Our Aging Water Infrastructure

The Attributes and Needs of the Water and Wastewater Infrastructure in the Bi-State St. Louis Region

August 2014

MWIPartnership.org
In 2008, Pennsylvania State Public Broadcasting issued its *Liquid Assets* documentary designed to raise public awareness about the nation’s water and wastewater infrastructure. The airing of the Liquid Assets program encouraged the bi-state St. Louis water and wastewater utilities to increase cooperation in outreach to the public. The Illinois American Water Company (IAWC), the City of Kirkwood Water Department (Kirkwood), the Metropolitan St. Louis Sewer District (MSD), Missouri American Water Company (MAWC), and the City of St. Louis Water Division (St. Louis City) came together to discuss education and outreach on the important issues documented in Liquid Assets. The bi-state St. Louis regional water and wastewater utilities recognized the need to encourage community conversations about aging water and wastewater infrastructure in the bi-state St. Louis region.

The Metro Water Infrastructure Partnership (MWI Partnership) was formed in 2009 by the utility member organizations including: IAWC, Kirkwood, MSD, MAWC, and St. Louis City. Later, St. Charles Public Water Supply District No. 2 and Jefferson County Public Water Supply District No. 1 joined the group. Non-utility members of the MWI Partnership include the St. Louis Section of American Society of Civil Engineers (ASCE), the Missouri Section American Water Works Association (MOAWWA), the Missouri Water Environment Association (MWEA), the Illinois Section AWWA (ISAWWA), and the St. Louis Chapter of the Association of General Contractors (AGC).

The purpose of MWI Partnership is to raise awareness about aging water and wastewater infrastructure in the bi-state St. Louis region and to encourage an understanding among consumers and other stakeholders that these assets are vital to the well being and growth potential of the region.

MWI Partnership has completed a number of community-focused activities including the following:

- KETC Channel 9 Screening of Liquid Assets and Open Panel Forum
- Junior Achievement, Kennard Classical Junior Academy and City of Chesterfield Community Leaders, “A Day Without Water” exercise
- Infrastructure educational program and development with Missouri educators from eMINTS
- Representation at the Missouri Public Service Commission Water Symposium
- Presentation at the Regional Commerce and Growth Association, the Saint Louis University/ASCE/MWIP Symposium and other local groups
- Representation at the Missouri State Chamber of Commerce Annual Legislative Action Seminar and Infrastructure Forum
- Representation at the St. Louis County Missouri Legislative Caucus luncheon
- Presentations to water related organizations including: Missouri Section American Water Works Association, Illinois Section American Water Works Association, Water Environment Federation, and National Association of Water Companies

The MWI Partnership commissioned Camp Dresser & McKee Inc. (CDM) to provide this comprehensive report on the attributes and needs of the water and wastewater infrastructure in the bi-state St. Louis region. The report encourages understanding by customers and other stakeholders that water and wastewater assets are vital to the well being and growth potential of the region.

In this report, CDM discusses the characteristics of the utilities, needs within the region, and potential costs to the community. The report emphasizes the benefits of underground infrastructure and the need for its timely replacement. CDM makes the case that providing upkeep through timely replacement is essential to continued public health, public safety, and economic growth.
## Contents

Challenges of an Aging Water Infrastructure ......................................................... 1
   The Importance of Water Infrastructure to the Bi-State St. Louis Region .......... 2
   Regional Water Utilities Deliver Critical Services to the Community .......... 3
   Bi-State St. Louis Region’s Water and Wastewater Systems Show Signs of Aging .... 6
The Need for Infrastructure Replacement .......................................................... 9
   The Nationwide Funding Gap in Water and Wastewater .......................... 10
   Recognizing the True Value of Underground Infrastructure ..................... 11
The Cost of Aging Infrastructure in the Bi-State St. Louis Region .................. 15
   Costs of Water Infrastructure ................................................................. 15
   Costs of Wastewater Infrastructure ....................................................... 16
   Cost to the Bi-State St. Louis Region .................................................... 17
Water Infrastructure is Fundamental to Quality of Life .................................. 18
Bi-State St. Louis Water Utilities’ Contribution to the Regional Economy .......... 19
Fostering Investment in Infrastructure for the Vitality of the Region ............... 21
Our Aging Water Infrastructure

The Attributes and Needs of the Water and Wastewater Infrastructure in the Bi-State St. Louis Region

August 2014

About the Authors

CDM (Camp Dresser & McKee Inc.) is a consulting, engineering, construction, and operations firm delivering exceptional service to public and private clients worldwide. Water issues are the cornerstone of CDM’s business.

Our services include architectural and engineering design, environmental management and planning, transportation, management consulting, information management, and construction. We provide cost-effective, sustainable solutions that meet clients’ technical, financial, socioeconomic, and operational goals.

