TOWN OF PITTSBORO

2014 JORDAN ALLOCATION REQUEST

DRAFT**

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Tom Fransen
Water Planning Section Chief
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NC Department of Environment and Natural Resources
1611 Mail Service Center
Raleigh, NC 27699-1611

Dear Mr. Fransen:

This draft Jordan Lake Allocation Application being submitted by the Town of Pittsboro represents a request for storage allocation required to meet the Town of Pittsboro's projected needs for additional water supply capacity through 2045. This Application constitutes a request for water supply consistent with the Triangle Regional Water Supply Plan (TRWSP) that has been developed by the Jordan Lake Partnership (JLP), a collection of thirteen local governments and water systems that was created to collaboratively plan for the future of water supply in the Triangle Region, including the future use of Jordan Lake.

The JLP's TRWSP was compiled with the intention of meeting the needs of all JLP members while minimizing the impacts on other water users (including downstream systems), the environment, and rate payers. Additionally, it has been a goal of the JLP to present a set of coordinated allocation requests for Jordan Lake water supply storage that neither over-allocates the storage pool nor results in needless competition among individual water systems.

As such as, all Jordan Lake Allocation requests submitted by the Jordan Lake Partnership member entities have been made transparent to other partners, and should match the designated allocation requests that are presented in the JLPs TRWSP.

As such, Town of Pittsboro affirms that this request for a __6__ % Level _II__ allocation is recognized to be:

☒	IN AGREEMENT	☐	NOT IN AGREEMENT

with the JLP's TRWSP.

The Town of Pittsboro has no current allocation in Jordan Lake. We are requesting an increase of 6 MGD as a part of the Western Intake Partnership. Our intent is to continue working with the partnership in order to develop an interlocal agreement to design, construct and maintain a new raw water intake, water treatment plant and distribution system to the Town. We acknowledge we will have financial responsibility to cover the cost of fees, permitting and the new water treatment facilities, based on our allocation portion.

Sincerely,

[**Your Name**]
[**Title**]

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2014 JORDAN LAKE ALLOCATION

INTRODUCTION

The Jordan Lake Partnership (JLP) has been working collaboratively since 2009 to plan for the future of the Triangle Region's water supply. They have developed a draft Triangle Regional Water Supply Plan (TRWSP) to meet the 50-year water needs of the thirteen partners listed below:

- ***Town of Apex***
- ***Town of Cary***
- ***Chatham County (North water system)***
- ***City of Durham***
- ***Town of Hillsborough***
- ***Town of Holly Springs***
- ***Town of Morrisville***
- ***Orange Water and Sewer Authority (OWASA)***
- ***Orange County***
- ***Town of Pittsboro***
- ***City of Raleigh and Merger Partners***
- ***City of Sanford***
- ***Wake County (Research Triangle Park - South)***

The draft Triangle Regional Water Supply Plan has been provided to DWR by the JLP as an accompanying document to this Jordan Lake Allocation request. The TRWSP details the planning process used to develop the regional water supply plan, and the preferred regional alternative includes projected requests for Jordan Lake water supply allocation by several of the JLP members. This introduction briefly presents the preferred regional alternative, thus providing the regional context of **the Town of Pittsboro**'s allocation request.

As part of the regional water supply planning process, JLP members collaborated to develop demand projections, identify water source options, construct and evaluate alternatives, and present a mutually-supported plan for meeting the future water supply needs of the Triangle Region. In doing so, JLP members supported each other through a careful peer review of each other's demand projections; through shared information about conservation and water use efficiency efforts; through inter-utility infrastructure planning efforts (e.g. a regional distribution system interconnection study and hydraulic model and a feasibility study for a new intake and water treatment plant on the western side of Jordan Lake); and by expanding the pool of potential water supply source options.

The 2060 future water service areas of the JLP members are shown in Figure 1.

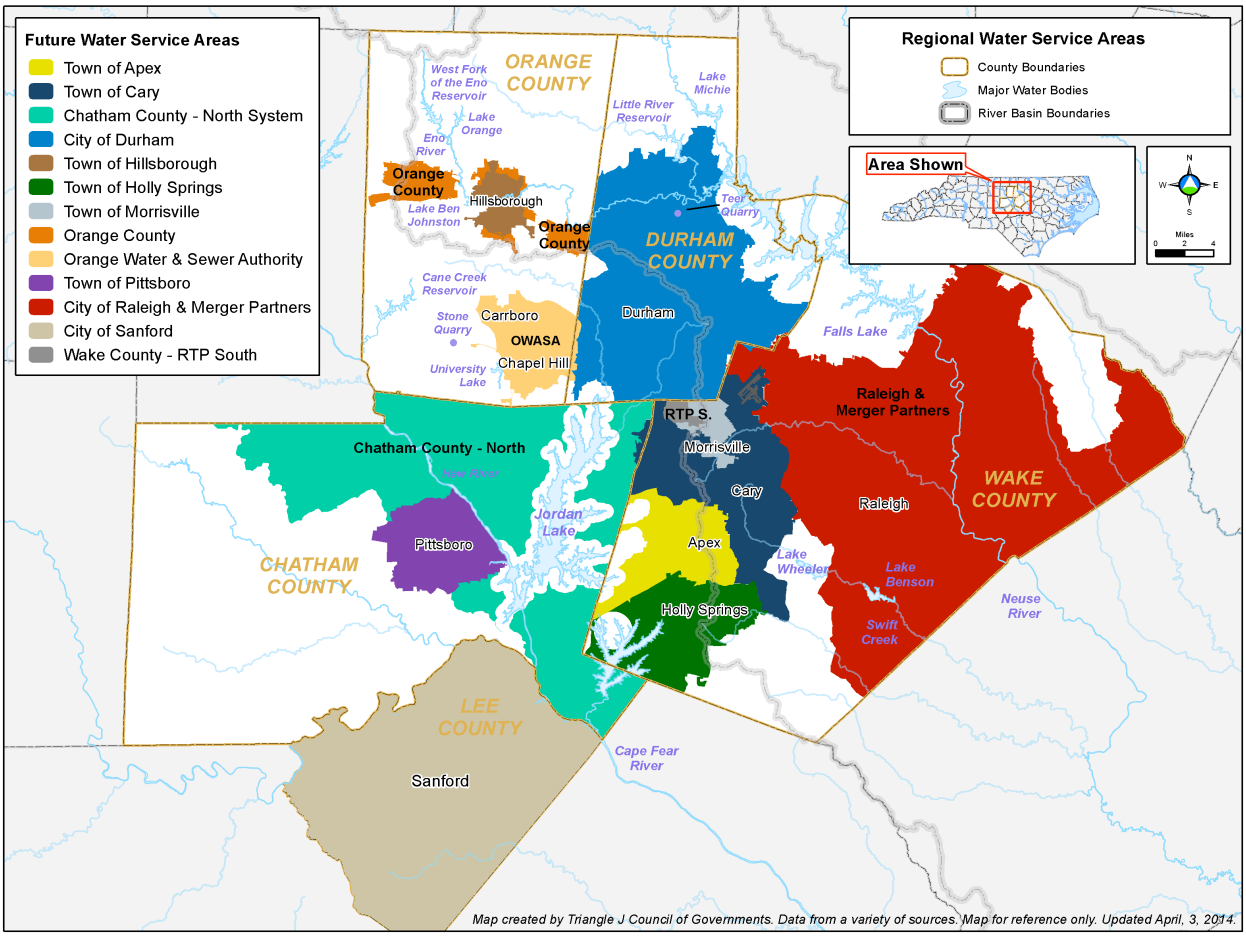


Figure 1 – Future (2060) water service areas of the Jordan Lake Partners

Developing the Regional Water Supply Plan

The TRWSP has two basic components: 1) identification of regional waters need through 2060, and 2) a plan for meeting those needs. The *Triangle Regional Water Supply Plan: Volume I – Water Needs Assessment* (May 2, 2012) presented the demand projections and initial estimates of water supply needs for all of the JLP members. The *Triangle Regional Water Supply Plan: Volume II – Regional Water Supply Alternatives Analysis* (Draft, April 18, 2014) presented the methodology used to create and evaluate regional water supply alternatives and the details of the preferred alternative and regional water supply plan. These documents should be consulted for more information. The following information summarizes the regional needs, recommended regional water supply alternative, and proposed Jordan Lake allocations requests.

Water Demand Projections and Projected Need

Figure 2 illustrates the total regional water demand projections as compared to the current available water supply (horizontal line) of 199 MGD for the thirteen JLP members. Each of the partners developed its own initial projections, which were then reviewed and scrutinized by the other partners, and subsequently revised. The revised, peer-reviewed demand projections were approximately 10-15% lower than the initial projections, as shown by the red shaded boxes in the figure below, and represent an historic consensus among local water system professionals about the present status and long-term needs of the Triangle Region's water supply resources.

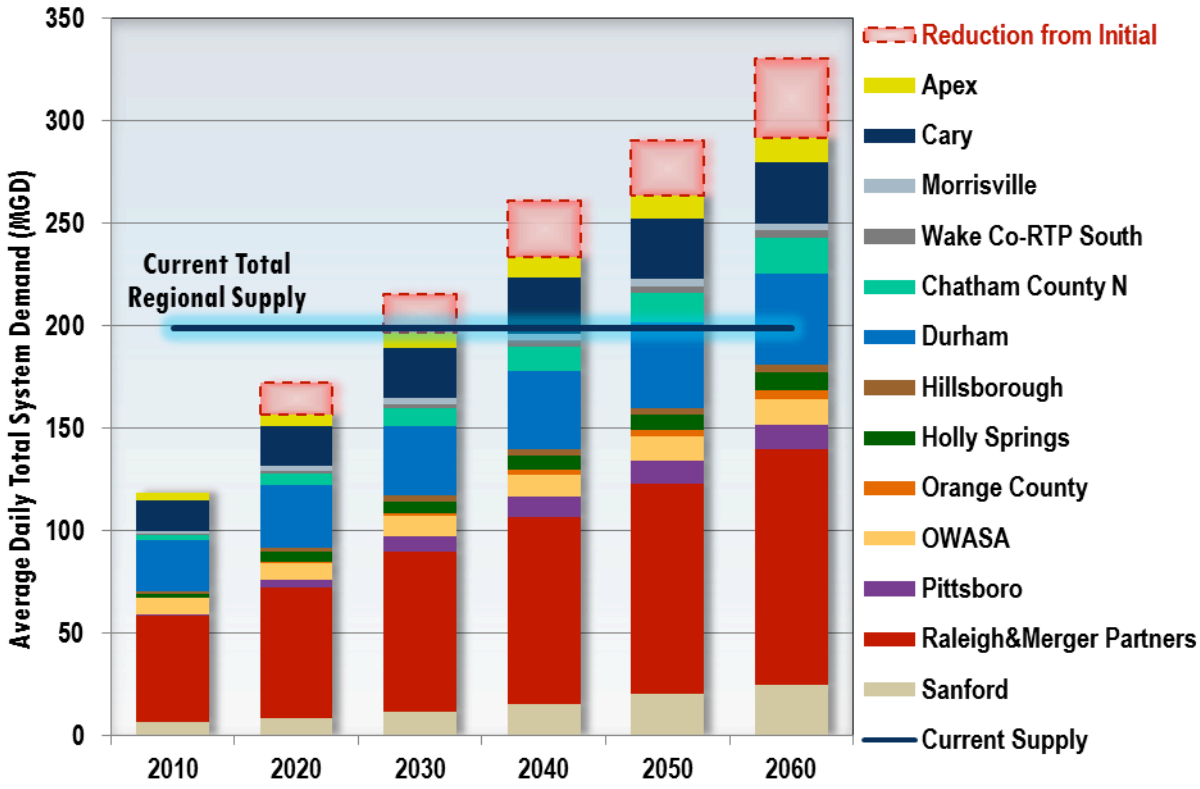


Figure 2 – Regional demand projections, current supply, and reductions due to peer review.

