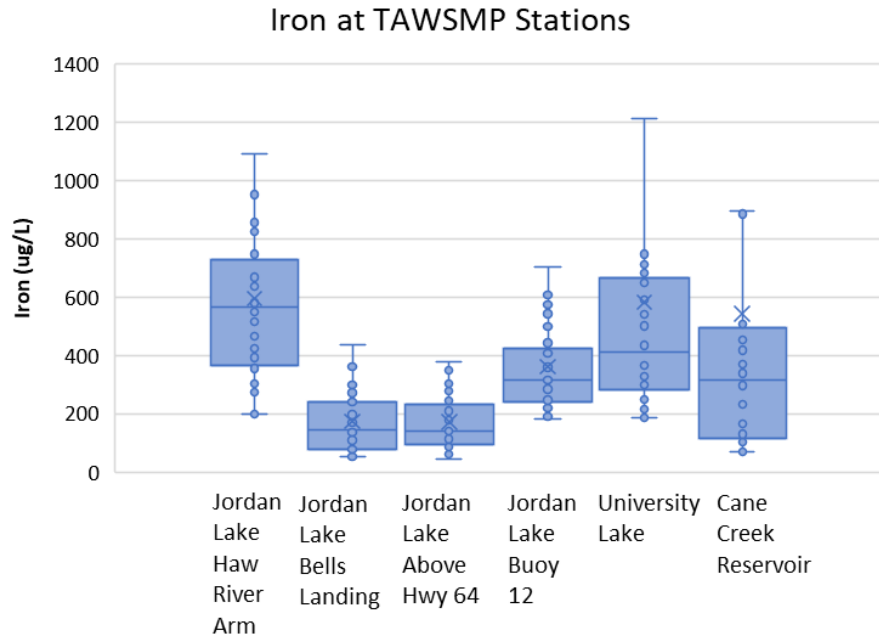
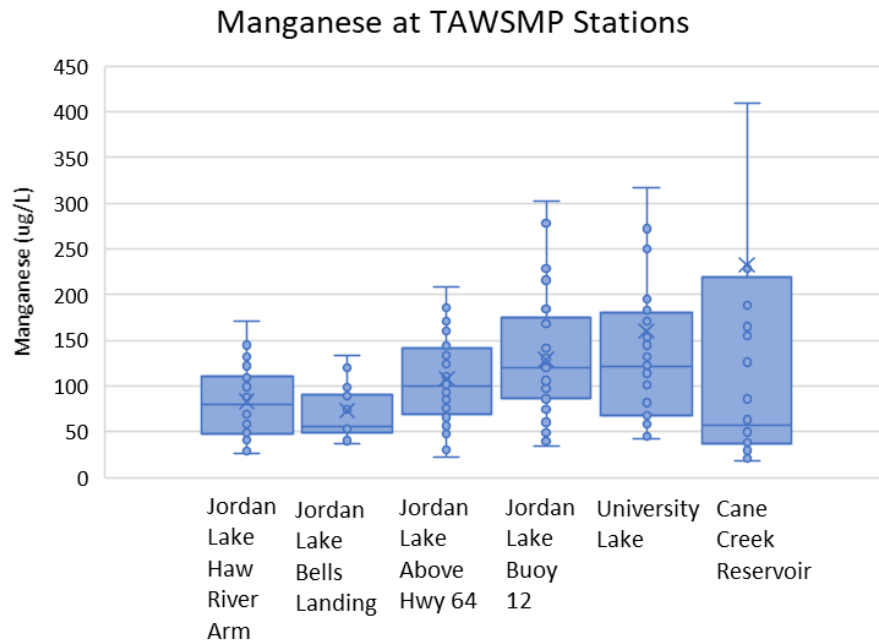


Figure 8: Manganese at Cane Creek Reservoir is Variable (outliers removed)



Appendix 1: Water Quality Definitions and Acronyms

Parts per million (ppm) or Milligrams per liter (mg/L) - One part per million corresponds to one minute in two years or a single penny in \$10,000.

Parts per billion (ppb) or Micrograms per liter (ug/L) - One part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.

Parts per trillion (ppt) or Nanograms per liter (nanograms/L) - One part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.

Picocuries per liter (pCi/L) - Picocuries per liter is a measure of the radioactivity in water.

Nephelometric Turbidity Unit (NTU) - Nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Running Annual Average (RAA) – The average of sample analytical results for samples taken during the previous four calendar quarters

Locational Running Annual Average (LRAA) – The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters under the Stage 2 Disinfectants and Disinfection Byproducts Rule.

Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Secondary Maximum Contaminant Level (SMCL) – Non-mandatory levels established by EPA to guide public water systems in managing their drinking water for aesthetic considerations such as taste, color, and odor. These contaminants are not considered to present risk to human health at the SMCL.

Running Annual Average (RAA) Removal Ratio - A removal ratio greater than 1.00 indicates the utility has surpassed State removal requirements for Total Organic Carbon (TOC).

Appendix 2: Water Quality Report Card Data for OWASA, Chatham County, and Town of Cary Drinking Water from 2016-2020. All Drinking Water Criteria are Met.

