



# Lake Junaluska

## Assembly Public Works

### Lake Junaluska Assembly Public Works Water and Sewer System Assessment and Appraisal

Spring 2012

By Buddy Young and Andrew d'Adesky

***DISCLAIMER: The content of this document represents the views and opinions of the authors alone. They do NOT reflect official positions or views of Cavanaugh and Associates, P.A., the Environmental Finance Center at the UNC School of Government, Lake Junaluska Assembly Board of Directors, or any of its official governing bodies.***

#### **Executive Summary:**

This Assessment and Appraisal is being released along with the Capital Improvement Plan (CIP) that has been completed by Cavanaugh and Associates, P.A. The CIP spells out in detail the areas of our water and sewer systems that are in critical need of repair and the estimated cost of those repairs over the next ten years. This Assessment and Appraisal is an attempt to put the CIP into perspective, to inform our community about our water and sewer systems, and to help us as a community to identify the best way to move forward with this plan and integrate it into our overall strategic planning process.

## **Background**

Lake Junaluska Assembly Public Works' (APW) water and sewer infrastructure finds itself in a situation similar to most water and sewer systems in the United States. The American Water Works Association completed national a study, Dawn of the Replacement Era, in May 2001, that states *"Water utilities must make a substantial reinvestment in infrastructure over the next 30 years. The oldest cast iron pipes, dating to the late 1800s, have an average life expectancy of about 120 years. Because of changing materials and manufacturing techniques, pipes laid in the 1920s have an average life expectancy of about 100 years, and pipes laid in the post-World War II boom can be expected to last about 75 years. The replacement bill for these pipes will be hard on us for the next three decades and beyond."*

Water and sewer are by far the most capital intensive of all utility services, mostly due to the cost of the pipes. The infrastructure is literally a buried treasure beneath our streets, but buried means out of sight and as the old saying goes; out of sight, out of mind. Like most communities, Lake Junaluska's infrastructure was laid down and paid for during the economic booms that characterized the last century's periods of growth and expansion. So not only do we take these pipes for granted because we can't see them, we also take them for granted because, for the most part, the huge capital expense of installation of the pipes is a cost that today's customers have never had to bear. Importantly, there is no evidence that America's utilities or Lake Junaluska's in particular are "behind the curve" or that the Assembly's infrastructure is in ruins. America has by far the safest drinking water and the most efficient waste removal in the world. Lake Junaluska is no exception. However we do find ourselves at the time when there is a compelling need to significantly increase the levels of spending on our infrastructure replacement and upgrades.

## **Capital Improvement Plan**

Approximately 13 years ago, Bob Mitchell, the previous Director of Residential Services, (currently APW) determined that we had a huge discrepancy between the amount of water we were purchasing from Waynesville and the amount we were billing our customers. At the time it was impossible to know what was leaking and what was not being metered correctly. Meters were installed at the Terrace Hotel and Lambuth Inn in 2001. A program of identifying defective meters and unmetered outlets was begun and continued for several years. Once we had effectively metered all known outlets, the water loss was calculated to be 48% of the amount purchased and was believed to be almost exclusively leaks or true water loss.

Our crew did their best to identify and fix leaks, but realized that we did not have the equipment or expertise to locate underground leaks that had either found their way into the storm drainage or sewer systems. Cavanaugh and Associates, P. A., an engineering firm with offices in Asheville, was retained to conduct a Modified Water Audit that included, review of purchase, consumption, operational records, verify water loss quantities and value, conduct a pressure management study and leak detection survey. The report they delivered identified

several major leaks that were repaired, bringing our water loss down to 26% in 2010. This represents a tremendous improvement in water loss in a short period of time. While there is no accepted industry standard, APW has identified, through Cavanaugh's Modified Water Audit, a long-term water loss end target of approximately 7 to 8 million gallons per year, or approximately 10 – 13% of system input.

Our crew worked closely with Cavanaugh through the study and follow up. Because of our familiarity with Cavanaugh and their understanding of our system, we retained Cavanaugh to develop our CIP in 2012. The specifications of the CIP were: develop a general system inventory, develop a schedule of water and sewer capital needs for the next 10 years, develop a preliminary cost opinion for the 10 year capital improvements, and to provide summary report. The summary report is being released and made public along with this Assessment.

