TOWN OF HILLSBOROUGH

ROUND 4 - JORDAN LAKE ALLOCATION REQUEST

The Town of Hillsborough is requesting a 1 MGD Level 2 allocation from Jordan Lake, in order to meet our long-term water supply needs.

Kenneth P. Keel, PE
101 E. Orange Street
PO Box 429
Hillsborough, NC 27278

November 14, 2014

Mr. Don Rayno
DWR-Water Planning Section
1611 Mail Service Center
Raleigh, NC 27699-1611

Dear Mr. Rayno:

This Jordan Lake Allocation Application being submitted by the Town of Hillsborough represents a request for storage allocation required to meet Hillsborough's projected needs for additional water supply capacity through 2045 and beyond. 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, the Town of Hillsborough affirms that this request for a 1% Level 2 allocation is recognized to be:

☒	IN AGREEMENT	☐	NOT IN AGREEMENT

with the JLPs RWSP.

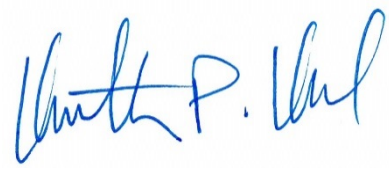
The Town of Hillsborough does not currently have an allocation from Jordan Lake. We previously had a 5.5 MGD allocation, but allowed it to lapse as we planned for and constructed another water source, the West Fork Eno Reservoir (WFER). As growth has occurred, and the need for additional water sources beyond Phase 2 of the WFER has become apparent,

Hillsborough desires a new but smaller allocation from Jordan Lake to secure our water needs into the future.

At this time, it appears that our need will be more of a seasonal/emergency source that will begin to be needed around 2035. Hillsborough would like to start contributing to the Jordan Lake maintenance and debt service as necessary with a Level 2 allocation, in order to be paying our fair share as we approach our direct need for water transfers.

Thank you for your consideration of our allocation request.

Sincerely,



Kenneth P. Keel, PE
Town Engineer/Utilities Director

TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF FIGURES

TOWN OF HILLSBOROUGH

ROUND 4 - JORDAN LAKE ALLOCATION REQUEST

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 **[organization name]**'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.

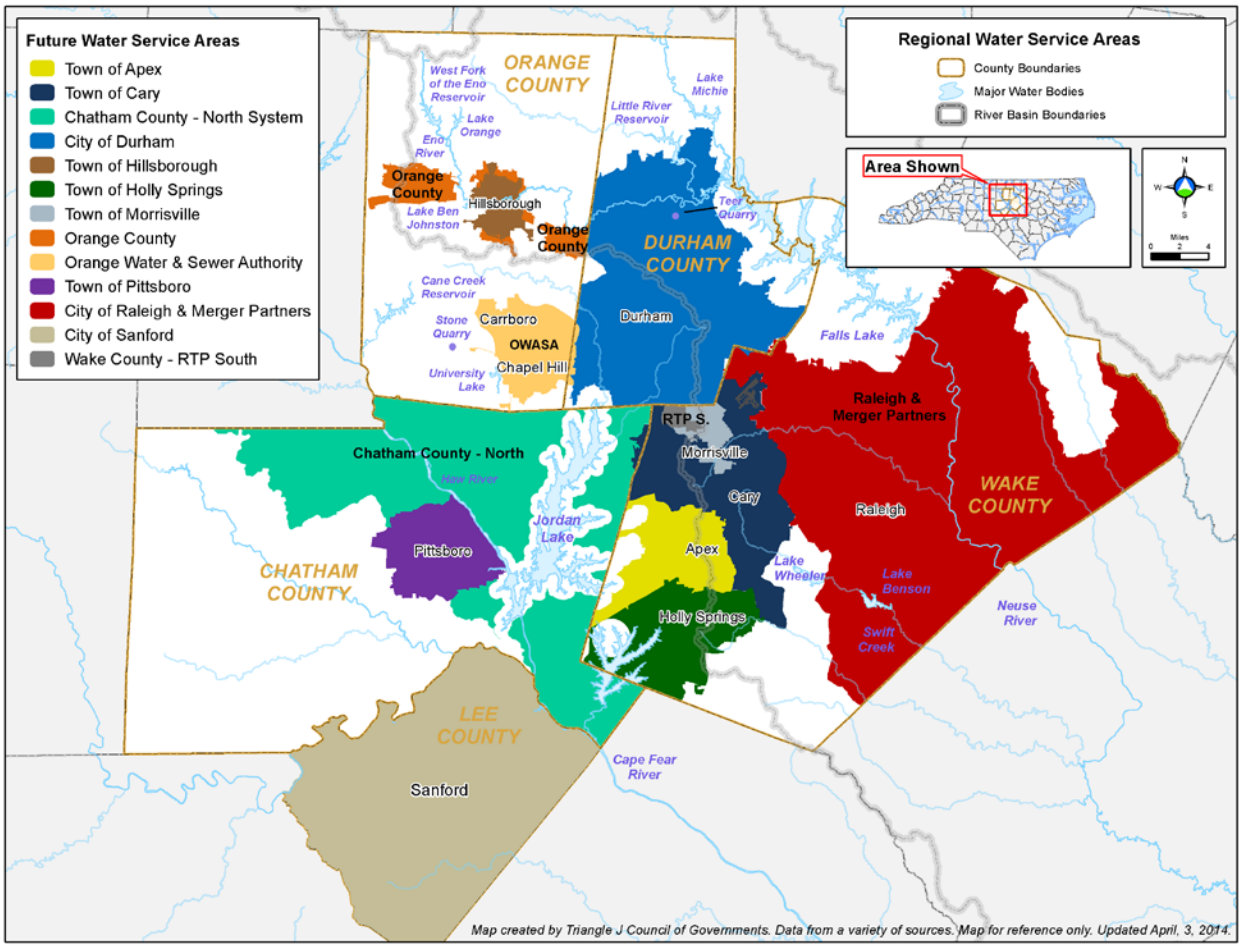


Figure 1 – Future (2060) water service areas of the Jordan Lake Partners

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.

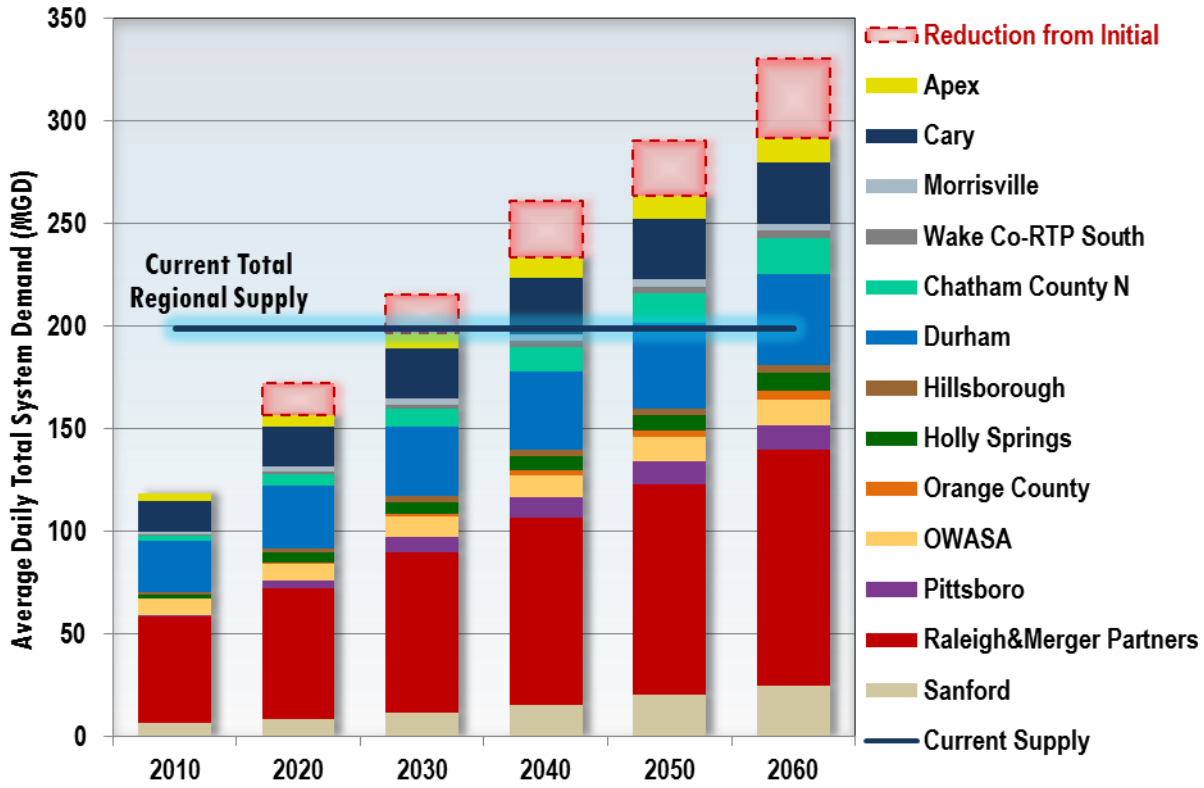


Figure 2 – Regional demand projections, current supply, and reductions due to peer review.