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Bromate	ppb	10 [RAA]	2020	N/A	N/A	N/A	N/A	N/A	N/A	8	1	4
Bromate	ppb	10 [RAA]	2019	N/A	N/A	N/A	N/A	N/A	N/A	7	0	20
Bromate	ppb	10 [RAA]	2018	N/A	N/A	N/A	N/A	N/A	N/A	4	0	11
Bromate	ppb	10 [RAA]	2017	N/A	N/A	N/A	N/A	N/A	N/A	2.2	0	5.4
Bromate	ppb	10 [RAA]	2016	N/A	N/A	N/A	N/A	N/A	N/A	2.7	0	6.9
Bromodi-chloromethane	ppb	N/R	2020	3.4	3.4	3.4	N/A	N/A	N/A	14	14	14
Bromodi-chloromethane	ppb	N/R	2019	1.9	1.9	1.9	N/A	N/A	N/A	13	13	13
Bromodi-chloromethane	ppb	N/R	2018	1.6	1.6	1.6	N/A	N/A	N/A	14.6	14.6	14.6
Bromodi-chloromethane	ppb	N/R	2017	2.7	2.7	2.7	N/A	N/A	N/A	22	22	22
Bromodi-chloromethane	ppb	N/R	2016	3.4	3.4	3.4	N/A	N/A	N/A	16	16	16
Bromoform	ppb	N/R	2020	< 1.0	< 1.0	< 1.0	N/A	N/A	N/A	1.7	1.7	1.7

Attachment 3: Water Quality Information
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Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Bromoform	ppb	N/R	2019	< 0.5	< 0.5	< 0.5	N/A	N/A	N/A	1.7	1.7	1.7
Bromoform	ppb	N/R	2018	< 1.0	< 1.0	< 1.0	N/A	N/A	N/A	4	4	4
Bromoform	ppb	N/R	2017	< 1.0	< 1.0	< 1.0	N/A	N/A	N/A	1.8	1.8	1.8
Bromoform	ppb	N/R	2016	< 1.0	< 1.0	< 1.0	N/A	N/A	N/A	0.68	0.68	0.68
Chlorodibromomethane (Dibromochloromethane)	ppb	N/R	2020	1.1	1.1	1.1	N/A	N/A	N/A	10	10	10
Chlorodibromomethane (Dibromochloromethane)	ppb	N/R	2019	0.7	0.7	0.7	N/A	N/A	N/A	10	10	10
Chlorodibromomethane (Dibromochloromethane)	ppb	N/R	2018	< 1.0	< 1.0	< 1.0	N/A	N/A	N/A	14.7	14.7	14.7
Chlorodibromomethane (Dibromochloromethane)	ppb	N/R	2017	1.1	1.1	1.1	N/A	N/A	N/A	12	12	12
Chlorodibromomethane (Dibromochloromethane)	ppb	N/R	2016	< 1.0	< 1.0	< 1.0	N/A	N/A	N/A	8.3	8.3	8.3
Chloroform	ppb	N/R	2020	4.7	4.7	4.7	N/A	N/A	N/A	13	13	13

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Chloroform	ppb	N/R	2019	2.6	2.6	2.6	N/A	N/A	N/A	9.5	9.5	9.5
Chloroform	ppb	N/R	2018	2.9	2.9	2.9	N/A	N/A	N/A	10.1	10.1	10.1
Chloroform	ppb	N/R	2017	3.4	3.4	3.4	N/A	N/A	N/A	25	25	25
Chloroform	ppb	N/R	2016	11	11	11	N/A	N/A	N/A	23	23	23
Combined Radium	pCi/L	5	2019	N/A	N/A	N/A	< 1	< 1	< 1	N/A	N/A	N/A
Combined Radium	pCi/L	5	2017	0.33	0.33	0.33	N/A	N/A	N/A	< 1	<1	<1
Copper 90th percentile	ppm	1.3	2020	0.029	0.007	0.038	N/A	N/A	N/A	N/A	N/A	N/A
Copper 90th percentile	ppm	1.3	2018	N/A	N/A	N/A	0.493	N/A	N/A	0.121	N/A	N/A
Copper 90th percentile	ppm	1.3	2017	< 0.050	< 0.050	0.120	N/A	N/A	N/A	N/A	N/A	N/A
Fluoride	ppm	4 [2]	2020	0.67	0.28	0.79	0.74	0.37	2.59	0.41	0	0.82
Fluoride	ppm	4 [2]	2019	0.72	0.26	0.87	0.75	0.48	0.99	0.77	0.77	0.77
Fluoride	ppm	4 [2]	2018	0.68	0.48	0.85	0.76	0.38	0.96	0.81	0.81	0.81
Fluoride	ppm	4 [2]	2017	0.21	< 0.10	0.77	0.73	0.13	0.95	0.4	0	0.8
Fluoride	ppm	4 [2]	2016	0.69	0.55	0.90	0.76	0.05	1.34	0.75	0.75	0.75
Free chlorine	ppm	4 (RAA)	2020	1.33	0.03	2.90	3.44	0.15	3.97	2.05	0.67	2.91
Free chlorine	ppm	4 (RAA)	2019	1.45	0.00	2.15	3.37	0.32	4.00	2.08	0.42	3.31