Each water system's *need* is presented as the *average day demand minus the operational yield of its existing water supply sources (including existing Level I Jordan Lake allocations)*. Based on demand projections and existing supply, the need for each partner was computed for the 2010 -2060 planning period at five year intervals as shown in Table 1. The italicized columns for 2045 and 2060 highlight the key planning years for the Round 4 Jordan Lake Allocation process and the 50-year TRWSP, respectively.

Table 1 – Projected Water Supply Need (MGD) by Partner

Partner	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Apex *	0.0	0.0	0.0	0.0	0.0	0.3	1.4	2.1	2.5	2.8	3.1
Cary *	0.0	0.0	0.0	0.0	0.8	2.5	3.9	5.1	6.3	6.3	6.3
Morrisville *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Wake Co. (RTP S.) *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chatham County N *	0.0	0.0	0.0	0.8	2.3	4.1	5.9	7.0	8.2	10.1	12.1
Durham *	0.0	0.0	0.0	0.0	0.0	0.0	0.2	2.1	4.0	5.2	6.5
Hillsborough	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.6	0.8	0.9	1.1
Holly Springs	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	1.1	1.6	2.1
Orange County	0.0	0.1	0.5	0.9	1.3	1.8	2.2	2.6	3.0	3.3	3.7
OWASA *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pittsboro	0.0	0.0	1.3	3.6	5.8	6.9	8.1	8.4	8.8	9.3	9.8
Raleigh & Merger	0.0	0.0	0.0	0.0	0.9	7.5	14.0	19.7	25.4	31.6	37.7
Sanford	0.0	0.0	0.0	0.0	0.0	1.3	3.2	5.8	8.4	10.6	12.8
Total	0.0	0.1	1.8	5.3	11.2	24.7	39.4	54.0	68.4	81.8	95.2

**** "Need" assumes that existing Level I Jordan Lake allocations are fully utilized***

Recommended Regional Alternative

The JLP evaluated a multitude of regional water supply alternatives that could meet the Region's needs as presented in Table 1. The *Triangle Regional Water Supply Plan: Volume II – Regional Alternatives Analysis* presents the methodology and analyses used to create and evaluate those alternatives. A preferred regional alternative for meeting the future needs of all partners through 2060 emerged from this effort and is referred to hereinafter as the "JLP Recommended Alternative."

Table 2 presents new water supply sources that would be brought online as part of the JLP Recommended Alternative. The Projected New Supply column lists the estimated yield of supply sources in addition to existing yields currently available. These sources may include either new supply sources or the expansion of existing sources.

The City of Raleigh's preferred source options remain uncertain with regard to timing and order of implementation, but include four priority sources, any of which could provide approximately 13.7 MGD of additional yield. These include 1) a new Little River Reservoir in eastern Wake County, 2) a reallocation of Falls Lake storage to increase the available water supply pool, 3) a direct withdrawal from the Neuse River upstream of Raleigh's Neuse River Wastewater Treatment Plant, and 4) a quarry reservoir adjacent to the Neuse River near Richland Creek. Under the JLP Recommended Alternative, Raleigh would meet its future demands from a combination of these Neuse Basin sources and would not require a Jordan Lake allocation.

Table 2 – JLP Recommended Alternative sources to be constructed.

Partner	Source Name	Basin	Type	Year Online	Projected New Supply [MGD]
Multiple	Jordan Lake – Round 4	Haw	Storage Allocation	2015	28.2
Multiple	Jordan Lake – Future Rounds	Haw	Storage Allocation	2025 – 2045	8.2
Sanford	Cape Fear River Withdrawal	Cape Fear	River Withdrawal	2025, 2045	12.8
Pittsboro	Haw River Withdrawal	Haw	River Withdrawal	2015, 2020	4.0
Hillsborough	W. Fork Eno Reservoir Expansion	Neuse	Reservoir Expansion	2015	1.2
OWASA	Stone Quarry Expansion	Haw	Quarry Reservoir	2035	2.1
Orange County	Town of Mebane Purchase	Haw	Purchase	2015-2020	2 (0.5 – 2.5)
Raleigh	Neuse Basin Option 1	Neuse	TBD	2025	13.7 (9-15)
Raleigh	Neuse Basin Option 2	Neuse	TBD	2035-2045	13.7 (9-15)
Raleigh	Neuse Basin Option 3	Neuse	TBD	2050-2055	13.7 (9-15)
TOTAL	All New Sources				96.2-100

In total, the JLP Recommended Alternative provides approximately 100 MGD of additional supply by 2060, which would meet the Region's projected cumulative need of 95.2 MGD. The timing and sequence of bringing the new sources online would reduce the risk of a supply deficit for any partner during the planning period.

Jordan Lake Allocations proposed in JLP Recommended Alternative

The JLP Recommended Alternative includes new or expanded Jordan Lake Allocations for multiple partners, both in this current Round 4 and in future allocation cycles, to meet needs through 2060. Currently, 63% of Jordan Lake's water supply pool has been allocated, and a 1% storage allocation is assumed to yield approximately 1 MGD of average day supply. All existing allocations are currently held by Jordan Lake Partnership members, and the JLP Recommended Alternative proposes that all of these either be maintained or increased.

Table 3 presents current allocations, the proposed Round 4 allocation requests, and future proposed allocation requests through 2060. Round 4 requests would meet water supply needs through 2045; future allocations would meet 2060 needs. Table 3 indicates the total allocation amounts for each partner, who are expected to distinguish between Level I and Level II requests in their respective Round 4 allocation applications.

Table 3 includes all thirteen JLP members, even though Raleigh and Sanford are not expected to request Jordan Lake Allocations. The Towns of Apex and Cary currently hold a combined allocation that meets the needs of both communities. The Town of Cary also has finalized long-term agreements to serve the Town of Morrisville and the Wake County – RTP South service areas and is expected to make a joint allocation request. Table 3, therefore, includes the combined amount of the proposed allocation request, but it also shows the individual partners' amounts.

Table 3 – JLP Recommended Alternative proposed Jordan Lake Allocations by Partner (MGD).

Partner	Current		Round 4 Requests		Future Rounds (2060 Need)	
Apex	8.5	32.0	10.6	46.2	11.6	48.5
Cary	23.5		28.6		29.8	
Morrisville	3.5		3.5		3.6	
Wake County (RTP South)	3.5		3.5		3.5	
Chatham County - N	6		13		18.2	
Durham	10		16.5		16.5	
OWASA	5		5		5	
Orange County	1		1.5		2	
Holly Springs	2		2		2.2	
Hillsborough	0		1		1	
Pittsboro	0		6		6	
Raleigh & Merger Partners	0		0		0	
Sanford	0		0		0	
TOTAL JLP	63		91.2		99.4	

Moving toward implementation

The JLP Recommended Alternative is the result of more than four years of collaborative planning by the Partnership. The water supply needs of the thirteen partners have been vetted through multiple rounds of peer review and represent the most complete long-term picture of the Region's demands compiled to date. A thorough regional water supply alternatives analysis determined that the JLP Recommended Alternative would be most acceptable in terms of implementability, environmental and community impacts, customer costs, and overall acceptance by local governments and the general public.

The JLP efforts constituted the successful collaboration – including an unprecedented level of mutual trust and respect – among local entities planning, coordinating, and moving toward implementation of a water supply plan that will meet the long-term needs of the entire Triangle Region. Individual partners will continue to operate their own systems, but the success of this regional water supply plan will depend on each partner being able to implement its respective additional water supply sources as recommended.

The partners investigated the various impacts of the JLP Recommended Alternative – including effects on the environment, downstream water users, and the general public – and found these impacts to be acceptable and preferable to those of the other options. Hydrologic effects of the JLP Recommended Alternative were modeled with the recently updated Cape Fear-Neuse Basin OASIS model. Preliminary results indicate the proposed alternative will meet long term demands without creating downstream shortages; is considered to be the most implementable from a regulatory and political perspective; and provides for coordinated allocation requests among JLP members.

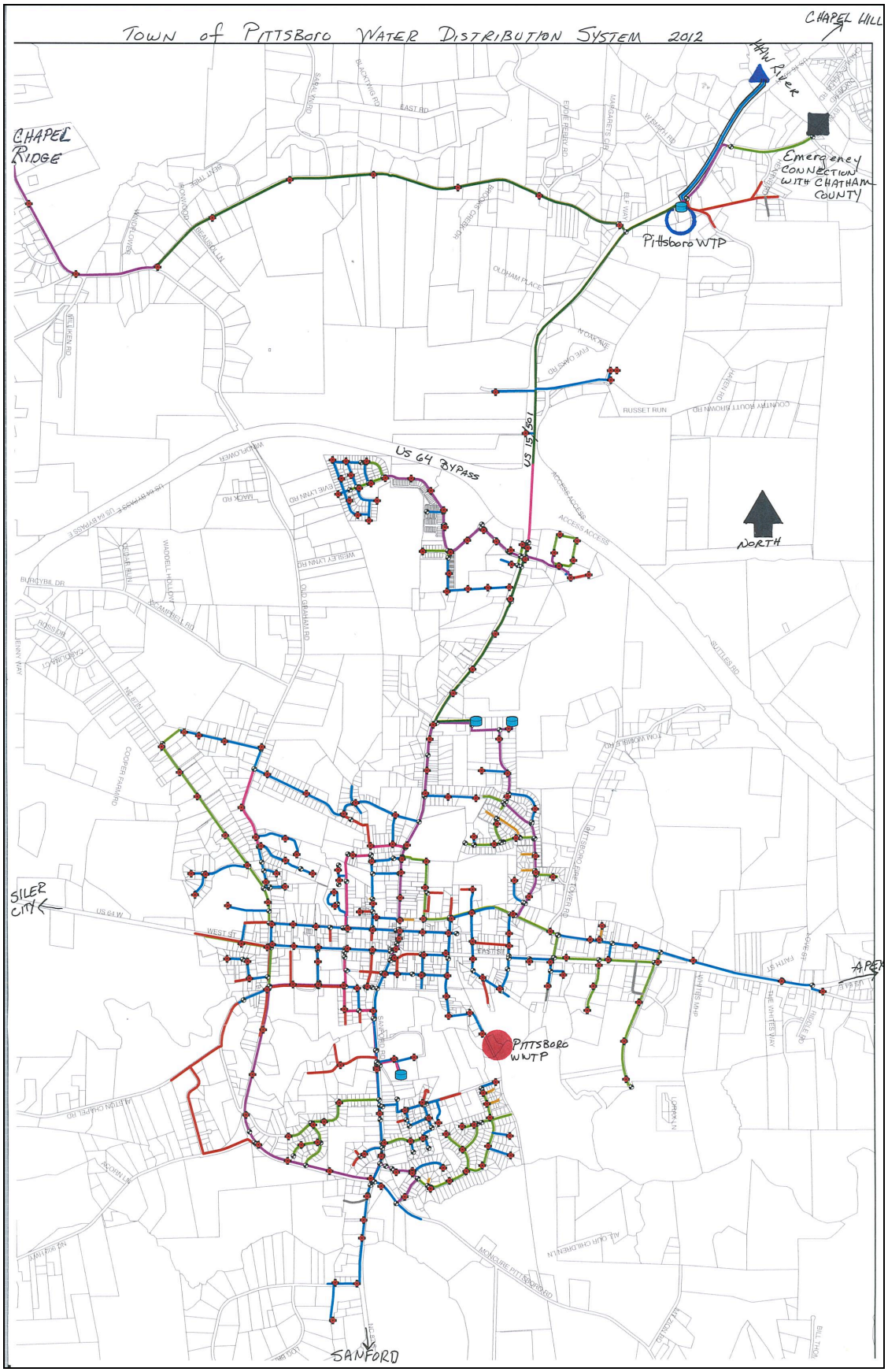
The remainder of this document presents the allocation request for **the Town of Pittsboro**.