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 and Level II 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 and Level II 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	2018	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	10.6	11.6
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.

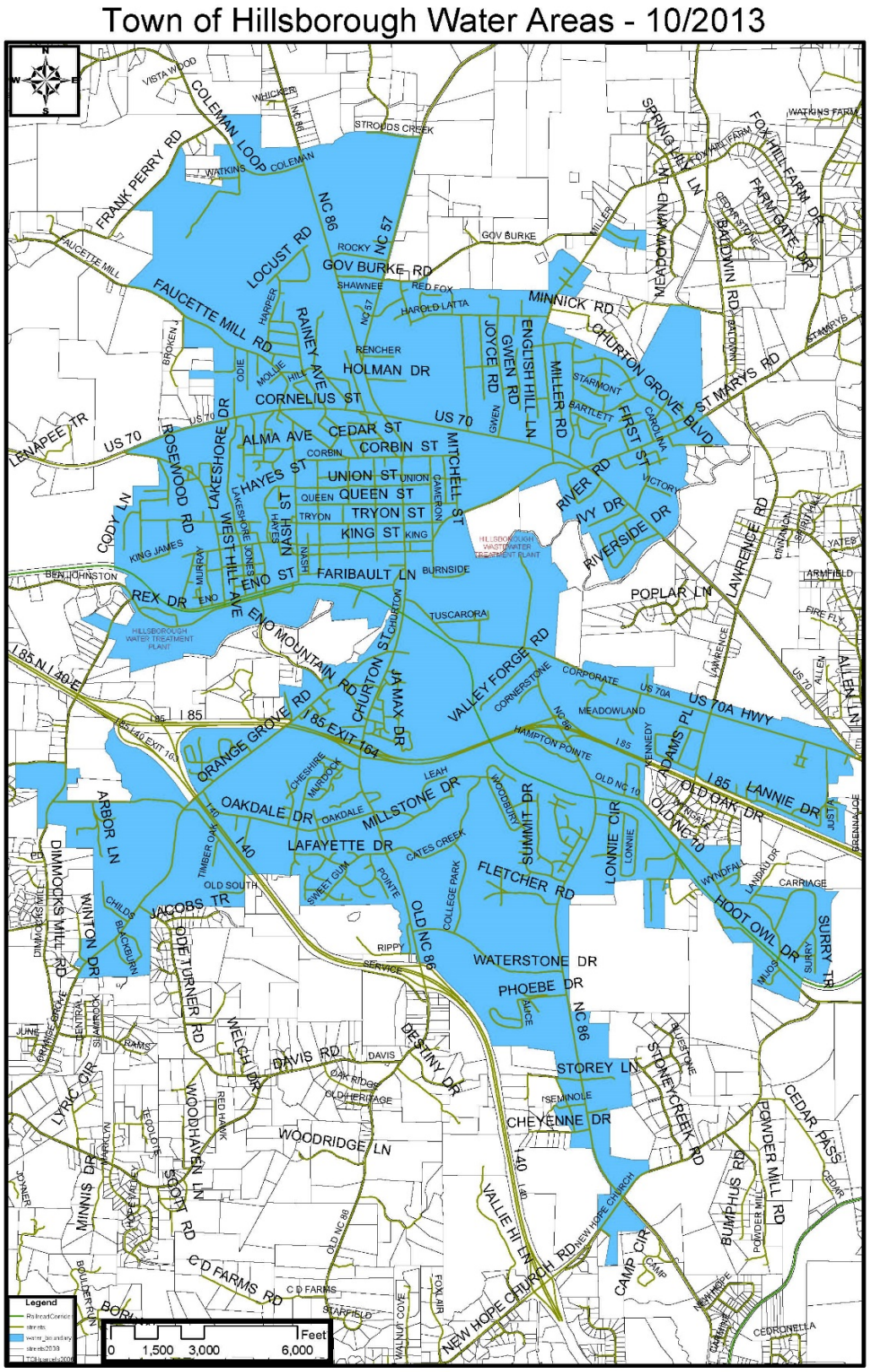
The partners investigated the various impacts of the JLP Recommended Alternative – including effects on the environment, downstream water users, and the general public – and found these impacts to be acceptable and preferable to those of the other options. Hydrologic effects of the JLP Recommended Alternative 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 Hillsborough**.

SECTION I. WATER DEMAND FORECAST

The Town of Hillsborough operates a public water system drawing raw water from Lake Ben Johnston, an impoundment of the Eno River in the Neuse River Basin, upstream of Falls Lake. The Town owns and operates the West Fork of the Eno Reservoir upstream of Lake Ben Johnston to augment the flow in the Eno River as needed to maintain adequate supply for its intake in Lake Ben Johnston and to maintain a 1 cubic foot per second (cfs) minimum release to the Eno River, which is based on the Eno River Basin Voluntary Capacity Use Agreement between Orange County, the Orange-Alamance Water System, Piedmont Minerals and the Town of Hillsborough. The water supply system consisting of Lake Orange, the West Fork of the Eno Reservoir and Lake Ben Johnston is estimated to have a yield of 2.56 MGD. The Town's withdrawal intake has a relatively small upstream watershed, so its withdrawal amount is limited by weather-dependent water levels in addition to the capacity use agreement for the Eno River. The Hillsborough WTP has a permitted capacity of 3 MGD. Hillsborough does not currently have a Jordan Lake allocation, though it previously had a Level II allocation. Hillsborough does not have an IBT certificate. The Town of Hillsborough water system has interconnections with the City of Durham, OWASA, and Orange-Alamance water systems. The Town of Hillsborough may also provide finished water in the future through bulk sales to a portion of the future Orange County service area near Hillsborough.

Figure I.1 – Map of Service Area



User Sectors

Table I.1. Water Use Sectors

Use Sector	Use Sub-sector	Description
Residential		Single detached dwelling units, townhouses, and other buildings with multiple units
Commercial		Business offices, food service establishments, and retail use
Industrial		Facilities that manufacture a product or store products for distribution, typically large square footage facilities.
Institutional		Public and private secondary schools, community college campuses, hospitals, medical clinics
Unique	none	n/a
Non-Revenue	Distribution System Process	Semi-annual flushing, automatic dead-end blow-offs, etc.
	Water Treatment Process	Filter backwash, basin cleaning/wash-out, etc.
	Other Non-Revenue	Metered Town facility usage, system leaks, write-offs for customer leaks (up to 1/year), fire service, etc.

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 use 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 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

Hillsborough's future water demand projections are based on their Water Capacity Model, which uses a land capacity/development-type analysis of known and potential future development. The water capacity model projects demands for residential and non-residential uses in the following ways. For residential usage projections, demands are split between committed residential units and potential residential units. Committed residential includes approved residential developments through 2020 plus four new in-town lots developed per year through 2060. Potential residential units includes other known potential residential development projects. The projects are delineated by the number and type of units and their estimated completion dates.

By 2020, the committed and known potential residential developments are built out except for the following development types: in-town lots, higher density infill of single-family, multi-family and townhouses, phase 4+ Habitat for Humanity, out-of-town development and out-of-town failed septic systems. For these types of developments, the following assumptions were made:

- In-town lots – 4 per year from 2010 through 2060
- Infill higher density – 30 units per year of single-family, multi-family and townhouses from 2020-2060
- Habitat Phase 4+ – 7.5 units per year from 2021-2060
- Out-of-town development – 25 units per year from 2010-2060
- Failed septic systems – 25 units per year from 2018-2060

For non-residential usage projections, demands are also split between committed and potential developments. Rather than the number of units, as in the residential projections, non-residential projections are based on the development building footprint. Committed non-residential development includes approved developments through 2020 and potential non-residential includes other known potential development projects. The projects are delineated by their building footprint or number of restaurant seats and their estimated completion dates. By 2020, the committed and potential non-residential developments are built out except for the following development types: higher density infill of office/institutional, restaurant and retail. For these types of developments, the following assumptions were made:

- Infill higher density: Office/Institutional – beginning with 125,000 square feet (sf) in 2020 and increasing 20,000 sf per year through 2050

- Infill higher density: Retail – beginning with 125,000 sf in 2020 and increasing 17,500 sf per year through 2030 and 15,000 sf per year through 2060
- Infill higher density: Restaurant – beginning with 400 seats in 2020 and increasing 40 seats per year through 2050

For both residential and non-residential water demand projections, the projected development units or building footprint, as described above, was multiplied by a usage factor to yield the projected water demand. The usage factors are shown below:

Residential

- Single Family 150 gpd/unit
- Multi-Family 90 gpd/unit
- Retirement Residencies 135 gpd/unit
- Townhomes 135 gpd/unit

Commercial

- Hotels 108 gpd/room
- Restaurant 36 gpd/seat
- Retail 108 gpd/1,000 square feet of building

Industrial

- Industrial 108 gpd/1,000 square feet of building

Institutional

- Office/Institutional 90 gpd/1,000 square feet of building
- School - Elementary 10.8 gpd/student
- School - Middle 13.5 gpd/student
- School - High 13.5 gpd/student

Demand Projections

Population Estimates

Hillsborough's population estimates were developed by the Town's Planning Department. A constant rate of population growth of 2% was used, based on the rate of historical growth and expected future growth. As described below, the future water demand projections were not derived from the population estimates.