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Free chlorine	ppm	4 (RAA)	2018	1.20	0.00	2.12	3.41	0.24	4.08	N/A	N/A	N/A
Free chlorine	ppm	4 (RAA)	2017	1.22	0.02	2.70	3.40	0.91	4.33	2.05	0.76	2.87
Free chlorine	ppm	4 (RAA)	2016	1.12	0.03	3.40	3.49	0.32	4.29	1.51	0.83	2.86
HAA5 max LRAA	ppb	60	2020	N/A	N/A	13.1	N/A	N/A	14	N/A	N/A	16
HAA5 max LRAA	ppb	60	2019	N/A	N/A	14.1	N/A	N/A	17	N/A	N/A	15
HAA5 max LRAA	ppb	60	2018	N/A	N/A	13.7	N/A	N/A	23	N/A	N/A	15
HAA5 max LRAA	ppb	60	2017	N/A	N/A	15.2	N/A	N/A	25	N/A	N/A	21.8
HAA5 max LRAA	ppb	60	2016	N/A	N/A	15.5	N/A	N/A	25	N/A	N/A	25.3
Iron	ppm	[0.3]	2020	0.03	0.00	0.09	0.014	0	0.14	<0.06	<0.06	<0.06
Iron	ppm	[0.3]	2019	0.02	0.00	0.10	0.014	0.001	0.09	<0.06	<0.06	0.06
Iron	ppm	[0.3]	2018	0.01	0.00	0.09	0.015	0	0.06	<0.05	<0.05	0.07
Iron	ppm	[0.3]	2017	0.01	0.00	0.44	0.013	0.001	0.07	<0.05	<0.05	0.05
Iron	ppm	[0.3]	2016	0.01	0.00	0.20	0.022	0.001	0.09	<0.05	<0.05	0.21
Lead 90th percentile	ppm	0.015	2020	< 0.001	< 0.001	< 0.001	N/A	N/A	N/A	N/A	N/A	N/A
Lead 90th percentile	ppm	0.015	2018	N/A	N/A	N/A	< 0.003	N/A	N/A	< 0.003	N/A	N/A
Lead 90th percentile	ppm	0.015	2017	< 0.003	< 0.003	0.004	N/A	N/A	N/A	N/A	N/A	N/A

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Magnesium (estimated for OWASA)	ppm	N/R	2020	2.0	N/A	N/A	2.89	2.68	3.25	2.75	2.35	3.34
Magnesium (estimated for OWASA)	ppm	N/R	2019	1.9	N/A	N/A	2.76	2.32	3.21	2.75	1.77	3.35
Magnesium (estimated for OWASA)	ppm	N/R	2018	2.8	N/A	N/A	3.06	2.44	3.42	2.88	2.03	3.48
Magnesium (estimated for OWASA)	ppm	N/R	2017	2.7	N/A	N/A	3.01	2.61	3.36	2.82	1.93	3.22
Magnesium (estimated for OWASA)	ppm	N/R	2016	2.7	N/A	N/A	2.76	2.48	2.96	2.72	1.56	3.32
Manganese	ppm	[0.05]	2020	0.003	0.000	0.082	0.008	0.001	0.05	0.01	< 0.01	0.03
Manganese	ppm	[0.05]	2019	0.003	0.000	0.017	0.007	0.001	0.049	0.01	< 0.01	0.03
Manganese	ppm	[0.05]	2018	0.005	0.000	0.082	0.011	0.001	0.175	0.02	< 0.01	0.04
Manganese	ppm	[0.05]	2017	0.005	0.000	0.115	0.011	0.001	0.088	0.01	< 0.01	0.04
Manganese	ppm	[0.05]	2016	0.005	0.000	0.032	0.015	0.001	0.166	0.01	< 0.01	0.04
Ortho-phosphate	ppm	N/R	2020	0.59	0.50	0.65	N/A	N/A	N/A	0.62	< 0.05	0.71
Ortho-phosphate	ppm	N/R	2019	0.59	0.52	0.66	N/A	N/A	N/A	0.64	0.54	0.86
Ortho-phosphate	ppm	N/R	2018	0.58	0.52	0.64	N/A	N/A	N/A	0.66	0.51	0.73

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Ortho-phosphate	ppm	N/R	2017	0.56	0.42	0.60	N/A	N/A	N/A	0.62	0.48	0.68
Ortho-phosphate	ppm	N/R	2016	0.56	0.51	0.64	N/A	N/A	N/A	0.66	0.58	0.72
pH	SU	No MCL	2020	8.34	7.30	8.68	7.54	7.00	7.80	7.75	7.23	8.12
pH	SU	No MCL	2019	8.32	7.09	8.67	7.53	7.20	7.80	7.70	7.00	8.6
pH	SU	No MCL	2018	8.30	7.33	8.73	7.53	7.30	8.00	7.69	7.13	8.24
pH	SU	No MCL	2017	8.30	7.27	8.75	7.52	7.20	7.90	7.68	7.38	8.10
pH	SU	No MCL	2016	8.23	7.11	9.09	7.40	7.00	8.00	7.73	7.00	8.58
Sodium	ppm	N/R	2020	36	N/A	N/A	22.8	NR	NR	31.7	29.4	34
Sodium	ppm	N/R	2019	32	N/A	N/A	21.9	NR	NR	30.9	N/A	N/A
Sodium	ppm	N/R	2018	32	N/A	N/A	28.7	NR	NR	35	N/A	N/A
Sodium	ppm	N/R	2017	31	N/A	N/A	23	NR	NR	35	32.7	37.2
Sodium	ppm	N/R	2016	31	N/A	N/A	19.5	NR	NR	32.2	N/A	N/A
Specific Conductance	µS/cm	N/R	2020	253	219	279	N/A	N/A	N/A	221	121	264
Specific Conductance	µS/cm	N/R	2019	237	190	280	N/A	N/A	N/A	217	150	281
Specific Conductance	µS/cm	N/R	2018	235	206	265	N/A	N/A	N/A	257	105	306
Specific Conductance	µS/cm	N/R	2017	214	164	268	N/A	N/A	N/A	236	176	325