SECTION I. WATER DEMAND FORECAST

The Town of Pittsboro is an active member of the JLP and in 2011 participated in the development of the Triangle Regional Water Supply Plan. At the time, Pittsboro did not have data regarding the proposed mega development Chatham Park. Assumptions were made regarding land use and density in order to predict future water needs. Late in 2013, Chatham Park provided a very rough estimate of their future water needs for the 7000+ acres they plan to develop. The original land use assumptions for the Chatham Park acreage were backed out of the total demand and replaced with the data recently supplied by Chatham Park. Therefore, tables in the original Triangle Regional Water Supply Plan for Pittsboro do not match those presented in this application.

Pittsboro gained multiple benefits from participating in the Jordan Lake Partnership. The exchange of information among the partners about demand projection methodologies and the peer-review of data guided Pittsboro towards significant improvements in water data monitoring. For example, Town staff have updated the utility billing software and reviewed water rates. They have also purchased meters to aggressively track flushing water and further identify all non-revenue water. Expertise shared by larger systems also helped Pittsboro plan for the impact of Chatham Park. The collaborative effort of the Partnership has genuinely improved water supply planning for Pittsboro and those benefits are reflected back to the Partnership by improving confidence in regional modeling outcomes and in the ability of the Partners to meet the long term water demand of the region.

Figure I.1 – Map of Service Area



User Sectors

Table I.1 presents the water use sectors that were used to develop the demand projections for Pittsboro.

Table I.1. Water Use Sectors

Use Sector	Use Sub-sector	Description
Residential	Residential	Single family homes, duplexes, apartments – including apartments with a master meter, and irrigation to these buildings.
Commercial	Commercial	Commercial businesses & institutional customers are both included in this sector. Examples include; county office buildings, schools, colleges, nursing homes, and daycares as well as irrigation to these buildings.
Industrial	Industrial	Currently serving: WDL, Biolex-1, Biolex-2, Piedmont Biofuel.
Institutional		Included in commercial sector.
Bulk Sales	Bulk sales to large subdivision	Master meter to Chapel Ridge subdivision. Not included in residential sector because most of the water demand is for golf course irrigation.
Non-Revenue	Distribution System Process	Flushing water
	Water Treatment Process	Raw water used at WTP & returned to the Haw River. Not sent into the distribution system.
	Other Non-Revenue	Firefighting, leakage, unmetered Town buildings.

Residential user sector includes single family homes, duplexes, apartments, and irrigation used by these customers. This sector also includes apartments that are supplied through a master meter and does not distinguish between customers that live inside or outside the Town limits or by the size of the meter. Residential sector size was based only on the total number of meter connections; one master meter was counted as one connection.

The commercial user sector includes both commercial businesses and institutional customers. This category includes businesses, county buildings, schools and colleges, nursing homes and daycare facilities. The total number of commercial/institutional users was based on the number of meter connections.

The industrial user sector includes only four manufacturing plants in Pittsboro.

Bulk water sales to a large subdivision were put into a separate, unique user sector. Build-out of this subdivision will take several more years and the current large water demand is not for the few residential customers but for golf course irrigation. Since on-site irrigation will be accomplished through reuse water in the future, extrapolating future demand from current use did not seem reasonable, so it was broken out separately from the residential sector.

The non-revenue water sector for Pittsboro was broken into two subsectors for 2010, water treatment plant process water and other non-revenue water. At the time, data was not available to further distinguish between system flushing water and system losses. In 2012, Pittsboro began metering flushing water and this data was used to estimate future distribution system usage and better define losses.

The JLP, in accordance with current water supply industry practice, no longer uses the term "Unaccounted-for Water". In general, non-revenue water falls into unbilled water used for system management, maintenance and operations purposes, and all other non-revenue water use. The JLP members agreed in principle to separate the "System Process" usage according to where it was used, namely, at the water treatment plant or in the distribution system. This distinction is important as the "Distribution System Process" water is by definition "finished water" and is most easily calculated as a function of total consumed or total finished water entering the distribution. "WTP Process Water" is generally calculated as the portion of the "raw water" that is pulled from the source that does not become "finished" water. The "Other Non-Revenue" category is a flexible category for many other types of unbilled use, but primarily should represent loss through leakage. The JLP members have been working towards completing water audits, and better measuring flows to be able to more categorize system process uses, reduce apparent losses, and more accurately define true losses in the "Other Non-Revenue" category.

Breaking down what was once "Unaccounted-for Water" into these three components allows a more complete representation of non-revenue water uses that is still flexible enough to be used by multiple JLP members. While the definitions of the sectors are largely similar, differences in system operation lead to differences in the specific components within the sectors. Furthermore, each partner used slightly different methodologies to compute the actual demand in each of these subsectors. Thus, the single percentage factor in the "Population & Demand Projections" tab of the JLA4 Excel Workbook (DWR, 2012) is not sufficient to represent these sectors, and the projections are instead entered as the projected values in units of million gallons per day (MGD).

Sector Projections

Pittsboro's future water demand projections were developed based on a land capacity/development type analysis. The future service area, which is Pittsboro's ETJ, has ten-fold more land available for development in the future (25,000+ acres) than is currently developed (2,200 acres). Of the land in the ETJ, over 11,000 acres are already listed in known residential developments. See Map….

The sector projections were developed based on estimated per capita use rates and population estimated from developable land, development density and household size. The future development was separated into two categories: known developments and other undeveloped land in the ETJ. For these areas, usage rates were derived for residential uses and commercial and industrial uses.

The Town has one bulk customer, Chapel Ridge Subdivision, and it was assumed that this customer would grow to build-out by 2030.

Industrial water demand was projected to remain flat at its current demand through 2060.

Usage Rates

The residential use rate was developed by examining the billing data from several recently built single-family residential subdivisions (These subdivisions will likely be more representative of future development than

older housing stock in Pittsboro.) Billing records indicate an average household water use of 240 gpd in these neighborhoods. Using the 2010 census average household size of 2.33 pph, a per capita residential use rate was calculated at 103 gpcd, which was rounded down to 100 gpcd for the future water projections.

Next, a combined commercial and institutional use rate was determined by examining 2009 billing records. Given a total commercial and institutional use of 123,610 gpd and a 2009 population of 2,670, a system-wide commercial and institutional use rate of 46 gpcd was calculated. Thus, for each resident, 46 gallons per day of commercial and institutional water is used to support the residential population. These use rates agree fairly well with the 2010 gross estimate of 165 gpcd of raw water use, computed from 2010 raw water use data and the 2010 census population of 3,743.

After the use rates were determined, the population was determined for the known and potential future development. For all future development areas, a percentage of the area was assumed as not developable due to space needed for transportation infrastructure, utilities, open space, etc. The percentages of remaining developable land was assumed to be 60%. For the known developments, a density of 2 units per acre was assumed with 2.33 pph. For the other areas within the Town's ETJ, a density of 0.4 units per acre was assumed with 2.33 pph, after excluding certain undevelopable areas (areas already subdivided and existing spray fields). Then, the residential and commercial/institutional use rates were applied to the population estimates to develop the future water demand projections.

Demand Projections

Table I.2 - Population projections for service area

Service Area	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Pittsboro ETJ	3,700	13,900	24,000	41,300	58,600	69,300	79,900	83,500	87,100	92,000	96,800

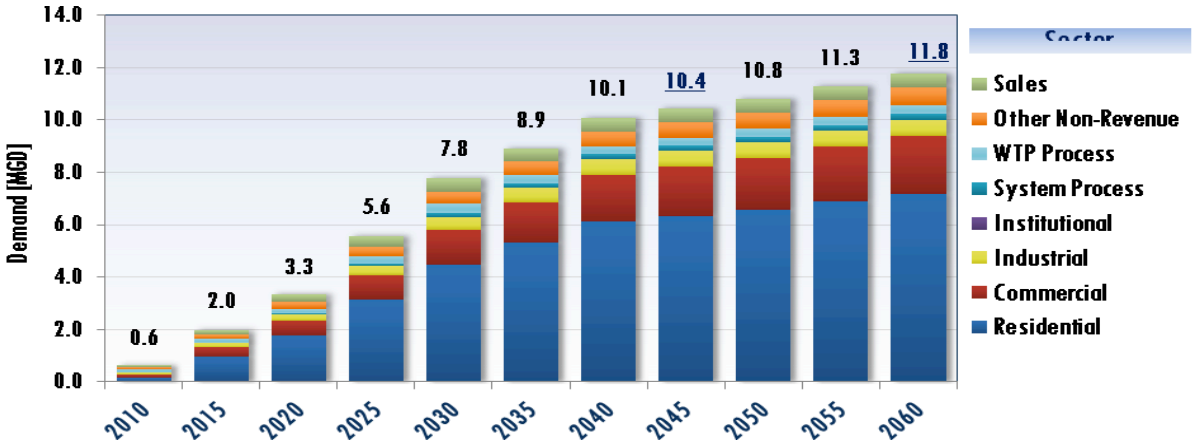
*

Table I.3 – Water Demand Projections by sector table.

Sector	Subsector	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Residential	Residential	0.17	0.97	1.78	3.13	4.49	5.30	6.11	6.34	6.57	6.88	7.19
Commercial	Commercial	0.13	0.35	0.57	0.95	1.32	1.56	1.79	1.88	1.97	2.09	2.21
Industrial	Industrial	0.07	0.15	0.22	0.35	0.48	0.54	0.61	0.61	0.61	0.61	0.61
Institutional	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
System Process	System Process	0.00	0.03	0.06	0.10	0.14	0.16	0.18	0.19	0.20	0.21	0.22
System Process	WTP Process	0.10	0.13	0.16	0.27	0.38	0.34	0.30	0.31	0.32	0.33	0.35
Non-Revenue	Other Non-Revenue	0.09	0.17	0.25	0.34	0.44	0.51	0.58	0.60	0.62	0.64	0.67

Residential/Commercial/Etc	*Sales*	0.06	0.18	0.29	0.41	0.52	0.52	0.52	0.52	0.52	0.52	0.52
TOTAL		0.62	1.98	3.34	5.55	7.77	8.93	10.09	10.44	10.80	11.28	11.76

Figure I.2 – Demand Projections by Sector



Finally, non-revenue water demand projections were developed. There was a limited set of historical data for use in determining the Town's WTP process water, flushing water and other non-revenue water. The Town has several historically unmetered uses including distribution system flushing, cleaning water at the Town's WWTP and utility vehicle washing. The Town has taken steps to begin tracking the amount of water used for flushing distribution mains by purchasing a hydrant meter. Based on 2010 billing records, 14.5% of all raw water was used for WTP production, finished water monitoring and flushing, and an additional 16.4% of raw water was other non-revenue. For the projections, 10% of the total system demand was assumed for other non-revenue water and 10% was assumed for WTP process and distribution system process water combined. These projections represent a reasonable attempt by Pittsboro to conserve water relative to current operations. Pittsboro's staff have instituted a program to meter the portion of water used for flushing the distribution system. Pending results of the program, Pittsboro is considering modifications to its flushing protocol and a leak detection program.

In summary, the following assumptions were used in Pittsboro's water demand projections:

- Infill water demand growth of 1.0% per year
- Residential use of 100 gpcd
- Known developments were assigned a residential density of 2 dwelling units per capita: 100 gpcd, with 60% of the total acreage assumed to be developed as residential
- Acreage not included in a known development was assigned a residential density of 0.4 dwelling units per acre, with 60% of total acreage assumed to be developed as residential
- Certain undeveloped areas were left undeveloped (spray fields & areas to be served by Chatham County)
- Allow 10% other non-revenue (system losses, meter inaccuracies, etc.)
- Allow 10% for process water (WTP process & distribution system flushing)
- Keep industrial use flat over time (65,120 gpd)

• Allow bulk customer to grow to build-out by 2030

• The per capita rate for commercial and institutional uses needed to support residential development is 46 gpcd

Bulk Water Sales

The Town of Pittsboro has a sales contract to supply the water needs of approximately 2100 homes and any buildings associated with the Chapel Ridge subdivision (club houses, pools, etc). A contract to supply water to Chatham County also exists but has never been used. The connection to Chatham County remains for emergency use only.