Water Demand Projections

The Town of Hillsborough's Water Capacity Model is used to guide planning for water and sewer infrastructure, and as a result, for consistency, keeps water use rates constant. Thus, additional conservation is not directly included in the projections. The current water use

projections are reasonably conservative; for instance, the existing residential customers' use rate is only 110 gpd per connection. Due to changes in housing type being developed, future users' per connection demand is projected to be higher under the methodology used. Hillsborough's water demand has actually fallen considerably from its peak in 1997. Part of the decrease in demand can be attributed to the loss of a few industrial users, but some of the decrease is believed to be due to greater conservation by its users, which is expected to continue in the future.

Hillsborough's three water sources listed are operated as a single system, with Lake Orange and the West Fork of the Eno Reservoir located upstream of Lake Ben Johnson. The total system is estimated to yield approximately 2.56 MGD.

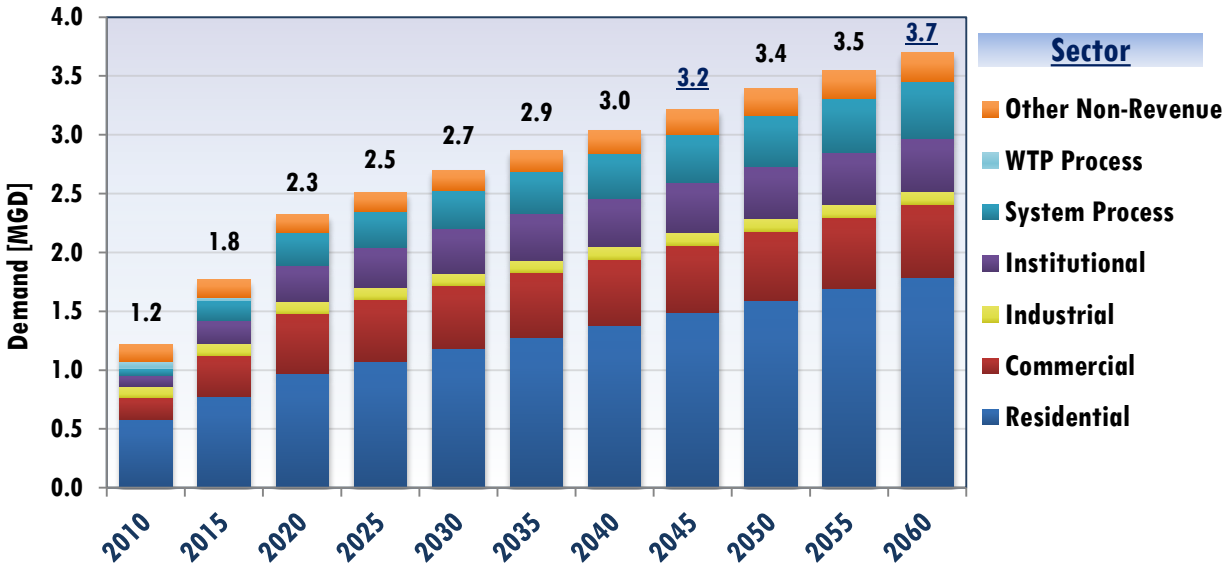
Table I.1 - Population projections for service area

2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
12,200	15,800	16,800	18,500	20,100	22,200	24,200	26,600	29,000	31,400	33,800

Table I.2 – Water Demand Projections by sector table.

Sector	Subsector	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Residential	Residential	0.58	0.77	0.97	1.08	1.18	1.28	1.38	1.49	1.59	1.69	1.79
Commercial	Commercial	0.19	0.35	0.51	0.53	0.54	0.55	0.56	0.58	0.59	0.61	0.62
Industrial	Industrial	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11
Institutional	Institutional	0.09	0.20	0.31	0.35	0.38	0.40	0.41	0.43	0.44	0.45	0.45
System Process	System Process	0.06	0.17	0.28	0.31	0.33	0.36	0.38	0.41	0.43	0.46	0.48
System Process	WTP Process	0.06	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Revenue	Other Non-Revenue	0.15	0.15	0.15	0.16	0.17	0.19	0.20	0.22	0.23	0.24	0.25
TOTAL		1.22	1.77	2.32	2.51	2.70	2.87	3.04	3.22	3.39	3.55	3.70

Figure I.2 – Demand Projections by Sector



Bulk Water Sales

The Town of Hillsborough does not have any regular sales contracts with other water systems. We do, however, have three emergency contracts through our interconnections with the City of Durham, Orange Water & Sewer Authority, and Orange-Alamance Water System. We do not anticipate entering into any regular sales contracts through the year 2060.

Table I.3 – Sales to other systems

Purchaser	Purchaser PWSID	Contract Amount (MGD)	Begin Year	End Year	Regular or Emergency	Pipe Size (in.)
OWASA	03-68-010	2.00	NA	NA	Emergency	16
City of Durham	03-32-010	2.00	2014	2024	Emergency	12
Orange-Alamance	03-68-020	0.00	NA	NA	Emergency	6
TOTAL		4.00				

References

1. DWR, 2009. *Local Water Supply Plan Report, Hillsborough.* Submitted by Hillsborough to North Carolina Division of Water Resources. PWSID: 03-68-015. 2009.
2. DWR, 2008. *Local Water Supply Plan Report, Hillsborough.* Submitted by Hillsborough to North Carolina Division of Water Resources. PWSID: 03-68-015. 2008.
3. Peterson, Eric, 2008. "Memorandum: 2060 Water Capacity Model for Jordan Lake Work Group" Prepared by Eric Petersen, Town Manager of Hillsborough for Mayor Stevens and Board of Commissioners, Hillsborough. Dec. 31, 2008.

SECTION II. CONSERVATION AND DEMAND MANAGEMENT

The Town of Hillsborough has a Water Shortage Response Plan which has been adopted into their Town Code, and is available online on the Town website www.ci.hillsborough.nc.us. Hillsborough does not have water conservation pricing, although their regular water rates are among the highest in the Triangle, which has kept their overall water usage consistent over the last 10 years, despite a growing customer base.

Hillsborough had their entire water system examined by a consultant in the early 2000's with acoustical leak detection to identify leaks, and made repairs accordingly. This work, as well as periodic strategic acoustic leak detection by NC Rural Water Association has reduced their non-revenue water percentage by double digits.

Hillsborough performs an annual water audit, utilizing the AWWA WLCC Water Audit Software, as well as a traditional % unaccounted-for water calculation. Their unaccounted-for water loss has reduced from a high of 24% in 1998, to a low of 6.5% in 2012. Hillsborough's Infrastructure Leakage Index (AWWA) has been within the Target ILI range since they began using this method in 2006.

Hillsborough provides periodic reports on their website outlining water usage and water supply reservoir levels. Frequency increases to weekly during water restriction periods. They also, at least annually, provide a booth at the monthly Last Fridays downtown street fair which provides information on the water and sewer system, including conservation information.

Hillsborough offers rebates for customers installing efficient fixtures. Town Code Section 14-9 (b) states "Beginning July 1, 1999, the town will give a $10.00 rebate for new or replacement installation of low-flow faucets, showerheads and toilets. The rebate will be given one time per water and/or sewer customer. Proof of installation will be required in the form of a receipt or billing invoice showing the actual work done. The rebate will be included in the customers' next billing statement following approval of the town." Hillsborough also has water conservation kits available at no cost to our customers, containing a 1.5 gpm shower head, 1 gpm bath sink aerator, 1.5 gpm kitchen sink aerator, and a toilet water saver (fill cycle diverter).

Hillsborough has specific irrigation requirements, as follows:

- Town Code Section 14-19, Irrigation System Requirements: "(a) Spray irrigation shall not occur more than three days per week. Even-numbered properties may be irrigated with spray systems only on Sundays, Wednesdays, and/or Fridays. Odd-numbered properties may be irrigated with spray systems only on Tuesdays, Thursdays, and/or Saturdays. All spray irrigation shall occur only between the hours of 8:00 p.m. and 9:00 a.m. These restrictions shall not apply to properties using underground, drip irrigation, micro spray, low precipitation bubblers, hand watering, or where watering of containerized plants and commercial plant stock in trade is

maintained for resale. (b) Regardless of irrigation methods used, no more than one inch of water may be applied to plant material in any given week. (c) All irrigation systems shall be equipped with automatic controllers that activate the system according to a desired frequency and duration, and shall also be equipped with rain or soil moisture sensors that will prevent irrigation during periods of rainfall or when there is sufficient moisture in the ground for plant health and survival. (d) Miscellaneous: (1) All hoses used for hand watering, car washing, or other allowable outdoor uses shall be equipped with shutoff nozzles. (2) Supplemental irrigation permits may be purchased from the utility by customers who need to be released from the above regulations in order to protect new planting. The permits will be priced at $100.00 plus $20.00 per system zone. The duration of the permit is 90 days from the purchase date. To be eligible to purchase the permit, a property must have an active building permit, or had a permit within the previous 90 days. Permits shall be unavailable during water restriction Stage 2 or higher.