Primary Author
Nicole A. Young, P.E.
Principal, CDM

Contributing Authors
Terry Jones, Ph.D.
Professor of Political Science
University of Missouri—Saint Louis

Jack Strauss, Ph.D.
Simon Chair of Economics
Director of the Simon Center for Regional Forecasting
Saint Louis University
Challenges of an Aging Water Infrastructure

More than 150 years ago

the bi-state St. Louis region made it a priority to invest in water and wastewater infrastructure in order to provide vital services, critical supplies for fire protection, and as a primary economic driver for the region. In the mid-1800s, the City of St. Louis and East St. Louis developed water systems that were among the best in the nation and allowed for substantial growth. The St. Louis County water system dates from 1904, and the Kirkwood water system dates from 1903. The bi-state St. Louis region benefited from its water resources and infrastructure making St. Louis one of the largest metropolitan areas in the nation early in the 20th century.

Today, MWI Partnership member utilities in the bi-state St. Louis region have approximately 15,000 miles of pipelines taking water to and from more than 500,000 customers, serving a residential population of more than 1.5 million. These regional water and wastewater utilities provide critical services for area businesses, hospitals, schools, and millions of residents.

The bi-state St. Louis region, like many metropolitan areas around the country, faces a challenge with its water and wastewater systems. Water infrastructure consisting of both water mains carrying drinking water to communities, and sewers carrying wastewater from communities are hidden from public view—buried below ground. These water and wastewater mains are long lived assets often lasting 80 to 100 years. Because of their long life, buried infrastructure is not only out of sight, it is out of mind. While not easy to see, the aging of the underground infrastructure is a reality and is becoming a growing challenge. Components of the MWI Partnership utility systems are more than 100 years old and require replacement.

Breaks in pipes on the evening news serve as reminders, overflows into basements cause hardship and property loss for homeowners, and environmental groups demand attention to impacts for waterways. It is important that the bi-state St. Louis community understand the value of the water and wastewater infrastructure and the current needs of the systems in the bi-state St. Louis region.
Aging water infrastructure is an issue, not just in the bi-state St. Louis region, but across the nation. As time progresses, those regions that invest today will be in a better competitive position for economic growth in the future. Putting critical funds towards water infrastructure in the bi-state St. Louis region can benefit the economy now through immediate jobs and make a lasting investment in the future of the community. Water infrastructure is a vital community asset and investments must be made in its upkeep and rehabilitation.

The Importance of Water Infrastructure to the Bi-State St. Louis Region

In 1849, there were two events in St. Louis that made water a top priority for the community. The 1849 cholera epidemic killed nearly one of every ten St. Louisans, and a devastating fire on May 17, 1849 destroyed a significant part of St. Louis. As a result of these events, utilities were created for water and sewer. Over the years, these agencies developed systems that were some of the best in the country.

Metropolitan areas need water for basic human survival and for economic productivity. It is part of the metropolitan heritage: the cities which were the starting core for today’s region almost all began near bodies of water. From the earliest days, communities had to develop systems for obtaining water for household and industrial purposes and then find ways for disposing of the wastewater.

Regional rivers supply an abundance of water to the area providing not only drinking water, but also cooling water for electricity, shipment of goods, recreation, and tourism. It is important to remember that water is a limited resource, which can be exhausted. Metropolitan regions in other areas of the country, such as Las Vegas or Phoenix, confront the realities of water shortages regularly. The United States Geological Survey (USGS) estimates that the Missouri River has been depleted 28% by consumption in western states located upstream of Missouri. The bi-state St. Louis region has a plentiful supply of water which is an important natural resource, but it should not be taken for granted.

The bi-state St. Louis region is served by water systems drawing water from the Missouri, Meramec, and Mississippi Rivers.
According to local water utilities, the average household in St. Louis County uses 84,000 gallons a year, enough to fill more than 7 medium-sized swimming pools. About 70% of this is for indoor purposes such as showers, toilets, faucets, clothes washers, cooking, and food preparation while the remaining 30% is used outdoors. Within the home, the bathroom is the largest component consuming nearly 27% of indoor water usage. Many industrial purposes require millions of gallons daily. For example, every gallon of beer brewed in St. Louis requires 4 gallons of water as an input.

Once used, all the water must flow into sewer systems routing human and other wastes from each building, starting with pipes entering each building, to trunk sewers underneath many major streets, and ultimately to treatment plants. There the water and solids are separated, disinfectants added, and the treated water is returned to be reused downstream. When the system operates well, it is largely invisible. When it fails, odors occur, health can be threatened, and waterways become polluted. Wastewater treatment is essential for protecting the public from waterborne diseases and for protecting the region’s waterways from pollution.

Water is a precious resource, and the water and wastewater infrastructure are foundational elements of the bi-state St. Louis region. Industry and business as we know it, our lifestyles, standard of living, and quality of life could not exist without reliable water and wastewater infrastructure.