Table I.4 – Sales to other systems

Purchaser	PWSID	Contract Amount (MGD)	Begin Year	End Year	Regular or Emergency	Pipe Size (in.)
Chatham County North	03-19-126	0.5	1988		Emergency	8
Chapel Ridge S/D	40-19-009	0.4	2002		Regular	12
TOTAL						

The demand for this purchaser was not included in the residential use sector. The large volume of water used by this customer is not representative of the existing +150 homes. As water is delivered to a master meter, Pittsboro does not have actual data on usage, but it is suspected that a considerable amount of water is used for golf course irrigation. As more homes are built, the community plans to substitute reuse water for irrigating and save potable water for the residential customers. Building in this area was projected to be complete by 2030.

Table I.5 – Sales Projections

Purchaser	Current Contract [MGD]	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Chapel Ridge S/D	0.4	0.06	0.18	0.29	0.41	0.52	0.52	0.52	0.52	0.52	0.52	0.52
TOTAL												4.98

Once demand was determined from the above land use plan methodology, the population was used as a check to determine if the projection was reasonable. The Hydrostructures memo (2010) located in the Appendices includes three other population estimates for comparison.

Pittsboro is a small town that is projected to grow rapidly over the next 50 years. The current corporate limits make up only a small percentage of the Town's relatively large extra-territorial jurisdiction (ETJ), which is its future water service area. Land developers have purchased large tracts of land within the Town's ETJ, with plans for future development. The known areas for future development far exceed the size of the current corporate limits of Pittsboro.

Pittsboro's population estimate was a combination of existing/infill population growth along with known and potential future residential development. The population of Pittsboro's current service area (i.e. current corporate limits) was assumed to grow by 1% each year as infill growth. Future development was determined for three separate areas: Chapel Ridge, an existing bulk water customer; known future developments; and other potential development. The Chapel Ridge subdivision was assumed to be built out to 1,975 units by 2030, which was used to calculate a population estimate using the 2010 US Census figure of 2.33 people per household (pph).

References

DWR, 2012. Local Water Supply Plan Report, Pittsboro. Operations Research & Education Laboratory, 2007. Integrated Planning for School & Community, Land Use Supply.

SECTION II. CONSERVATION AND DEMAND MANAGEMENT

The Town of Pittsboro's Water Efficiency Program plays a critical role in managing future water use. To use resources efficiently and to effectively manage demand from projected population growth, an ambitious systems approach comprised of education, incentives, and regulatory programs is planned. These programs will target water use for all customer classes – residential, commercial, industrial, and institutional. Where applicable, parallel measures will target water use by the Town (e.g. use of efficient fixtures and landscape watering practices). In addition, more aggressive measures will be used to address the Town's antiquated water treatment and distribution system and high non-revenue water (NRW) loss. The Town began its NRW loss prevention program in 2012. This program will be expanded and will be part of a systematic, sustained effort to reduce and minimize losses. Over time, all programs will be monitored and adjusted as needed to ensure progress toward the Town's long-term efficiency goals.

Water Efficiency Goals

As described in Section I, Pittsboro's demand projections are based on the age of several categories of housing stock. The oldest segments of town are fairly inefficient at a current average of 100 gpcd. As shown in Table II.1, a moderate goal of reducing consumption 20% over the planning horizon. Newer housing stock will be very efficient indoors due to plumbing codes, but outdoor use may be higher. The education, incentive, regulation approach will provide a foundation for aggressive efficiency, with the long-term consumption goal of 60 gpcd. In addition to achieving efficient use of a limited water supply, the aggressive scenario would save the Town a projected XX million dollars in facility expansion and operation costs.

Table II.1. Moderate and Aggressive Conservation Goals 2010 – 2060 – Town of Pittsboro, NC

2010 Existing	2060 Moderate	2060 Aggressive
100 gpcd	80 gpcd (20% reduction)	60 gpcd (40% reduction)

A Systems Approach to Reducing Consumption

The proposed education/incentive/regulation systems approach will accomplish water savings through both technology and behavior change. Education measures provide the foundation for the Town's water efficiency program. Education provides both the understanding for why water conservation is important and the practices needed to reduce water use. To further motivate customers to reduce water, incentives offer a financial benefit. The Town's water rate can motivate customers to use less water through reduced utility bills. Customers can also reduce water by using rebates for water efficient fixtures such as toilets. Regulations provide the third and final critical component of the systems approach to efficiency; ordinances can be used to accomplish both technological and behavior-oriented measures.

Figure II.1 – Tri-fold Systems Approach

Education **Incentives** **Regulation**

With the systems approach, each area complements and supports the others, as depicted in Figure II.1. The Town of Pittsboro's plan summarized in Table II.2 aspires to achieve widespread water efficiency using the systems approach. Some customers will learn from education and use incentives. Other will follow regulations. For example, a water waste ordinance provides a tool to educate customers who excessively water their landscapes, causing runoff. The tiered rate structure is designed to get a customer's attention – higher than anticipated usage either from an indoor or outdoor leaks or by known uses such as irrigation – can kick a customer into the next tier and a much higher bill.

The systems approach provides the means to sustain decreased water use over time. By simultaneously addressing multiple measures and multiple customer types, the program avoids reliance on a single measure to achieve goals. Similar combination approaches have been successfully used in other JLP utilities and progressive utilities around the country to attain efficient water consumption rates (Maddaus Water Management, 2009).

Table II.2. Existing and Planned Water Efficiency Measures – Town of Pittsboro, NC

Program	Target Use Class	Indoor	Outdoor
Education			
Current:			
Website	All	X	X
Festival Booths	All	X	X
Planned:			
Publications	All	X	X
Workshops	All	X	X
Audits	All	X	X
Utility Billing Consumption History	All	X	X
Incentives			
Current:			
Tiered Rate Structure	All	X	X
Reclaimed Water	Industrial (current) Residential/Commercial (planned)	X	X
Planned:			
Water Efficient Fixtures Rebate Program	Residential	X	X
Regulations and Policies			
Current:			
Voluntary Water Conservation Measures	All		
Water Shortage Emergency	All		
Planned:			
Water Waste Ordinance	All	X	X
Water Efficient Landscapes – Site Design and Irrigation	All		X
Tree Protection	All		X
Zero Footprint - New Development	Residential	X	
Town Operations			
Current:			
Meter Replacement	NRW		
Water Treatment Plant Efficiency	NRW		
Waterline Replacement	NRW		
Landscape Watering Practices	NRW		X
Planned:			
Leak Detection	NRW		
Town Fixtures	NRW		

The Quantity/Quality Connection

Most outdoor measures that improve water efficiency can also reduce adverse water quality impacts caused by runoff. For example, proper landscape watering practices can prevent runoff from improper use of irrigation systems, which can transport nutrients into storm drains and subsequently waterways. The Town's education, incentive, and regulatory measures used to address water efficiency will serve a dual purpose and also support implementation of the Jordan Lake Nutrient Management Rules.

Wastewater Discharge and Reuse Program

In addition to the Jordan Lake Nutrient Management Rules, the Town's limited capacity to discharge wastewater (0.75MGD currently with a maximum of 3.22 MGD) will constrain long-term wastewater discharges. Water used efficiently indoors as well as a robust and expanded reuse program will reduce wastewater generated, and thus help the Town's ability to meet state permit requirements.

Education

Pittsboro's public education program consists of outreach through the Town's website, utility bill inserts, street fairs and, when staff become available, landscaping/water efficiency workshops sponsored in conjunction with local organizations. An early component of the Town's program will include public workshops and other outreach to solicit feedback on planned program initiatives.

In addition to educating citizens about indoor and outdoor residential water use, the public education program will share measures to improve water use efficiency in the Town's industrial, commercial, and institutional sectors. The Town's voluntary measures ordinance adopted in 2007 (see "Ordinances") provides a starting point for ongoing education measures to educate citizens about efficient water use.

Additional tools will be used over time to educate customers about water use. The Town recently installed a new utility billing system, which will eventually provide a water usage graphic showing historical consumption on utility bills. When staff is available, the Town will offer water audits to residential, commercial, industrial, and institutional customers to assess the presence of leaks and educate about savings opportunities.

Incentives

Over the past several years the Town has paid increased attention to incentive-oriented mechanisms to reduce water use. The block rate structure adopted in January, 2013 targets excessive water use through increased fees based on use. The Town also initiated reclaimed water service in 2010, offering a reduced rate for water used for industrial and bulk contracting uses. A third planned component to the Town's incentives is a rebate program to encourage use of efficient indoor fixtures.

Utility Rate Structure

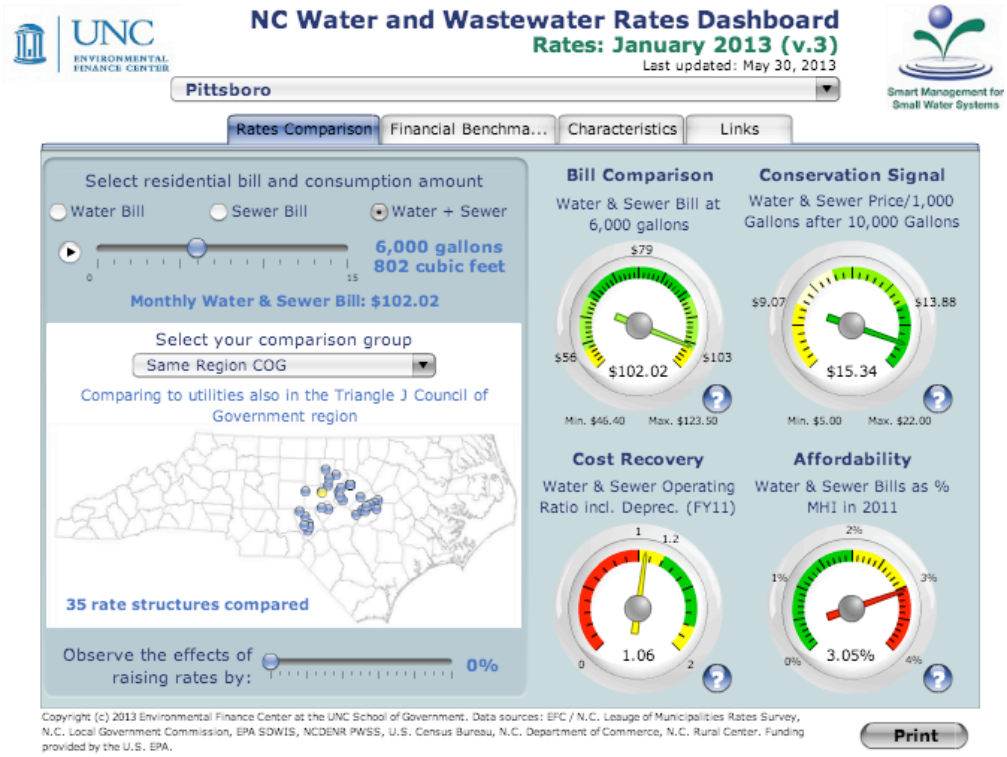
The Town's increasing block rate structure strongly discourages excessive indoor and outdoor water use. Pricing mechanisms are a key tool used around the country to accomplish effective demand management. As shown in Table II.2 and Figure II.2 below, the Town's structure sends a strong conservation signal. Table II.3 shows how the rate increases for increased usage. Figure II.2, obtained from the NC Water and Wastewater

Rates Dashboard, shows how Pittsboro compares to other utilities within the Triangle J Council of Governments (many of which are JLP partners). As shown in the "Conservation Signal" indicator at the top right, the Town's pricing is extremely strong. It is anticipated that the aggressive rate structure will encourage customers to use water efficiently, and whenever possible, to see other sources such as reclaimed.

