Lincoln Water Department Budget Report, FY 14

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1 General Information

Established in 1874, Lincoln's Water Department (LWD) provides clean safe drinking water to its customers and fire flow protection throughout the town. Lincoln's position at the head of the watershed plus the wisdom of previous generations in protecting the watershed by selected land purchases and by-laws means that Lincoln has some of the purest drinking water in the state.

Lincoln's water comes from Flint's Pond (primary) and the Tower Road Well (secondary). Flint's Pond water is purified by an advanced microfiltration plant before distribution. Depending on the source location, LWD adds a very low concentration of either potassium hydroxide or sodium hydroxide to the drinking water in order to increase the pH of the water and reduce its natural corrosiveness. Chlorine is added as a disinfectant at the Flint's Pond facility and fluoride is added at both the treatment plant and the Tower Road well to aid in dental health and hygiene. Zinc orthophosphate is also added at both sites for corrosion control and to reduce levels of iron and manganese. The treated water is then pumped into the distribution system until the storage tank on Bedford Hill is full.

2 Financial Structure

Governed by three elected Commissioners, the Department is funded totally by user fees. We do receive certain accounting, insurance, and personnel services from the general town government, for which we are billed. While

LWD is self-funded, our budget and capital expenses are approved at the Town Meeting and we maintain liaisons with various town entities.

The Commonwealth strongly recommends that town water departments be structured as independent Enterprise Funds. In too many cases in the past, revenue-desperate towns have plundered water revenues, leaving a town's water department unable to properly maintain the water supply.

As an Enterprise Fund, the Water Department must be self-sustaining, i.e., revenues must exceed expenses on an annual basis. Although the Department functions as a free-standing financial entity, the town must approve our annual budget and our revenue structure. In keeping with Massachusetts regulations, our revenues must be based on services provided, to wit, the user's connection to the supply system and the amount of water consumed.

2.1 Costs and Budget

Our mission is to operate the department at a minimum cost while meeting our overall goals: safe and adequate supply for normal daily and fire needs. Inherent in this mission statement is the need to meet all Massachusetts requirements, and to be ready for emergencies, such as system component failure.

2.2 Cost Elements

A summary of our Fiscal Year (FY) 2014 budget, approved at last year's Town Meeting, is given on Table 1. This table shows that the three major components of the budget are personnel costs, principal on debt (for the microfiltration plant placed on line in FY2004), and utilities of electricity and natural gas. The "Other" category at the bottom of the Table includes items such as purchase of Weston water, our water conservation rebate program, telephone and postage, vehicle fuel, professional development, and waste disposal.

Table 1: Summary of Expenses, FY 2014		
Description	Expense, $	% of Total
Personnel	424,840	42
Utilities	143,250	14
Repair & Maintenance	33,500	3
Outside Services	57,000	6
Chemicals	27,000	3
Meters, Supplies, Tools	50,500	5
Principal on Debt	180,000	18
Other	85,300	9
TOTAL	1,001,390	100

2.3 Revenue

The Department bills each water user twice yearly, with the plan to convert to quarterly billing by the end of calendar year 2014. The billing structure the department uses reflects the cost of providing the water service to the user. The cost of the service has two major components: the capital cost of the infrastructure (source of water, treatment, pumps, storage tank and pipe system) to be able to deliver water to the user, and the cost of the water itself, including the personnel, utilities and the other budget items necessary for the operation of the system. Thus, the water bill has a base charge, e.g., $40.00 semi-annually for a service with a 5/8-inch meter, plus a consumption charge for the amount of water used. The consumption charge, in order to encourage conservation and to conform to state-wide regulation is regressive, in that the higher the water consumption, the higher the unit price charged for the water consumed. The current rates are posted on the Town website. Rates are reviewed periodically to confirm that the rates reflect current costs of providing water service. The current rates have been in effect since April 2010.