### Regional Water Utilities Deliver Critical Services to the Community

Follow a drop of water that goes to and from a home in the bi-state St. Louis region. It is likely that drop of water comes from a river, drawn through a large pump at an intake facility, and treated through various treatment processes at the water treatment plant. After meeting exacting quality standards, the water is then piped and pumped to get that drop of water to a home. After being used—for a drink, to launder clothes, to flush a toilet—it flows out of the house, and is transmitted through sewers and pump stations back across the region to a wastewater treatment facility. The water is treated through various wastewater processes to meet environmental quality standards, and then returned to a river.
Utilities provide vital water and wastewater services to the bi-state St. Louis region. The complex and extensive water and wastewater systems across the bi-state St. Louis region represent billions of dollars in past capital outlay over a century and a half. The underground water infrastructure in the community is vast and generally unseen. The major attributes of the bi-state St. Louis region water and wastewater infrastructure are described below.

**Drinking Water**

Drinking water systems provide a critical public health function and are essential to life, economic development, and growth. Drinking water service in the bi-state St. Louis region is provided by several entities including the MWI Partnership members: St. Louis City Water Department, Missouri American Water, Illinois American Water, and Kirkwood Water. These utilities provide water to nearly 556,000 customers in the bi-state St. Louis region. They also provide fire protection across the region, through thousands of hydrants protecting homes and businesses. The MWI Partnership water utilities maintain:

- 11 water treatment facilities with a total treatment capacity of 907 million gallons of water daily
- 8,400 miles of water mains
- 80 Storage tanks, reservoirs, and water towers
- 92 pump stations
- 136,552 valves
- 58,422 fire hydrants

St. Louis City intake structures near the confluence of the Missouri and Mississippi Rivers. The Chain of Rocks Water Treatment Plant, still in use, originally went into service in 1894.

**CONSIDER...**

There is the same amount of water on Earth today as there was 3 billion years ago.

Only 1% of the Earth’s water is available for human consumption.

Nearly 50% of the world’s population does not have water piped into their homes.

1 in 8 people in the world do not have access to safe water supplies.

1 in 4 people in the world do not have proper sewage treatment systems.

As St. Louis grew and urbanized in the late 1800s and early 1900s, a patchwork of sewer networks was created. Little regional planning occurred as sewer systems were developed by subdivisions and various government entities. This resulted in a sprawling wastewater system built with different standards and operational processes in providing sewer services. In 1954, systems originally owned by subdivisions and local municipalities were consolidated within the Metropolitan St. Louis Sewer District to provide regional systems to better serve the community. Over the years, MSD grew to be one of the largest pipeline systems in the country.

Wastewater service in the St. Louis Region is mainly provided by Metropolitan St. Louis Sewer District. The District provides service to more than 432,000 wastewater customers in St. Louis City and about 80% of St. Louis County. The District maintains:

- 7 treatment facilities processing over 330 million gallons of sewage daily
- 6,650 miles of wastewater sewers
- 2,980 miles of stormwater sewers
- 285 pump stations

Public Water Supply District No. 2 also provides wastewater service to approximately 11,000 homes and business in St. Charles County. The District’s nine wastewater treatment facilities have a combined capacity of one approximately one million gallons per day.

**Bi-State St. Louis Region’s Water and Wastewater Systems Show Signs of Aging**

The bi-state St. Louis region’s water pipes and sewers, some constructed several generations ago, are aging and there is a growing need for replacement of the infrastructure. Unlike a highway, where a driver feels the bump of a pothole, water and sewer pipe deterioration remains hidden. The invisibility of the water infrastructure limits public awareness of this important issue. There are some signs of underground infrastructure failures.
MWI Partnership Utilities – Metropolitan St. Louis Sewer District
Below are a few examples of how aging infrastructure can affect communities:

• In January 2014, the cold weather front referred to as “the polar vortex” caused an uptick in water main breaks across the region. The breaks interrupted water service, obstructed traffic and, in some cases, caused property damage. Crews worked around the clock, in frigid conditions, to restore water service to customers.

• In April 2013, a 42-inch diameter stormwater pipe collapsed on Hanley Road near the Manchester Road intersection. Repair crews responded quickly to repair the damage. Approximately 40,000 drivers use Hanley Road each day.

• In July 2013, a water main break on Broadway Street in Alton, Illinois closed a portion of the street and led to the issuance of a boil water advisory.

While these events make the evening news, their impacts are short lived and usually affect only the customers in a given area. Most community members are unaffected and take for granted the vast network of underground water infrastructure. Faucets continue to deliver fresh, clean, safe water whenever the tap is turned on. Wastewater disappears whenever toilets are flushed. Unlike roads and bridges, water assets are buried and remain “out of sight, out of mind.”