Hillsborough does not currently have any additional plans to encourage conservation and efficiency by their customers, due to their current level of usage (1.1 MGD average vs. 3 MGD available), and current low residential usage (110 gpd/customer). Since water rates are already high, which curtails usage, increased revenues are needed. Raising rates for additional revenue causes less consumption, and does not have the desired effect to increase revenues. As usage expands and excess supply decreases, Hillsborough will consider additional measures to encourage conservation and efficiency. Hillsborough plans to spend $20,000 on acoustical leak detection equipment within the next 5 years.

Water usage of only 110 gpd per residential connection (3,300 gallons/month) is used in Hillsborough's future projections, which is reflective of current actual customer usage. Through continued emphasis on finding leaks in their system and minimizing waste, Hillsborough projects to keep their unaccounted-for water levels below 10%.

Hillsborough has one rainwater harvesting system in its system at Durham Technical Community College, which uses rainwater for toilet flushing. Hillsborough's system has one gray water system at Orange County offices on N&K Street and West Margaret Lane that uses water from sink drains for toilet flushing.

References

1. Hillsborough Annual Water Audits, 1998 - 2012.
2. Hillsborough Town Code.

SECTION III. CURRENT WATER SUPPLY

Available Supply

Figure III.1 – Map of Water Supply Sources and Treatment Plants

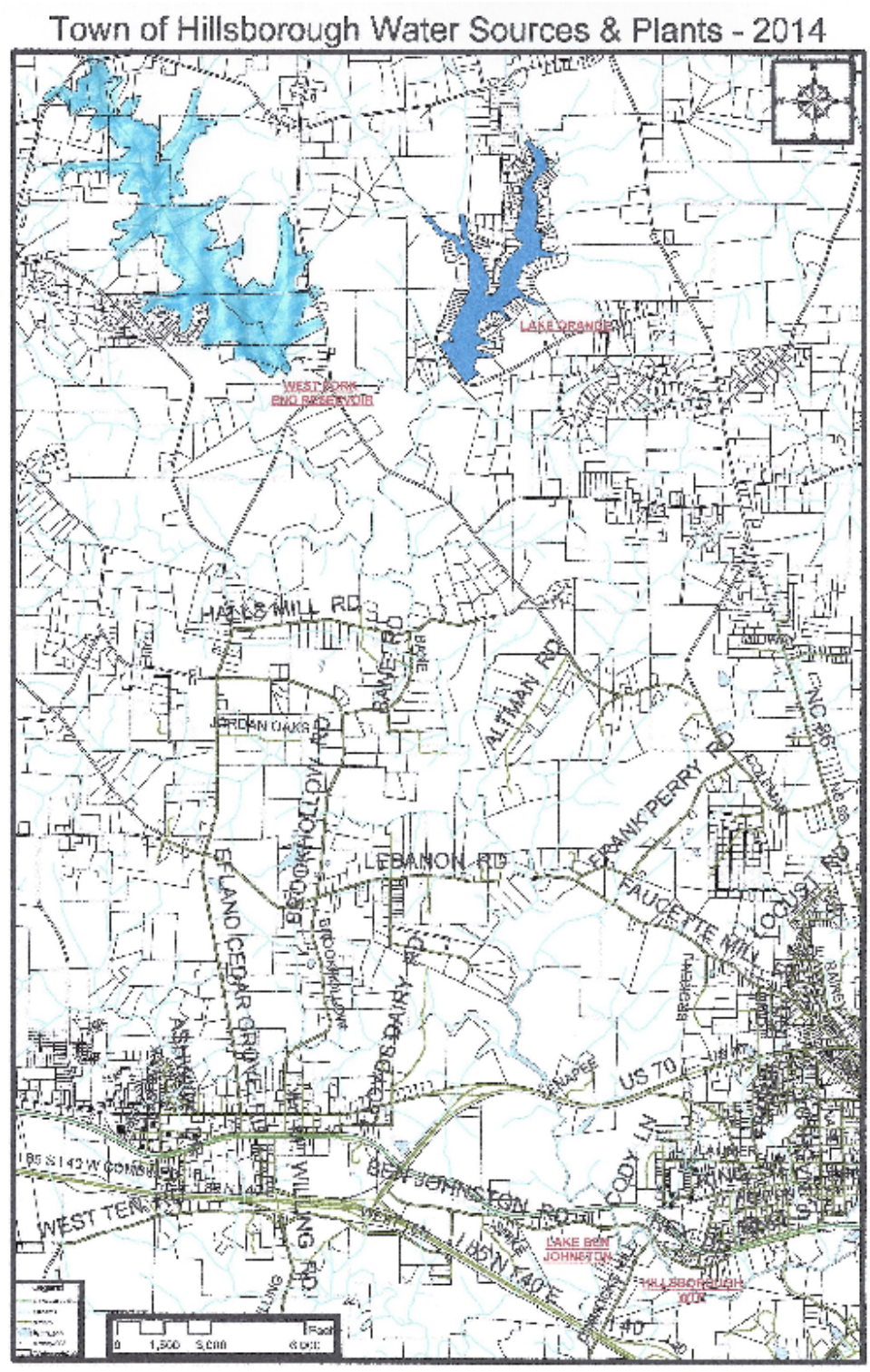


Table III.1 – Existing Source Summary, Available Supply

Source	PWSID	SW or GW	Basin	WQ Classification	Available Supply (MGD)
Lake Orange (East Fork Eno)	03-68-015	SW	Neuse	WS-II	0.1
Lake Ben Johnston/Eno River	03-68-015	SW	Neuse	WS-II	0.7
West Fork Eno Reservoir	03-68-015	SW	Neuse	WS-II	1.8
TOTAL					2.6

Lake Orange was constructed in the late 1960's by Orange County to ensure water availability for area water systems and provide more consistent flow in the Eno River. Lake Orange is located in Cedar Grove, NC, on the East Fork of the Eno River. A voluntary capacity use agreement between Hillsborough, Orange County, Orange-Alamance Water System, and Piedmont Minerals establishes the quantity of water available for each entity, dependent on drought conditions and the current water level in the lake. Water is released from Lake Orange into the East Fork of the Eno River for use downstream.

Lake Ben Johnston is a run-of-river impoundment constructed in 1955, about a half mile from the Hillsborough Water Plant, near the intersection of Ben Johnston Road and Dimmocks Mill Road. Water is extracted directly from this source and pumped to the Hillsborough Water Plant for treatment.

The West Fork Eno Reservoir was constructed in 1998-2000 by the Town of Hillsborough as an additional water source, as a backup to Lake Orange. The available supply was calculated during the reservoir design as the 20-year safe yield. Water is released from West Fork Eno Reservoir into the West Fork of the Eno River for use downstream.

Purchased Water

Section not applicable.

SECTION IV. FUTURE WATER SUPPLY NEEDS

The Town of Hillsborough has developed a water capacity analysis, which is periodically updated, which includes existing water usage, approved developments, and projections from our Planning department on future land use within our current and prospective service area. The anticipated demands were based on actual water usage by existing water customers in their respective categories. Data from this analysis was used to establish the projections in this application.

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 the Town of Hillsborough for average day demand over the planning horizon.