2.4 Retained Earnings (Reserve Fund)

The requirement that the Department operate such that revenues meet or exceed expenses on an annual basis results in a reserve fund that the department carries forward on its books. The amount of this fund is kept at a level that allows the department to respond to minor emergencies and modest capital improvement needs without having to raise bonds or constantly change the billing rate structure. The reserve fund now stands at $1,051,390, and has remained relatively stable for the last six years.

All capital improvements, even when paid for out of this reserve fund, must be approved at Town Meeting as warrant articles. Emergency repairs using this fund must be approved by the Water Commissioners. Examples of the use of this fund are the warrant articles for the March 2014 Town Meeting, discussed in Sections **3 Warrant Articles** and **4.3 Preserving Capital Infrastructure**. The Commissioners can consider funding very large expenditures through bonding to avoid sudden large increases in water rates.

2.5 Current Status

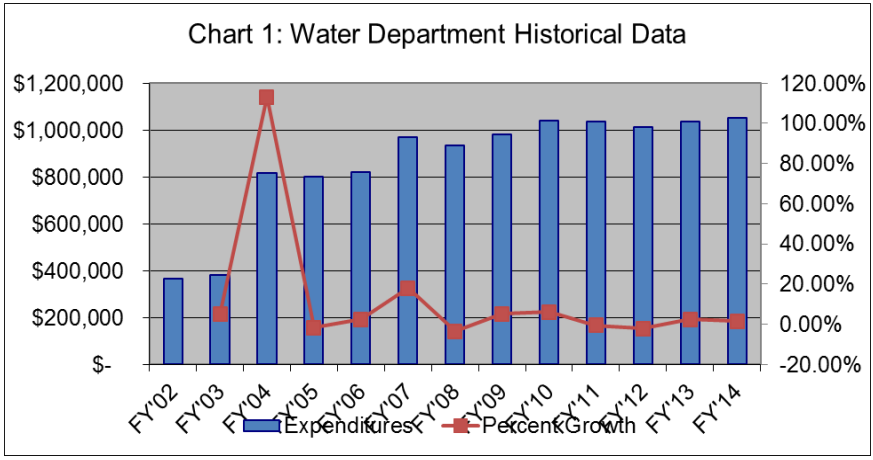

Chart 1 shows the Water Department expenditures for the last 12 years. Expenses increased in 2004 as the microfiltration plant came on line, with attendant increase in operating costs and the initiation of principal payments

to retire the bonded indebtedness. Since Fiscal Year (FY) 2007, however, annual expenditures have been relatively stable. In fact, on a per capita basis, the costs have remained stable, or decreased, depending on what population estimate is used as a basis. The US Census figures for 2000 and 2010, for the 01773 Zip Code, basically the water department's service area, are 5,152 and 5,112, respectively, almost identical. The Town Census figures for 2003 and 2013 are 5,481 and 6,291, respectively, showing modest growth. The Town Census, however, done by mail, does not provide as consistent an estimate method as the US Census. We can say that the water cost per capita has not increased appreciably over the last seven years, and may actually have decreased.

2.6 Comparison to Neighboring Town Billing Rates

It is informative to compare the Lincoln water rates to those of neighboring towns, as a reality check on our budget. The following chart summarizes calculated water bills for Lincoln and four nearby towns for varying levels of residential water use: 50,000 gallons per year, which represents a very low household use: 100,000 gallons per year, about the average consumption of a family of four at 65 gallons per capita per day, the State target; and, 150,000 gallons per year, representing a household that is about halfway between the Lincoln lowest tier rate and the highest.

Chart 2: Water Bill Comparison to Neighboring Towns

	Values in $ per year			
Town	50,000 gpy	100,000 gpy	150,000 gpy	2010 Population
Lincoln	$334	$598	$937	5,112
Acton	$340	$584	$882	21,924
Concord	$274	$548	$926	17,668
Lexington	$214	$514	$895	31,394
Wayland	$467	$977	$1,690	12,994

All towns have a regressive rate structure, charging more per gallon consumed the higher the consumption, as an incentive to conserve water. The individual towns' structures are not identical, having differing unit costs and differing "breakpoints "of consumption to define each cost tier. The costs in this chart have been calculated by the Lincoln Commissioners based on unit rates posted on the Towns' respective websites.