APW is treated as a not for profit developer by the NC Utility Commission, Public Water Supply and by the Division of Water Quality (sewer). We are not eligible for government grants or loans. There are more stringent regulations attached to grants, federal loans and municipalities than for private developers. One example of the difference is the size of sewer pipes and the availability of manholes required. A municipality is required in some instances to use 8" pipe and install manholes at certain lengths and in certain situations. A developer may use 6" pipe with cleanouts on similar sewer service. Another example is the placement of hydrants, which is more clearly defined for a municipality than for a developer. In our CIP, Cavanaugh treated us as a developer using the less costly requirements for sewer and planning for the replacement of hydrants at or near their current locations.

APW cannot deny that it is seriously "behind the curve" in our technology and system inventory. Our system mapping and inventory is practically non-existent. This information is essential to the efficient operation of our system. More and more emphases are being placed on the accuracy and thoroughness of this information by regulatory agencies. The cost of mapping has been included in the CIP. The estimated cost for mapping our water system is \$50,000 and \$35,000 for sewer.

Our billing and work-order software is DOS based technology and was installed in 1996. The software will not be supported by the manufacturer much longer. We have looked into upgrades and have included a minimal cost of \$5,000 in our Strategic Equipment Report that was released in the spring of 2011.

Most utilities are currently upgrading older mechanical water meters to digital meters that may be read electronically. Not only are these meters more efficient and accurate when meters are read for billing, they provide much more information about customer usage and flow. To upgrade our system to include digital meters including the related software and hardware would add about \$196,000 to our capital budget. This estimate is based on a cost of \$200 installation for each meter and \$30,000 for the required software and hardware. This improvement is not included in the CIP.

There are cost estimates in the CIP included as Asphalt Repair. APWs released our Strategic Pavement Survey last year. There is a great deal of overlap in our Pavement Survey and our CIP. The information in these two plans must be considered together as we set our project priorities to avoid costly duplication of projects and may even represent savings in one study or the other.

Not only are our pipes in serious need of improvements, we must increase expenditures to keep up with compliance requirements. More rigorous testing is required as testing technology develops. APW outsources all of our testing except the most basic checks. Permitting of major projects has become much more costly and requires extensive professional engineering and surveying. APW is not equipped to undertake the needed capital improvements without professional services and guidance. Therefore these additional costs are included in the CIP as Engineering-Administration and are calculated at a rate of 15% of the cost of the projects.

There are several significant components of our system that are not addressed in the CIP, such as the reservoir, the Liberty Road pump station and the Tri-Vista sewer lift station. These facilities are in sound condition and should not need significant investment in the next ten years. They are discussed in more detail in the Current Asset portion of this report.

## **Financial Information**

APW annual water and sewer budget is approximately \$500,000 per year. Currently our monthly household charges for 5,000 gallons of water and sewer is \$55.00; the average of all NC municipal utilities is \$59.99 per month. Unlike most utilities APW does not treat water or sewage. We are a purchase system and have contracted with The Town of Waynesville to provide all of our water and sewer treatment. As a purchase system a major part of our expenses, the cost of water and sewer is passed on directly to the water and sewer supplier and is for the most part, out of our control. If a purchase system has major water loss (as we have experienced) the cost for the loss is the full price of water and sewer treatment, whereas a utility that treats its own water and sewage only pays for the cost of water treatment. However, it should be noted that by not owning and operating our own water and sewer treatment facilities, there are also no upgrades or improvements to these facilities coming due.

Of the total APW water and sewer budget of \$500,000, approximately \$350,000 is budgeted as a pass-through to Waynesville. This pass through to Waynesville includes Fire Protection fees of approximately \$40,000 per year. The reason fire protection is included in the Water and Sewer Budget is that the fire protection is included in APW monthly utility bill and also in Waynesville's monthly water and sewer billing to APW. After the pass through payments to Waynesville, our operation and maintenance budget is only around \$150,000. This includes wages and benefits for two crew members, testing, licensing, equipment, billing and postage, as well as the repair and maintenance of the system. Obviously there is very little extra funding to undertake the CIP.