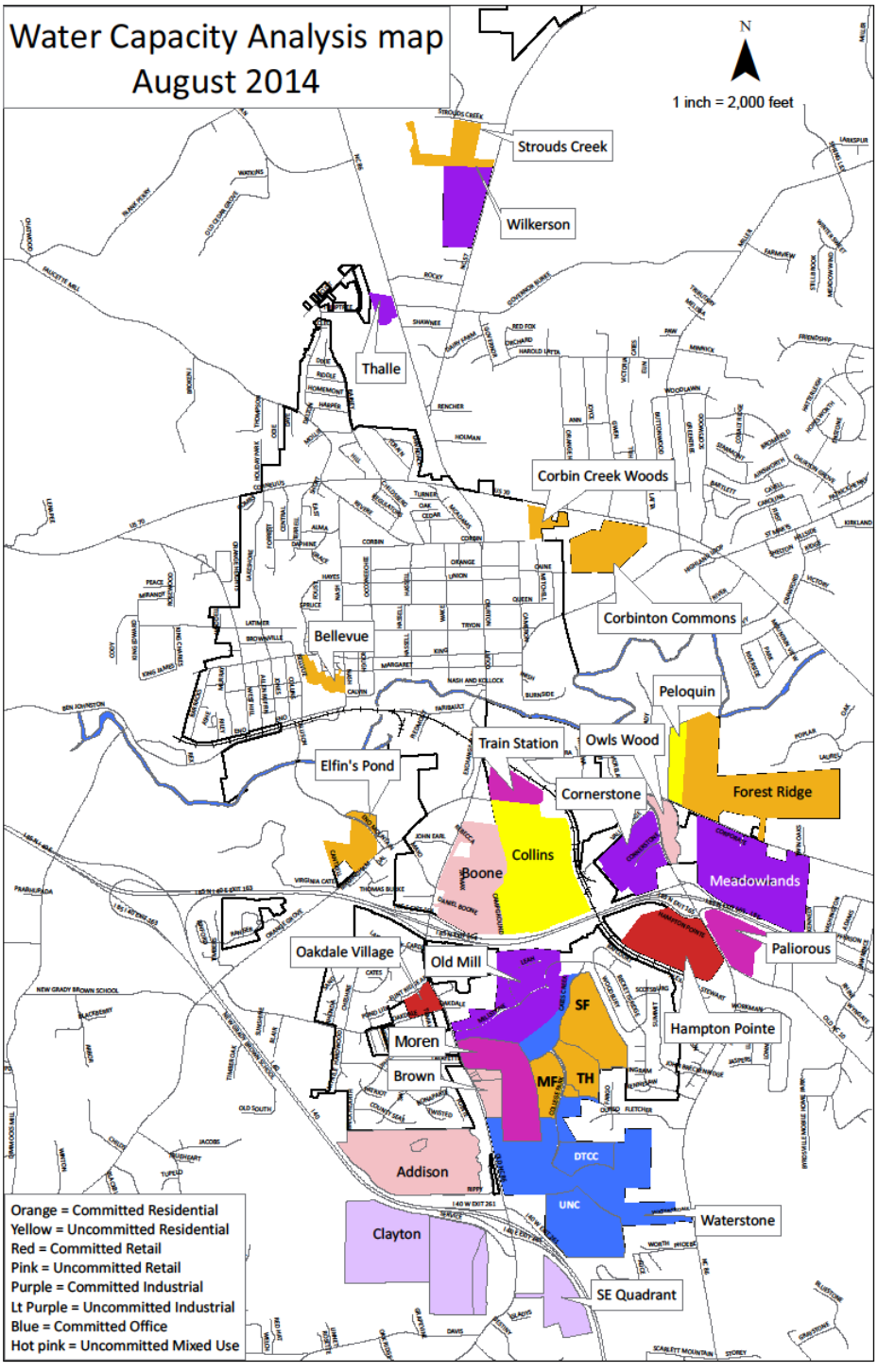
Table IV.1 - Projected Water Needs (5-year increments)

	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060
Demand	1.2	1.7	2.3	2.4	2.7	2.8	3.0	3.2	3.4	3.4	3.7
Supply	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Demand % of Supply	*45%*	*65%*	*91%*	*95%*	*105%*	*108%*	*119%*	*127%*	*132%*	*135%*	*145%*
Need	0	0	0	0	0.14	0.2	0.48	0.68	0.83	0.886	1.14

Our water supply reservoirs have relatively small drainage areas (approximately 10 square miles each), so in a particularly severe drought, they may fail, or start to diminish in quality rapidly, especially in summer months with higher than average demand. This average day need is only an estimate, and the actual need may be higher to allow some safety factor.

Hillsborough's Water Treatment Plant capacity is 3.0 MGD. As demand approaches our available treatment capacity, an expansion to 4.5 MGD is planned for 2019.

Figure IV.1 – Map of Projected Additional Water Service Areas



References

1. *Hillsborough Water Capacity Model, 2014 Update*

SECTION V. ALTERNATIVE WATER SUPPLY OPTIONS

Source Options

The Town of Hillsborough has two reasonable options for our future water supply needs, as noted in the following table. Hillsborough will need to utilize both of these options for our ultimate water supply needs.

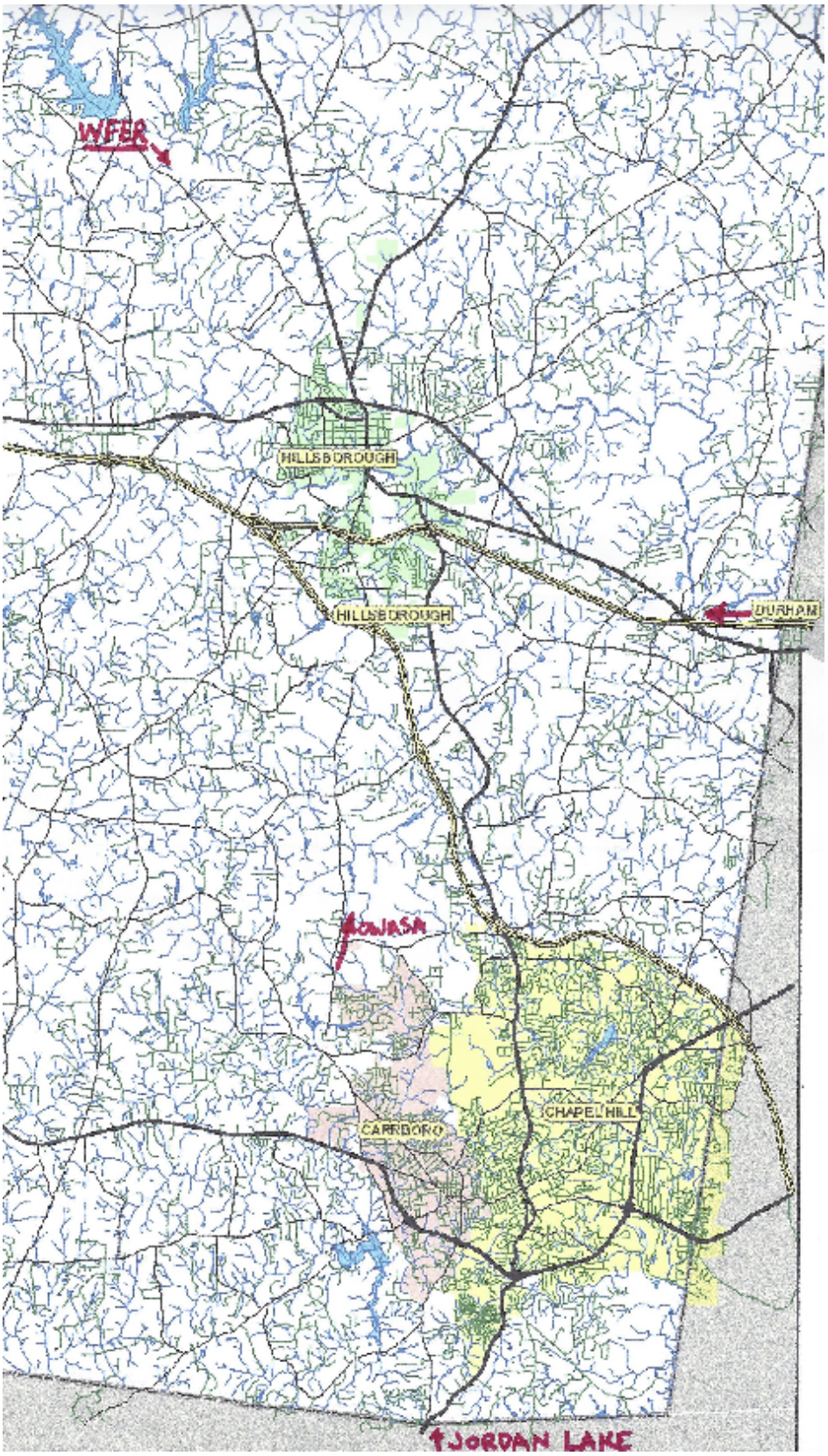
Table V.1 – Source Options descriptions

Source	Type	Basin	WQ Classification	Year Online (earliest)	Available Supply (MGD)	Supply Range (MGD)
Jordan Lake Allocation	Jordan Lake	Haw (2-1)	WS-IV	2035	1.0	1.0
West Fork Eno Rvr Phase 2	Modify Reservoir	Neuse (10-1)	WS-II	2018	1.2	1.2

Hillsborough's proposed **Jordan Lake Allocation** will be received through either our interconnections with OWASA or the City of Durham, or a combination of both. We currently have a 16" interconnection with OWASA, and a 12" interconnection with Durham. Both interconnections are capable of water transfers of up to 2 MGD.

The **West Fork Eno Reservoir-Phase 2** alternative is currently in the design phase. This project will double the volume of the existing West Fork Eno Reservoir and raise the water level by 10 feet vertically. Construction of this project is anticipated to begin in 2016, and will be completed by the end of 2018.

Figure V.1 – Map of Water Supply Source Options



Supply Alternatives Summary

Both supply alternatives (West Fork Eno Reservoir Phase 2 & Jordan Lake) are necessary for Hillsborough's ability to serve future water needs, including seasonal and emergency peaks.