The bi-state St. Louis water utilities provide a valuable public service in keeping the infrastructure functioning for the community. Water and wastewater utilities in the bi-state St. Louis region, already at work with infrastructure replacement programs, continue to provide quality water and quality customer service. The water and wastewater systems are important for the standard of living, quality of life, sustainable economic vitality, and facilitation of economic growth in the region. The issue today is whether the rate of infrastructure replacement is adequate to maintain those standards.
The Need for Infrastructure Replacement

Utilities today are working to replace aging pipelines, while providing high quality service to their customers. Water pipes, sewage treatment plants, and reservoirs can age and deteriorate with some components having short lives of as little as 15 years and other components lasting nearly 100 years. The list on the right outlines the life expectancy of various infrastructure components compared to the average age of infrastructure in the bi-state St. Louis region.

In comparing the age of bi-state St. Louis regional water and wastewater systems to the expected lifetime, it is clear that the average age of these system components is quickly approaching the expected lifetime of those components. This means that nearly half of the bi-state St. Louis regional system has exceeded its expected life, and should be considered for replacement.

An example of the growing need for infrastructure replacement can be seen when looking at the rate of replacement of water mains. While the expected life of pipelines vary as a function of a number of factors such as material type and soil conditions, it is generally accepted in the industry that water main replacements should be completed on average at a rate of approximately 1% per year to avoid increased levels of system failures due to age. CDM estimates that the bi-state St. Louis region is currently replacing between 0.4% and 0.7% of the existing water mains on an annual basis. As time goes on, if the rate of replacement does not increase, the amount of infrastructure past its projected useful life increases.

In the bi-state St. Louis region and across the country, aging of infrastructure is happening throughout water and wastewater systems. Components ranging from pipelines to treatment plants are aging and in need of planned replacement. The needed infrastructure replacement requires ongoing investments which can be costly for utilities. The increases in costs create challenges for utilities, which must balance investments in the systems with affordability of rates for the community. When the need for infrastructure replacement is not balanced with investments because of concern over rates or the inability to raise capital, a funding “gap” is created.
The Nationwide Funding Gap in Water and Wastewater

The bi-state St. Louis region is not alone in the issues it faces with aging infrastructure. Metropolitan areas across the country are facing similar issues with pipelines and facilities nearing the end of their useful lives. In 2008, Penn State Public Broadcasting released a national documentary called “Liquid Assets: The Story of Our Water Infrastructure” focusing on the aging national water infrastructure systems. The documentary highlighted many cities across the nation including Atlanta, Ga.; Boston, Mass.; Los Angeles, Calif.; Milwaukee, Wis.; Philadelphia and Pittsburgh, Penn.; and Washington D.C.

- The United States Environmental Protection Agency (USEPA) estimates that nationally, almost $384.2 billion of additional investment in drinking water systems will be needed over the next 20 years to continue to deliver safe drinking water to the nation’s homes and industries. In Missouri alone, approximately $8.4 billion is needed. More than $255 billion of wastewater system investment is required, based on a comparable EPA study. The USEPA projects that for most communities replacement needs will increase steadily through the year 2035. In its original needs

ESTIMATED 5-YEAR FUNDING REQUIREMENTS FOR DRINKING WATER AND WASTEWATER

**Total Investment Needs**

$255 BILLION

**PROJECTED SHORTFALL**

$108.6 BILLION

**ESTIMATED SPENDING**

$146.4 BILLION

Source: American Society of Civil Engineers; Report Card for America’s Infrastructure, 2009

MYTH #3: Out of sight out of mind

Water and wastewater systems may seem to be invisible, but they are essential for public health, safety and economic growth.
A study in 2002, EPA found that the infrastructure funding gap “largely disappears if municipalities increase clean water and drinking water spending at a real growth of three percent per year”

- The ASCE 2013 Report Card for America’s Infrastructure determined that drinking water and wastewater infrastructure earned a grade of D. ASCE estimated multi-billion dollar annual funding shortfalls. These funds are needed to replace aging facilities and to comply with current federal regulations. The shortfall does not account for any growth or changes in regulations.

The national shortfalls in water infrastructure funding will be a challenge in difficult economic conditions. Utilities face more requirements and less revenue to accomplish the needed investments. Nationally, communities have delayed paying the long-term replacement costs of the system. Continuing to underfund replacement will require a catch-up effort across the nation.

### Recognizing the True Value of Underground Infrastructure

The infrastructure gap is a relatively new problem for utilities. The vast majority of water mains and wastewater sewers were constructed and funded by local municipalities or developers and then handed over to local utilities. Because of those “donated assets” in the past, neither water nor wastewater utility rates today reflect the true cost of water and wastewater.

As the utilities developed rates for upkeep of the systems, traditionally the cost of replacement was not included for assets that the utility did not originally fund. The utilities are now faced with the task of replacing this aging infrastructure. So while the first generation of buried pipes may have been donated in full or in part, the second generation will require new utility investments. And while the rate of investment must be balanced against household utility rates, that balance needs to shift upward to pay a little more each month to upgrade water systems to ensure long-term viability of water and wastewater systems.

In 2010, the ITT Corporation performed a nationwide telephone survey. Among the findings:

- **69%** of voters agreed that they generally take their access to clean water for granted.
- **72%** of businesses agreed.