				OWASA			Chatham			Cary		
Analyte	Units	MCL [SMCL]	Year	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Specific Conductance	µS/cm	N/R	2016	229	197	275	N/A	N/A	N/A	213	112	298
Sulfate	ppm	[250]	2020	56	N/A	N/A	33	N/A	N/A	37	35	39
Sulfate	ppm	[250]	2019	54	N/A	N/A	28	N/A	N/A	39	39	39
Sulfate	ppm	[250]	2018	56	N/A	N/A	40	N/A	N/A	40	40	40
Sulfate	ppm	[250]	2017	49	N/A	N/A	39	N/A	N/A	42	38	46
Sulfate	ppm	[250]	2016	53	N/A	N/A	31	N/A	N/A	32	32	32
TOC	ppm		2020	0.95	0.64	1.51	1.59	0	2.3	N/A	N/A	N/A
TOC	ppm		2019	0.78	0.54	1.06	1.78	1.1	3.8	N/A	N/A	N/A
TOC	ppm		2018	0.62	1.87	1.08	2.35	1.6	3.1	N/A	N/A	N/A
TOC	ppm		2017	0.65	1.53	1.04	2.29	1.9	3	N/A	N/A	N/A
TOC	ppm		2016	0.58	1.96	1.04	2.03	1.1	3	N/A	N/A	N/A
TOC	removal ratio	> 1	2020	1.86	1.64	1.96	1.66	1.35	2.22	1.62	1.32	1.92
TOC	removal ratio	> 1	2019	1.93	1.82	2.00	1.62	1.1	1.8	1.68	1.38	1.94
TOC	removal ratio	> 1	2018	1.83	1.72	1.98	1.48	1.2	1.7	1.47	1.25	1.86
TOC	removal ratio	> 1	2017	1.82	1.71	1.97	1.49	1.1	1.6	1.53	1.08	1.87

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
TOC	removal ratio	> 1	2016	1.81	1.73	1.95	1.58	1.3	1.8	1.46	1.22	1.89
Total chlorine	ppm	4 (RAA)	2020	2.81	0.10	3.80	3.62	2.09	3.94	3.05	1.23	3.96
Total chlorine	ppm	4 (RAA)	2019	2.9	0.3	3.9	3.64	1.65	4.00	3.01	0.8	3.98
Total chlorine	ppm	4 (RAA)	2018	3.0	0.2	3.8	3.45	1.34	3.88	3.1	2	4
Total chlorine	ppm	4 (RAA)	2017	3.0	0.2	3.8	3.23	0.00	4.18	3.04	1.6	4.24
Total chlorine	ppm	4 (RAA)	2016	3.1	0.1	3.9	3.63	2.01	3.92	2.86	1.4	3.99
Total Hardness	mg CaCO ₃ /L	N/R	2020	23.8	18.0	35.0	33	30	36	33	27	39
Total Hardness	mg CaCO ₃ /L	N/R	2019	22.7	14.0	32.0	31	27	36	32	23	38
Total Hardness	mg CaCO ₃ /L	N/R	2018	27.9	21.0	50.0	35	28	38	31	20	40
Total Hardness	mg CaCO ₃ /L	N/R	2017	27.6	20.0	41.0	34	30	38	27	17	36
Total Hardness	mg CaCO ₃ /L	N/R	2016	26.3	20.0	38.0	31	28	34	31	22	37
Total-Phosphorus	ppm	N/R	2020	0.73	0.71	0.75	0.929	0.02	2.03	0.23	< 0.05	0.28
Total-Phosphorus	ppm	N/R	2019	0.75	0.66	0.87	0.996	0.8	1.19	0.26	0.22	0.37
Total-Phosphorus	ppm	N/R	2018	0.70	0.55	1.00	0.881	0.08	1.26	0.27	0.21	0.3
Total-Phosphorus	ppm	N/R	2017	0.72	0.56	0.80	0.778	0.03	1.64	0.26	0.21	0.29

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Total-Phosphorus	ppm	N/R	2016	0.74	0.66	0.81	NR	NR	NR	0.26	0.17	0.30
TTHM max LRAA	ppb	80	2020	N/A	N/A	21.7	N/A	N/A	28	N/A	N/A	40
TTHM max LRAA	ppb	80	2019	N/A	N/A	21.5	N/A	N/A	28	N/A	N/A	43
TTHM max LRAA	ppb	80	2018	N/A	N/A	22.9	N/A	N/A	38	N/A	N/A	51
TTHM max LRAA	ppb	80	2017	N/A	N/A	26.6	N/A	N/A	39	N/A	N/A	49
TTHM max LRAA	ppb	80	2016	N/A	N/A	25.4	N/A	N/A	41	N/A	N/A	42.5
Turbidity	NTU	≥95% of sample s < 0.3 and max 1	2020	0.021	0.013	0.245	0.044	0.01	0.369	N/A	0.02	0.09
Turbidity	NTU	≥95% of sample s < 0.3 and max 1	2019	0.023	0.011	0.340	0.081	0.009	0.298	N/A	0.02	0.15
Turbidity	NTU	≥95% of sample s < 0.3 and max 1	2018	0.019	0.008	0.080	0.05	0.018	0.387	N/A	0.01	0.18
Turbidity	NTU	≥95% of sample s < 0.3 and max 1	2017	0.046	0.200	0.014	0.038	0.017	0.356	N/A	0.03	0.17

Analyte	Units	MCL [SMCL]	Year	OWASA			Chatham			Cary		
				Avg	Min	Max	Avg	Min	Max	Avg	Min	Max
Turbidity	NTU	≥95% of samples < 0.3 and max 1	2016	0.043	0.111	0.027	0.037	0.009	0.768	N/A	0.03	0.16

N/A = Not Applicable or Not Analyzed or Available (not all values are measured annually)

Attachment 4: Background Information on the Western Intake Partnership and Jordan Lake

Western Intake Partnership:

The City of Durham, Town of Pittsboro, Chatham County and OWASA (Western Intake Partners or WIP) have been working together since 2014 to evaluate options to develop a new intake and treatment facilities on the western side of Jordan Lake. The City of Durham funded initial studies which identified that it was most cost-effective to build one intake and treatment facility to serve all four Partners. The WIP executed an Agreement which outlines cost-sharing between the Partners for planning, designing, and permitting the facilities. OWASA chose not to cost-share in these studies until our LRWSP is completed; the Agreement includes clauses for making up payments should OWASA choose to participate in the WIP.