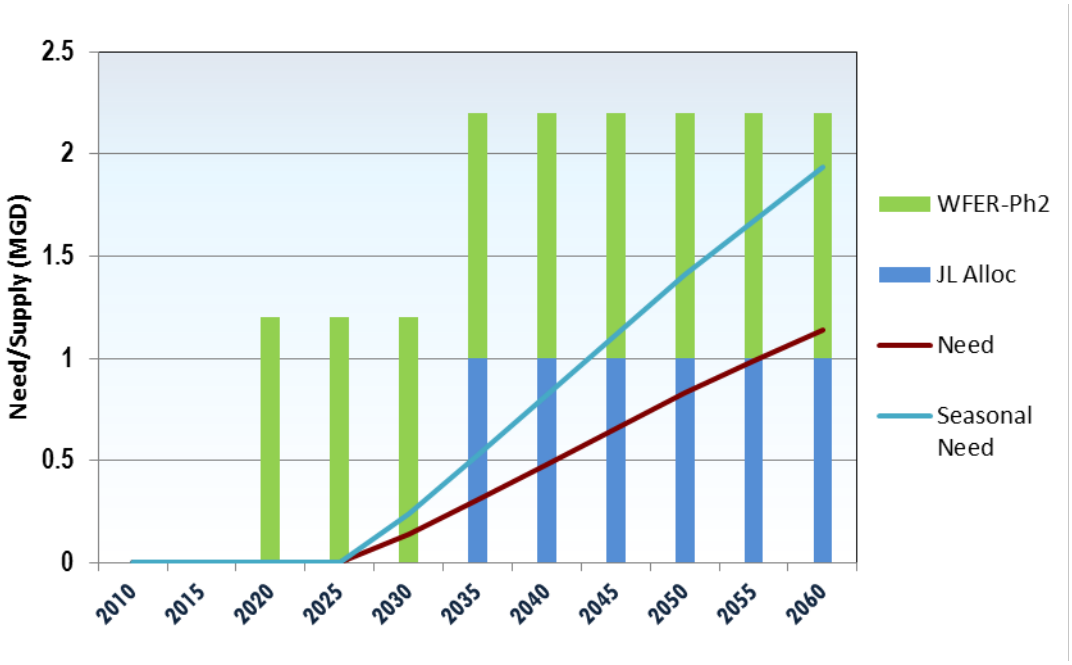
Table V.2 – Alternatives Description Table

Alternative	Alternative Description
Jordan Lake Allocation	This alternative is the preferred alternative and was developed in collaboration with, and is supported by the Jordan Lake Partnership. This option includes 1 MGD Level 2 Jordan Lake Allocation.
West Fork Eno Reservoir-Ph 2	This alternative is also needed to meet Hillsborough's future demand. It includes the expansion of the existing West Fork Eno Reservoir to double the current capacity.

Table V.3 – Source Composition of Supply Alternatives (MGD)

Need and Source Options	MGD	MGD
Total Projected Need (2045)	*0.655*	
Total Projected Need (2060)	*1.14*	
Seasonal Peak Projected Need (2045)		*1.114*
Seasonal Peak Projected Need (2060)		*1.938*
Sources:		
Jordan Lake Allocation	1	1
West Fork Eno Reservoir–Phase 2	1.2	1.2
Total New Supply (MGD)	2.2	2.2

Figure V.2 – Alternatives - Timeline of need versus new water supply



Alternatives Analysis

Table V.4 – Water Supply Alternative Ratings –

Classification	Jordan Lake Allocation	WFER Phase 2
Rd. 4 Allocation Request (% of storage)	1.0	
Total Supply (MGD)	1.0	1.2
Environmental Impacts	The Same	More Than
Water Quality Classification	WS-IV	WS-II
Timeliness	Good	Good
Interbasin Transfer (MGD)	1	None
Regional Partnerships	Yes	None
Technical Complexity	Not Complex	Complex
Institutional Complexity	Complex	Not Complex
Political Complexity	Complex	Not Complex
Public Benefits	Few	Few
Consistency with local plans	Yes	Yes
Total Cost ($ millions)	4.0	8.7
Unit Cost ($/gallon)	4.00	7.25
Selected Alternatives	✓	✓

Alternative 1 – Preferred Jordan Lake Partnership Alternative

Jordan Lake Allocation Request

The Jordan Lake Allocation Alternative will be a 1 MGD Level 2 request, since the need is anticipated to occur after 2045. It is anticipated that this allocation will become a Level 1 request in or around 2045. Finished water will be obtained through OWASA or the City of Durham. Although complete details have not been determined, it is anticipated that capacity in an existing (OWASA or Durham) or future water plant (constructed in association with the new western intake from Jordan Lake) will be added, or capacity purchased, by the Town of Hillsborough to utilize its proposed allocation. The total cost above is estimated.

Available Supply

The JL Allocation will provide 1 MGD after 2045. Since the Town is already committed to construct Phase 2 of the West Fork Eno Reservoir, its capacity will give us sufficient supply through 2045. These two alternatives are sufficient to meet Hillsborough's need for the entire forecast period through 2060.

Environmental Impacts

Environmental impacts of Hillsborough's use of a Jordan Lake allocation are minimal, if not non-existent, due to the fact that other entities will be using a much larger percentage of Jordan Lake water. The facilities needed for the allocations not attributed to Hillsborough will be constructed whether Hillsborough receives an allocation or not. The marginal increase of facility size for Hillsborough's 1 MGD allocation is negligible.

Water Quality Classification

Jordan Lake has a WS-IV water quality classification.

Timeliness

The timeliness of this alternative is rated as **Good**. Only a Level 2 allocation is needed at this time. This leaves a significant amount of time to plan the details of actual water delivery before water is needed to be delivered.

Interbasin Transfer

While this alternative is technically an interbasin transfer from the Cape Fear to the Neuse Basin, the volume is at or less than 1 MGD. Therefore, this alternative is not subject to the Regulation of Surface Water Transfers Act (GS 143-215.22L).

Regional Partnerships

This alternative was developed in coordination with the Jordan Lake Partnership, and is supported by other JLP members.

Technical Complexity

The Technical Complexity is rated as **Not Complex** for this alternative. It is possible that sufficient capacity will exist for raw water pumping and treatment of a modest 1 MGD allocation. If not, upgrading facilities to achieve an additional 1 MGD should be relatively straightforward and not cost prohibitive.

Institutional Complexity

The Institutional Complexity is rated as **Complex** for this alternative, primarily because it will involve other utility systems to have the allocation delivered to Hillsborough. While any obstacles should be easily surmountable, there are still details that will have to be worked out.

Political Complexity

The Political Complexity is rated as **Complex** for this alternative, primarily because it will involve the agreement of other jurisdictions to approve a contract with Hillsborough. Water sales agreements already exist between Hillsborough, Durham, and OWASA, but these will have to be significantly revised to address issues related to delivery of a Jordan Lake Allocation.

Public Benefits

This alternative will generate **Few** public benefits. The primary benefit will be the provision of an ample water supply to the citizens of Hillsborough. Also, Hillsborough's sharing of some infrastructure costs will help other utilities in covering their costs, and the purchase of finished water from OWASA and/or Durham will provide a reliable customer for their water.

Consistency with local plans

The anticipated growth areas to be served with water from a Jordan Lake Allocation are consistent with Hillsborough's Capacity Study, and with the joint Strategic Growth Plan developed with Orange County.

Total Cost ($ millions)

The total net present of worth of this Alternative through 2060 is expected to be **$4 M**. This is an estimate based on minor pumping and treatment upgrades that may be necessary to deliver water to the Town of Hillsborough. Due to the fact that actual water transfer is not anticipated until at least 2045, a full cost analysis has not been performed.