<table>
<thead>
<tr>
<th>Percentage Agree</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>69%</td>
<td>Voters agree they generally take their access to clean water for granted.</td>
</tr>
<tr>
<td>72%</td>
<td>Businesses agree.</td>
</tr>
</tbody>
</table>

An increase of only 11% by 63% of American households alone would lead to increased investment in our nation’s water infrastructure by more than $5 billion per year.

**TWO-THIRDS OF AMERICAN VOTERS ARE WILLING TO PAY AN AVERAGE OF $6.20 MORE PER MONTH**

- **$6.20** average amount voters are willing to pay more per month.
- **11%** average percentage increase over current water bill.

Of the 57% of industrial and agricultural businesses willing to pay more now, the average acceptable increase is 7%.

*2010 U.S. Census Bureau Projections: 114,200,000 U.S. Households

Source: ITT Corporation, Value of Water Survey, 2010
poll for their Value of Water Survey. This study found that voters ranked water as the most important service provided by utilities. Yet, across the nation, water and wastewater resources are undervalued. Consider that we are willing to pay 8,000 times more for coffee than for tap water; we are willing to pay a dollar for a 16-ounce bottle of prepackaged water and less than a penny for the same amount of tap water. Compared to other utilities and optional services, the average household pays more for cell phone, cable, and energy than for water or sewer service. The cost differential coupled with the “out of sight, out of mind” concept continues to promote the devaluation of our most important asset.

Nevertheless, it appears that many Americans know our water infrastructure is aging, and recognize its importance. National studies show there is public support for water issues:

• The 2010 ITT Corporation nationwide poll for their Value of Water Survey found that 69% of voters and 72% of businesses agree that they take their access to clean water for granted. More than 80% of voters and businesses agreed that government money should be invested to upgrade water systems. A surprising 63% of voters and 57% of busi-

THE MAJORITY OF BOTH VOTERS AND BUSINESSES ARE WILLING TO PAY MORE

<table>
<thead>
<tr>
<th>VOTERS</th>
<th>63%</th>
<th>Willing to pay a little more each month in water bill to upgrade our water system to ensure long-term access to clean water</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSINESS</td>
<td>57%</td>
<td>Willing to pay a little more each month in water bill to upgrade our water system to ensure long-term access to clean water</td>
</tr>
</tbody>
</table>

Source: ITT Corporation, Value of Water Survey, 2010

Price Comparison:

How the monthly price of residential water stacks up to other utilities

<table>
<thead>
<tr>
<th>Utility</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric</td>
<td>$50</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$65</td>
</tr>
<tr>
<td>Sewer</td>
<td>$28</td>
</tr>
<tr>
<td>Water</td>
<td>$37</td>
</tr>
<tr>
<td>Cable TV</td>
<td>$75</td>
</tr>
<tr>
<td>Phone</td>
<td>$50</td>
</tr>
</tbody>
</table>

Note: monthly utility prices are typical national averages for residential users.
A March 2009 Gallup Poll of a national sample found that 49% of Americans “worry a great deal” about water issues including pollution of drinking water, pollution of rivers/lakes/reservoirs, and maintenance of the nation’s supply of fresh water for household needs.

- A 15-country public opinion survey in 2009 conducted for the Circle of Blue, a nonprofit water resource network that publishes WaterNews, also finds that water is high among citizen concerns. Across all the countries, water pollution and fresh water shortages finished first and second, respectively, as being “very serious” among a list of seven environmental issues.

A local survey mirrors these national results. According to a recent survey by the MWI Partnership, residents of the bi-state St. Louis region recognize the challenges of aging water and wastewater systems. They also understand the importance of water and wastewater infrastructure and the value they receive for the rates they pay.

The 2011 survey conducted by the ETC institute revealed that...
the challenges are well understood

- 65% of the respondents thought aging water and wastewater infrastructure in the bi-state St. Louis region will become a problem over the next five to ten years
- 79% of the respondents surveyed felt it was either very important or important that investments are made to improve water mains and sewer pipes in the region
- 59% believe it will cost billions of dollars to upgrade the region's water and wastewater systems.

The survey data also confirmed that most residents believe that water and wastewater service is a good value.

- 62% thought they “got a good value” for their rates they pay for water and wastewater services
- Survey respondents recognized that water and wastewater were their lowest monthly utility bills, compared to electricity, natural gas, cable/satellite and phone. They rated electricity, water, natural gas and wastewater as the most important among these utilities
- However, in response to the question, “Would you be willing to pay a slight increase in your water and sewer bill to help fund improvements to the region’s aging water and wastewater infrastructure,” only 39% answered yes. Among the respondents, 44% answered no and 16% said they did not know.