For the purposes of the evaluations included in this agenda package, it is assumed that the treatment facilities will be constructed in two phases:

- Phase 1 – this will accommodate Partner capacity needs through approximately 2050; these facilities are projected to be online in approximately 2031.
- Phase 2 – these facilities will be online in approximately 2051 and provide capacity through approximately 2070.

Background on Jordan Lake and Regional Water Supply:

Jordan Lake is an important regional water supply. There are currently 11 local governments which hold allocations of water from Jordan Lake, and the lake's water supply pool has been 91.2 percent allocated. The lake's water supply pool will likely be fully allocated in the next round of allocations (new rounds open up upon an allocation application request from a local government). During each future round of allocations, OWASA will need to apply to maintain its allocation and it will be reconsidered against other requests.

At this time, the Towns of Cary and Apex own and operate the only intake on Jordan Lake, and there are two treatment facilities: (1) one jointly owned by Cary and Apex with a design capacity of 56 mgd, and (2) one owned by Chatham County which obtains raw water from Cary/Apex and then treats it at a 3 mgd facility. Therefore, during a prolonged drought, all allocation holders will be looking to Cary and Apex to access their Jordan Lake allocations.

When the proposed Western Intake and Treatment Facility is online, the security of the entire region's water supply increases. It reduces the impact of a single point of failure that results from currently having only one intake on the lake and provides an additional treatment plant from which allocation holders can access drinking water from Jordan Lake.

With proper planning, OWASA can make the most of increased regional security and other factors which could help OWASA access its allocation of water in a cost-effective manner:

- Treatment plants typically have underutilized capacity in the early years of their lives

- OWASA has a large amount of storage (relative to current demands) in Cane Creek Reservoir which would enable us to draw water from our Jordan Lake allocation during non-peak times (i.e., summer) even as the new plant approaches its capacity. (Water treatment plants typically produce less water in winter when demands are lower and more during summer; even in summer there is variability in the amount they treat and peak treatment typically occurs during the hottest, driest days).

The Jordan Lake Agreement alternative (JL-A) was developed to capitalize on this increased regional water security.

Agenda Item 7:

Review and Discuss Draft Water Conservation Plan Guiding Principles

Purpose:

To receive feedback and guidance from the Board of Directors on draft Water Conservation Plan Guiding Principles, which will provide usable criteria for identifying and evaluating additional water conservation and efficiency opportunities

Background:

Demand management through water conservation, water efficiency, and reclaimed water use is a key value of the organization and our community. Developing a Water Conservation Plan is also a strategic initiative of the 2016 Strategic Plan and in-line with our current strategic plan's core value of sustainability: *the utility strives to make the highest and best use of our local water resources and promotes conservation of water, energy and other natural resources.*

On [November 11, 2021](#), the OWASA Board of Directors received and discussed a report of OWASA's existing water conservation efforts and provided guidance on criteria to use in finalizing the overall water conservation program.

OWASA and the community have invested in a suite of water conservation strategies that have made our community a leader in water conservation, efficiency, and reclaimed water use. Based in the Board's feedback, these draft guiding principles are designed to provide usable criteria for identifying and evaluating additional conservation opportunities that will allow OWASA to continue to be a leader in this space.

Action Needed:

No formal motion required.

Staff requests feedback from the Board of Directors on the draft Water Conservation Plan Guiding Principles.

Based on this guidance, staff will bring a final version of the Guiding Principles to the Board to approve. In addition, staff will introduce to the Board a framework for evaluating our overall water conservation program. This framework will help staff conduct a gap analysis of our existing programming and evaluate additional conservation opportunities based on the guiding principles.

Information:

- Draft Water Conservation Plan Guiding Principles

January 13, 2022

DRAFT WATER CONSERVATION PLAN

GUIDING PRINCIPLES

Drinking water is a valuable resource, essential to sustain public health, economic prosperity, and the high quality of life we enjoy in Carrboro and Chapel Hill. We are a leader in water conservation because our community recognizes the many benefits of conservation, including reducing water bills for low-income residents and keeping our essential service affordable, protecting our natural resources, building resiliency in the face of climate change, and extending our raw water supply, delaying the need for additional supply for many years. Sustainability is a core value of our organization.

As such, water efficiency and conservation are fundamental resource planning tools and should be considered equally with the other means of meeting our water needs. Embedded in our long-range water demand projections are assumptions about how much water our community will conserve in the future. We must meet or exceed these projections to ensure a reliable and adequate water supply in the long run. We recognize that a diverse water supply portfolio and continued focus on demand management adds to our resilience and reduces the likelihood of mandatory water use restrictions.

Therefore, we are committed to continuing to advance drinking water use reduction and conservation in our community and in our internal operations.