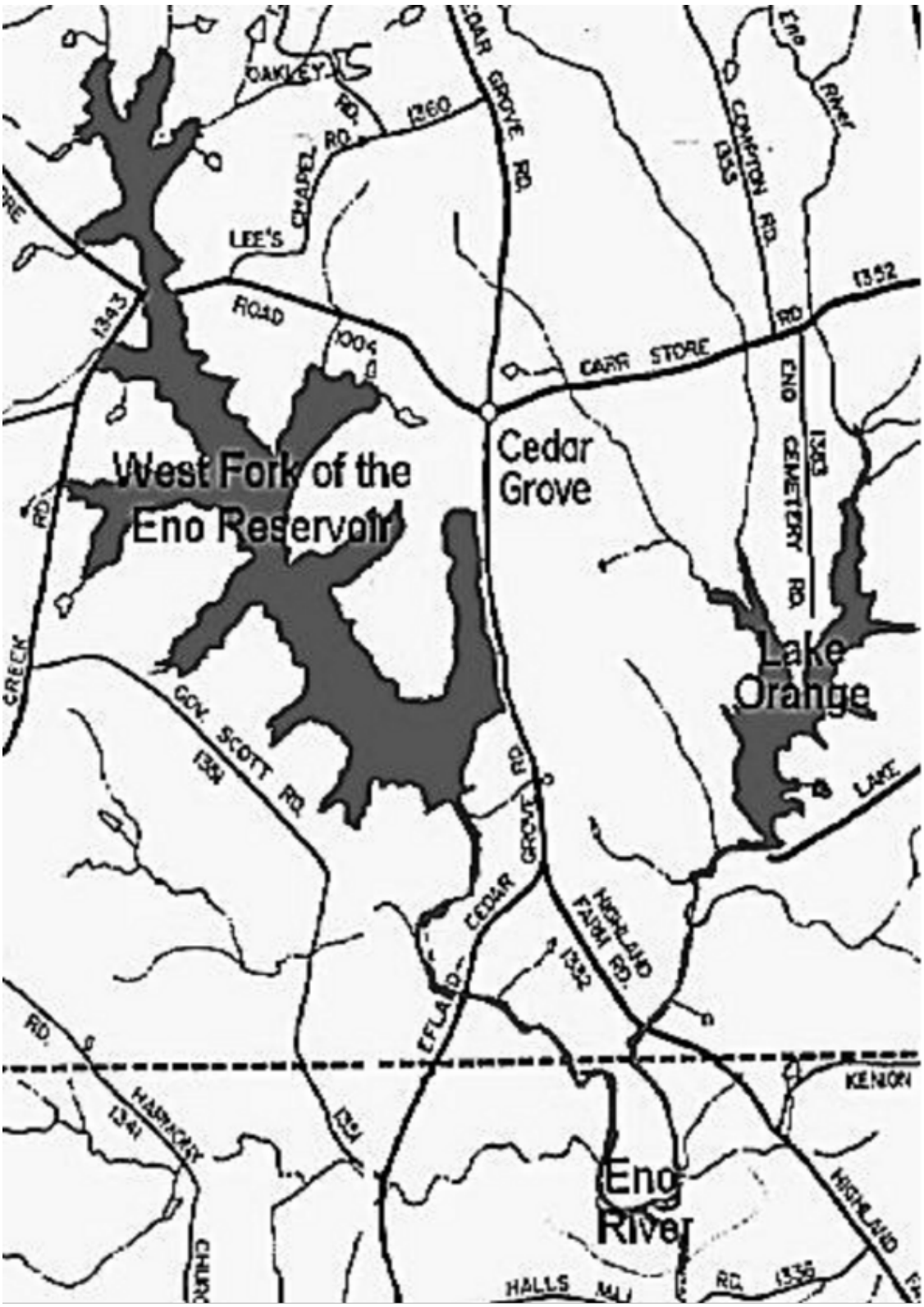
Unit Cost

The unit cost of this alternative is estimated to be $4/gallon.

--END ALTERNATIVE 1.--

Alternative 2 – West Fork Eno Reservoir, Phase 2

Figure V.3 – Map of Alternative 2



Jordan Lake Allocation Request

This alternative is planned to be used in addition to the requested Jordan Lake Allocation.

Available Supply

This source will provide a 1.2 MGD safe yield after 2018. This alternative, along with a Jordan Lake Allocation, is sufficient to meet Hillsborough's need for the entire forecast period through 2060.

Environmental Impacts

Environmental impacts of this alternative are more significant than a Jordan Lake Allocation, due to the fact that additional land clearing and construction will be required. The town is currently studying the full extent of the environmental impact of this alternative.

Water Quality Classification

The West Fork Eno Reservoir has a WS-II water quality classification.

Timeliness

The timeliness of this alternative is rated as **Good**. The project already has a US Army Corps of Engineers 404 permit, which expires at the end of 2018. Therefore, the town is committed to complete this project before 2018 to avoid additional permitting and costs.

Interbasin Transfer

There is no interbasin transfer associated with this alternative. Therefore, this alternative is not subject to the Regulation of Surface Water Transfers Act (GS 143-215.22L).

Regional Partnerships

This alternative was developed in coordination with the Jordan Lake Partnership, and is supported by other JLP members.

Technical Complexity

The Technical Complexity is rated as **Complex** for this alternative. The existing dam will have to be raised 10 feet, and over 100 acres cleared for Phase 2 construction. In addition, several NCDOT roads will require modifications to accommodate the higher water level.

Institutional Complexity

The Institutional Complexity is rated as **Not Complex** for this alternative. Hillsborough owns all the property required for the project, and minimal coordination with other entities is required. Since this project expands an existing lake, and the Phase 2 concept was reviewed prior to construction of Phase 1, the project should not be complex.

Political Complexity

The Political Complexity is rated as **Not Complex** for this alternative. Since this project expands an existing lake, and the Phase 2 concept was reviewed prior to construction of Phase 1, the project should not be complex.

Public Benefits

This alternative will generate **Few** public benefits. The primary benefit will be the provision of an ample water supply to the citizens of Hillsborough. Since there are no approved recreational uses of this lake, there are no significant benefits to the surrounding community.

Consistency with local plans

The Town of Hillsborough has planned to implement this source since the original West Fork Eno Reservoir was constructed between 1998 and 2000.

Total Cost ($ millions)

The total net present of worth of this Alternative through 2060 is expected to be **$8.7 million**. This is an estimate based on an engineering study completed in September 2014, which was our first step toward constructing Phase 2 of the WFER. The Town of Hillsborough is currently funding engineering design of the required road improvements required of this alternative, as well as the environmental permitting. The final design will follow in 2015, with construction anticipated to begin in 2016. This project will be completed by the end of 2018.

Unit Cost

The unit cost of this alternative is estimated to be $7.25/gallon.

--END ALTERNATIVE 2.--

Selected Alternative

The Town of Hillsborough has selected a 1% Level 2 Jordan Lake allocation, as well as the Phase 2 expansion of the West Fork Eno Reservoir, in order to meet our long-term water supply needs.

This alternative is in agreement with the JLP's RWSP. As such, any changes to the allocation request in this alternative could have an impact on the ability of other partners to meet their needs. This alternative represents a regional alternative for which allocation requests have been coordinated, and to the best knowledge of the partners, will not have a substantial negative impact on either the ability of Jordan Lake to meet all applicants' requests for water, or downstream users and the environment.

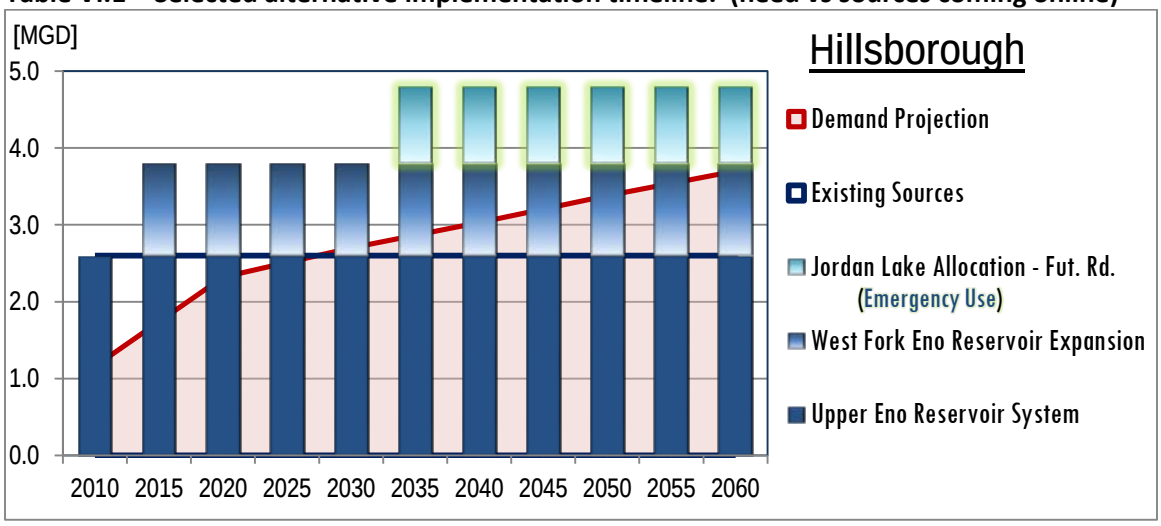
SECTION VI. PLANS TO USE JORDAN LAKE

Based on the need demonstrated in Section IV, and the alternatives analysis presented in Section V, Hillsborough is planning to implement Alternative 1 and 2. Accordingly, this application includes a request for Jordan Lake Water Supply Storage in the amount of a **1 % Level II Allocation**. This represents an increase of 1 MGD from the existing 0 % Allocation. The future projected 2060 need is for a 1 MGD [%] allocation.

Implementation Plan and Timeline

Hillsborough will revise our current emergency water purchase contracts with OWASA and the City of Durham to address supply of our 1 MGD Jordan Lake Allocation. Since we are requesting a Level II Allocation, all the details of this contract and transfer of water have not been worked out yet. The physical capacity to purchase 1 MGD from OWASA or Durham currently exists.

Table VI.1 – Selected alternative implementation timeline. (need vs sources coming online)



Access to Jordan Lake

Hillsborough will not have direct access to Jordan Lake. Our allocation will be supplied as noted above, through OWASA and/or the City of Durham. Our allocation will be temporarily assigned to the entity providing us with Jordan Lake water.

Raw and Finished Water Quality Monitoring Plan

Hillsborough will be purchasing finished water from Jordan Lake. The entity from which we purchase will ensure raw and finished water quality. Hillsborough will ensure finished water quality within our system through periodic testing as required.

Estimate of Costs

Jordan Lake Costs

Table VI.2 - Jordan Lake Costs

1% Jordan Lake Allocation	Estimated Costs
Year 1 Allocation Capital/O&M Costs	*$ 90,000*
Pumping Improvements & Automation	*$ 1,000,000*
Treatment Improvements/Buy-In	*$ 2,000,000*
Miscellaneous Piping and Physical Improvements	*$ 910,000*
TOTAL ESTIMATED COST	$4,000,000

Jordan Lake was financed and constructed by the federal government through the US Army Corps of Engineers. Storage space for municipal and industrial water supply was included at the request of state and local officials with the understanding that the costs associated with this water supply storage would be paid for by the actual users. The result of that arrangement is that the management plan for Jordan Lake dedicates 33 percent of the conservation pool, or 45,800 acre feet, for water supply storage.