Capturing the true value of water and wastewater infrastructure in rates will cause rates to increase over the coming years. Water infrastructure improvements can be costly, and continuing replacement programs will require ongoing increases in rates. While rate increases may not be popular among customers, the failure to keep pace with needs can threaten service quality and reliability. A reliable water and wastewater infrastructure is a valuable asset to communities.
Our Aging Water Infrastructure | 15

The Cost of Aging Infrastructure in the Bi-State St. Louis Region

Like most metropolitan areas in the United States, the bi-state St. Louis region is in need of replacing its aging water and wastewater infrastructure. If utilities do not have the funding and resources to replace our aging infrastructure, interruptions in utility service will increase, and there will be a quality of life cost to the community.

Water main breaks in Kirkwood, Missouri alone have increased 500% over the past three decades causing increased operating costs. In the 1980s, Kirkwood had an average of 28 breaks a year, now they have 150 breaks per year. As the bi-state St. Louis regional water infrastructure continues to reach obsolescence at an increasing rate, investment in the funding for replacement must also increase.

Costs of Water Infrastructure

As noted earlier, utilities in the bi-state St. Louis region are currently replacing pipelines at an average annual rate of just over a half percent of the 7611 miles. General industry standards suggest a 1% replacement is needed based on a nominal 100 year life span of buried pipes. To achieve that recommended rate, an additional 34 miles of pipe replacement per year is required. At a cost of $1 million per mile, this represents an investment of $34 million or $62 per customer per year. Over the next twenty years, $1240 per customer would be spent for a total of $680 million.

This $34 million yearly investment would require added revenue of $4.1 million per year every year. Water utilities would need $4.1 million in year one, $8.2 million in year two, $12.3 million in year three and so on. An average $30 per month residential water bill today would grow to $36 per month in ten years and $42 per month in twenty years -- just due to the additional 34 miles of pipes replaced.

This growth in water bills reflects only the cost of needed pipeline replacements. The costs of operating a water utility, from power costs to laboratory costs, will tend to increase over time. Additionally, system improvements, needed from time to time, can include the upgrade and replacement of water treatment facilities. These upgrades have been an ongoing part of water
utility costs. For example, after the Great Flood of 1993, century old water treatment plants that had been damaged by the flood were re-built and significant investments in new flood protection were added. These other investments, which have been and will continue to be a part of the water utility needs, put further pressure on rates.

To think of it in terms of total impact, funding the infrastructure gap of $34 million per year will increase water bills that are already going up by some estimates at a rate of 5% per year. Taken together, the average monthly household water bill will likely exceed $80 in the next fifteen to twenty years.

**Costs of Wastewater Infrastructure**

The Metropolitan St. Louis Sewer District has implemented a $4.7 billion Capital Improvement and Replacement Plan to be implemented over the next 20 to 30 years, not including potential for future regulations.

Due to state and federal regulatory issues, the Metropolitan St. Louis Sewer District requires specific cost needs at their wastewater treatment facilities to protect the environment. These costs are included in the capital improvement plan that the District has already begun. As with water treatment plants, there may be additional investments that will be needed from time to time to replace and upgrade wastewater treatment facilities.

The Metropolitan St. Louis Sewer District estimates that today’s average single family residential wastewater bill of $31.34 per month will easily exceed $80 per month within the next 10 to 15 years.
Cost to the Bi-State St. Louis Region

Based on miles of existing water main in the bi-state St. Louis region and needed additional replacement rates, CDM estimates a $680 million total gap for drinking water main replacement alone. An estimated $4.7 billion is needed for wastewater system improvements over the next 20 to 30 years. In the case of wastewater, this includes infrastructure replacement as well as upgrades at treatment plants to meet increased environmental standards. Current levels of investment will need to increase to meet this need for infrastructure replacement.

The median annual household income in the bi-state St. Louis region is $53,189, as reported on the St. Louis East-West Gateway Organization’s website. Currently, the average water and wastewater spend together represents about 1.4% of the household income. Under the premise of water and wastewater bills increasing to $80 each in fifteen to twenty years and incomes rising by 3% per year, the ratio of water and wastewater bill spend to income will increase to 2.3%.

The story in the bi-state St. Louis region is comparable to our national situation. A Black & Veatch study of the 50 Largest Cities Water/Wastewater Rates found that typical bills for a residential user have increased at a rate of over twice the consumer price index, as defined by the Bureau of Labor Statistics since 2001. According to Black & Veatch, one of the key factors driving up typical bills is aging infrastructure.
Water Infrastructure is Fundamental to Quality of Life

As a national issue, the report *Infrastructure 2010: Investment Imperative* warns that further delay in infrastructure spending risks impeding sustained economic recovery and means losing additional ground to countries in Asia and the European Union. These nations continue to implement long-range programs to integrate infrastructure into national spending plans. Despite coping with recessionary fallout, they can front-load stimulus spending on national and regional infrastructure initiatives already underway, while the US, including the bi-state St. Louis region, is at risk of losing ground internationally.

Simply put, water is necessary to survive as well as prosper. Consider the water that goes into everything from growing food, to many manufacturing processes, electrical production, and most businesses that sell goods or services. Communities that do not invest in water now will struggle to gain traction without the critical infrastructure investments that are necessary to ensure future economic growth, support industry, and job growth.