Table II.3. Town of Pittsboro's Water Rates

	Inside	Outside
Basic Service Charge (Flat monthly fee for meter reading, billing and accounts management)		
Meters ≤ 1 inch	$ 13.00	$26.00
Meters > 1 inch	$ 24.00	$48.00
Plus a monthly usage fee per 1,000 gallons		
0 to 2,000 gallons	$ 4.50	$ 9.00
2,001 to 6,000 gallons	$ 5.15	$ 10.30
> 6,000 gallons	$ 6.00	$ 12.00

Figure II.2 – Town of Pittsboro Dashboard–NC Water and Wastewater Rates



Rebate Programs

Rebates for water efficient products will provide another key component to the Town's incentive-oriented programs. Because about 35% of the Town's water customers live in older, less efficient housing stock, significant savings (20-40%) could be achieved by replacing indoor water fixtures. A program that will offer rebates for water efficient toilets, clothes washers, and dishwashers is planned for implementation by 2015.

Reclaimed Water

Another key component of the Town's incentive programs is the availability of reclaimed water. In April 2010, the Town completed a reclaimed water system (RWS) and offers a discounted rate over potable water. The RWS has the capacity to pump up to 0.43 MGD, and currently provides a capacity of 0.05 MGD. In its first seven months of operation the Town delivered over 12 million gallons to 3M, the system's first customer[1]. 3M uses the water for manufacturing. The water evaporates during the process, eliminating the discharge, creating a win/win for both the customer and the WWTP. The Town plans to partner with the customer to conduct an evaluation and use the results as part of a PR campaign touting their environmentally friendly business practices.

As shown in Figure II.3, the Town plans to expand the RWS infrastructure as new customers come online. The total reclaimed water supply available depends on the volume of water treated at the WWTP, which averaged 0.336 MGD in 2013.

The Town currently offers bulk potable water purchases at Town Hall for construction and other uses; in 2013 contractors used nearly 100,000 gallons. As construction and demand for water increases, the Town will install a bulk reclaimed water port for contractor use. The first year demand is projected to be 50,000 gallons, replacing the bulk potable water purchases within three years. Contractors working within a certain distance of the bulk reclaimed port or using water for irrigation or road construction may also be required to use reclaimed water.

Figure II.3 – Map of Reclaimed Water Service Area

Regulations

Ordinances

The Town has two ordinances that address water conservation, and several other ordinances under consideration. In August 2007, the Town Board of Commissioners approved the Voluntary Conservation Measures[2] ordinance. The measures encourage behavioral practices such as irrigation limits, mulching and hand watering, use of water efficient interior plumbing fixtures, and fixtures and other methods. In June of each year, this document is updated and shared with the public via the Town website and through other public outlets. The Town's second conservation-related ordinance -Pittsboro's Water Shortage Response

[1] Because this customer originally used potable water supplied by Chatham County, demand reductions are not included in the Town of Pittsboro's projections.

[2] http://pittsboronc.gov/vertical/Sites/%7B512CE168-4684-4855-9CD9-7D209FE775E3%7D/uploads/%7BD54311E2-E547-444A-947E-BA531F243E06%7D.PDF

Plan[3]- is submitted each year to the NC Division of Water Resources. It includes provisions for different stages of water conservation from voluntary to mandatory to rationing.

To incorporate water efficiency into the Town's new and expanded infrastructure, additional ordinances are proposed. These ordinances primarily target water use in the landscape, which is anticipated to comprise a substantial component of the increased water use.

- Landscape Water Efficiency Ordinance – Under consideration is a comprehensive ordinance to address efficient water use in new landscapes, using techniques ranging from soil amendments to efficient irrigation system design.
- Tree Protection Ordinance – Town staff are also examining the feasibility of a tree protection ordinance. Maintaining tree cover supports efficient water use because of reduced impacts from evaporative cooling loss.
- Zero Footprint New Development Ordinance – One way to offset growth in the Town's system would be to require developers to contribute to a conservation account that provides funds for rebates to promote water efficient fixtures. This would essentially be a self-funded program that also increases efficiency. This could target particular sources such as in-fill development.
- Water Waste Ordinance – This ordinance targets overwatering from irrigation systems and leaks.

With adoption of ordinances comes the administrative need to educate, implement, and enforce to achieve a successful program. This will have to be carefully reviewed from an administrative and fiscal viewpoint to ensure progress toward long-term efficiency goals.

Water Use In Town Operations

Through daily operations, town staff uses water in numerous ways, ranging from process water at the treatment plant to indoor fixtures in Town buildings. As shown in Table 1 above, Pittsboro's plan includes an ambitious program to address non-revenue water, and utilize conservation-oriented features of the automated meter reading (AMR) system. Other Town initiatives will target landscape watering and indoor efficiency.

Non-Revenue Water

The non-revenue water losses prior to entering the distribution system are within staff's ability to review and address for possible reductions through management actions and new facilities and capital improvements. As shown in Figure II.3, water loss in the distribution system - the Town's "other non-revenue water" (NRW) - is estimated at twenty two percent (22%). Non-revenue water currently costs the Town about $225,000 in

[3] Link to WSRP

annual lost sales. A number of measures are underway with the goal to reduce distribution system loss by half, down to ten percent (10%).

The first step used by the Town of Pittsboro's Utilities Department to reduce NRW was to begin metering uses of process water such as for flushing operations. In 2013, staff also implemented a program to replace the Town's oldest, largest meters; results are summarized in Table II.4. As shown, the projected payback is less than 2.5 years. Staff will continue to target NRW by calibrating or replacing 2" and larger meters in 2014.

To address the remaining high loss, a systematic Capital Improvements Plan will be recommended to reduce the distribution system losses to <10% by 2025, or one percent per year. With this reduction realized, the Town will benefit from the cost savings and will be better positioned to minimize additional withdrawals and treatment capacity needs. The water loss reduction program will require a combination of public official education and approval, public education to inform the citizens, data collection, reviewing existing reports and planning/programming ongoing actions with sufficient budgets to accomplish the goals.

Figure II.4 – Town of Pittsboro Non-Revenue Water Sources

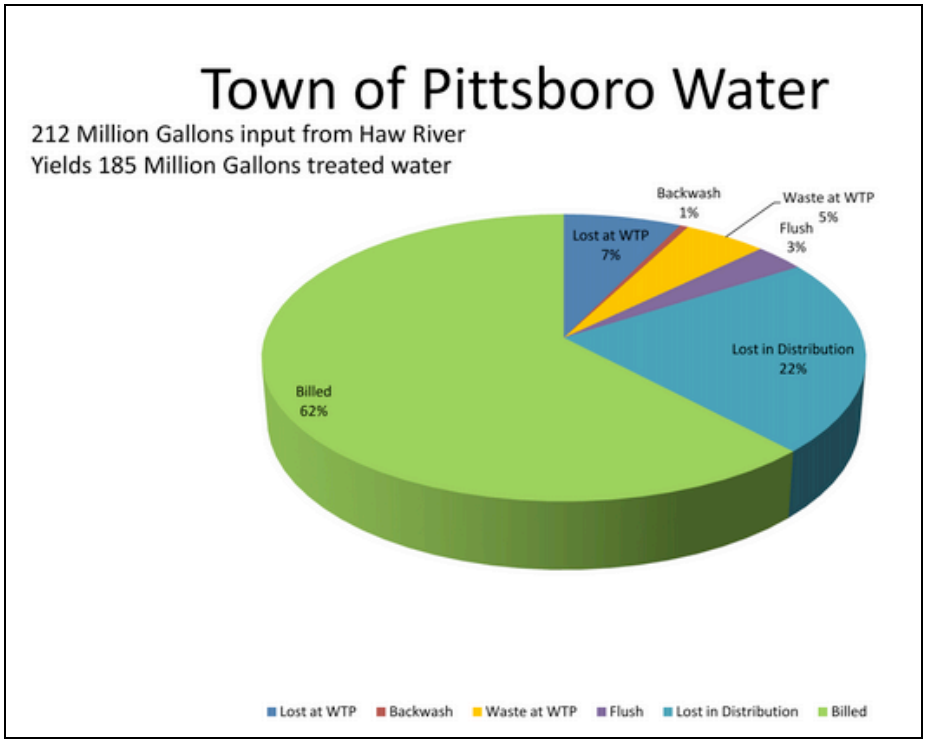


Table II.4. 2013 Meter Replacement Program

Total Replacement Meter Cost	$38,290
Meter Revenue:	$116,429
Total Gain:	$15,939.20
Total Payback in Years:	2.40

Automated Meter Reading System

The use of automated meter reading (AMR) technology holds one of the strongest opportunities for achieving a water efficient community. As with electric utilities, AMR in a water utility allows staff to monitor usage and alert customers when excessive or unusual usage occurs. The AMR system also allows a utility to spread out demand to manage fluctuations in the system. This feature will be especially useful as new development causes consumption spikes and staff learns to manage a rapidly growing system. The Town of Pittsboro began converting to AMR meters in 2002. Over 90% of the Town's meters now use AMR technology.

Impact On Water Use

The systems approach to conservation proposed by the Town of Pittsboro will enable the use of extraordinary measures to achieve long-term water use efficiency. As shown in the demand forecast, the Town aims to reduce per-capita consumption by up to thirty-three percent (33%) over the fifty year planning horizon. To expand the efficiency program measures, the Town will implement ordinances and programs as funds become available. Careful monitoring will help determine progress towards reduction goals, and allow for changes when necessary to ensure progress remains on track.

References

Atteberry, et. al. 2010. MY GROUP IS READY FOR WATER CONSERVATION. NOW WHAT? http://www.ncsafewater.org/Pics/Training/AnnualConference/AC10TechnicalPapers/AC10_Management/Management_T.AM_10.00_Atteberry.pdf

Maddaus Water Management (MWM). 2011. "Why do new homes use more water than existing homes even during the recession?" Presentation at the Water Smart Innovation Conference. October 6, 2011.

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Mayer, Peter and Al Dietemann. 2011. "Assessing Changes in Single Family Water Use". Water Research Foundation webcast. December 6, 2011.

Texas Water Development Board (TWDB). 2011. Water Conservation Savings Quantification Study.

UNC Environmental Finance Center, 2013. Small Systems Technical Assistance Memo. Prepared for Town of Pittsboro, July 13.

SECTION III. CURRENT WATER SUPPLY

Available Supply from Existing Sources

Pittsboro's current water supply is a run-of-river intake located behind the Bynam Dam on the Haw River. The river is classified as WS IV NSW and has a 20% 7Q10 flow of 8.91 MGD.

Existing intake/withdrawal currently has a DENR permit for 3 MGD from the Haw River. The current treatment plant has a 2 MGD permit capacity. Future planning of infrastructure upgrades include the following;

- study of existing in-take structure
- new or upgraded water treatment plant
- new distribution system
- storage tanks
- improvements to existing distribution system.

While the Haw River is Pittsboro's only water source, one emergency interconnection exists with the Chatham County North system. The JLP Interconnection Study identified another potential connection south of Pittsboro with the Chatham County Asbury system. Both of these connections require further study and inter-local agreement for their viability.

Map of Water Supply sources and Treatment Plant
Figure III.1

Please see Figure I.1 above – Map of Service Area, for Water Supply Sources and Treatment Plant

Table III.1 – Existing Source Summary, Available Supply

Source	*PWSID*	*SW or GW*	*Basin*	*WQ Classification*	*Available Supply (MGD)*
Haw River	03-19-015	*SW*	*Haw (2-1)*	*WS – IV - NSW*	3.0

TOTAL	**6.0**

Purchased Water

The Town of Pittsboro does not purchase water or have contracts to purchase water from other sources or suppliers.

References

North Carolina Department of Environment and Natural Resources, Division of Water Resources, 2013. Haw River 7Q10 determination letter, signed by Fred R. Tarver III, Aquatic Monitoring Unit. Prepared for Town of Pittsboro, October 9, 2013.

Jordan Lake Potable Water Interconnection Study, Technical Memorandum, December 2011. Hazen and Sawyer Environmental Engineers & Scientists.

SECTION IV. FUTURE WATER SUPPLY NEEDS

The Demand Projections presented in Section I have been peer-reviewed by the Jordan Lake Partnership, and represent the best available estimate of the future demand for Pittsboro for average day demand over the planning horizon. Pittsboro's Haw River supply is more than sufficient to meet projected demand until 2030, as Table IV.1 indicates below. The projected deficient will be made up by the Haw River source until the new Jordan Lake source is online. The Town is in partnership with OWASA, Durham and Chatham County to develop alternatives for this Jordan Lake water supply. See section VI for details.