North Carolina General Statute 143-215.38 authorized the State, acting through the Environmental Management Commission (EMC), to assume repayment responsibilities for the costs associated with providing water supply storage in Jordan Lake. These costs fall into three basic categories: capital costs including interest, operating costs, and administrative costs. The total cost for each percent of water supply allocated from Jordan Lake varies with a number of parameters, the key ones being when the allocation is granted and when water is expected to be withdrawn. The rules governing allocation of water supply storage require the state to recover the complete federal capital and interest costs associated with a Level I allocation by 2012. Thereafter, the cost of future Level I allocations will be based on the initial capital cost and accrued interest as well as the accrued operating expenses associated with the percent of storage.

BACKGROUND - Jordan Lake Capital and Interest Costs

Capital costs are based on the Jordan Lake construction costs of approximately $89 million, excluding funds budgeted specifically for recreational lands and facilities. Since the project's cost is shared among several project purposes, the Corps estimated that 4.6% of the construction cost is attributable to water supply. Including interest accrued during project construction, $4.388 million represents the original investment cost for the water supply provided by the reservoir. Based on this figure, the initial capital cost is $43,880 for each one percent of supply storage.

In 1992, the State began making interest payments at a rate of 3.225% on the unallocated portion of the Jordan Lake water supply. As stated above, all of these interest payments will be passed on to the eventual holders of the water supply storage.

For example, the cost of a new Level I allocation made in 2014, based on capital cost and accrued interest, is estimated to be $75,013 per percent of water supply storage. In future years entities that receive a new Level I allocation in this round of allocations will be billed for operation and maintenance expenses based on the percentage of storage in the allocation.

Holders of Level II allocations are required to make the annual interest payments on the capital costs associated with the allocation percentage, along with a similar proportion of operating expenses, until their allocation is converted to Level I. [1]

BACKGROUND - Jordan Lake Operating Costs

In addition to the costs incurred to construct the project, there are continuing expenses for operation and maintenance (O&M), and periodic expenses for replacement and rehabilitation of facilities at the reservoir. Current and future allocation holders are required to pay a proportional share of these operating expenses. Allocation holders must also reimburse the State for payments made to cover operating expenses since the Corps started charging for these operating expenses in 1992. The estimated accrued operating expenses for a new Level I

[1] Level I allocations are based on projected water supply needs for a 20-year planning period and the withdrawal must be initiated within 5 years. Level II allocations are based on projected water supply needs for a 30-year planning period.

allocation of one percent made in 2014 is $13,034, which would be added to the capital and interest payment.

The water supply proportional share of operation and maintenance costs is estimated by the Corps to be 5.4% of the total expenses. For example, in 2011 $109,258 was attributed to annual operation and maintenance costs associated with water supply. Thus, $1,092.58 was attributed to each one percent of water supply storage. The average annual O&M cost for 2007-2011 is $777 per percent of storage. Since 1992, the Corps has been charging the State the full 5.4% of operation and maintenance costs associated with water supply storage. Future allocation holders must reimburse the State for the actual operation and maintenance charges for their allocations since 1992.

BACKGROUND - Jordan Lake Replacement Costs

The proportional share of replacement costs attributed to water supply is estimated by the Corps to be 2.8% of the total expense. These costs are more difficult to budget because they are not incurred on a regular basis. The Corps estimated an annual equivalent project replacement expense of approximately $66,000. [2] The proportion of these annual replacement costs charged against water supply amounts to approximately $1,800 total, or $18 per percent of storage. Until the Corps starts incurring replacement costs and passing these costs on to the State (they have not through 2011), allocation holders will not have any additional reimbursement costs associated with replacement costs.

BACKGROUND - Jordan Lake Rehabilitation Costs

The proportional share of major rehabilitation costs attributed to water supply is also estimated by the Corps to be 2.8% of the total expense. Annual rehabilitation costs can be estimated at about $30,092.86 based on costs incurred in 1995 and 1996. At this rate the proportion of these annual rehabilitation costs charged against water supply amounts to approximately $843 or $8.43 per percent of storage. Future allocation holders must reimburse the State for the actual rehabilitation payments made on their allocations since 1992. The Corps has not billed the state for any rehabilitation expenses since 1996. When rehabilitation expenses are incurred in the future they will be distributed proportionally to allocation holders.

[2] It is important to note that replacement costs will fluctuate from year to year based on actual expenses incurred by the Corps.

BACKGROUND - Jordan Lake Cost Summary

Based in the figures presented in the discussions above a new one percent Level I allocation of water supply storage made in 2014 is estimated to cost the holder $88,071. This figure includes: $43,880 of capital cost, $31,133 in accrued interest, $12,998 in accrued O&M costs, $34 in accrued rehabilitation costs, and $26 estimated costs for annual rehabilitation and replacement costs. In addition a fixed $250 administration fee is added to each bill. Based on the figures used for these estimates, in subsequent years the cost of a one percent Level I allocation can be expected to be in the neighborhood of $2,200 based on historical O&M and interest costs.

The cost of a new one percent Level II allocation made in 2014 is also estimated to be about $2,200 annually, based on the same figures. At the time a Level II allocation is converted to a Level I allocation the holder can expect to make a payment of at least $88,071 for each one percent of storage included in their allocation. This covers the capital cost and accrued expense up to the time the Level II allocation is made. After that date the allocation holder will be paying the O&M and interest payments annually. These estimates are presented as a table below.

Example of Payment Responsibilities for Allocation Holders (per percent of storage allocated).

Estimates for Year	**2014**		**2014**
	New 1% Level I		**New 1% Level II**
Allocation Level	I	I	II
	1st Year	Subsequent Years	1 st Year
Capital Cost [1]	$ 43,880.00	$ -	$ -
Accrued Interest on Capital [2]	$ 31,132.86	$ -	$ -
Total Capital Cost [3]	$ 75,012.86	$ -	$ -
Interest Portion of Capital Payments [4]	$ -	$ 1,415.13	$ 1,415.13
Annual O&M Cost [5]	$ 777.30	$ 777.30	$ 777.30
Accrued O&M Costs [6]	$ 12,220.47	$ -	
Annual Rehabilitation Cost [7]	$ 8.43	$ 8.43	$ 8.43
Accrued Rehabilitation Costs [8]	$ 33.98		
Replacement Cost [9]	$ 18.00	$18.00	$18.00
Total Cost per PERCENT [10]	$ 88,071.03	$ 2,218.85	$ 2,218.85
Additional Fixed Cost per Acct. [11]	$ 250.00	$ 250.00	$ 250.00

Notes: *1. $4,388,000 for 45,800 acre-feet of storage.*

2. 3.225% interest paid annually on the original capital cost for the years 1992-2014, compounded annually.

3. *Total Capital Cost = Capital Cost + Accrued Interest on Capital.*
4. *The interest on $43,880 at 3.225% interest rate.*
5. *The estimated annual O&M (operation and maintenance) cost, based on an average of actual O&M costs for the years 2007-2011.*
6. *The total of actual O&M costs for the years 1992-2011 and estimates for 2012, 2013 and 2014.*
7. *The estimated annual rehabilitation cost, based on an average of actual rehabilitation costs for the years 1995-1996.*
8. *The total of actual rehabilitation costs for the years 1992-1999. Payback assumes either a lump sum, or 20 equal annual payments at a 3.225% interest rate.*
9. *Replacement cost is based on the Corps estimate of the average annual replacement cost. Note that there is no accrued replacement cost, as the State has not been billed for such as of year 2011.*
10. *Total Cost per percent of storage = (Total Capital Cost or Interest Portion of Capital Payments) + Annual O&M Cost + Accrued O&M Cost + Annual Rehabilitation Cost + Accrued Rehabilitation Costs + Replacement Cost.*
11. *An additional administrative charge of $250 is added to each allocation holder's bill.*

Other Capital Costs

No other capital costs are known at this time.

Operating Costs

Additional operating cost information is not available at this time.

Replacement and Rehabilitation Costs

Additional replacement and rehabilitation costs are not available at this time.

Cost Summary

Table VI.3 – Overall costs for the selected alternative

Selected Alternatives	Estimated Costs
Jordan Lake 1% Allocation - Total	$ 4,000,000
West Fork Eno Reservoir - Phase 2 Costs:	
Dam Modifications	$ 3,100,200
Road Modifications	$ 2,322,000
Environmental Mitigation	$ 376,200
Land Clearing	$ 900,000
Engineering & Project Management	$ 1,978,000
TOTAL ESTIMATED COST	$ 12,676,400

APPENDICES

APPENDIX A. DENR JORDAN LAKE WATER SUPPLY WORKBOOK

See attached excel workbook file titled JLA4_Workbook_JLP_v1-Hillsborough-FINAL.xls.