The APWs' water and sewer rate structure has been established and approved by the North Carolina Utility Commission. The rate structure is set up to provide funding for the operation and management of the system by a set base rate applied to all customers regardless of usage. The rate is based on the size of the tap supplying the water and the tap to remove sewer. Our base household rate is \$8.65 for water and \$8.25 for sewer based on ¾ inch diameter water lines and 4" sewer lines. For comparison, the base rate for the Lambuth Inn and the Terrace Hotel are \$437.25 for water and \$369.89 for sewer based on 6 inch lines for water and sewer. In addition to the base rate there is an add-on charge per cubic foot for water and sewer used. This rate is based on the rate that APW pays to the Town of Waynesville plus a markup for water loss and system flushing. The markup on our water and sewer usage is approximately 30% due to our recent water loss of 26% in 2010 and 27% on 2011 plus normal flushing. The usage rate is \$0.0253 for water and \$0.033 per cubic foot for all customers. Financing of our water and sewer upgrades should follow this formula to avoid potential intervention from the NC Utility Commission.

As pointed out in the Preliminary Report on the Municipal Status of Lake Junaluska, under our present municipal structure, the costs for maintaining the infrastructure of the Assembly will fall solely upon the property owners of Lake Junaluska; without assistance from government grants, loans, additional revenue sources or a broader tax base. The arithmetic for financing our CIP under our current rate structure is simple. As stated earlier our operation and maintenance budget is approximately \$150,000 per year, allocating half for water and half for sewer, we have a base rate budget of \$75,000 per year for each. The CIP estimates that we will need to spend approximately \$1,145,000 on water system upgrades over the next ten years, or an average of \$114,500 per year. If this amount is added to our current base of \$75,000, we should plan to budget \$189,500 per year for water operation and management. This represents a 152% increase in our base rate to \$21.80 per month for household connections. Our sewer CIP proposes a ten year layout of \$633,600 or an annual increase from \$75,000 to \$138,360 in our operation and management budget, representing an increase of 85%, bringing our monthly sewer base rate to \$15.26 for household customers. The usage rate applied on top of the base rate would remain the same unless Waynesville increases their rates, which would be passed on to our customers.

Financial and operational information along with other utility benchmarks for NC's municipalities is available on the website of the Environmental Finance Center at the UNC School of Government, [www.efc.unc.edu/ratesdashboard/nc.html](http://www.efc.unc.edu/ratesdashboard/nc.html) . Lake Junaluska is not part of this survey because we are not a municipality. Additional information on benchmarking municipalities' water and sewer related debt can be found through the Local Government commission, specifically at the NC State Treasurer's website at the following address, [www.nctreasurer.com/dsthome/StateAndLocalGov/lgcreport](http://www.nctreasurer.com/dsthome/StateAndLocalGov/lgcreport).

## Current Assets

Trying to establish a value on our system has proven to be a challenge because of our lack of solid information about our systems and our limited research capabilities. However, we have established very conservative and simplified estimates of our physical assets, using federal infrastructure cost standards provided by staff at the Environmental Finance Center at UNC's School of Government. We have based our calculations on our system containing 26 miles of water and sewer pipes, a total of 137,280 feet of pipe each. The value was computed under the assumption that approximately 10% of the system was added each 10 years for the past 100 years, with the average lifespan of the pipe being 100 years. Therefore, the value of pipe placed 100 years ago would be 0, as it has fully depreciated to the end of its expected lifespan, while the value of pipe placed 50 years ago would be worth 50% of its value, since it has depreciated to half of its expected lifespan.

Using this calculation method, the total current "value" of the pipes in our water system in 2012 is \$4,257,080. If one adds to this the value of our water meters, whose estimated value is approximately \$180,000 in 2012, the total value of our water system rises to \$4,437,000.

Our sewer system's value is calculating similarly. The sewer system is approximately the same length as the water system, 26 miles, with a total of 137,280 feet of pipe. Our estimate is that 60% of the pipe is 6 inches in diameter or smaller, while 40% of the pipe is 12 inches in diameter, with the larger pipe costing more per foot than the smaller pipe. Using the same method for calculating age and depreciation as the water system, the total value of our sewer system is estimated at \$6,798,464.

Adding together both the value of the water system and sewer system, you would reach a total current value of \$11,235,543 for the Lake Junaluska water and sewer system, including water meters. This does not include the value of our reservoir or pump stations.