Table IV.1- Projected Water Needs (5-year increments)

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Demand	0.6	2.0	3.3	5.6	7.8	8.9	10.1	10.4	10.8	11.3	11.8
Supply	2	2	2	2	2	2	2	2	2	2	2
Demand % of Supply	*31%*	*99%*	*167%*	*278%*	*388%*	*446%*	*504%*	*522%*	*540%*	*564%*	*588%*
Need	0.0	0.0	1.3	3.6	5.8	6.9	8.1	8.4	8.8	9.3	9.8

SECTION V. WATER SUPPLY ALTERNATIVES

The Town of Pittsboro has two alternatives under consideration. Alternative 1 – Preferred is to supply half of Pittsboro's future water needs from the Haw River and half from Jordan Lake. Alternative 2 depends primarily on Jordan Lake as the supply for future water demand.

Alternative 1 - Preferred

This alternative utilizes both the Haw River and ultimately Jordan Lake, in a 5-year incremental (phased) approach. The first phase is from present Year 2014 to Year 2020. This phase assumes starting with 2 MGD from the current plant operations and adding an approximate 4 MGD by 2020, for a total of (not to exceed) 6 MGD from the Haw River. This phased increase at the Haw River may be somewhat less, depending on actual growth rates.

The overall goal is for the Haw River WTP to grow to meet actual demand up until approximately Year 2025 at a minimum. If the growth rate and demand is not this aggressive, the growth at the Haw River WTP may reduce to a slower rate.

Assuming the growth rate and demand continues as projected, the Jordan Lake allocation of up to 6 MGD will be made available by approximately Year 2025, with the Western Intake Partnership. Additional details with the partnership will emerge upon a full analysis of cost/benefit and demand projections from Year 2025 – 2060 for the initial, intermediate and ultimate water supply phasing from Jordan Lake.

Alternative 2 – Primarily Jordan Lake

This alternative assumes that the Haw River intake and treatment capacity will not exceed 2 MGD and that up to 10 MGD will be sourced from Jordan Lake. This option may be possible only if there are unforeseen constraints with increasing the Haw River intake and with a prudent, cost-effective and phased approach utilizing the western intake and treatment partnership. This is a less likely scenario but it is an alternative nevertheless. . The Town is in partnership with OWASA, Durham and Chatham County to develop alternatives for this Jordan Lake water supply. The proposed western intake will be accessed from OWASA property as shown on Figure VI

Source Options

Table V.1 - Source Options Descriptions

Source	Type	Basin	WQ Classification	Year Online (earliest)	Available Supply (MGD)	Supply Range (MGD)
Jordan Lake Allocation	Jordan Lake	Haw (2-1)	WS IV B NSW CA	2030	6.0	0.0
Expand Haw River	River Withdrawal	Haw (2-1)	WS IV NSW	2020	2.0	0.0
Expand Haw River	River Withdrawal	Haw (2-1)	WS IV NSW	2025	2.0	0.0

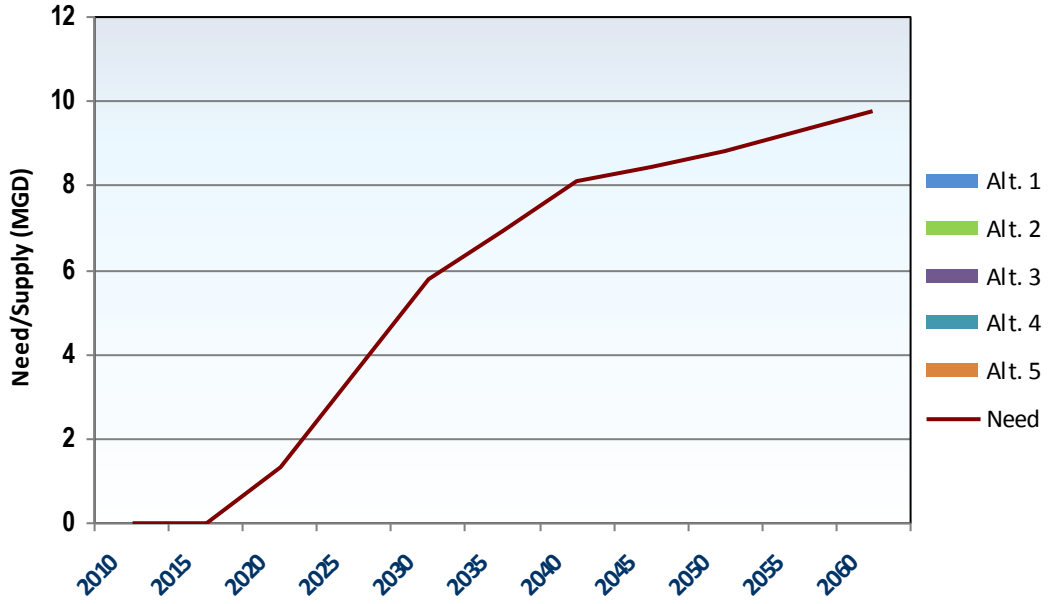
Water Supply Alternatives

The water supply alternatives are described above.

Table V.2- Source Composition of Supply Alternatives (MGD)

Need and Source Options	Alternative 1	Alternative 2
Total Projected Need (2045)	8.4	8.4
Total Projected Need (2060)	9.8	9.8
Sources:		
Jordan Lake Allocation - Rd 4	6.0	10.0
Expand Haw River	2.0	0.0
Expand Haw River	2.0	0.0
Total New Supply (MGD)	10	10

Figure V.1 – Alternatives- Timeline of need versus new water supply



Alternatives Analysis

Classification	Alternative 1	Alternative 2
Rd. 4 Allocation Request (% of storage)	6.0%	10.0%
Total Supply (MGD)	10.0	10.0
Environmental Impacts	Less Than	More Than
Water Quality Classification	WS IV NSW	WS IV B NSW CA
Timeliness	Acceptable	Problematic
Interbasin Transfer (MGD)	None	None
Regional Partnerships	JLP	JLP
Technical Complexity	Complex	Very Complex
Institutional Complexity	Complex	Complex
Political Complexity	Not Complex	Very Complex
Public Benefits	None	None
Consistency with local plans	Yes	Yes
Total Cost ($ millions)	67.6	80.0
Unit Cost ($/1000 gallons)	6.76	8.00

Environmental Impacts

The preferred alternative (Alternative 1) includes utilizing the Town's existing raw water intake in the Haw River. However, this intake will likely not be subject to any modifications with any increase in capacity. Therefore, no impacts to the river bed and bank or existing riparian buffer are anticipated. The riparian area would not be further impacted and the existing easement area would continue to be used.

The treatment plant expansion would likely occur at and immediately adjacent to the site of the existing water treatment plant and would have no impacts to existing undisturbed areas. It could include an expansion of the existing footprint, which if so, would impact existing grass and gravel parking areas.

These impacts describe the preferred scenario of increasing the capacity at the Haw River plant up to 6 MGD in a phased approach as demand warrants.

The Jordan Lake allocation will involve the Western Intake Partnership, which would require new intakes out into Jordan Lake, pump station, treatment plant and distribution system. The extent and type of environmental impacts for this project have not been estimated to-date. See Section VI. below for details of the preferred alternative.

From a sustainability stand-point and as described in Section II of this application, the Town has and is committing to water loss reductions, energy savings using variable speed pump drives and a water efficiency program and ordinance designed to reduce water demand and increase re-use water consumption.

The Alternative 2 environmental impacts would be the same on the Jordan Lake side but would be less impact on the Haw River side as there would not be any change from the existing.

Water Quality Classification

The Haw River classification is WS IV NSW. This is Pittsboro's only water source and will continue to always supply at least 2 MGD in either alternative. For Alternative 1, Pittsboro proposes to add Jordan Lake as a new source. Jordan Lake's classification is WS IV B NSW CA. For alternative 2, Pittsboro will also add Jordan Lake, just at a greater amount.

Insert time table

Timeliness

Alternative 1 timeline proposes 2MGD increases in 5 year increments to stay ahead of the demand projections. The cost of these increments will be controlled and implemented for the most efficient treatment and use of the distribution system. By the time we reach 6MGD, Pittsboro will begin to phase in the western intake as a source; estimated to be 2030. We suspect the western Jordan Lake intake will mostly supply the Chatham Park development and the eastern side of Pittsboro.

Alternative 2 proposes to maintain the Haw River at 2MGD and aggressively develop the western intake at Jordan Lake for 10MGD. The problem with this alternative is that Pittsboro's demand will exceed the current Haw River capacity of 2MGD in approximately 2015. Completion of the western Jordan Lake intake will be dependent on the Western Intake Partnership, where the earliest reasonable completion is 2020.

Interbasin Transfer

IBT does not apply to the Town of Pittsboro.

Regional Partnerships

Pittsboro continues to work with the Jordan Lake Partnership as a whole and is included in both Volumne I & II of the TRWSP. The JLP provided vetting and peer review, interconnectivity studies, and modeling results that verified our allocation requests could be met with the preferred alternatives.

A subgroup of the JLP is the Jordan Lake Western Intake Partnership. It includes the Town of Pittsboro, Chatham County, OWASA, and the City of Durham. This subgroup has already completed the engineering feasibility study and cost estimation found in Section VI of this application.

Technical, Institutional and Political Complexities and Public Benefits

Technical Complexity:

For Alternative 1, the "complex" rating is based on accessing Jordan Lake as a water source for Pittsboro. In order to access the 6 MGD from Jordan Lake, Pittsboro must partner with other municipalities to build a new intake and a new treatment plant. For Alternative 2 this is the same requirement, but is listed as very complex

because the increase in volume requested for this alternative would require that the partnership to re-evaluate allalocations in order to remain below the maximum total allocation for the Lake.

Institutional Complexity:

Alternative 1 – Complex. For both alternatives, the institutional complexity is the same because the development of the Jordan Lake western intake will require the same regulatory and environmental review requirements whether 6 MGD is withdrawn or 10 MGD. Permitting requirements from the ACOE, NCDENR, and (EIS) may be difficult , but not impossible. Jordan Lake will be a new water source for Pittsboro, but it is already permitted as a water supply source for Cary. Therefore, we did not rate this as very complex. The permitting for the increased withdraw volume from the Haw River as a source will be minimal; the proposed 6MGD is below 20% of 7Q10 and therefore will not require extensive environmental review. The modeling results have a favorable outcome for this allocation and do not show negative environmental impact.

Alternative 2 – Complex.

Political Complexities:

Alternative 1 – Not Complex. The approach of balancing Pittsboro's water supply between the Haw River and Jordan Lake is a popular view among our elected officials. It can reduce risk to the Town by having two water sources if there is an emergency that stops production at either WTP. Having an online emergency back-up is seen as good planning. The long term environmental impact is seen as less with this alternative – the long term pumping costs to deliver the water are expected to be reduced by using a water source that is in close proximity to the demand; ie. The western intake will primarily supply south and east areas of Pittsboro and the Haw River will likely supply the north and west areas of Pittsboro. In addition, by having two source options Pittsboro can adjust operations based on need.

Alternative 2 – Very Complex. This would require extensive re-evaluation with the partnership to withdraw this volume and it would require re-negotionation of the TRWSP. It would also create an imbalance in our long-term water supply planning and lastly it does not meet our short-term demand forecast needs.

Public Benefits:

For both alternatives there are no additional public benefits because both of the water sources are existing and the benefits are in place at this time.

Consistency with Local Water Supply Plans

This allocation application is consistent with the Town of Pittsboro Local Water Supply Plan, 2013. This is in terms of water demand, future water supply, and future water demand forecasts. Please see the attached LWSP.

The Town's 2012 Land Use Plan shows development primarily on the north and south-east sid of town. These areas will directly benefit and is consistent with alternative 1 balanced water supply approach. The water sources are located nearest the water demand areas to reduce long term pumping and maintenance costs. Please see attached Land Use Map 9.