The chart shows that Lincoln's water rates are in line with those of most of its neighbors, and measurably less than those in Wayland. For the target water users (middle cost column), the first four towns all have annual bills between $500 and $600. Since Lincoln is the smallest of these five towns, and the unit cost of supplying water decreases with volume supplied, we can say that Lincoln's billing rates and expenditures are reasonable.

2.7 Affordability Index

A Massachusetts guide to the operation of municipal utilities provides further insight into the reasonableness of Lincoln's water billing rates. This guide states that most jurisdictions consider an affordability index, the ratio of median annual water bill to median household income, of between 1.25% and 1.75% to be acceptable. Lincoln's index is 0.50%, well below the accepted minimum for this index. Again, Lincoln's rates compare well to industry standards.

3 Warrant Articles for 2014 Town Meeting

- Filtration plant maintenance work: Replacing an aging connection pipe that is showing signs of corrosion.
- Maintenance of Flint's Pond spillway: Upgrading and maintaining the dam and spillway at the outlet of Flint's Pond.
- Watershed protection: In partnership with Conservation Commission, acquiring a parcel of land within the Flint's Pond watershed.

4 Key Issues:

1. Maintaining safe drinking water.
2. Conforming to the restricted water withdrawal permitted by the Massachusetts Department of Environmental Protection (DEP).
3. Preserving capital infrastructure.
4. Providing fire flow protection.
5. Balancing revenue vs. expenditures.

4.1 Maintaining safe drinking water

Safe drinking water is our most important mandate. We follow all state mandates and also stay current on best practices.

- Water is tested frequently as required by the state and federal governments.
- Filtration and disinfection practices are continually monitored. We also improve disinfection practices as better methods become available.
- We contribute to the purchase of land as appropriate to protect the Flint's Pond watershed.
- We recommend improved water protection by-laws to the Town to prevent surface and ground water contamination. Two such by-laws were voted in 2012 and 2013.

4.2 Water permit compliance

Starting in 2014, the DEP is reducing Lincoln's water withdrawal allowance. The new permit allows Lincoln a total combined water withdrawal from Flint's Pond and the Tower Road Well of 182.5 million gallons per year (MGY). Lincoln's withdrawal in 2013 was 213.4 million gallons, already above the new reduced rate. To derive the overall rate, the permit allows residents to use 65 gallons of water per person per day. Lincoln is also above that usage rate. The primary reason for the high usage is watering of lawns and other plantings. Many customers' water usage doubles in the summer months.

The Water Department has multiple programs to reduce Lincoln's water use:

- Aggressively pursuing leaks in water mains and service pipes through an annual sonic leak detection survey followed by rapid repair of leaks found.
- Promoting residential water conservation programs such as the high efficiency toilet and washing machine rebate program, the WaterSense smart lawn irrigation controller rebate program, and the low-cost rain barrel program. Rebates were approved for 19 toilets, 14 washing machines and one irrigation system moisture sensor. In addition, residents have purchased more than 35 rain barrels.
- Publishing information on drought-tolerant lawns and other plantings and best pool management practices.
- Prohibiting lawn irrigation on commercial and municipal properties.
- Imposing restrictions on outdoor water use in the summer months (this is required by the DEP).
- Structuring the water rates to increase with higher use rates and requiring separate meters on lawn irrigation systems; all water use for irrigation is charged at the highest rate.
- Upgrading the meters to remote-read smart meters. The new meters show a leaking faucet symbol when a leak is detected, allowing property owners to catch leaks early. The reduced time required to read the meters will allow us to change from semi-annual to quarterly billing, thereby detecting probable leaks (unusually high water use) more quickly.