To determine the actual monetary amount that Lake Junaluska has put into the system over the past 100 years, we are using the Construction Index Inflation rates provided by the UNC Environmental Finance Center. In other words, about how much have we actually paid over the years for our water and sewer system? If we use the same assumption that we installed 10% of our system starting in 1912 and going forward added 10% per decade, Lake Junaluska has spent \$2,079,518 over the past 100 years on our water system, including both pipes and water meters. One might ask, "How is our water system worth almost \$4.45 million when we spent about \$2 million on it?" It is a direct result of inflation and rising construction costs. If 10% of the system was built in 1912 - 1922, in this period they are estimated to have only paid around \$10,000 for that segment; building the same amount of pipe today would cost about \$950,000, not including permitting or planning costs, which have risen drastically over the past 100 years.

Using the same calculation method for the sewer system and once again assuming that 60% of

the pipe is of 6 inch diameter or smaller and 40% is of 12 inch diameter, Lake Junaluska is estimated to have spent around \$3,033,488 over the past 100 years on its sewer system. Once you combine these figures, you can estimate that Lake Junaluska has spent an approximate total of \$5,113,006 over the past 100 years on the water and sewer system, including the installation of water meters.

All of these estimates do not include the cost of our reservoir or our pump station. The Liberty Road Pump station was built in 2005 at a cost of \$50,000 and is in very good shape. Our reservoir holds 230,000 gallons and was built in the 1960's. In 2004 the reservoir was inspected and repaired at a cost of \$20,000. The cost to replace the reservoir would be close to one million dollars today and probably cost around \$125,000 in the 1960's. The Tri-Vista sewer lift-station was constructed when the Condominiums were built in the seventies. The 2010 snowstorm severely damaged the lift-station. All of the controls and grinder pumps were replaced in 2011. If built new today, the lift station would cost approximately \$45,000. As stated earlier, the pump station, reservoir and lift station are not included in the CIP because they are not considered to be in need of repair in the next ten years.

One financial positive is that there is currently no debt associated with our water and sewer systems. We do have a line of credit of \$50,000 established for emergency repairs, but at the present time, there is no debt. Staff at the Environmental Finance Center at UNC's School of Government has compiled financial information from all NC utilities. Their Leverage Indicator measures NC utilities' Debt to Equity ratio. This indicator is used by funders and bond rating agencies to evaluate the risk of providing financing to utilities. A utility with a ratio greater than 1.0 has more long term debt than equity in the system's assets. Among North Carolina's 422 utilities included in the survey for 2011, 93% have a ratio lower than .6. There is no statewide average in the information; however, the Assembly would have a ratio of 0.0 which is unheard of. Peer municipalities to Lake Junaluska, of similar size and geographic location, typically have an average long term debt of around \$2,000,000 for water and sewer related expenses. While it might be possible for APW to finance the CIP with long term debt, it would likely require The Lake Junaluska Assembly Board of Directors to leverage Conference Center Property to secure the loan.

## **Summary**

This report and the Water and Sewer Capital Improvement Plan developed by Cavanaugh and Associates, P.A. were intended to provide information that will help us plan for our future and understand more about our water and sewer systems. Lake Junaluska is not yet at a critical crossroad, but our water and sewer infrastructure is aging and will need repairs, upgrades, and replacement to provide safe drinking water and uninterrupted service, as well as efficient and clean sewer collection. To continue operation of our system without putting in place the funding and planning to carry out these projects soon, will surely force painful and expensive decisions before much longer.

There is no evidence that current or previous Assembly utility management has been negligent or irresponsible. Like many other utilities across the country, maintenance has been deferred in an attempt to be prudent. Patches have been made on old lines instead of replacement projects to keep utility rates low. The quality of the engineering and construction in our infrastructure is impressive. As explained in the first paragraph of this report, parts of our infrastructure are simply approaching the end of its life expectancy.

The Water and Sewer Capital Improvement Plan is just the beginning of a long term commitment to rebuild and maintain our system. It should not be viewed as a onetime fix that will forever restore our system. As we move through this ten year cycle we must plan for the next ten years and beyond.

The water and sewer infrastructure are our community's most valuable asset, our most expensive liability, and provides our most vital quality of life service. However it is only one part of our overall strategic planning process. The studies and reports that are being developed for our community must be taken together to responsibly move Lake Junaluska into our next century.