Ensuring that we remain a leader in water conservation will require regular review and evaluation of new and emerging water conservation opportunities. As an organization dedicated to the wise use of rate-payer dollars, the guiding principles below strive to provide usable criteria for identifying and evaluating additional conservation opportunities.

Guiding Principles:

1. The strategy is expected to generate a sustained reduction in the community's water consumption.
2. The strategy is cost-effective, defined as being less expensive to implement than the next water supply alternative in which OWASA will invest (based on dollars per thousand gallons). Where cost and benefit cannot be reliability quantified, the strategy will be considered based on how well it balances environmental, economic, and societal goals.
3. Where appropriate, the strategy will be developed in coordination and with the cooperation of the Town of Chapel Hill, Town of Carrboro, UNC, Chapel Hill Carrboro City Schools, Orange County, the development community, and other partners and stakeholders.
4. Strategies will be evaluated by their performance against the following criteria:
 - The strategy is based on the best available and demonstrated water efficiency technology, designs, and practices.
 - The strategy utilizes a data-driven approach.
 - The strategy is equitable and provides multiple benefits to all.
 - The strategy incorporates efforts to raise community awareness and advocacy through active engagement, public outreach, and education.

Agenda Item 8:

Discuss Suggested Actions OWASA Might Take to Encourage Public Interest in Service as OWASA Board Members

Purpose:

The Board of Directors will review and discuss various suggestions to encourage public interest in applying for appointment as members of the OWASA Board of Directors.

Background:

In order to encourage the appointment of citizens to fill vacant seats on the OWASA Board of Directors, regular messaging about the importance of timely appointments will be included in the information packets supplied in advance of the quarterly meetings with the Chapel Hill Town Council's OWASA Committee, and in the annual updates to the Carrboro Town Council and Orange County Board of County Commissioners. Board Members are also encouraged to reach out to community members to peak their interest in OWASA and to encourage their application for appointment to serve as OWASA Board members.

Chair Jody Eimers recently proposed that the Board of Directors consider raising the compensation paid to Board Members for their service to OWASA to encourage more applicants to apply for appointment to the OWASA Board of Directors. She also asked that the Board be provided with General Counsel's summary of the legal rules applicable to the question of Board Member compensation.

General Counsel notes that the only legal requirement pertaining to Board Member compensation is found in Chapter 162A of the North Carolina General Statutes, (the [Water and Sewer Authorities Act](#)), in the last sentence of G.S. 162A-5, which provides:

"The members of the authority may be paid a per diem compensation set by the authority which per diem may not exceed the total amount of four thousand dollars (\$4,000) annually, and shall be reimbursed for the amount of actual expenses incurred by them in the performance of their duties."

Presently the Chair is paid \$250.00 per month, and all other Board members are paid \$50.00 per meeting attended. Historically, OWASA Board Members have been compensated as follows:

- Presently, by Resolution adopted May 12, 2011 – Board Members receive \$50 compensation for attendance at each OWASA Board Meeting, Special Meeting, Work Session, and Standing Committee meeting of the Board. In lieu of a meeting attendance payment, the OWASA Board Chair receives a \$250 monthly stipend regardless of the number of meetings attended; these rates of compensation have been in effect since July 1, 2011.

- Previously, by Resolution adopted February 21, 2002 – the Board increased its compensation from \$20 to \$50 for attendance at each official Board Meeting, Special Meeting, or Work Session.
- Originally, from OWASA’s inception in 1977 – Board Members received \$20 for each official Board meeting, Special Meeting, and Work Session attended; and the Chair received a \$40 monthly allowance for partial reimbursement of (un-itemized) expenses incurred for services in that office.
- Note that the Statute also permits reimbursement of “expenses incurred in the performance of their duties.” While few requests for reimbursements have been received from Board Members over the years, this provision gives the Board substantial latitude to reimburse Board Members for their expenses actually incurred for official OWASA business such as transportation to and from meetings or other official activities as Board Members. But this language would not authorize an expense stipend, as it provides only for reimbursement for expenses *actually incurred*.

Nor would it allow for providing other benefits unrelated to their actual service as Board Members, such as health insurance, because such expenses would not be “expenses incurred in the performance of their duties.” It is not clear whether Board Members are even eligible for coverage under OWASA’s group health insurance policy. We are waiting for further information in that regard and will provide it when received from Gallagher. In any event, OWASA would not be able to cover the cost of such health insurance for Board Members.

Action:

Board discussion and further direction.

Agenda Item 9:

Review Board Work Schedule

Purpose:

- a) Request(s) by Board Committees, Board Members, General Counsel and Staff
- b) Review draft Agenda for January 27, 2022 Board Meeting
- c) Review draft Agenda for February 10, 2022 Board Work Session
- d) Review 12 Month Board Meeting Schedule
- e) Review Pending Key Staff Action Items

Information:

- Draft agenda for the January 27, 2022 Meeting of the Board
- Draft agenda for the February 10, 2022 Board Work Session
- 12 Month Board Meeting Schedule
- Pending Key Staff Action Items from Board Meetings

January 13, 2022

Agenda
Meeting of the OWASA Board of Directors
Thursday, January 27, 2022, 6:00 P.M.

Due to COVID-19 public health concerns, the Orange Water and Sewer Authority (OWASA) Board of Directors is conducting this meeting virtually utilizing Microsoft Teams software. Board Members, General Counsel and staff will be participating in the meeting remotely.