Cost Analysis

Alternative 1: The existing Haw River Treatment Plant may be modified to accommodate an additional 4 MGD, for a total of 6MGD. The estimated cost for this improvement is $28.4M, or $$ 4.67M/MGD

The estimated capital costs for the additional 6 MGD allocation from the Jordan Lake western intake, treatment plant, pump stations and distribution is $6.67M/MGD.

Alternative 2: Small modifications and upgrades to the existing Haw River WTP $1M/MGD.

The estimated capital costs for the additional 10MGD from Jordan Lake is $6.7M/MGD.

SECTION VI. PLANS TO USE JORDAN LAKE

Based on the need demonstrated in Section IV, and the alternatives analysis presented in Section V, [Partner] is planning to implement Alternative 1. Accordingly, this application includes a request for Jordan Lake Water Supply Storage in the amount of a **6 % Level I Allocation**. This represents an increase] of _6__MGDsince Pittsboro does not currently possess a Jordan Lake allocation. . The future projected 2060 need is for a _6__ MGD allocation, which is no increase from Round 4.

Implementation Plan and Timeline

Table VI.1 – Selected alternative implementation timeline.

Source	Year Online	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Expand Haw River	2020	0	0	2								
Expand Haw River	2025	0	0	0	2							
Jordan Lake Allocation	2030	0	0	0	0	6						
TOTAL NEW SUPPLY		0	0	2	4	10	10	10	10	10	10	10

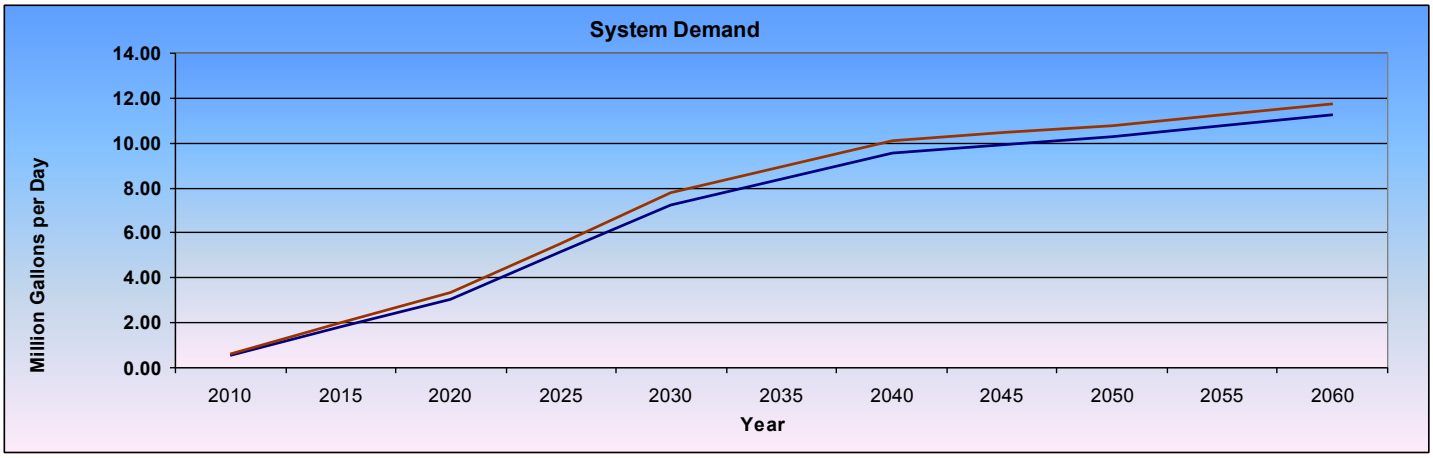
The Town's 2012 Local Water Supply Plan (LWSP) describes the current water supply as 2 MGD from the Haw River, which is based on the permitted treatment capacity of the Water Treatment Plant. The LWSP also describes the future demand (Year 2060) as 11.76 MGD. Thus, the Town's long term need, calculated as demand minus supply is 9.76 MGD. For future water supply, the Town intends to "balance" the future supply sources between Haw River and Jordan Lake. This planning will include the expansion of the Haw River intake and treatment plant capacity from 2 MGD to 4 MGD (or 6 MGD). The Jordan Lake source is planned to be from the Western Intake (Jordan Lake Partners) up to 6 MGD. The ultimate supply source and capacity is dependent on the actual population increases, associated water demands, water use efficiencies and the extent of the re-use system.

Projections

Type of Population to be Served												
		2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Year-round population		3700	13850	24000	41300	58600	69250	79900	83500	87100	91950	96800
Seasonal Population (if applicable)												
Indicate months of seasonal use												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec

Type of Use (Average Daily Service Area Demand in Million Gallons per Day (MGD) Do not include sales to other systems)												
		2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
(1) Residential		0.168	0.9715	1.775	3.134	4.493	5.301	6.109	6.3385	6.568	6.8775	7.187
(2) Commercial		0.132	0.3525	0.573	0.946	1.319	1.5565	1.794	1.8835	1.973	2.093	2.213
(3) Industrial		0.07	0.1465	0.223	0.3515	0.48	0.5435	0.607	0.607	0.607	0.607	0.607
(4) Institutional		0	0	0	0	0	0	0	0	0	0	0
Sub-total		*0.370*	*1.471*	*2.571*	*4.432*	*6.292*	*7.401*	*8.510*	*8.829*	*9.148*	*9.578*	*10.007*
(5) System Process - Distribution Process	0.03	0.00	0.03	0.06	0.10	0.14	0.16	0.18	0.19	0.20	0.21	0.22
System Process - WTP Process		0.10	0.13	0.16	0.27	0.38	0.34	0.30	0.31	0.32	0.33	0.35
(6) Other Non-revenue water (Unaccounted-for)	0.05	0.09	0.17	0.25	0.34	0.44	0.51	0.58	0.60	0.62	0.64	0.67
(7) Total Service Area Demand		0.56	1.80	3.04	5.14	7.25	8.41	9.57	9.92	10.28	10.76	11.24

Sales Commitments		2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Existing Sales Contracts (list buyer and years covered by contract)												
Chatham County North	0.5	0	0	0	0	0	0	0	0	0	0	0
Chapel Ridge S/D	0.4	0.06	0.18	0.29	0.41	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Existing commitments for additional Future Sales (list buyer)												
Total Sales Contracts		0.061	0.177	0.293	0.407	0.521	0.521	0.521	0.521	0.521	0.521	0.521
Total System Demand		0.624	1.980	3.335	5.552	7.768	8.928	10.088	10.445	10.801	11.281	11.761
		2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Minimum Consumptive Use in Source Basin		0.15	0.376	0.6	0.8475	1.095	1.188	1.281	1.308	1.335	1.3715	1.408



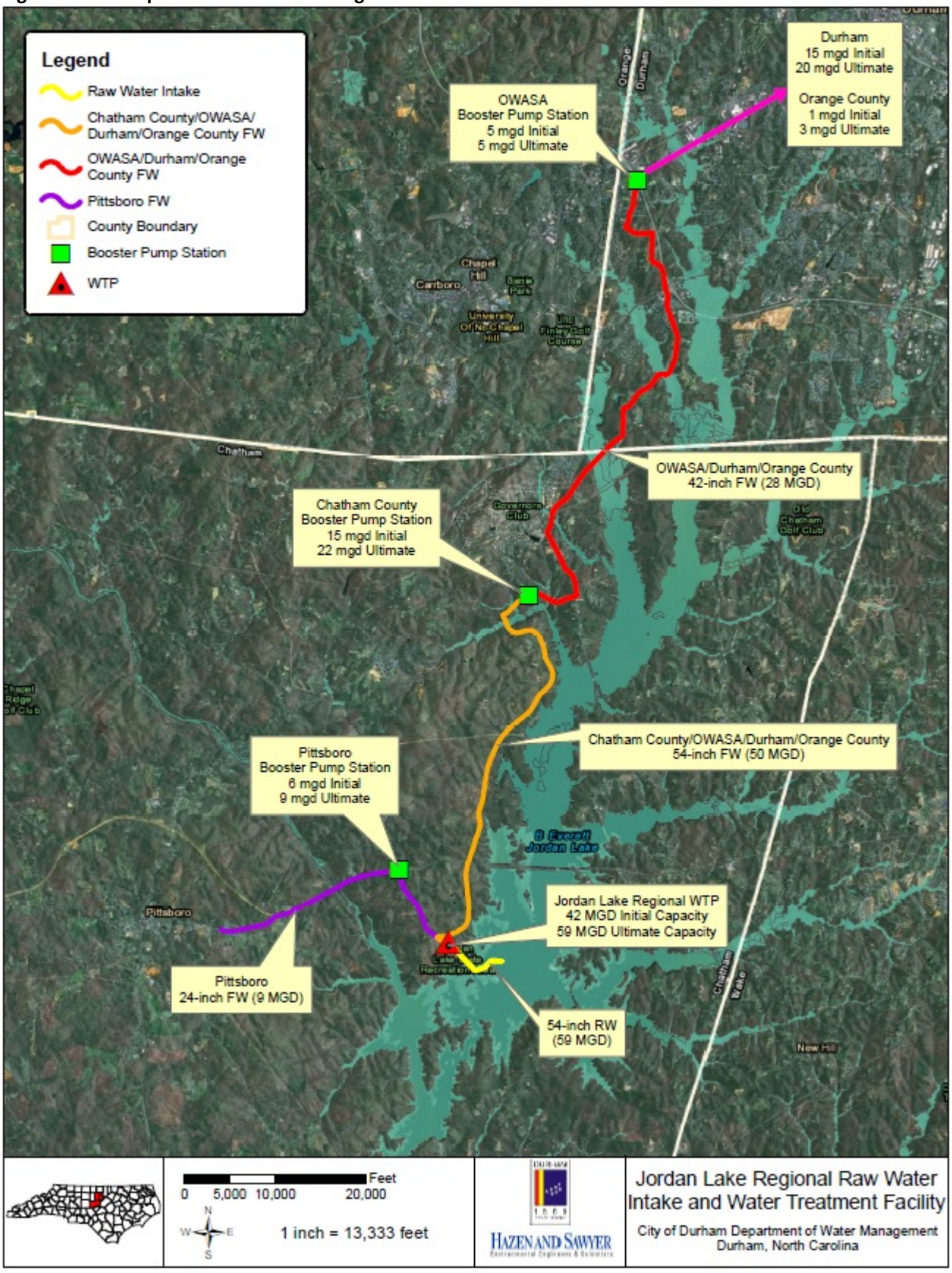
Future Sales Contracts that have already been agreed to.						
Water Supplied to:		Contract Amount and Duration			Pipe Size	Regular or
System Name	PWSID	MGD	Year Begin	Year End	(inches)	Emergency
none						

Future Supplies List all new supplies or facilities which were under development as of July 1, 2012							
Source or Facility Name	PWSID	SW or GW	Sub-Basin	Wat Qual Classification	Expected Supply	Development Time	Year Online

Demand - Supply Comparison (Show all quantities in Million Gallons per Day)											
Available Supply , MGD	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
(1) Existing Surface Water Supply	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

(2) Existing Ground Water Supply											
(3) Existing Purchase Contracts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(4) Future Supplies	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(5) Total Available Supply	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*	*2.00*
(6) Service Area Demand	0.56	1.80	3.04	5.14	7.25	8.41	9.57	9.92	10.28	10.76	11.24
(7) Existing Sales Contracts	0.06	0.18	0.29	0.41	0.52	0.52	0.52	0.52	0.52	0.52	0.52
(8) Contracts for Future Sales	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(9) Total Average Daily Demand	*0.62*	*1.98*	*3.34*	*5.55*	*7.77*	*8.93*	*10.09*	*10.44*	*10.80*	*11.28*	*11.76*
(10) Demand as Percent of Supply	31%	99%	167%	278%	388%	446%	504%	522%	540%	564%	588%
Additional Information for J.L. Allocation											
(12) Sales Under Existing Contracts	0.06	0.18	0.29	0.41	0.52	0.52	0.52	0.52	0.52	0.52	0.52
(13) Expected Sales Under Future Contracts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(14) Demand in Each Planning Period	0.62	1.98	3.34	5.55	7.77	8.93	10.09	10.44	10.80	11.28	11.76
(15) Supply Deficit (Demand minus Supply)	(1.376)	(0.021)	1.335	3.552	5.768	6.928	8.088	8.445	8.801	9.281	9.761

Figure VI.1 – Map of the Jordan Lake Regional Raw Water Intake and WTF



Access to Jordan Lake

Add interconnection here

Raw and Finished Water Quality Monitoring Plan

Estimate of Costs

Jordan Lake Costs

Table VI.2 - Jordan Lake Costs

Other Capital Costs

Identify any other major capital costs (treatment plants, etc.)