Locally, in the bi-state St. Louis region, a renewed focus on water is imperative. Water is an essential service and the bi-state St. Louis region must and does compete with other metropolitan areas to provide quality water and sewer services at reasonable costs. The bi-state St. Louis region has an ability to draw people and businesses to the area based on the availability of high quality water and wastewater services.

“How do you put a dollar value on a child not getting sick, or put a dollar value on someone not coming down with a disease, because of poor sanitation in terms of drinking water or wastewater?”

— Lance LeComb, Metropolitan St. Louis Sewer District
Bi-State St. Louis Water Utilities’ Contribution to the Regional Economy

Increased investment in infrastructure carries an inherent rate increase burden. It also presents an opportunity to create much needed jobs in the area, while making a lasting investment in the future of the community. The employment and economic impact of the water and wastewater utilities is considerable.

- The utilities annually employ over 2,000 individuals
- Combined spending averages $182 million per year on local vendor supply purchases; and
- Average spending on maintenance and construction of water and wastewater facilities totals $265 million.

Additionally, this impact is projected to rise in the future as additional maintenance spending and construction is budgeted. All of these activities by the utilities have substantial positive economic effects that can be quantified.

Jack Strauss, the Simon Chair of Economics and Director of the Simon Center for Regional Forecasting for Saint Louis University, provided a financial model to determine the beneficial effects of the water and wastewater utilities in the bi-state St. Louis region. For the purposes of this evaluation, a model was used to quantify the positive economic impacts. The U.S. government’s Bureau of Economic Analysis (BEA) model was used, as its model can be specifically designed to demonstrate the effects of utilities in the bi-state St. Louis region on employment and income. The economic impact is summarized as follows:

- Supplier purchases and maintenance/construction contribute overall to 13,250 jobs in the bi-state St. Louis region.
- Spending on payroll, local vendors and maintenance/construction lead to more than $1.3 billion in income and spending annually to the community.
- The economic impact of construction and maintenance needed over the next 5 years, coupled with utility employee payroll and vendor purchases, will lead to more than $8 billion in income to the bi-state St. Louis region.
- Failure to obtain appropriate rates or fee increases will not only limit the direct employment of utility workers and local supplier purchases, but also severely constrain maintenance and construction spending as well as overall employment in the bi-state St. Louis region. If lower rate increases over the next 5 years tend to reduce planned water and wastewater, maintenance and construction investment, the economic impact could exceed a billion dollars in economic spillover effects including job loss.
• The economic impacts of the water and wastewater utilities in this region are extensive not only because of the more than 2,000 workers they directly employ, but also due to the very large maintenance and construction projects and considerable local vendor purchases. These impacts have multiplier effects throughout the bi-state St. Louis region. Every million dollars the utilities invest in construction generates nearly 20 jobs and $2.3 million in income to the bi-state St. Louis region. Since the projected spending over the next 5 years in maintenance/construction alone is $1.4 billion, this is projected to generate nearly $4 billion in spending to the community and the additional employment of 4,770 jobs.

• Additionally, local water and wastewater utilities support a large number of independent contractors who supply needed equipment and labor in the area. The annual spending on local vendors/supplier purchases averages $182 million. Over the next 5 years, assuming 2.5% annual inflation, the vendor purchases contribution to the community will have an impact exceeding $2.6 billion and generate 3,360 jobs.

• Water and wastewater utilities also directly employ approximately 2,100 persons per year with an annual payroll that exceeds $103 million. This employment has an additional multiplier effect of 2.4 and thus leads to 4,815 jobs annually and an impact of $240 million annually. Over the next 5 years, the employment payroll will contribute nearly $1.5 billion to the bi-state St. Louis region.

In sum, the cumulative economic impact of water and wastewater utilities on the bi-state St. Louis region area will exceed $8 billion dollars over the next 5 years and lead to over 13,000 jobs.
Fostering Investment in Infrastructure for the Vitality of the Region

Ultimately, the solution to aging infrastructure is to increase the rate of replacement, which will require increases in rates. The challenge of aging infrastructure can continue to be met with the support of the bi-state St. Louis region. The bi-state St. Louis region cannot move through the 21st century and ensure the standard of living on infrastructure systems planned and built during the mid-20th century and earlier. Maintaining the reliability of the infrastructure requires an increase in public conversation about the growing need, and support for higher rates required by this need.

Water and wastewater utilities are and will be asking the support of the bi-state St. Louis community through increases in rates. The investment in replacement of aging infrastructure is critical to fostering the vitality of the bi-state St. Louis region. The bi-state St. Louis water utilities provide a valuable public service in keeping the infrastructure functioning for the community. The water and wastewater systems are important for the standard of living, quality of life, sustaining economic vitality, and facilitating economic growth in the region.