The Board of Directors appreciates and invites the public to attend and observe its virtual meetings online. Public comment is invited via written materials, ideally submitted at least two days in advance of the meeting to the Board of Directors by sending an email to board_and_leadership@owasa.org or via US Postal Service (Clerk to the Board, 400 Jones Ferry Road, Carrboro, NC 27510). Public comments are also invited during the Board Meeting via telephone, and members of the public will need to be available to call-in during the meeting. Please contact the Clerk to the Board at aorbich@owasa.org or 919-537-4217 to make arrangements by 3:00 p.m. the day of the meeting.

Public speakers are encouraged to organize their remarks for delivery within a four-minute time frame allowed each speaker, unless otherwise determined by the Board of Directors. The Board may take action on any item on the agenda.

In compliance with the "Americans with Disabilities Act," interpreter services for non-English speakers and for individuals who are deaf or hard of hearing 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.

Announcements

1. Announcements by the Chair
2. Announcements by Board Members
3. Announcements by Staff
4. Additional Comments, Suggestions, and Information Items by Board Members (Jody Eimers)

Petitions and Requests

1. Public
2. Board
3. Staff

Consent Agenda

Information and Reports

1. 12 Month Board Meeting Schedule (Todd Taylor)
2. Capital Improvements Program Semiannual Report (Allison Spinelli)

Action

3. Resolution Appointing Independent Audit Firm for the Orange Water and Sewer Authority's Fiscal Year 2022 Finance Audit (Stephen Winters)

4. Minutes of the January 13, 2022 Closed Session of the Board of Directors for the Purpose of Discussing Personnel Matter in Accordance with N.C. General Statute 143-318.11 (Ray DuBose)

Regular Agenda

Discussion and Action

5. Long-Range Water Supply Plan – Select Water Supply Alternative (Ruth Rouse)
6. Approve Water Conservation Plan Guiding Principles (Mary Tiger/Amy Armbruster)

Information and Reports

7. 2021 Annual Lakes Recreation Report (Johnny Riley)
8. Financial Report for the Six-Month Period Ended December 31, 2021 (Stephen Winters)

Discussion

9. Fiscal Year 2023 Budget Calendar and Assumptions (Stephen Winters)

Summary of Work Session Items

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

DRAFT

Agenda
Work Session of the OWASA Board of Directors
Thursday, February 10, 2022, 6:00 P.M.

Due to COVID-19 public health concerns, the Orange Water and Sewer Authority (OWASA) Board of Directors is conducting this meeting virtually utilizing [Microsoft Teams](#) software. Board Members, General Counsel and staff will be participating in the meeting remotely.

In compliance with the "Americans with Disabilities Act," interpreter services for non-English speakers and for individuals who are deaf or hard of hearing 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.

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The Board may take action on any item on the agenda. Public speakers are encouraged to organize their remarks for delivery within a four-minute time frame allowed each speaker, unless otherwise determined by the Board of Directors. The Board may take action on any item on the agenda.

Announcements

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

Consent Agenda

Action

1. Resolution Awarding a Construction Contract for the Water Treatment Plant Belt Filter Press Project (Coleman Olinger)
2. Minutes of the January 13, 2022 Work Session of the Board of Directors (Andrea Orbich)

Regular Agenda

Discussion and Action

3. Review and Approve Community Engagement Plan for the Long-Range Water Supply (Ruth Rouse/Mary Tiger)

Information and Reports

4. Reliability and Resiliency Improvements Update (Vishnu Gangadharan)

Discussion

5. (Tentative) Department Managers Fiscal Year 2023 Budget Presentations (Monica Dodson/Jesse DuClau/Christopher Giesting/Stephen Winters)
6. Review Board Work Schedule
 - a. Request(s) by Board Committees, Board Members and Staff (Jody Eimers)
 - b. February 24, 2022 Board Meeting (Todd Taylor)
 - c. March 10, 2022 Work Session (Todd Taylor)
 - d. 12 Month Board Meeting Schedule (Todd Taylor)
 - e. Pending Key Staff Action Items (Todd Taylor)

Summary of Work Session Items

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

Closed Session

8. The Board of Directors will meet in Closed Session for the Purpose of Discussing a Personnel Matter in Accordance with N.C. General Statutes 143-318.11.6 (Ray DuBose)

OWASA Board of Directors – 12 Month Board Meeting Schedule (January 7, 2022)