Operating Costs

Provide an estimate of operating costs, including an estimate of Net present value.

Replacement and Rehabilitation Costs

Include if applicable within planning period.

Cost Summary

Discussion

References

The following source summary describes the western intake partnership and *the need for additional water supply facilities to obtain Jordan Lake water. Five members of the thirteen-member Jordan Lake Partnership (Chatham County, the City of Durham, Orange County, OWASA, and the Town of Pittsboro) are jointly evaluating options for a new regional intake and treatment plant located on the western side the lake. This preferred alternative will supplement their existing supply sources and will provide more regional reliability and redundancy.*

SOURCE SUMMARY

Source Name:		
Jordan Lake - Western Intake		
Utility:		
Chatham County, Durham, Orange County, OWASA, Pittsboro		
	Source Type:	***Jordan Lake Reservoir Allocation***
Location -	**Latitude:**	***35.71***

Longitude:	***-79.04***
Available Supply/Estimated Yield [MGD]:	***6 MGD***
Additional Storage Volume [MG]:	***900***
Subbasin:	***Haw (2-1)***
Water Quality Classification:	***WS-IV, NSW***
Estimated in-service Year:	***2020***
Design and Construction Time [yrs]:	***5***
Timeliness Rating	***Acceptable***

Narrative Description:

Only two facilities produce drinking water from Jordan Lake at the present time: the Cary-Apex Water Treatment Facility and the Chatham County Jordan Lake Water Treatment Plant. Both are located on the eastern side of the lake and obtain raw water through a single intake structure located in the lake a short distance north of the U.S. Highway 64 causeway. The intake facilities are owned and operated by the Towns of Cary and Apex. Neither the existing intake nor treatment plants were designed to accommodate the full water supply capacity of Jordan Lake, nor were they intended to meet the future needs of water service areas to the north and west of the lake.

Recognizing the need for additional water supply facilities to obtain Jordan Lake water, five members of the 13-member Jordan Lake Partnership (Chatham County, the City of Durham, Orange County, OWASA, and the Town of Pittsboro) are jointly evaluating options for a new regional intake and treatment plant located on the western side the lake to supplement their existing supply sources and to provide more regional reliability and redundancy. The initial concept, for which the technical, economic, institutional, and environmental feasibility were recently estimated, includes a new intake structure, pumping facilities, and water treatment plant located south of U.S. Highway 64 near the western shore of Jordan Lake, as well as major finished water transmission lines to serve the Partners. Raw water intake and pumping facilities would be constructed within the lake and/or on land leased from the Army Corps of Engineers. The treatment plant would be constructed on property currently owned by OWASA adjacent to Corps land. Additional concept-level configurations are being developed and will be evaluated, but the five Partners have agreed that the scenario outlined in this narrative provides a consistent technical and economic basis for developing their respective Jordan Lake allocation requests.

Capital costs for this scenario include a new raw water intake, raw water transmission facilities, a water treatment plant (WTP), plus shared as well as separate finished water pumping facilities and transmission lines. Where applicable, costs also include the purchase of land/easements, environmental mitigation, and water supply storage allocations. For the purposes of this analysis, capital funding for the initial facilities is assumed to occur in 2015, with construction completed in 2020. The new intake facilities and all pipelines would be sized to meet ultimate maximum day demands. Each Partner's share of the capital costs of those facilities was calculated as the ratio of that Partner's ultimate demand to the total ultimate facility capacity. The WTP and shared pumping facilities are assumed to be constructed in two phases, with initial sizing to meet interim (2040) demands. Each Partner's share of the capital costs for those facilities was calculated as a direct ratio of that Partner's interim demand to the total interim capacity of the WTP and shared pumping facilities. Facility expansion is based on ultimate capacity in 2060. Financing for the expansion is assumed to occur in 2035 with construction completed in 2040. Each Partner's share of the capital

cost for the expansion was calculated as a direct ratio of that Partner's incremental increase in demand (from 2040 to 2060) to the total increase in facility capacity. Initial and ultimate facility capacities of 42 and 59 mgd are based on projected maximum day demands in 2040 and 2060, respectively. A summary of ultimate estimated capital costs (in 2010 dollars) is presented below:

Conceptual-Level Capital Cost Estimates			
Partner	Tot Allocation Request (mgd)	Cost Share ($M 2010)	Cost Per MGD of Allocation ($M 2010)
Chatham County	18	$102.5	$5.69
Durham	16	$111.10	$6.94
OWASA	5	$30.80	$6.16
Orange County	2	$18.30	$9.15
Pittsboro	6	$46.60	$7.77
Total	47	$309.30	$6.58

Unlike the other water supply alternatives considered in the Town of Pittsboro's application package, ***this Jordan Lake scenario and associated capital costs comprise new finished water (treatment and transmission) as well as raw water facilities****. Unit cost comparisons to other supply alternatives which do not include finished water treatment and transmission facilities may therefore be misleading (i.e., the unit costs for Jordan Lake may be disproportionately high), as they do not represent levelized or "apples to apples" comparisons. However, separating treatment and finished water transmission costs from the raw water components of this Jordan Lake scenario would not be meaningful, due to the locations and distances from Chatham County's and Pittsboro's existing treatment plants and service areas. Raw-water-only scenarios are not feasible for Chatham County, Orange County, or Pittsboro, but might be viable for OWASA and/or Durham. Such raw-water-only scenarios were not evaluated by the five Partners.*

The estimated total capital cost of $309 million represents an average unit cost of $6.58 million per mgd of Jordan Lake water supply allocation; however, as noted above, this includes finished water treatment and transmission facility as well as "water-supply-only" costs.

No specific agreements are yet in place among any of the Partners regarding possible financing, ownership, governance, or operation of such a regional project, but potential institutional arrangements could include single-entity ownership and operation (e.g., Durham, OWASA, Chatham County, or Pittsboro); shared or joint ownership, such as the present Cary-Apex water treatment or Western Wake (Cary-Apex-Morrisville) wastewater partnerships; interlocal agreements among individual utilities; or the creation of a new entity, such as a Jordan Lake water supply authority. The actual institutional setting for any new regional enterprise will be established by the appropriate local policy-making bodies.

Financial Cost Impact:	***Medium***
Estimated Total Capital Cost ($46.6M):	***[Obtain from table above]***
Estimated Unit Cost	***[Obtain from table above]***

This regional alternative offers substantial economies and efficiencies of scale. Because the estimated unit cost of $6.58 million per mgd of yield includes new treatment and finished water transmission as well as raw water intake, pumping, and other facility costs typically associated with "water supply only" options, it does not represent a levelized or "apples to apples" comparison to other options considered in this application.

Environmental Impact:	***Low***

This alternative does not require the development of a new water supply source, and therefor represents none of the major environmental and social costs of a new reservoir, such as private land (and home) acquisition, road relocation, significant habitat destruction, and so forth. The direct environmental impacts of the proposed Jordan Lake regional facilities will be largely limited to the temporary and localized construction activities required for new raw water intake, pumping, treatment, and finished water transmission facilities. Virtually all of these will occur on property already owned by public entities or located within public rights of way.

Projected Interbasin Transfer (First Year Online and in 2045):	***Orange County: 0 mgd (in 2020)*** ***2 mgd (in 2045)***
From Basin:	*Haw*
To Basin:	*Upper Neuse*

Neither Chatham County, Durham, Orange County, OWASA, nor Pittsboro currently transfer water out of the Haw River Basin (2-1). Implementation of the Jordan Lake regional alternative would eventually involve an interbasin transfer (IBT) of up to 2 mgd from the Haw to the Neuse River Basin (10-2) by Orange County, but no transfers would occur by any of the other four entities. Orange County would access its Jordan Lake allocation via a finished water interconnection between the Durham and Hillsborough systems, but would not require IBT certification because its transfer would not exceed the 2 mgd statutory threshold.

Water obtained and treated from Durham's Jordan Lake allocation would be used only within the Cape Fear (Haw) portion of Durham's service area and would not require IBT certification. It is notable that Jordan Lake would support a significant reduction in Durham's current and future transfers out of the Neuse Basin by decreasing its reliance on Lake Michie and the Little River Reservoir for all of its needs. Because Durham would use its full 16 mgd Jordan Lake allocation (10 mgd existing + 6 mgd requested) immediately upon completion of the new regional facilities, its projected transfer of 19.4 mgd from the Neuse River Basin in 2020 would be reduced to 8.8 mgd. Similarly, if Durham were required to rely solely on its Neuse Basin sources to meet all of its future needs, the projected transfer of 26.6 mgd in 2045 would be reduced to 16.0 mgd. [Actual amounts of Durham transfers (maximum month) during the three most recent calendar years (2011-2013) averaged 14.5 mgd. Durham has a grandfathered capacity to transfer up to 45.4 mgd from the Neuse to the Haw River Basin.]

Institutional Complexity	***Moderately Complex***

This source option represents a moderate degree of institutional complexity, as it requires the formal participation by multiple units of local government and must address issues of financing, ownership, governance, and operation of new facilities. As noted above, agreements are not yet in place among these entities, but potential arrangements include single-entity ownership and operation; shared or joint ownership, such as the present Cary-Apex water treatment or Western Wake (Cary-Apex-Morrisville) wastewater partnerships; interlocal agreements; or the creation of a new entity, such as a Jordan Lake water supply authority. The eventual institutional arrangements will be determined by the appropriate local policy-making bodies.

The regulatory challenges of this alternative are also of moderate complexity and associated primarily with permitting requirements. Each participating entity must be able to acquire and retain its own Jordan Lake water supply storage allocation from the NC Environmental Management Commission. Construction of new intake, pumping, treatment, and transmission facilities will require varying degrees of environmental review and permitting by local, State, and Federal (Corps of Engineers) agencies; but none of these represent new or unique regulatory challenges.

Political Complexity	***Moderately Complex***

Similar to the issues of institutional complexity noted above, this option represents a moderate degree of political complexity due to the involvement of multiple units of local government who must collaborate and reach agreement on issues of financing, governance, operation, maintenance, etc. of the new facilities. The existing Cary-Apex agreement regarding the construction, ownership, and operation of the Cary-Apex Water Treatment Facility; the Cary-Apex-Morrisville partnership in developing the new Western Wake Wastewater Facility; and the utility merger agreements among Raleigh and other Wake County municipalities have all demonstrated the economic and operational benefits to the individual partners of shared facilities. It is also believed that the successful and ongoing staff level collaboration demonstrated by the Jordan Lake Partnership and the recent focus of the Western Intake Partners provides a credible body of information and trust on which the respective local policy boards can base their formal agreements.

Public Benefits	***Few***

The primary public benefits of this alternative result from the anticipated economies and efficiencies of scale provided by regional facilities shared by multiple entities. Such an approach simplifies or streamlines regulatory oversight and is better able to respond to an evolving regulatory landscape; and is better able to incorporate new and emerging technologies than more traditional and individualized local approaches. Also, as noted above, this alternative requires the development of no new water supply sources while ensuring a reliable and sustainable water supply for the participating entities, and reduces the volume of interbasin transfers out of the Neuse River Basin.

Technical Complexity	***Not Complex***

This alternative is well within the practical range of existing utility engineering practices and procedures.

References/ Technical Reports/ Links:

[need to cite recent work of Hazen and Sawyer]