Through the MWI Partnership, water and wastewater utilities are reaching out to communities on the issues of aging infrastructure. Customer recognition of the true value of water and wastewater services and their support for increased rates is critical to replacing aging infrastructure for the health and prosperity of the region. A wealth of information is available at mwipartnership.org and the websites of member utilities.
Sources of Information

American Water Works Association, Reinvesting in Drinking Water Infrastructure: Dawn of the Replacement Era, May 2001. AWWA estimated that, on average, the replacement cost value of water mains is about $6,300 per household in today’s dollars. If water treatment plants, pumps, etc., are included, the replacement cost value rises to just under $10,000 per household, on average.

American Society of Civil Engineers, Report Card for America’s Infrastructure, 2013. According to the American Society of Civil Engineers (ASCE) 2009 Report Card for America’s Infrastructure, our nation’s drinking water and wastewater systems require a $255 billion dollar investment over the next five years. ASCE estimates that only $146 billion is scheduled to be spent, creating a $109 billion shortfall.

Black & Veatch, 50 Largest Cities Water/Wastewater Rate Survey, 2012-2013. The study found that typical bills for a residential user have increased at a rate of over twice the consumer price index, as defined by the Bureau of Labor Statistics since 2001. According to Black & Veatch, one of the key factors driving typical bills up is aging infrastructure.

Environmental Protection Agency, The Clean Water and Drinking Water Infrastructure Gap Analysis, September 2002. EPA’s gap analysis estimates a $120 billion dollar gap over 20-years to replace existing wastewater infrastructure systems and to build new ones. The analysis estimated a potential 20-year funding gap for drinking water capital, and operations and maintenance, ranging from $45 billion to $263 billion, depending on spending levels.


Environmental Protection Agency, Office of Water, Drinking Water Infrastructure Needs Survey: Fifth Report to Congress, EPA 816-R-09-001, April, 2013. The EPA is required to provide a needs survey and assessment on drinking water to Congress every four years. In 2009, the EPA released its fourth Drinking Water Infrastructure Needs Survey and Assessment based on data collected in 2007. The survey found that the total nationwide infrastructure need is $384.2 billion over a 20-year period.

ETC Infrastructure Survey 2011. A survey of customers in St. Louis City and St. Louis, Madison and St’ Clair counties reported that 79% of respondents felt it was very important or important that investments are made to improve water mains and sewer pipes in the region.

ITT Corporation, Value of Water Survey, 2010. A nationwide poll that included registered voters and industrial and agricultural businesses, and measures how the public values water and their level of awareness of the nation’s aging water infrastructure. The results show that a majority of the American public desires reform and is willing to pay more now to ensure that they have access to clean water in the generations to come.

Michigan State University, Institute of Public Utilities Regulatory Research And Education, Trends In Consumer Prices (CPI) for Utilities Through 2010, Janice A. Beecher, Ph.D., February 2011. Trending in consumer prices for utilities showing water rates increasing at 5% per year.

Missouri Department of Natural Resources, The State of Missouri’s Environment, 2009. Provides a statewide focus on water issues including: drinking water sources, monitoring of water quality, and protecting water sources. The report states that one of the biggest obstacles to clean rivers and streams and safe drinking water in Missouri is simply a lack of funding for maintaining and updating wastewater and drinking water treatment facilities.


Urban Land Institute and Ernst & Young, Infrastructure 2010: Investment Imperative, 2010. A report focusing attention on the need for infrastructure for America to remain competitive in the global environment. Perhaps no other infrastructure category presents the United States with greater challenges than water.
Bi-State St. Louis Water and Wastewater Utility Contact Information

City of St. Louis Water Division
Dept. of Public Utilities
1640 S. Kingshighway
St. Louis, MO 63110
Customer Service: 314-771-2255
Website: stlwater.com

Illinois American Water
300 North Water Works Drive
Belleville, IL 62223
Customer Service: 800-422-2782
Email: infoil@amwater.com
Website: illinoisamwater.com

Kirkwood Water
139 S. Kirkwood Road
Kirkwood, MO 63122
Customer Service: 314-822-5843
Email: kwdutil@kirkwoodmo.org
Website: kirkwoodmo.org

Metropolitan St. Louis Sewer District
2350 Market Street
St. Louis, MO 63103
Customer Service: 314-768-6260
Email: CustomerSvc@stlmsd.com
Website: stlmsd.com

Missouri American Water
727 Craig Road
St. Louis, MO 63141
Customer Service: 866-430-0820
Email: infomo@amwater.com
Website: missouriamwater.com

Public Water Supply District No. 2
100 Water Drive
O’Fallon, MO 63368
Customer Service: 636-561-3737
Email: info@waterdistrict2.com
Website: www.waterdistrict2.com

Public Water Supply District #1, Jefferson County
2970 Schnieder Dr.
PO Box 646
Arnold, MO 63010
Customer Service: 636-296-0659
Email: dsimpson@pwsd1jeffco.org