Month	Board Meetings		Committee Meetings & Other Board Items
	Work Session	Business Meeting	
January 2022	LRWSP – Evaluation of Supply Alternatives Employee Health and Dental Insurance Update for FY 23 Review Water Conservation Plan Draft Guiding Principles D&I Update Discuss Suggested Action to Encourage Public Interest to the OWASA BOD CS – ED Interim Performance Review 1/13/2022	Appoint Audit Firm (Tentative) 2021 Annual Lakes Recreation Report CIP Semiannual Report Approve Water Conservation Plan Guiding Principles Q2 Financial Report Discuss FY 23 Budget Calendar and Planning Assumptions LRWSP – Select Alternative 1/27/2022	<i>Strategic Plan Work Session (1-26-2022)</i> <i>BOD D&I Training Sessions (TBD)</i> <i>OWASA Orientation for new CTC & CHTC Elected Officials (TBD)</i> <i>Meeting between the BOCC Members & Orange County Appointees to the BOD (1-19-2022)</i>
February 2022	Award WTP Belt Filter Press Construction Project LRWSP - Review and Approve CEP (Tentative) Department Managers FY 23 Budget Presentations Reliability and Resiliency Improvements Update CS – Prepare for GC Interim Review 2/10/2022	Award University Lake Permanganate Facility Construction Project Award Bolinwood Interceptor Construction Project (Tentative) Receipt of the OC Board of Health Report on Drinking Water Fluoridation CS – GC Interim Review 2/24/2022	<i>Annual Update to BOCC (2-17-2022)</i> <i>OWASA Orientation for new CTC & CHTC Elected Officials (TBD)</i> <i>Meeting between the CHTC OWASA Committee & Chapel Hill Appointees to the BOD (TBD)</i>
March 2022	FY 23 Draft Budget Annual Update of the Energy Management Plan 3/10/2022	Set date for Public Hearings – FY 23 Budget & Rates FY 23 Draft Budget and Rate Adjustment Affordability Program Update 3/24/2022	<i>Strategic Plan Work Session (TBD)</i>
April 2022	Award Secondary Clarifier No. 4 Construction Project FY 23 Draft Budget and Rate Adjustment Strategic Plan Update BOD Eligible for Nominations to Election as Board Officers (include Officer descriptions) Planning for BOD Self-Assessment 4/14/2022	Q3 Financial Report Authorize Staff to Publish FY 23 Budget and Rate Information BOD Eligible for Nominations to Election as Board Officers (if needed) 4/28/2022	<i>Mitigation Banking Field Trip (TBD)</i>
May 2022	Approve Employee Insurance Renewals Employee Merit Pay for FY 23 Strategic Plan Update CS – Prepare ED Annual Review 5/12/2022	Public Hearings – FY 23 Budget and Rates Approve Employee Insurance Renewals (if needed) CS – ED Annual Performance Review (Public Hearings) 5/26/2022	
June 2022	Approve FY 23 Budget and Rates (including Employee Merit Pay decision) Strategic Plan Update Election of Officers 6/9/2022	TBD 6/23/2022	
July 2022	D&I Update Strategic Plan Update 7/14/2022	TBD 7/28/2022	<i>Possible welcome of new Board member(s)</i>
August 2022	TBD 8/11/2022	Preliminary 12 Month Financial Report CIP Semiannual Report CS – Prepare GC Annual Review 8/25/2022	

OWASA Board of Directors – 12 Month Board Meeting Schedule (January 7, 2022)

Month	Board Meetings		Committee Meetings & Other Board Items
	Work Session	Business Meeting	
September 2022	Annual Report on Disposal of Surplus Personal Property (C) EEO/Affirmative Action Report and D&I Update (C) Review Draft Strategic Plan CS – GC Annual Review (C) 9/8/2022	Annual Report and Financial Audit (C) Approve GC Engagement (C) Forest Management Program Update (C) Approve Strategic Plan (Annual Meeting of the BOD) 9/22/2022	
October 2022	TBD 10/13/2022	Strategic Trends Report (C) Q1 Financial Report (C) 10/27/2022	
November 2022	TBD 11/10/2022	<i>Holiday – no meeting</i>	
December 2022	CS – Prepare for ED Interim Review (C) 12/8/2022	<i>Holiday – no meeting</i>	

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

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

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

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

- Development of a plan and policy framework for OWASA lands is considered a longer-term priority. The NRTS Committee discussed this issue in September 2017 and determined it was lower priority than Forest Management.

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

Abbreviations Used in Draft Schedule:

(C)	Recurring agenda item (generally these are "required" items)	CHTC	Chapel Hill Town Council
AV/AMI	Agua Vista/Advanced Metering Infrastructure	CIP	Capital Improvements Program
BOCC	Orange County Board of County Commissioners	COLA	Cost of Labor Adjustment
BOD	Board of Directors	CS	Closed Session of the Board
CCR	Cane Creek Reservoir	CTC	Carrboro Town Council
CE	Community Engagement	CY	Calendar Year
CEP	Community Engagement Plan	D&I	Diversity and Inclusion
		ED	Executive Director

OWASA Board of Directors – 12 Month Board Meeting Schedule (January 7, 2022)

EEO	Equal Employment Opportunity	MFMM	Multi-Family Master Meter
EPA	Environmental Protection Agency	NCDOT	North Carolina Department of Transportation
FY	Fiscal Year	NRTS	Natural Resources and Technical Services
GC	General Counsel	OC	Orange County
HR	Human Resources	Q	Quarter
JL	Jordan Lake	RFP	Request for Proposals
KPI	Key Performance Indicator	SRF	State Revolving Fund
LRWSP	Long-Range Water Supply Plan	SOW	Scope of Work
MOA	Memorandum of Agreement	TBD	To Be Determined
MWBE	Minority/Women-owned Business Enterprises	WTP	Water Treatment Plant
MST	Mountains-to-Sea Trail	WWTP	Wastewater Treatment Plant

Pending Key Staff Action Items from Board Meetings

No.	Date	Action Item	Target Board Meeting Date	Person(s) Responsible	Status
1.	12-9-2021	Staff and Gallagher will determine whether to market medical insurance if needed.	1-13-2022	Glasgow Tucker	Discuss regarding timeline on January 13, 2022.
2.	11-11-2021	Provide a draft schedule for new budget format development, and research opportunities for consultant assistance with new budget format.	TBD	Winters	Complete – emailed on 12-28-2021
3.	10-28-2021	Evaluate trends in the labor market, cyber security, etc.	NA	Taylor Directors	
4.	7-8-2021	Schedule Board D&I training session.	NA	Taylor Orbich	Will be scheduled once a consultant is hired.
5.	7-8-2021	Schedule separate Board Work Sessions to update the Strategic Plan this fall and winter.	11-18-2021 12-16-2021 1-26-2022	Orbich Tiger	The Board will hold its Strategic Plan Work Session on January 26, 2022; and the February 2022 session will be rescheduled for March 2022 (TBD).