These programs are already showing results. During the last meter reading event, the new meters identified 89 continuous leak conditions within residential houses, proving the value of the advanced meters. Homeowners were notified of the leaks, and, in many cases, Department personnel assisted the homeowner in finding the source. Meanwhile, the sonic leak detection survey identified 11 service line leaks and four water main leaks, which have all been repaired. The estimated total leakage rate ranged between 49 and 94 gallons per minute.

4.3 Preserving Capital Infrastructure

Normal maintenance includes routine work on the Department's buildings, which include the microfiltration plant and the two pump stations (Flint's Pond and the Tower Road Well. The storage tank on Bedford Hill also requires maintenance to both exterior and interior surfaces. In addition, the Department maintains and occasionally replaces 3 vehicles.

Longer term projects include upgrading and maintaining the dam and spillway at the outlet of Flint's pond. We recently initiated an in-depth study that convinced the DEP to lower the dam's hazard classification (potential damage from a 100-year flood) from Significant to Low. The lower classification allows us to meet the state dam safety requirements with minimal improvements. That project will commence once Town Meeting approves the funds.

Several years ago we commissioned a survey of our water mains, some of which are more than 100 years old. The survey revealed that, while the 100 year old pipes last at least 100 years, the newer pipes have a shorter projected lifetime. Thus all the pipes are at risk of increased failure rates over the next 20 – 50 years. Since this is a problem throughout the country, there is considerable activity to develop more cost effective pipe testing and pipe replacement technology. The Department Superintendent attends regional meetings to keep current on the latest technology and on potential federal and state funding programs in this area. Meanwhile, our pipe rupture rate is low and we are able to handle the occasional leak from our operating budget.

The Department also has a planned routine maintenance schedule for our sophisticated microfiltration plant. The expensive filter membranes require periodic replacement. We are in the process of replacing an aging connection pipe that is showing signs of corrosion. We also recently replaced an air compressor, which will result in a significant reduction in energy use. That is important, since the Water Department is the largest consumer of energy in Lincoln. We investigated the possibility of using solar panels to generate electricity, but our buildings are heavily shaded and not oriented correctly. The water storage tank area at the top of Bedford

Hill is open and sunny, but solar structures there would compromise our ability to maintain the tank.

4.4 Providing Fire Flow Protection

The Water Department receives no revenue to support fire flow throughout the town, but it is an important task and a driver of capital expense. The water mains and the water tank are much larger than would be required to provide water only for normal household use.

The storage reservoir, in particular, must have high enough elevation and reserve water to meet the heavy demand required to fight a major fire. Most towns have more than one such reservoir. If we had to shut down the water tank for serious maintenance, or if it had a structural failure, the Department would be unable to provide the water flow needed for a fire.

We have been looking for ways to mitigate this risk. We have examined whether we could connect to Weston, Concord, or Lexington's water supply if the need arose. In each case, the required large interconnection pipes or mitigation of the pressure difference between towns would require capital costs of $1.5 million, and in some cases, on-going maintenance costs. We are currently investigating whether re-activating the Farrar Pond well would be more cost-effective. When our investigations have been completed, we will bring a recommended plan to Town Meeting for the voters to consider.

4.5 Balancing Revenue vs. Expenditures

The Water Department continuously looks for increased efficiency and cost reduction. Recent cost savings initiatives include the following:

- Computerizing many day-to-day functions to increase personnel efficiency.
- Adding location data for hydrants, shutoff valves, and mains into the GIS data base to give more rapid response to problem areas and DigSafe requests.
- Upgrading to remote-read meters to save personnel time spent to collect usage data.

- Upgrading the microfiltration plant air compressor to reduce energy use.
- Convincing the state to reclassify the dam to reduce future costs of repair and maintenance.

As conservation efforts reduce our water use, slight increases in rates may be required to match revenue to expenditures. The Department continually seeks, however, to reduce costs while still maintaining our core mission.